

Identifying opportunities to strengthen school food environments in the Pacific: a case study in Samoa

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Abstract

Background Despite global recommendations to prioritise policies that create healthy environments within education institutions, the implementation of effective healthy school food policies has proved challenging for many countries. This study examined the experience of Samoa in introducing a stronger policy to improve the healthiness of school food environments. Our aim was to identify opportunities to strengthen school food policy implementation in Samoa and other comparable contexts.

Methods We used a qualitative case study approach, underpinned by policy science theory. We conducted in-depth semi-structured interviews with 30 informants, coupled with analysis of relevant documents, to generate a detailed understanding of the relevant policy implementation processes in Samoa, and the perspectives and capacities of key implementation actors. Data collection and analysis were guided by the Health Policy Analysis Triangle supplemented by other policy theories relevant to policy process.

Results Samoa's school food policy operationalizes international 'best practice' recommendations for school food policy, and provides insights into the outcomes resulting from high level political commitment. We found health policymakers and leaders in Samoa to be strongly committed to improving school food environments. Despite this, compliance to the school food policy had continued to face challenges. Key issues that negatively impacted on the policy's effectiveness were the broader food environment in which schools were surrounded by unhealthy options, the lack of priority by stakeholders outside of health, and the high degree of agency exercised by actors in and around the school. We noted several opportunities for policies to be effectively implemented and sustained. Respondents identified community level leaders as potentially pivotal stakeholders, particularly in a context where school governance draws heavily on community representation.

Conclusions The re-engagement of political and community leaders to identify the institutional and operational changes required, including a fully-enforceable accountability mechanism, may be needed to improve and embed effectiveness.

Background

Noncommunicable diseases (NCDs) are the main contributor to mortality and morbidity globally (1). The prevention of NCDs is a key target of the Sustainable Development Goals due to the impact of NCDs on population health, livelihoods and national economies (2). Childhood overweight and obesity are major risk factors for the development of diet-related NCDs, and increasing global prevalence is therefore of concern to policymakers (3, 4).

Schools are a setting where children's dietary behaviours can be influenced during a formative period (5, 6). As a result, school food policies are critical components of comprehensive action for NCD prevention (3). The World Health Organization recommends that countries prioritise

policies that create nutrition-promoting environments within education institutions (7), including by offering health promoting schools programs, mainstreaming nutrition curriculum, and by setting healthy food standards (6). Schools are already tightly regulated by governments, and as such should be straightforward targets for regulation (8). In some settings, school food standards contribute to food security, stimulating local food production and the local economy (8), and the public procurement of food is increasingly viewed as an opportunity to promote policy coherence (9, 10).

However, evidence from both high-income (11-13) and low income (14-16) countries in the Western Pacific Region suggests that implementing and maintaining compliance with school food standards has proved difficult. Reasons include the lack of emphasis placed on the school food environment by administrators and the broader school community, and the absence of effective enforcement mechanisms (17, 18) . The relative expense of healthy food, and a perceived lack of financial viability for implementing school nutrition standards, are frequently reported as barriers to the implementation of school food policies (19-21). The lack of understanding of healthy food provision and school food standards, and absence of the requisite knowledge and skills to execute them is common among school-based vendors (15, 17, 18, 20, 22, 23). Additionally, the multisectoral nature of food policies can often lead to dispersed implementation and governance arrangements (24, 25). Complicating factors for school food policy making in developing country contexts include that schools are situated within highly complex, and often largely unregulated, food environments (26-29), that typically include informal food vendors surrounding schools and selling predominately unhealthy food and non-alcoholic beverages (15, 26, 29-31). The influence of informal vendors is compounded because children in lower socioeconomic settings are more likely to walk to school (32-35), thereby increasing their exposure to unhealthy alternatives.

Faced with these challenges, the Government of Samoa has demonstrated a strong commitment to improving the diet of the Samoan population in an effort to address diet-related NCDs (36, 37). Samoa experienced rapid increases in the prevalence in overweight and obesity in children (38). A government-led review found that the most children in Samoa did not bring food or drinks to school from home, and were fully reliant on vendors in and around the school, largely selling '*foods high in fat, salt and sugar and contain few nutrients (page 7)*' (39). In response to this, health leaders led a 2007 reform process resulting in new School Nutrition

Standards ('the Standards'). Policy leaders engaged parliamentarians to promote the policy, and invested significant financial and human resources towards its adoption and implementation (40).

The World Health Organization's Commission for Ending Childhood Obesity calls on researchers to address knowledge gaps with regard to policy implementation (41).

Implementation is the continual process to carry out activities that are aligned to a policy's objectives. It is shaped by diverse contexts (42-44), and led by a community of actors with varying priorities, capacities and resources (24, 45, 46). Conflict between policy enactment and implementation often relates to a divide between government agents delegating responsibility for implementation to agents over whom they have 'indirect' and 'incomplete' control (41). While there is some evidence of barriers to operationalizing healthy food policies in a school setting, the vast majority of this literature is from high-income settings, with less utility to lower or middle-income settings. This is particularly the case in the Western Pacific Region, where over 68% of countries have enacted nutrition policies for schools (47).

This study examined the experience of Samoa in introducing an overarching healthy school food environment policy, to identify lessons to inform global action to improve school food environments. Our focus throughout this study was on identifying opportunities to strengthen the policy implementation process in Samoa and other comparable contexts.

Methods

2.1. Study Design

We adopted a qualitative case-study approach, which is well suited to solution-oriented, contextual enquiry around a complex problem (48). All aspects of the study were underpinned by policy theory, to enhance rigour and generalizability. The Consolidated Criteria for Reporting Qualitative Research (COREQ) was applied to enhance transparency (49).

2.2. Theoretical frameworks

The Health Policy Analysis Triangle (HPAT) was adopted as the overarching framework for study design and analysis. It is deemed appropriate for health policy analysis (50), and has been applied in similar

nutrition policy research (14, 15, 51, 52). The four constructs of the HPAT (Actors, Context, Processes and Contents) prompt investigation into how different aspects of the policy context affect the way in which a policy is developed and disseminated (50, 53, 54), the way individual and groups of actors interacted with the process of policy-making and implementation (41, 46, 55-58), and the development and interpretation of policy contents. In order to match the aims of the study, 'Outcomes' was added to the HPAT framework as an additional construct. Policy analysis is thought to be strengthened by the interlacing of various policy frameworks (59), and so we supplemented these constructs with policy theory to seek and gain a more in-depth understanding of potential influences to the policy implementation process, culminating in the adoption of 26 specific codes (Table 1). We therefore also drew on theories of policy learning to generate lessons from Samoa that are applicable to other settings (60, 61).

Table 1: Summary of theoretical domains adopted for data collection and analysis

Contextual factors	Policy Content	Policy Process	Actors	Outcomes
<ul style="list-style-type: none"> · Political · Environmental · Cultural · Institutional structures and mandates · Resources 	<ul style="list-style-type: none"> · Clearly constructed · Specificity · Evidence-based change outcome · Acknowledges risks, addresses risks · Enforceable within mandate 	<ul style="list-style-type: none"> · Planning · Resources · Communication · Coordination · Monitoring · Incentives · Enforcement 	<ul style="list-style-type: none"> · Roles of actors § Institutions § Government policymakers & officers § Implementing agents (school leaders, vendors) · Actors exercising agency · Motivation (interests, incentives) · Capacity (resources, cognition) 	<ul style="list-style-type: none"> · Government generated reports · Foods available in schools · Perceived healthfulness of foods in schools · Types of foods perceived as healthy · Sense of priority

2.3. Interview participants

In July 2017 the lead author and in-country collaborators conducted in-depth key informant interviews with 30 stakeholders at urban and rural locations across Upolu, the most populous of seven islands in Samoa. Interview participants included senior policymakers (5), policy officers (8), school principals (9), school-based food vendors (6), a representative from a public health organization (1) and a leading health politician (1). Informants were initially selected in consultation with the Ministry of Health (MOH) and Ministry of Education, Sports and Culture (MESC) as being relevant to the school food policy process. Snowball sampling was used to identify additional key informants viewed as relevant to the school food policymaking process across two ministries. School-level informants were selected in collaboration with MESC by nominating two urban and two rural settings on Upolu, and visiting schools in that area viewed by MESC as variable in compliance. One school was visited opportunistically as an example of a 'compliant' school in the area.

The researcher conducting the interviews was known to many health informants as a former public health policy advisor with a strong understanding of the policy context. Local researchers were selected from each MOH and MESC to maintain engagement in the research process and promote ownership of results. To minimise the potential influence of these relationships on informant expression, it was important to make clear that: a) the purpose of the research was to construct an understanding of process (and not evaluate it); b) interviews would be confidential and deidentified; and c) that there were no consequences for non-participation. All interview participants provided informed consent.

2.4. Interviews

Interview schedules were based on the selected theoretical domains outlined in Table 1. Questions were asked about the policy process based on the policy cycle (61)(development, implementation, monitoring, evaluation), policy context (political, cultural, socioeconomic, environmental), influences over the role and actions of different actors (capacity, knowledge, motivation) and actor agency (compliance and incentives). Participant perspectives on barriers and enablers to implementation were sought with regard to each of these factors.

Interviews were semi-structured, and modified based on the informant, with prompts used to provide further context or illicit different information. Interviews ranged from 10 to 50 minutes, depending on the richness of the information being provided and the relevance of the participant to the process. For

example, in general, school-based food vendors were asked to report a 'bottom-up' perspective, and not about 'top-down' issues such as policy development, the roles of policy leaders, government resources or national accountability frameworks. Most interviews were conducted in English apart from two, where the interview was translated into English by coresearchers. Interviews were recorded and transcribed, and field notes maintained. Verification occurred throughout the interviews, as well as by sending transcripts all participants providing an email address (around 14, all policymakers). Results were also submitted to co-researchers in two government ministries.

2.5. Document review

Coresearchers and key informants within MOH and MESC provided relevant documents that could inform the aims of the study, offering a basis for triangulating data. In total, 16 documents were analysed, including strategy and policy frameworks (4), a report of the 2007 consultation review process, the School Nutrition Standards Guide, a workplan for Parliamentarians, Health Promoting Schools (HPS) committee meeting minutes (2), Minimum Service Standards for schools, school health monitoring reports and data collection and data entry forms. The compliance rate underpinning policy outcomes was from Ministry-generated biannual reports, based on data collected during biannual compliance visits.

2.6. Coding and Analysis

Using NVivo, we coded document and interview data against the policy domains from the theoretical frameworks. Findings against each code were documented in full, and we returned to this comprehensive document throughout the analysis. We also applied a lens which sought opportunities with regards to the research aims, that is, how policy actors might best engage in policy barriers.

Results

A summary of the key findings, grouped by the domains of the theoretical framework, is outlined in Table 2. These are presented in the sections below under three broad categories: enablers for the policy process, policy challenges, and participant suggestions to strengthen the policy. This is preceded by an overview of the relevant school food policy that applies in Samoa.

3.1 Overview of the Samoan School Food Policy Context

The Standards listed a number of commitments towards achieving their goal, including that all meals are served with vegetables and lean meat, that fruit is always available, that sandwiches and rolls include vegetables, and that food is not deep-fried. They provide menu examples aligned to the Healthy Eating Guidelines for Samoa, also recommend complementary activities that promote the guidelines.

The arrangements for school food vendor operations vary widely between schools, though most food vendors operate on school grounds as tenants, and accountability to the Standards rests with the school committee. According to policymakers some of the vendors have a registered business permit, though it is not a requirement.

3.2 Enablers for school food policy implementation in Samoa

The Standards are supported by a clear mechanism for governance and monitoring

Nearly all public schools (urban and rural) are situated inside of villages, and these villages take a central role in carrying-out government programs. In most areas, school operations and infrastructure are the responsibility of the surrounding village and school committee, while MESC adopts responsibility for teaching, learning and accountability in the public-school system. The school committee is responsible for school management, and is most often comprised of the principal, and a group of senior community members.

The Ministry of Health is the leading health promoting body in the country, and principally responsible for delivering on the Standards, which are implemented under the auspice of the HPS Committee. The Standards are continually promoted in schools during monitoring visits, during training opportunities and annual school health symposiums involving around 200 school representatives. The Government also delivers a coordinated monitoring program made of biannual visits to schools by health promotion and nutrition officers, together with representatives from MESC. Monitoring visits routinely include feedback to school principals, who are encouraged to discuss the results with the school committee. Four of the principals explained that the monitoring visits were a useful mechanism to remind them of the policy.

“So that (the monitoring visits) challenges us to make sure everything is prepared and done by the standards given to us.” (Principal, Interview 33)

Biannual reports on compliance are aggregated and submitted to policy leaders in Health and Education, as well as the HPS Committee, which is represented by sectors Health, Education, Women, and Agriculture. Reports are also presented to schools during annual HPS Symposiums, where an award system is offered as an incentive. According to health officers, schools not complying with the standards risk an official letter of reprimand or rebuke by political leaders.

The school health space is a priority of policy leaders and health officials

The document analysis revealed that MOH, as the principle driver of health policy in Samoa, has continually prioritised school health throughout their policies. MOH allocates significant resources to implementing HPS, including resourcing a team of health workers to undertake year-round monitoring.

HPS was until 2018 overseen by Samoa's Parliamentary Advocacy Group for Healthy Lifestyles (SPAGHL), a group of parliamentarians championing public health issues. According to interviews, members of the group had in the past visited schools that were not meeting sanitation standards and threatened closure to those not meeting tobacco and sanitation standards.

Education officials recognise the importance of good nutrition

All education officials interviewed for this research indicated that they viewed nutrition as important, especially in view of the NCD crisis in Samoa. The education sector had demonstrated some commitment to improving school nutrition, including by integrating a performance indicator related to the Standards into a new set of Minimum Service Standards (2017) as an attempt to improve their enforceability.

A third of the principals we met with reported monitoring the school canteen themselves, issuing warnings to the canteen or reporting poor compliance to the school committee. One principal had successfully encouraged the committee to integrate compliance with the Standards into the canteen vendor's contract. The contract was subsequently terminated when they were found not to comply.

"The partnership is really important, ...I'm so blessed to have a very good support from not only the parents but the school committee....I raised it to the school committee...so we have made a letter to the canteen man and cancelled his contract"

(Principal, Interview 34)

The policy has led to some positive changes to the school food environment

Interviewees from MESC reported that they believed that the introduction of the Standard in 2012 had led to vast improvements to the school food environment. Some schools we visited sold a large range of compliant foods, including sandwiches, eggs, popcorn, spaghetti, bags of dried cereal (e.g. rice crisps) and curry with rice. Health officers provided examples of schools delegating families in the village to supply soup on 'healthy soup' days, or fruits for morning tea. These were identified by participants as a revenue-earning opportunities for local families.

At least three principals discussed having complementary programs to promote healthy eating, for instance by growing fruit trees or displaying nutrition promotion materials.

Table 2: Summary of findings grouped by theoretical domains

Contextual factors	Unhealthy and banned foods are very affordable to children when compared to healthy alternatives
	Local food vendors significantly influence food consumption by school children
	Political leaders are very supportive of school-based food policy
	The Standards are supported by a clear mechanism for governance and monitoring
	Nutrition is included in the school curriculum, but not at all levels of schooling
	The local community has oversight of the school environment and infrastructure
Policy Content	The Standards comprehensively outline allowable and banned foods
	The Standards have no meaningful repercussions for non-compliance
Process	The health agency dedicates adequate resources to promote and monitor the policy
	Training was provided to school-level actors at inception
	The policy is routinely monitored
	The policy has not been formally evaluated
Actors	Political leaders and health officials are very committed to regulating foods in schools
	Cross-sectorally, there is a varied perception of responsibility for ensuring the Standards are effectively implemented
	Education actors face a number of competing priorities which prevent them from prioritising implementation of the Standards
	All actors demonstrate interest in the health and wellbeing of children
	School-level actors report that they know about and understand the policy
	School and community level actors exercise discretion and agency in implementing the Standards
	Nutrition literacy and financial resources were key barriers to the effective implementation of the Standards
Outcomes	The policy has led to some positive outcomes in the school food environment
	A large proportion of schools are still selling unhealthy foods and beverages to children, including sugar-sweetened beverages, ice-blocks, dried noodles and highly processed meats

3.3 Policy challenges facing improvements to the school food environment

Unhealthy foods and beverages are still widely available in schools

Interviewees from both MOH and MESC indicated that there were a large proportion of school food vendors still selling unhealthy foods. Biannual program reports show consistently low compliance year-on-year (62, 63), lingering between 32% and 36% between 2014 and 2018. The compliance report for 2016 found that over 55% of schools still sold ice blocks and sweetened beverages, despite widespread recognition that they were a banned product for schools (63). Conclusions from the Government's own reports acknowledge the lack of progress in improving compliance, and call on stakeholders to make greater efforts to ensure that standards are adhered to.

We were invited by a number of schools to visually inspect their canteens during the interview process. Foods and beverages that were commonly available included cakes, doughnuts, packaged sweet biscuits, chips and extruded snacks, milo and other sugar-sweetened beverages, hot dogs and other processed meat franks, noodles, chop suey (noodles with soy sauce), ice-cups and white-bread sandwiches. One canteen manager stated that she was trying to convert her canteen into a healthy canteen, but she was currently selling fries, doughnuts, cream buns, packaged biscuits, chocolate, packaged savoury snacks, dried noodles and a range of sugar-sweetened beverages.

The School Nutrition Standards are not enforceable

The Standards have no clear implications for non-compliance, and policymakers and principals consistently noted that the lack of enforceability was a significant barrier to policy implementation and effectiveness. Policy officers explained that they could only provide warnings to non-compliant schools. It was evident through these interviews that the existing accountability mechanisms were exerting little pressure to food vendors operating in and around schools. Other health policies that apply to schools and are protected by legislation (for example The Tobacco Act and Food Safety Act) are all enforceable, risking school closure for non-compliance.

“If they sell the food in unhygienic environments, they would be warned or a closure...School nutrition Standards, there's nothing in the law [to enforce it]...They don't take it seriously unless we regulate the food to be sold in schools.” (Health Official, Interview 15)

The challenge of cross-sectoral collaboration and perceptions of responsibility

Despite significant efforts to address the contribution of poor nutrition to NCDs, health officials believed nutrition was a low-priority for other key actors, specifically villages and MESC. MOH indicated that the Standards would be more effective should the Education department take over their responsibility. Conversely, the education officials we met with indicated they believed nutrition promotion to be the responsibility of health officials.

“As I see, because the Education ministry, they are not encouraging because they said their goal is just teaching. They are there to teach, not to do anything else about nutrition” (Senior Health Official, Interview 15)

“(School) nutrition should sit with MOH and they should be driving it as well. Collaborating of course with us, when they do go into schools” (Education Official, Interview 12)

Four health officials noted that the interests of partnering sectors in HPS had dwindled over time, and that officers representing them at committee meetings often rotated between meetings, affecting continuity and the likelihood of recommendations being taken to (or actioned by) senior leaders.

One senior official from Education explained that that the ability of the Education sector to dedicate more ‘space’ to nutrition in the curriculum would require a mandate from senior policy leaders, and that this would be in direct competition with other priorities (e.g. sexual health).

“(Samoa) people are dying everywhere, getting sick [from NCDs]. The only way to enforce it is to have it as a policy decision from the high level. And it's the only way to turn things around and say the focus on health must be made compulsory... in terms of NCDs... It's important, but it's packed together with PE [physical education], you know?” (Senior Education Official, Interview 38)

According to policy officers in health and education, the personal motivation of individual principals to administer and enforce the Standards is a critical aspect of success.

"It really depends on the school principal 'cause there are principals that are really supportive, and also we've come across principals that just don't want to do anything with the Standards." (Health Official, Interview 17)

School-level actors are exercising 'agency'

We found that canteen vendors were exercising a high-degree of agency in running their canteens, and that the accountability mechanisms were not adequately influencing school committees to prioritise nutrition. In at least five of the schools we visited, we noted a large disconnect between the principal's statements of commitment to the policy, and the foods being sold.

"I think they just pick the food that sells fast.... .. they only look at income [of the canteen]...they don't see the benefits of children eating those foods" (Health Official, Interview 15)

Several principals indicated that they personally had little influence over canteen sales. In two instances, the principals reported that their canteen vendor was in the family of a leading school committee member, an arrangement that reduced the power of the principal to enforce change. One principal appeared visibly disappointed when she took us to the canteen and saw what was being sold.

"We always talk to them about the food they bring and they sell to the pupils in school, but they don't admire what we say" (Principal, Interview 28)

Although every vendor we interviewed was aware of the Standards, we noted that those retailing non-compliant foods discussed so without hesitation. For instance, one vendor told us he knew of the guidelines, but had on display only cakes, cookies, sugar-sweetened beverages. Another vendor knew of the guidelines but sold only icy poles and doughnuts. None of the vendors raised with us any concerns regarding implications for non-compliance.

Capacity and resources of implementing actors

Vendors in both urban and rural schools discussed that the relative cost of healthy food would make it difficult to run a successful business whilst being compliant with the Standards. One canteen manager indicated that she wasn't committed to the Standards because the foods advocated in them were cost-prohibitive and non-competitive, lamenting that they should have been costed for feasibility.

“Cause we don't care. We're business people, right?...It's very expensive for the food that is required” (School Food Vendor, Interview 29)

Reportedly, the majority of school committees rely on revenue generated by the canteen to maintain school grounds and infrastructure, an arrangement that creates a conflict for principals attempting to enforce Standards.

Vendors we met appeared to have a very limited understanding of nutrition principles. Though the Standards provide an extensive list of compliant foods, examples given by vendors of compliant foods indicated they were misinterpreting the guidelines. Policymakers from both health and education indicated that lack of understanding around nutrition was a systemic problem.

“But now we've realised that sometimes the community find it hard to follow or to understand what constitutes healthy food” (Education Official, Interview 12)

For instance, one canteen manager discussed how she only sold cooked noodles instead of dry noodles because they were a healthier alternative, and told us she was ‘dry frying’ commercial chicken nuggets and French fries to improve their healthfulness. Another canteen manager explained that she sold chicken franks (highly processed sausages) because they were a healthier alternative to hot dogs. Many schools listed ‘chop suey’ (noodles cooked in soya sauce, with or without canned beef) or white bread as examples of healthier alternatives. While many of these are allowed on the Standards, they are to be accompanied by “a generous amount of vegetables” (page 9 of the Standards)(64).

The food environment negatively influences policy implementation

The broader food environment in Samoa was a principle problem identified by interviewees throughout this research. The poor nutritional quality of food being sold by informal food vendors surrounding the school settings was noted by all nine of the principals we interviewed, and by half of the canteen vendors.

According to interviewees, children were commonly leaving school grounds during school hours, and returning with cheap processed foods. This was affecting canteen viability, as well as canteen vendor commitment to implementing the Standards.

“There’s a lot of vendors now...that’s how they want to make unhealthy food because the vendor is selling this food and the kids go and buy from them instead of buying the food that they are carrying in the canteen” (Policy Official, Interview 16)

For children and their families, the affordability of healthier foods and beverages, compared with less-healthy alternatives, was consistently reported as a key barrier to the implementation of the Standards by school principals, vendors and policymakers.

“I think despite all that we’ve been trying to do, it comes down to costs. Because a can of Coke costs sometimes go down as far as 1.50 tala [USD0.65]. And a meal, you don’t get a meal for one tala.” (Politician from the Samoa Parliamentary Advocacy Group for Healthy Lifestyles, Interview 20)

Children’s preference for unhealthy foods, and their unwillingness to purchase healthy foods at a higher cost was perceived by both policymakers and policy implementers to be a key challenge.

Policy effectiveness has not been evaluated

The Standards had not undergone evaluation to examine its impact on policy objectives since their launch in 2012. Monitoring reports are routinely discussed at HPS Committee meetings, though the level of representation at these meetings reportedly limits the degree to which these are used to generate high-level policy discussion across agencies, and policy officers we talked to were unclear if compliance reports were used by policy leaders (e.g. heads of agencies and parliamentarians).

3.4 Participant recommendations for addressing challenges

Interviewees identified a number of opportunities to strengthen policy action. One school had requested a more nuanced approach to monitoring, to better reflect some of the positive changes and to incentivise improvements made overtime.

One principal suggested others should work to engage the interest and support of community leaders and the school committee to pressure vendors operating in and around school grounds, and ban unhealthy food vendors from operating nearby. Three principals had pinned compliance to the opportunity to operate a food outlet on school grounds.

Others felt the issue of school nutrition and nutrition literacy should once again be brought to the attention of political leaders in the context of Samoa's concerns around the rise of diet-related NCDs. They recommended that the policy should become fully enforceable, that children should be banned from leaving school grounds during school hours, and that nutrition curriculum should become a mandatory subject throughout a child's education.

"And if Cabinet were to see numbers, patterns of NCDs escalating, then propose best options to do this, through education system, through the community...things can happen." (Senior Education Official, Interview 33)

Discussion

We found health policymakers and leaders in Samoa to be strongly committed to improving school food environments, expressed through dedication of substantial staff resources towards development, implementation and monitoring of standards, and the involvement of parliamentarians. Despite this commitment, Samoa had struggled to lift compliance with the Standards and create healthy food environments within all schools. Actors both in and around the school setting were able to exercise a high degree of agency, effectively diminishing the efforts of policymakers and implementers towards successful implementation of the Standards. In particular, the food vendors and school committees reportedly had limited motivation to comply with the policy, and had a reduced capacity to do so. Consistent with previous research, implementing actors in and around schools were limited by their nutrition literacy and financial resources, and the perception that children would not purchase healthy foods when less-healthy, more affordable alternatives were available. In Samoa, we also found that most school-based actors showed a genuine interest in the health and wellbeing of children, but were complacent about the role of food and nutrition in health, and the responsibility of the school community to protect and promote health.

Success factors for school-based food policy implementation previously identified in both higher- and lower-income countries include the need to address financial implications (13, 17, 19, 65), offer food vendors continued education, training and technical support (11, 17, 18, 21), provide educational and promotional resources (17, 21) and undertake regular monitoring and evaluation (17, 65, 66). This study supports those findings, but also highlights that the creation of universal healthy school food environments in a country is likely to require a very strong mandate, powerful incentives for adoption at

the local level, and meaningful sanctions for non-compliance (similarly to those applied for health risks related to food safety and tobacco). Moreover, the Samoan government's substantial implementation and monitoring efforts were not enough to generate widespread improvements to school food environments. This suggests that non-regulated ('voluntary') school food standards are unlikely to lead to systemic change (65).

This study also provides evidence that the broader food environment is a principle problem reducing the effectiveness of school food policies in Samoa, consistent with evidence from other countries (15, 23, 67). Specific issues include the relatively high cost of healthier foods, and the widespread availability of affordable 'junk' food provided by informal vendors in and around schools (15, 68). A policy restricting the sale of unhealthy foods and drinks around the school vicinity in Korea had not led to significant benefits, primarily because of food vendor concern for profitability (69). Competitive pricing is a critical barrier to promoting good nutrition in schools, suggesting a critical need to address the relative affordability of healthy foods more broadly.

In considering policy implications of this study, we identify below three key opportunities to strengthen implementation and effectiveness of policies governing the availability of food in schools, as policy learning for other settings facing similar challenges.

Policy enforcement as an essential support mechanism

One of the important findings for strengthening multisectoral food policies, is that implementing officials find it difficult to enforce policy compliance with actors operating outside of their circle of influence (including principals, vendors and school committees). Enforcement mechanisms are needed to reduce pressures on low-level actors responsible for overseeing compliance.

In the context of resource constraints, Samoa's integration of the Standards into Minimum Service Standards for primary and secondary schools facilitated a level of efficiency by using existing accountability mechanisms. They had introduced a Parliamentary advocacy system to oversee school health policy and exert pressure directly on schools and communities. There was opportunity to build onto this by mandating business licencing for food vendors operating in and around schools, and revoking licences from operators found not to comply. This approach was adopted in the Australian

Capital Territory (Australia), where a canteen licence is conditional on adherence to the school food and drink policy (70). Efforts to strengthen enforcement could also draw on legally binding school food policies that have been adopted in the US (19), UK (65), Korea (69) and Brazil (71).

Addressing policy barriers for implementing actors

We found that schools and vendors need to be provided with ongoing strategic and financial support to overcome personal barriers to compliance. Evidence suggests that it is beneficial to examine the perspectives of lead actors, and the way in which they are affected by, or involved in the policy (69, 72). We report that school committees and vendors hold concerns for their financial viability in implementing the Standards. This suggests that policy leaders may need to counter some of the financial constraints faced by individuals, schools, and communities (13, 17, 67, 73), for instance by reducing reliance on canteen revenue for school maintenance, or offering grants or reward programs (74). There is also scope to facilitate programs to empower and create economic opportunities for local communities by incentivising schools to source foods from local producers (8). As suggested by participants themselves, schools need political support to prevent food vendors from operating around the perimeter and to restrict the movement of children during school hours. The Philippines, Korea and Singapore are among countries in the Western Pacific Region that have taken steps to restrict vendors from selling unhealthy foods and beverages within a designated radius of schools (15, 16, 69).

Both our study and others (69) have shown a clear gap between self-reported compliance (by school vendors and principals), and actual compliance, suggesting food and nutrition literacy remains low for school-level actors despite the government offering some training and resources. Accordingly, it is likely to be important to include programs to build the requisite knowledge and skills for vendors, principals, school committees and communities to execute the school food standards (17, 18, 75). Vendors may need ongoing support and training, specifically on proving low-cost, compliant food options (17). In addition, there is evidence that school food policies that are underpinned by a clear system of food classification, including specific examples of compliant and non-compliant products (17, 76) can substantially reduce misinterpretation. Moreover, the degree to which nutrition literacy hinders the widespread adoption of school food policies, and the scale of the NCD crisis in countries like Samoa, suggests that governments should consider how to address nutrition literacy more systemically (77), for

instance through scaling up the volume of mandatory nutrition curriculum (78) or by offering accredited training options for food vendors and committee members (65, 79).

Capitalising on commitment from political and community leaders

This study found that building political will for improving school food environments is important for driving policy reform. There is further opportunity to engage political and community leaders to adopt the institutional and operational commitments required to fully implement and sustain school food policies. One potential vehicle for harnessing existing commitment to action is through conducting research and evaluation of the existing degree of implementation. Bringing such results to those with power played a significant role in influencing policy and legislative change for school food in Brazil (71), the US (19) and the UK (65). Evaluation builds on monitoring efforts by providing governments with insight into operational aspects of a policy, and the value of their investments (19, 65).

We have shown that strong school food policymaking requires committed advocates at all levels, especially within the school community (20, 22, 66). Developing a common purpose and building a sense of responsibility among school-level stakeholders is critical to improve implementation of school food policies (17). Our study and others (69, 80, 81) have shown that implementing actors generally have a strong interest in the wellbeing of children, but that this does not necessarily translate to policy compliance by those actors (69). Samoa has developed a culturally-relevant approach to decentralising responsibility for the health and social development of children on other issues, and villages in Samoa have historically taken responsibility for a range of primary-care strategies in their communities (82). Community-led engagement is thought to be a critical component of childhood-obesity prevention (83, 84), and trials are currently underway to assess the outcomes of community-led priority setting processes on obesity prevention (85).

Strengths and limitations

A key strength of this research was that we were able to interact with nearly all relevant policy officials, and principals and vendors from schools ranging in their compliance. The breadth of perspectives we were able to glean was assisted by the small size of Samoa, and the relatively simple governance structures.

To mitigate potential bias introduced through the involvement of government officials as research partners, we interviewed every policymakers deemed to have a significant influence on the policy process. We noted that both principals and school food vendors seemed un-influenced by government officer presence and were open about challenges faced. Nevertheless, we recognize that the involvement of government officials as part of the research may have influenced the perspectives in ways we did not recognize.

As with any case study, a potential limitation to the transferability of findings is the influence of local contextual factors on policy processes. To maximize transferability beyond the Samoan context, we based our analyses on a political sciences framework that has been applied in multiple contexts (14, 51, 52). In addition, we explicitly attempted to identify local contextual factors, and focus on opportunities for lesson drawing as applicable to other contexts.

The interviews conducted at the school level as part of this study were opportunistic and therefore the results are not interpreted or presented as being representative. Since these interviews yielded wide-ranging results with regard to motivations, interest and knowledge, we judged that selection had not yielded bias.

Conclusion

The adoption of effective food policies in school settings is an ongoing challenge for many countries. We provide evidence that policy dissemination, training, and monitoring is unlikely to lead to full implementation without strong incentives for compliance and effective enforcement. We also highlight the importance of policy makers engaging with potential implementation issues, such as implementation capacity and resources, and accountability structures, during policy development and evaluation (86).

This study on school food policy in Samoa has relevance for other low-resource settings implementing such policies in the context of food insecurity and high rates of NCDs. There is opportunity for countries like Samoa to build on existing support for NCD prevention strategies by generating political support to recalibrate the institutional and operational commitments required by different sectors to fully implement and sustain school food reform. Highlighting to political and community leaders the far-reaching benefits of implementing and sustaining school food policy might aid reengagement on this issue.

Declarations

COREQ Consolidated Criteria for Reporting Qualitative Research

HPAT Health Policy Analysis Triangle

MESC Ministry of Education, Sports and Culture

MOH Ministry of Health

NCDs Noncommunicable diseases

HPS Health Promoting Schools

WHO World Health Organization

Ethics approval and consent to participate: Ethical approval was accessed from Deakin University Human Ethics Advisory Group (HEAG-H 185_2016) and Samoa's Health Research Committee. And approval was also gained from the CEO of Samoa's Ministry of Education, Sports and Culture. Written informed consent to participate was provided by all study participants

Consent for Publication: Information outlining the use of the data, including for publication purposes, was provided as a part of informed consent. Samoan research partner institutions approved this manuscript for publication.

Availability of data and material: A restricted access to the data for this study was requested as a condition of consent for participation by Samoan research partner institutions granting ethics approval.

Competing interests: None

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Authors' contributions: ER was involved in all aspects of the study and drafted the manuscript. GS, AMT and CB provided supervision, representation and review to the manuscript. CSU led arrangements for research on the ground, and technical review of the manuscript. **All authors read and approved the final manuscript.**

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