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Exploring the barriers and facilitators of continuous quality improvement for health promotion within healthcare food environments

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Abstract

Continuous quality improvement (CQI) has become a widely accepted approach to optimize health services while lowering healthcare costs (Quintuple Aim) and has expanded from clinical interventions to health promotion. Retail food environments (e.g. hospital cafeterias, cafes) are of interest given the increased adoption of healthy eating policies and interventions to influence diet (e.g. price, promotion, placement and product). However, there is a lack of understanding of what organizational and policy processes are necessary to implement CQI for health promotion in healthcare. This research uses a qualitative multiple exploratory case study design to explore the barriers and facilitators of CQI for health promotion in healthcare retail food environments. This research occurred in a healthcare setting with an organizational Healthy Eating Policy applicable to staff, patients and visitors. We collected semi-structured interview data with 12 healthcare staff working in Nutrition & Food Services in a Canadian provincial health authority from January to June 2023. We used directed content analysis to analyze the data. We used the Inside out model to interpret cross-cutting organizational barriers and facilitators. Four cases of quality improvement interventions (Plan-Do-Study-Act (PDSA) cycles) were identified. Barriers included expertise to interpret nutrient criteria, lack of data, conflicting benchmarks (e.g. finance and health), third-party vendors, past negative experiences, and a lack of time to monitor and evaluate. Facilitators included an organizational Healthy Eating Policy, understanding community context, local knowledge, partnerships with researchers and leadership. This study revealed how overarching policies, accompanied by organizational support, facilitated quality improvement and engagement in CQI but also created barriers to routine practice and sustainability of health-promoting interventions.

CONTRIBUTION TO HEALTH PROMOTION

- Studying health promotion using multiple case studies (CQI PDSA cycles) revealed a variety of benchmarks (e.g. nutritional targets for product offerings and financial targets for profitability) within retail food environments. This allowed for a rich understanding of the context surrounding the interventions (e.g. price subsidies and digital apps).
- The facilitators and barriers to CQI for health promotion vary at the individual (e.g. past negative experiences), interpersonal (e.g. relying on the experience of peers), organizational (e.g. lack of data and monitoring), community (e.g. understanding issues for staff) and policy (e.g. healthy eating policy) levels. Understanding these facilitators/barriers is useful for practitioners implementing health promotion interventions in non-traditional settings, such as retail food.
- Healthy eating policies focused on supportive food environments facilitated health promotion interventions, but supplemental documents (e.g. nutrient criteria) created barriers (e.g. interpretation of nutrients and reliance on dietitians).

BACKGROUND

Continuous quality improvement (CQI) is a widely accepted approach in healthcare that has been defined as the process of challenging the status quo to meet the Quintuple Aim, improving patient care, health equity, population health, and worker health while lowering costs (Itchhaporia 2021). A systematic review by Hill *et al.* (2020) examined 28 randomized controlled trials assessing the effectiveness of CQI approaches,

such as Plan-do-study-act (PDSA) cycles, Root Cause analysis, and others, on the development of professional practices and healthcare outcomes, in comparison to control (no CQI). Although effectiveness was limited, benefits to professional practice and process were found. Hill *et al.* (2020) also found that the broad context for using CQI models, including PDSA cycles, as well as involving leaders and meeting frequency, had a positive effect on process.

PDSA cycles are designed with practitioners across the organization (e.g. frontline, manager) in mind and are meant to flatten hierarchies by incorporating frontline local knowledge with input from leaders in decision-making roles (Kahan & Goodstadt 1999). Some of the barriers to using PDSA cycles come from organizational factors, such as poor study design (e.g. lack of control groups), lack of leadership or unclear purpose, and not from practitioner unwillingness to become involved in improvement processes nor engaged in the improvement processes (Radawski 1999, Knudsen 2018).

The study of CQI and PDSA cycles within healthcare has expanded from clinical interventions to health promotion. Health promotion within this paper focuses on interventions and activities that aim to create healthy food environments to support population health. Healthcare organizations are well aligned with health promotion since they have mandates to improve the health of populations and create environments that support employee health (WHO 2007). CQI health promotion studies use PDSA cycles to explore benchmarks. Percival *et al.* (2016) used two data collection cycles to assess the number and types of local health promotion activities at an Australian health center, comparing the number and types of health promotion interventions across health centers and from year to year. After the first data collection cycle, researchers shared data with staff and adjusted for further planning and strategy implementation. The study collected the second cycle of data, finding that the number of health promotion activities increased, but the types of activities and health issues addressed remained unchanged. With leadership support, PDSA cycles provide autonomy to healthcare employees as they evaluate their practices, consider future actions, and tailor the interventions to local settings.

However, at times, CQI and health promotion are at odds. This was theorized by Kahan and Goodstadt (1999), who compared the tensions of the efficiency focus of CQI to the empowerment focus of health promotion. Other authors have explored this as well. One Canadian study examining a provincial health authority team found that there was practitioner resistance to using CQI tools meant to improve the quality of community partnerships because participants felt these tools jeopardized the partnerships based on efficiency (Bloomquist *et al.* 2021). This means that CQI benchmarks and organizational policies must remain flexible enough to allow for the tailoring of interventions and tools (Cranney *et al.* 2023).

To date, PDSA studies have largely drawn from research in clinical environments such as community-based primary care or adapting CQI lessons from hospitals to public health. What remains less understood, however, are the barriers and facilitators for adopting CQI for health promotion interventions within the large and complex healthcare organizational settings of hospitals, where practices are guided by protocols and policies (Hill *et al.* 2020).

An emphasis on food environments has become central to improving diets (Peeters 2018). These are settings where customers purchase and access food, and interventions, such as altering the price, promotion and placement of food and beverages, influence diets and food choices (Mah *et al.* 2019). Additionally, healthy eating policies within healthcare continue to develop. A policy review by Rosewarne *et al.* (2020) examined eight such policies in Australian healthcare institutions and identified that while healthy eating policies provide an opportunity to create healthy food environments (e.g. nutrition standards), they lacked accountability mechanisms

(e.g. evaluation and monitoring) to measure and benchmark food environments—a similar gap that has been identified for health promotion and CQI more broadly.

A study of the barriers and facilitators could shed light on the policy and organizational process of CQI for health promotion within healthcare. Learning more about these processes could lead to more successful implementation of health promotion within healthcare and overall improvement of healthcare systems. As described below, this study occurs within a Nutrition & Food Services team. Therefore, we explore CQI within retail food environments, which are the settings where food and beverages are sold to staff, visitors and patients. As such, this paper first explores PDSA cycles for health promotion among a healthcare Nutrition & Food Services team. Second, this paper examines the barriers and facilitators for conducting CQI for health promotion within retail food environments.

Context

Nova Scotia Health (NSH) is the largest provincial health authority in Atlantic Canada, employing over 27 000 people and delivering healthcare services to approximately one million residents (NSH 2023). The health authority is centralized and operates within four geographic zones, including 10 hospitals and 150 community locations (e.g. clinics). In 2018, NSH adopted an organization-wide mandatory Healthy Eating Policy, overseen by Nutrition & Food Services, a provincial team of managers, dietitians, volunteers and point-of-sale staff. The policy applies to all food and beverages served (inpatient) and purchased at NSH retail facilities (e.g. cafes, cafeterias, vending machines, auxiliaries, or foundations), most of which are NSH-owned and operated. Its overall purpose is to create supportive food environments across NSH facilities, which is a similar focus to other institutional healthy eating policies implemented in hospitals and schools (Rosewarne *et al.* 2020). The policy encompasses a wide variety of evidence-based practices to promote healthier food environments, such as increasing access to nutrient-dense foods and beverages, nonfood-based fundraising campaigns, restricting the marketing and advertising of less healthy foods, and collaborations with internal and external stakeholders (e.g. researchers) (NSH 2018).

Accompanying the policy were provincial Food and Beverage Nutrient Criteria, a standard provincial nutrient profiling system, also used for settings outside healthcare, such as in schools (Nova Scotia Government 2016). This profiling system acts as a traffic lights system and grades food based on nutrient content (e.g. healthier foods meet maximum criteria, and less healthy foods meet minimum criteria). Implementation of the Healthy Eating Policy at NSH was also accompanied by the development of procedural guidelines, such as for pricing and auditing of offerings in hospital retail food services.

Methods

Study design

This study used a qualitative multiple exploratory case study design to examine NSH practitioners engaging in PDSA cycles during the implementation of the Healthy Eating Policy. Case studies are an in-depth inquiry into a phenomenon and its surrounding context (Yin 2017). Our qualitative

approach, based on data collected through semi-structured interviews, allowed for an in-depth analysis of practitioners' active sense-making throughout implementation and evaluation (Yin 2017). This research was conducted to meet the requirements for a doctoral program at Dalhousie University and received ethics approval from NSH (REB # 1028236).

Data collection

Data was collected using semi-structured interviews with 12 NSH Nutrition & Food Services employees. Inclusion criteria included full-time employment for at least three years and at least 18 years.

Interviews were completed by LJK from January to June 2023. LJK recruited participants using a snowball technique, a type of purposive sampling that occurs when the researcher starts with one participant and asks participants to identify others interested in sharing (Palinkas *et al.* 2015). The first participant was selected from the Healthy Eating Policy Steering Committee (HEPSC), a group of internal (directors, managers, volunteers) and external (patient advisors, researchers) members responsible for guiding the policy direction. We contacted participants via e-mail about their interest in participating in the study. Interviews lasted between 45 and 80 minutes, with nine interviews conducted virtually, two interviews over the phone, and one interview in person to align with the preference and availability of the participant. Data collection occurred until saturation was achieved (Guest *et al.* 2006). Saturation occurs when further data collection does not produce new findings. Interviews were transcribed verbatim and uploaded to NVivo (Release 1.7.1) for coding and theming.

Data analysis

We used directed content analysis to analyze data. Directed content analysis uses deductive and inductive analysis to validate or extend existing theories about a topic (Hsieh & Shannon 2005, Humble & Mozellus 2022).

First, LJK coded the transcripts for interventions (inductive). Next, LJK coded the interventions by the PDSA stages (e.g. plan, do, study and act) and grouped the interventions into completed PDSA cycles (deductive). Among 12 interventions, LJK and CLM chose four, ensuring three were positive and one negative. Negative cases act as contradictory evidence, allowing researchers to explore findings that may be contrary to what they expect (Yanow & Schwartz-Shea 2006). LJK and CLM decided upon the final four cases using peer debriefing, the process of sharing findings with a peer to explore biases, multiple meanings and interpretations (Amin *et al.* 2020). Cases were analyzed using a cross-case synthesis (Yin 2017). LJK and CLM reviewed data repeatedly and used existing literature to understand and compare case studies.

Second, we created a codebook based on CQI and health promotion literature (deductive), including Itchhaporia (2021), Kahan & Goodstadt (1999), and Adams (2018). We iteratively updated the codebook to reflect the participant interviews (inductive). Coding and theming occurred as an iterative process while data collection was still occurring (Miles *et al.* 2020). We analyzed the four cases deductively and inductively for implementation barriers and facilitators. To increase the credibility of the analysis, LJK had a peer code a 10% random sample of the transcripts. This was not done to reach a consensus but to discuss the potential meaning of the barriers and facilitators (Palinkas *et al.* 2015).

Positionality

Insider status is when a researcher is known to the community of study (Labaree 2002). LJK was an insider to the organization and had pre-existing knowledge about the institution. Insider-ness can be beneficial and allow researchers to build trust with participants who would otherwise view them as outsiders (Dwyer & Buckle 2009); that being said, insider-ness can also curb objectivity and introduce bias in the interpretation of findings (Mullings 1999). To mitigate bias, LJK engaged in reflexivity and peer debriefing with colleagues and fellow researchers (Dodgson 2019).

Theoretical underpinnings: Inside out model

Data were analyzed using the Inside out socioecological model developed by Golden *et al.* (2015). The Inside out model is similar to the traditional socioecological model (Bronfenbrenner 1977) but is flipped inside out; rather than exploring the factors influencing population health this model explores the factors influencing policies. Policies/environments are situated at the model's center and within nested contexts of the other factors. See Figure 1. We chose this model because of its focus on policy and the reciprocal determinism between policy and organizational factors described below. This model was well suited to our context, where a Healthy Eating Policy was implemented to improve food environments. *Community* includes decision-making groups (e.g. boards or HEPSC) and health champions (McLeroy *et al.* 1988). *Organizations* are groups of well-networked and well-resourced people who come together around a specific policy, topic, or idea (e.g. community coalitions). *Interpersonal connections* are informal social networks or groups providing opportunities for further policy development. *Individuals* includes those with autonomy, power, and the ability to participate in policy activities. Other health promotion scholars have used the Inside out model when exploring policy implementation (Gielen & Green 2015, Kirk *et al.* 2021, Schwartz *et al.* 2022).

RESULTS

Participants

The participants worked in various roles at NSH, including point-of-sale ($n = 5$) and administration ($n = 7$). They were employed across the province ($n = 3$ urban; $n = 9$ rural). Nine participants had a dietetic background or formalized health professional license in dietetics. The first section of the results describes four case studies of health promotion PDSA cycles. The second section outlines the barriers and facilitators of CQI for health promotion in the retail food environment.

Cases of PDSA cycles for the Healthy Eating Policy implementation in the healthcare food environment

See Table 1 for a summary description of all four case studies, highlighting the key features of how practitioners navigated a PDSA cycle to initiate, enact, study, and collect data and modify small changes to practice while implementing the organization's new Healthy Eating Policy. The following four case studies vary in scale, focus and action.

Case study #1: Snacking Made Simple

Snacking Made Simple was a pricing intervention with accompanying price salience merchandising (e.g. promotions,

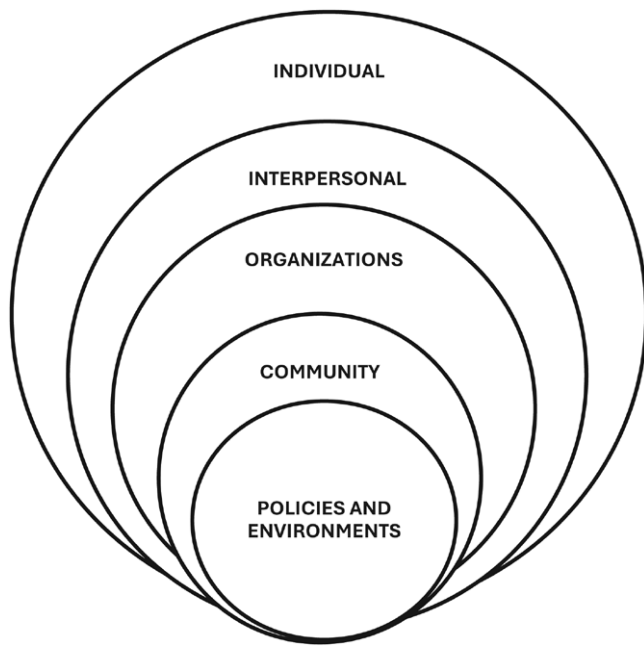


Figure 1. The inside out socioecological model derived from [Golden et al. \(2015\)](#).

placement) implemented in all four food outlet locations at the Queen Elizabeth II Health Centre, the central urban hospital campus in Halifax, NS. *Plan*: Participants had conducted a staff survey to determine the barriers to purchasing healthier snacks, and food affordability was returned as the top reason. This finding resonated with the appraisals of Nutrition & Food Services staff, who noted, ‘*I think people would buy the healthier things if they weren’t so expensive*’ (Participant #3, administration).

Do

Upon gathering this information, practitioners implemented a CQI pricing intervention named Snacking Made Simple. The purpose of the intervention was to promote and reduce prices for healthier snack items, while at the same discourage the purchase of less healthy items, merchandised in such a way as to make healthy eating seem ‘fun’, as one practitioner described: ‘*how do we make snacking healthy seem fun and lighthearted*’. (Participant #2, administration). Snacking Made Simple decreased the prices of five healthier snack items (apples, bananas, small/large white milk (unit = 237 mL/437 mL single-serve carton of 2% milk), and bottled water) while concurrently increased the price of five less healthy snack items (baked loaves, cinnamon buns, small/

Table 1. Four cases of Plan-Do-Study-Act cycles for health promotion at Nova Scotia Health.

| Case study | Improvement | Plan ¹ | Do ² | Study ³ | Act ⁴ | Quotation |
|----------------------|------------------------|---------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Snacking Made Simple | Affordability | Healthy food perceived as too expensive by staff (survey) | Pricing intervention altering the price of five healthier and less healthy snack items | Sales data analysis by researchers at Dalhousie University | Scaled up to other sites | ‘ <i>And it was really just in talking with our staff that they were like I think people would buy like the healthier things if they weren’t so expensive and so that’s where it started then we started being like what is it about like pricing is there any like little pricing research that we can do</i> ’. (Participant #3, administration) |
| Get App | Convenience/wait times | Concerns reported by staff who were waiting in line too long (survey) | Create an online method for ordering food | In progress—staff feedback, number of people using | Pilot to other sites | ‘ <i>It was a pretty simple app but it enabled us to just put healthy eating healthy foods on there... so maybe people that we work with don’t have time to go and stand in a line up in our retail locations we have peak times and certainly everyone comes or everybody wants to come at a similar time</i> – (Participant #2, administration) |
| Healthy Corner Store | Convenience | Staff wanted to limit exposure to COVID-19 in public shopping places like grocery stores | Mini grocery section of hospital cafeteria, where staff could pick up milk, eggs, bread, coffee, and other household staples | Informal feedback from staff | Still in place today | ‘ <i>We had a healthy grocery store option that we did, so, placing those we had, like eggs and milk and bread, thinking about those products as like easy to grab and go. They were showcased at the front of our grab and go fridge so that was something that we offered during COVID</i> ’ (Participant #8, administration) |
| Salad bar | Cost | Nutrition & Food Services ingredient expenditures found to be rising; portion sizes are not enforced at cafeterias. | Limit salad toppings to prevent ‘salad mountains’ | Informal feedback from staff | Still in place today | ‘ <i>People were getting massive salads which is wonderful but from a cost and ingredient control perspective it wasn’t great, so we implemented categories, so it was like choose four vegetables</i> ’. (Participant #10, point-of-sale) |

The Table above organizes each case by the phases of the plan-do-study-act cycle: ¹ Plan—when a practice issue or problem is identified that requires a response or improvement. ² Do—an intervention is adopted in response to the issue or problem. ³ Study—practitioners study the impact of their intervention. Act—When further actions or follow-up occur in response to the study phase. For example, staff administering feedback surveys discovered that healthy food was perceived as too expensive (plan). Staff implemented the Snacking Made Simple intervention (do) to improve the affordability of healthier options and dissuade purchasing less healthy items. Through discussion with Dalhousie University, practitioners and researchers studied the intervention using an interrupted time series analysis design (study). The intervention was scaled up to other sites (act).

large chocolate milk (same units as white milk), and Rice Krispie treats).

The targeted items were selected by NSH staff and categorized based on the Nutrient Criteria for Food and Beverages (Nova Scotia Government 2016). The intervention also included the placement of intervention items, either side by side, to emphasize price changes or placed close to impulse shopping areas (e.g. near cash registers). An accompanying promotional campaign included t-shirts, table signs and zip banners promoting the healthier items (apples, bananas, and white milk). The intervention was slightly altered at each Nutrition & Food Services site depending on the store layout and availability of promotional materials.

Study

Practitioners aimed to examine the quantitative effect of the pricing intervention through sales data and concluded on a cross-sectional examination of aggregate sales that the intervention had not resulted in a loss of revenue. However, after discussing the intervention with researchers participating in the HEPSC, it was collaboratively decided that further analysis of the sales data collected might shed additional light on intervention outcomes.

Researchers proceeded to conduct an interrupted time series analysis using the sales data, working with hospital practitioners to interpret the findings. They found that before the intervention weekly purchases of unhealthy snack items outpaced that of healthy snacks ($\beta = -11.02$, $P = 3.68E-14$), however after the intervention the weekly purchases of healthy snacks increased ($\beta = 21.41$, $P = 0.0024$) (Mah et al. 2023). Results appeared heterogeneous among snack items; for example, demand for unhealthy snacks increased for loaves and mini cinnamon buns but decreased for Rice Krispie treats.

Act

Practitioners, including directors, managers, and point-of-sale workers, reported that they scaled up the intervention to other sites across the province. In light of the research results, while practitioners noted that they had seen the benefits of the intervention, they shared the difficulty of finding time to monitor its progress and effectiveness. One practitioner described this as *'that's just a result of being busy; we do this, we do that [then] we're on to the next thing'* (Participant #4, administration).

Case Study #2: Get App

Plan

According to an internal workplace survey, NSH staff who purchased food at retail sites wanted fresh food (not grab-and-go premade options) that was quick to order. Many staff also reported that they did not have time to wait in line on their break or had lunches at non-traditional hours and, therefore, needed more flexibility in their food service options.

Do

The 'Get App' or Get Mobile App was a preorder mobile smartphone application for online food services ordering at select NSH food outlet locations. Nutrition & Food Services obtained customized app software to procure the Get Mobile App. The App included a Nutrition & Food Services defined, smaller, curated menu comprised of meals meeting maxi-

mum and moderate nutrient criteria from the standard in-person cafeteria menu, including a Make it Your Way menu that included bowls, salads, and smoothies, which usually required customers to wait at the cafeteria while their custom order was made.

Get App offered 14 menu items that staff and visitors could order ahead of time and have ready for pick-up. Multiple payment options, including automatic payroll deduction, were designed to save onsite healthcare workers further time in their food outlet experience from waiting at the cash register.

Study:

The provision of only healthier options through the Get Mobile App was purposeful. This was a strategic decision to support access to healthier foods. Practitioners piloted the app in two hospitals and have since implemented the app in a third location. One practitioner highlighted the feature of selling healthier foods only and the pilot and scale-up, saying: *'... doing a little pilot in two locations and now we've just rolled it out to a third one in [another location]. It was a pretty simple app but it enabled us to just put healthy eating healthy foods on there'*. (Participant #2, administration).

Participants referred to the Get Mobile App as *'modernizing'* (Participant #4, manager) the healthcare facility, drawing from technology and smartphone devices. Participants also custom-built sales data infrastructure into the app, as one participant said: *'digital infrastructure behind the healthy eating work so that we can have data'*. (Participant #2, administration). The sales data collected from the App included reports of items sold (e.g. burrito bowl), sales reports (sale price and total revenue), and user reports (# of active users).

Act:

The team decided to build data collection infrastructure into the Get Mobile App so they could study interventions on an ongoing basis.

Case study #3: healthy corner store

Plan

Retail food services in the health authority remained open throughout the COVID-19 pandemic, a priority for the organization, although many additional protocols were added. One practitioner emphasized that they altered the spaces to accommodate social distancing, *'but we never closed the cafeteria'* (Participant #11, point-of-sale).

The COVID-19 pandemic led to myriad systemic, process, and practice changes throughout hospitals, including retail food services. One of the broader public health measures to reduce the spread of COVID-19 outside the healthcare environment included recommendations for having a designated grocery shopper per household, which often fell to essential workers, including a range of frontline and other healthcare workers since they were already effectively 'exposed' in public-facing environments. However, healthcare workers expressed concerns about contracting or spreading COVID-19 when grocery shopping.

Do

In response, Nutrition & Food Services created a 'Healthy Corner Store' within retail spaces at the health authority to put staff at ease. The Healthy Corner Store model has been previously described as a comprehensive population health

intervention that transforms standard business practices into health-promoting practices through multisectoral partnerships, including health practitioners, community retailers, businesses, and partners (Mah et al. 2017). This version of a Healthy Corner Store had 'health' in terms of both nutrition promotion and communicable disease control in mind, including stocking everyday household grocery items, such as bread, milk, and eggs, that staff could purchase on their way home from their shift in healthcare.

Study:

One participant described the Healthy Corner Store as a 'mini-supermarket' (Participant #5, administration) and another as, 'our retail outlet': 'So, people can buy 2 litre milk, a loaf of bread, a couple of those staples – bananas – that you know if they don't have time to stop on their way home. They can get at our retail outlet...'. (Participant #9, administration).

The intervention provided access to common household items to tide staff over until they could go to the grocery store for a larger shop. Another practitioner talked about its continuation post-COVID-19, ensuring that prices were comparable with other retail grocers that healthcare staff might access: 'We obviously, provide [food items] at a very comparable price in terms of the economics of it ... Yes, we've continued on with that. It's not accessed as often as I would have thought but it's there and it's available for people that need it'. (Participant #9, administration).

Act

The Healthy Corner Store remains in place today, providing opportunities to source and sell grocery products through the food services offerings of the health authority.

Case study #4: salad bar

Plan

Food price inflation in recent years has forced many retailers to consider ways to control rising input costs, including within healthcare and other public sector food services. One option for cost control often discussed in the media during inflation has been to reduce portion sizes while maintaining prices, referred to pejoratively as 'shrinkflation' (Evangelidis 2023). Participants' experiences with a salad bar exposed an alternative way to think about 'shrinking' and 'growing' portions.

For many years, one hospital retail site at NSH had a salad bar. The salads were sold at a fixed (flat rate) price, and customers could choose any toppings that fit on the plate, offering customers a tailor-made meal with a wide selection of fruits and vegetables.

As a consequence, no weigh scale was available at the hospital cafeteria to cost salads by weight. Over time, the portions of the salads self-served by cafeteria customers began to grow, becoming unmanageable or, as one participant recalled, 'a free-for-all'. (Participant #8, administration). For example, some customers 'loaded up' their plates, described by one participant as a 'salad mountain with every single topping' (Participant #10, point-of-sale), with one practitioner recalling how customers used an additional takeout side plate for vegetable toppings to maximize the container use for proteins, making it difficult for Nutrition & Food Services to control costs. While consuming fresh vegetables was seen as ideal from a nutrition perspective, the salad bar had become less than ideal from an

organizational business cost and ingredient control perspective.

Do

In response, Nutrition & Food Services practitioners implemented structures defining and narrowing customer choices. They focused on categories of options, beginning with a choice of four vegetables and one protein per customer.

Study

One participant described the response as: 'We implemented categories ... choose four vegetables. I got a lot of feedback around this ... "this is not enough vegetable options", which is great I mean that's great feedback to get' (Participant #8, manager). Feedback was communicated through e-mails, software (e.g. Safety Improvement and Management Systems), and verbal feedback (e.g. point-of-sale workers to managers).

Act:

Practitioners responded once again, increasing the number of categories with the goal to appease customers and mitigate negative responses. 'I thought four was an appropriate [number of] options. We ended up increasing it to five based on feedback.' (Participant #8, administration)

The feedback from the healthcare workers using the salad bar was described as frustration, as described by one interviewee, which appeared to decrease with time:

"At first people were really upset about it [salad bar] in the cafeteria who frequently got those large salads but now they're used to it ... I was just explaining to them like either we get rid of the salad bar altogether or we streamline it ..." (Participant #10, point-of-sale)

CROSS-CUTTING BARRIERS AND FACILITATORS

Barriers

Our cases demonstrated that practitioners face barriers when conducting CQI for health promotion in healthcare (see Table 2). Barriers included conflicting benchmarks, a lack of monitoring, negative experiences of point-of-sale staff and interpreting the Nutrient Criteria.

The Healthy Eating Policy is meant to act as a guide for supportive food environments within the organization. However, participants described the nuances in the policy, especially the accompanying Nutrient Criteria document, as complex and cumbersome. The criteria were perceived as 'creating a dependency' on Nutrition & Food Services members, especially staff with a background in dietetics. One participant said,

"We create a dependency on Nutrition & Food Services for our organization to even use the ... Healthy Eating Policy ... because even to identify something as maximum-minimum or moderate nutrition requires a registered dietitian." (Participant #8, administration)

The majority of barriers were due to existing organizational factors, such as lack of data, navigating third-party vendors, and conflicting interpretations of benchmarks. When practitioners encountered problems during policy implementation,

Table 2. Cross-cutting barriers in conducting CQI for health promotion within retail food environments as identified by Nutrition & Food Services.

| | Inside out model | Theme | Context | Quote |
|----------|---------------------------------------------------------|------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Barriers | Policy and environments supportive of health | Difficulty interpreting nutrient criteria | A reliance on dietetic professionals to grade products as maximum, minimum, and moderate nutrient criteria | <i>'the nutrient criteria to me like is such a small piece of our policy'. (Participant #3, administration)</i> |
| | Communities that recognize health problems | Customers do not purchase food at retail sites | Hospital food is viewed as expensive, too serious, and unhealthy | <i>'...so when those healthy choices are made more affordable it's much easier to sell them'. (Participant # 7, point-of-sale)</i> |
| | Organizations that monitor and promote policies | Lack of data | When participants lacked data to inform decisions, they relied on experience and gut instincts. Other participants created data collection tools, like customer surveys or environmental surveys. | <i>'But sometimes you have to take that risk and try something different because there is no data available'. (Participant #2, administration)</i> |
| | | Conflicting benchmarks | Participants described the tension between health and financial benchmarks. Interventions involve both consideration of health and financial viability (e.g. break-even). Fundraising faced difficulties in prioritizing the healthfulness of food. | <i>'Definitely we have to break even in retail like that's our provincial goal is to of course we don't have to generate a profit but we need to make sure retail operations are sustainable so I think costing is a big part of that'. (Participant #8, administration)</i> |
| | | Third-party vendors | NSH owns and operates many retail services; however, some are run by third-party vendors who may not be accountable for the Healthy Eating Policy. | <i>'I never did like some of the things I was selling. I didn't really feel good about it. But, it wasn't my place as the employee to say anything'. (Participant #11, point-of-sale)</i> |
| | Interpersonal connections that foster collective action | Supporting frontline staff | Point-of-sale staff receive the brunt of the complaints for improving interventions. Interventions can also increase workload. | <i>'I think our frontline team found it easy to understand which is a big piece of it too'. (Participant #8, administration)</i> |
| | Fair and equal resources distributed across individuals | Past negative experiences | Participants described past healthy eating interventions as unsuccessful. | <i>'their past experience with that had only been like negative like taking you know French fries that used to be deep fried and then putting them in the oven'. (Participant #3, administration)</i> |
| | | Not enough time to monitor and study | Participants said research is something they don't have time for, and when done, it is done off the side of their desks. Nutrition & Food Services also balances time and resources with inpatient services. | <i>'We roll it out to the other sites around the cheaper and somehow, we lose sight of what was that all about. We did the work, but wait, that was called snacking made simple ... that's just a result of being so busy we do this we do this we're on to the next thing'. (Participant #4, administration)</i> |

they did not always have the specific routine data to inform a decision or intervention. For example, in attempting to examine intervention items sold most in a particular week (e.g. Case Study #1), there was no way of knowing because the sales data were aggregated to particular codes, such as distinct products that were entered under a single item code (such as both apples and oranges keyed into the point-of-sale using the same code).

Participants viewed collecting and understanding data as essential to CQI, expressing the importance of assessing pre- and post-intervention effectiveness to staff and leadership. Thus, when quantitative data were not readily analyzed, practitioners used other forms that could be descriptively analyzed, or qualitative data, such as customer feedback surveys. In some cases, practitioners relied on staff experiences when they did not have data to monitor interventions, for example:

"If I don't have site-specific feedback or any type of hard-based evidence, I think I would either lean on past experience or I'd reach out to other zones and my provincial network...." (Participant #9, administration)

In contrast, for interventions such as the *Get App*, where practitioners had greater design oversight in the first place, purpose-built sales data infrastructure was integrated into the intervention design in order to collect anticipated data that would be needed.

Benchmarks varied throughout the PDSA cycles. Participants frequently discussed two prominent benchmarks: financial and nutritional. External financial benchmarks included breaking even; policy-specific nutritional benchmarks included offering at least 70% of products that meet the maximum and moderate nutrient criteria. Yet, at times, these benchmarks conflicted with each other. For example, the salad bar intervention (Case Study #4) required limiting the variety of vegetables customers were allowed on their plates so that the cafeteria could meet specific financial benchmarks in response to customer behaviour observed. Essentially, staff discouraged the consumption of vegetables to break even.

A similar tension was also mentioned when participants discussed fundraising within hospitals. Auxiliary fundraising

organizations at NSH run a select number of gift shops. Their main goal is to raise money, including using food products. One participant described the items sold in the gift shops as getting out of hand, similar to the ‘free for all’ described in Case Study #4, meaning that auxiliary products were escalating counter to the Nutrient Criteria and needed to be, therefore, ‘reined in’ (Participant #12, point-of-sale).

Although the Healthy Eating Policy adoption was accompanied by a broad organizational shift to require on-site cooking for all retail food services, some retail sites in regional community hospitals remained owned and operated by third-party retailers (e.g. coffee shop chains and vendors) as the vendors may have been ‘grandfathered’ in. This was the case for a cafeteria in one rural district. One participant said they previously did not ‘feel good’ about what they were selling (e.g. large-sized muffins they referred to as ‘bucket muffins’) but felt ‘*it wasn’t my place as the employee to say anything*’ (Participant #11, point-of-sale), thus, disempowered to say anything. Now, with NSH policy oversight, they felt heard and ‘*interested in [my] input*’, providing suggestions about certain items they offered.

The health promotion changes received mixed reviews from other stakeholders outside the Nutrition & Food Services team. Practitioners described past initiatives as top-down and, while prioritizing health, lacked consideration for other aspects of eating, such as taste or appeal, and loss of revenue. Point-of-sale staff were especially vulnerable to complaints, suggesting a differential barrier for those at the customer point-of-sale. Managerial staff shared that they must consider the potential negative impacts on point-of-sale staff interpersonally and incorporate ways to mitigate them.

For example, the Snacking Made Simple intervention (Case Study #1) incorporated t-shirts for point-of-sale staff to wear as they implemented the intervention to symbolize a ‘united front’ amongst Nutrition & Food Services staff: ‘*We were so worried ...that ... our frontline team ... would take on the brunt of this, like fluky thing. We were going to try when we were like trying so hard to gain their trust too*’. (Participant #3, administration)

Facilitators

We identified facilitators of CQI for health promotion within retail food environments, summarized in Table 3. The Healthy Eating Policy provided guidance towards building a supportive food environment, including levers such as marketing, fundraising, and placement of food and beverage items.

Participants described the policy as providing ‘*a leg to stand on*’ (Participant #3, manager) when other staff asked about food fundraisers, offering space to different restaurants, or introducing new products. Participants described the policy as something they could fall back on in discussions with other hospital staff. Because the policy spoke broadly about food environments, it left room for policy interpretation and practice-based improvements. When staff wanted to challenge the status quo and seek buy-in, as we saw across the cases, they could problem-solve by tying the intervention back to the policy, for example,

“...pushing the purpose and premise of the policy that is creating a supportive environment for healthy eating that extends way beyond what we provide the patients what we have in the vending machines what’s in the cafeteria is how do we create that culture among people who work in our organization and who utilize the services of our organization.” (Participant #2, administration)

The Healthy Eating Policy shifted the focus of improvement from the nutrient content of the vending machine food to creating supportive environments (changing the status quo).

Champions and leaders were facilitators of CQI for health promotion and propelled problem-solving forward in all four case studies. One manager was repeatedly named the ‘go-to’ person for identifying what to do next in retail interventions. Many participants also named past organizational leaders who had supported their work and interpersonal relationships that were lasting. As one point-of-sale staff member stated, ‘*I’ve had good leaders good strong female leadership my entire career*’ (Participant #6, point-of-sale).

Point-of-sale participants had the greatest access to customers—and customer feedback, both positive and negative. They frequently incorporated this feedback (‘local data’) into their products and CQI practices. For example, long lineups prevented purchasing at the cafeteria. This issue informed the Get App (Case Study 2), a digital tool designed to reduce wait times and increase access to healthier lunch options by only featuring healthy options on the menu. This was also evidenced in Case Study #3, the Healthy Corner Store intervention; during the pandemic, staff across healthcare organizations expressed concern about going to the grocery store, concerned they would be exposed to or spread COVID-19.

Smaller pilot interventions created low-risk opportunities for staff to ‘prove themselves’. The ultimate goal was to scale up the intervention if it went well, but they needed buy-in first. Examples included introducing new products to see if they would sell, moving products to different locations, and piloting an intervention before scaling up. When staff did not have intervention data or evidence proving something would work, they adapted the intervention to what they thought might work. They relied on the experiences of others in the organization with whom they had interpersonal relationships, for example:

“...when we talk about how do you make a change or have you ever done something without any data if we didn’t do that original study it would have been very difficult for us to say let’s take a huge chance and just do this everywhere. Like you have to prove to yourself that it’s worthwhile doing first and then that’s those little studies.” (Participant #3, administration)

Partnerships with researchers were a facilitator of CQI for health promotion. Researchers from Dalhousie University were involved in quarterly meetings with the HEPSC and research projects such as the quantitative analysis of the Snacking Made Simple intervention (Case Study #1). According to the participants, the researcher partnerships provided opportunities for studying interventions and applying for grants. The partnership was described as opportune, and as one interviewee commented: ‘*So as far as I know I think there are great opportunities through Dalhousie, and we need to partner with them because they can access you know grants and things that we can’t*’. (Participant #4, administration)

DISCUSSION

This study explored the barriers and facilitators for four case studies of CQI for health promotion under a healthcare Healthy Eating Policy. The four case studies included a pricing intervention, a digital app, a Healthy Corner Store, and a

Table 3. Cross-cutting facilitators in conducting CQI for health promotion within retail food environments in hospitals as identified by Nutrition & Food Services .

| | Inside out model | Theme | Context | Quote |
|--------------|---------------------------------------------------------|--------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Facilitators | Policy and environments supportive of health | Healthy Eating Policy | Nutrient Criteria guide what foods to sell more of and less of—supposed to help classify foods. Staff to support policy and interventions | <i>‘We need to be grounded in a nutrient criteria that helps us define what’s healthy and unhealthy but to me, it’s such a small piece of the policy’. (Participant #3, administration)</i> |
| | Communities that recognize health problems | People are busy and don’t have a lot of time; people want a choice | Interventions that allow staff to avoid grocery stores avoid long lineups for lunch | <i>‘Increasing our access to a very busy healthcare system so that our caregivers and visitors have time to actually eat and nourish themselves’. (Participant #2, administration)</i> |
| | Organizations that monitor and promote policies | HEPSC | Group of interdisciplinary members who provide strategic direction for the Healthy Eating Policy. | <i>‘The steering committee is such an important aspect of you know the policy implementation. So, one of the guiding principles in my mind of any steering committee, but definitely the one that promotes the healthy eating environment, is to have interdisciplinary membership’. (Participant #2, administration)</i> |
| | Interpersonal connections that foster collective action | Local knowledge | Engagement with customers provided a lot of information to tweak interventions. People with the greatest access to customers are the point-of-sale staff. | <i>‘So maybe didn’t have a whole picture of the why but maybe it was just more of an ask, but I think you have to be sensitive I think of the needs of the site’. (Participant P#8, administration)</i> |
| | | Low-risk trials | Small trials allowed participants to prove themselves and gain the trust of managers and other staff | <i>‘... when we talk about how do you make a change or have you ever done something without any data if we didn’t do that original study it would have been very difficult for us to say let’s take a huge chance and just do this everywhere. Like you have to prove to yourself that it’s worthwhile doing first and then that’s those little studies’. (Participant #3, manager)</i> |
| | | Longstanding partnerships with researchers | Involvement of researchers allows for longitudinal study and application to grants, funding and future research opportunities. | <i>‘to work with universities and to have the research we really want to have data like daily data at our fingertips’ (Participant #2, administration)</i> |
| | Fair and equal resources distributed across individuals | Champions and leaders | Participants mentioned specific people when discussing interventions. There are people they go to for resources and information about interventions. | <i>I: ‘How do you decide what products to put at eye level and which to put on bottom shelves like how does that work?’ P: ‘Sometimes it comes through [name] I guess through like a provincial group so she provides I know when I started we did a lot of work around pricing and placement and she’s provided a lot of guidance for us’. (Participant #8, administration)</i> |

salad bar cost control intervention. Facilitators included the Healthy Eating Policy, community context, local knowledge, partnerships and leadership. Barriers included time, resources, conflicting benchmarks and past negative experiences. The Healthy Eating Policy supported participants in acting and trying new interventions but also created obstacles, such as when interpreting nutrient content. Individual, interpersonal, community, and organizational factors supported the policy and the goal of creating a supportive food environment. These findings provide insight into the different factors influencing health promotion within healthcare and can be used to inform future implementation.

This study found that the Healthy Eating Policy was a facilitator for health promotion but also posed barriers. Our findings are similar to those of [McIsaac et al. \(2017\)](#), who reported that top-down nutrition policies helped shape the cultural norms in school food environments. However, policies do not guarantee change. A hospital-based study by [James et al. \(2017\)](#) found that following the National Health

Service quality standard addressing childhood obesity, two hospitals remained non-compliant for vending machine offerings, displaying nutrition information on menus and displaying healthy options in hospitals. Even with a strategy in place to support policies, communities must agree on health issues ([Golden et al. 2015](#)). Policies and benchmarks must also remain flexible so the practitioners can tailor interventions to their settings ([Cranney et al. 2023](#)).

Policies support the consistency of CQI initiatives ([Gardner et al. 2010](#), [Bailie et al. 2017](#)) and larger-scale population health interventions ([Cradock et al. 2015](#)). However, unlike [Kirk et al. \(2021\)](#), who found no guideline-related barriers when exploring voluntary healthy eating guidelines implemented in recreational facilities, our study found obstacles to the policy’s adjacent document, the Nutrient Criteria. Participants, particularly those working at point-of-sale, felt that classifying food was a specialized skill that required a dietitian. It is important to note that there may be differences between implementation processes between this study and the

study by Kirk *et al.* (2021), who explored the implementation of optional nutritional guidelines within recreational centers, not mandatory policies.

This study found that PDSA cycles helped participants try new, low-risk innovations. Participants used local knowledge to act and innovate, thus demonstrating that individual autonomy and power support policies, as per the Inside out model (Golden *et al.* 2015). However, there are limitations to PDSA cycles in addressing more complex problems. There are calls for PDSA cycles to rely on qualitative contextual knowing to inform practices and benchmarks (Percival *et al.* 2016). Additionally, PDSA cycles can be an oversimplification of the problem-solving and sense-making process, when in practice, conducting PDSA cycles can be complex and require data capture, teaching, and mentorship (Reed & Card 2016, Zamboni *et al.* 2020). In addition to case studies, future research can use other methods to study health promotion interventions (e.g. cross-sectional pre-post study, institutional ethnography, natural experiments, randomized controlled trials (RCTs)).

Our study found that leadership and champions were essential facilitators of CQI for health promotion. Champions are also mentioned in the Inside out model as reinforcing policies. In our study, leaders were identified in formal leadership roles and described as ‘strong females’. These leaders supported staff when engaging in retail interventions and supported point-of-sale staff when implementing a new intervention. Leaders involved in CQI play a key role in the vision and direction of CQI interventions (Zamboni *et al.* 2020). Certain leadership styles impact patient and organizational outcomes differently, with transformational leadership having positive effects on organizational culture and transactional leadership having weaker effects, as demonstrated in a recent systematic review (Sfantou *et al.* 2017). Leadership engagement in CQI is influenced by the organizational supports in place to conduct CQI (e.g. resources, tools); therefore, the responsibility to facilitate innovation is not just up to a leader but also the organization (Sfantou *et al.* 2017). Leadership has also been studied in clinical CQI, and outcomes may vary for health promotion interventions (e.g. empowerment and resiliency) (Kahan & Goodstadt 1999, Pelikan *et al.* 2022).

Our paper explored barriers and facilitators of CQI for health promotion within healthcare. Much of our knowledge about facilitators and barriers to CQI comes from clinical literature (Hill *et al.* 2020). Conducting health promotion interventions within healthcare has the added burden of focusing upstream on prevention, which may pose challenges in a system largely organized, funded, and focused on downstream clinical outcomes (Pelikan 1997, Pelikan *et al.* 1997), where the priority outcomes may conflict (e.g. nutrition and financial benchmarks). In addition to further developing health promotion practice, our study has suggested a need to study PDSA cycles for health promotion to demonstrate what can be accomplished by investing in health promotion integration into quality improvement programs (Groene & Jorgensen 2005). Future research could continue to explore external political factors influencing policies and PDSA cycles.

Strengths and limitations

This study used in-depth interviews analyzed through multiple exploratory case studies. The interviews allowed for a rich understanding of the interventions and experiences of hospital staff. Although these findings are not generalizable

to other healthcare organizations, they may be transferable to other organizations or retail settings (e.g. schools and recreation centers).

The quality improvement case studies demonstrated a variety of benchmarks explored within healthcare settings and allowed for a rich understanding of context. Selecting the four case studies was challenging, given how much they differed in benchmarks, scope, geographic region and scale-up. However, this is arguably reflective of real-world practice and practitioner-led CQI. To strengthen the coverage of the cases to reflect a wider variety of healthcare health promotion practices, this paper included a negative case study (cost control salad bar) where healthy items were removed instead of added. Negative case analysis acts as a member check and demonstrates that the researchers didn't only look at confirmatory evidence (Lincoln & Guba 1985, Yanow & Schwartz-Shea 2006). For example, this case demonstrated the financial impacts of a shift towards health-promoting environments and how, at times, breaking even is prioritized, and healthy food options can also be viewed through a business case model.

This paper used the Inside out socioecological model by Golden *et al.* (2015) which was helpful in the cross-cutting examination of cases from multiple angles, including individual to policy levels. This provided possible theorization of the interconnectedness of healthcare contexts and how they support policies. The Inside out model ascribes agency to individuals and aligns well with CQI as a science which focuses on people and process. The model also speaks to the interpersonal relationships necessary for policy reinforcement, which emerged as a facilitator to advancing CQI initiatives. The Inside out model has been criticized for downplaying political factors contributing to upstream changes within public settings. This study does not speak to external political factors influencing CQI and health promotion, which is a limitation (Oladele *et al.*, 2015). A second limitation is a potential misalignment of CQI and socioecological theory. For instance, the Inside out model focuses on upstream policy issues, whereas CQI models have been largely drawn from downstream clinical care and are primarily implemented for efficiency and safety reasons (Kahan & Goodstadt 1999).

Conclusion

This research explores the barriers and facilitators of CQI for health promotion through a qualitative multiple exploratory case study analysis of quality improvement under a healthcare Healthy Eating Policy. Overall, a healthcare Healthy Eating Policy supported CQI for health promotion; however, the Nutrient Criteria were also seen to be a barrier. Although the lack of intervention data was an issue in solving problems in practice, the case studies included in this paper demonstrated evidence of building data infrastructure into new interventions. These CQI case studies explored multifaceted healthy eating objectives, such as healthy food affordability and healthy convenience, beyond the routinely monitored benchmarks of nutritional content of food offerings and financial ones of breaking even. Developing benchmarks for other aspects of the food environment could lead to further interventions and small tests of change that empower staff to try new practices. The study of how PDSA cycles are implemented and evaluated

within healthcare settings may shed light on factors that might impede or enhance the effectiveness of CQI. Policy and decision-makers need to understand these barriers and facilitators in order to maximize health promotion within healthcare.

Author contributions

C.L.M., J.P.L., S.F.L.K., and M.S. supervised the research. L.J. and C.L. conceptualized the work. L.J.K. collected the data. C.L.M., M.S., J.P.L., and S.F.L.P. contributed to the qualitative methodology, data analysis and interpretation of the findings. L.J.K. and C.L.M. wrote the initial draft, and all authors provided feedback and edits on the final draft. All authors approved the final version to be published.

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Data availability

The data underlying this article cannot be shared publicly due to confidentiality and privacy concerns. The data will be shared on reasonable request to the corresponding author.

Ethics

This study received ethics approval from Nova Scotia Health (REB # 1028236).

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