

Lessons Learned from Reusable Serviceware Implementation in School Lunch in a California School District: A Qualitative Exploration of School Staff and Parents' Perceptions

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INTRODUCTION:

The National School Lunch Program and School Breakfast Program are vital to promote student health and reduce food insecurity while providing nutritious meals to millions of U.S. children. In 2023, 4.6 billion school lunches were provided nationally (USDA, 2024). School meals ensure that students have access to essential nutrients that support their growth, development, and academic performance (J. F. W. Cohen et al., 2021). However, the extensive scope of these programs in conjunction with the models most schools have adopted, which often use satellite kitchens or off-site contracts with foodservice companies rather than on-site from-scratch cooking, leads to significant food packaging waste. Public schools in the U.S. generate about 14,500 tons of municipal solid waste daily, of which approximately 42% is food packaging generated by school foodservice (Waste360, n.d.).

Schools are increasingly implementing zero-waste initiatives to reduce environmental footprints (GSNN, 2015). In school cafeterias, these programs emphasize waste reduction, recycling, composting, and transitioning from disposable products to compostable or reusable serviceware (CalRecycle, n.d.). Such efforts have gained momentum in response to growing environmental concerns, including the prevalence of chemicals (including phthalates, adipates, and bisphenol-A) leaching into school food (Careghini et al., 2014; Fasano et al., 2012), which have potential impacts on student health (Caldwell, 2012; Chen et al., 2014; J. FW. Cohen et al., 2023; Rochester, 2013). Further, while compostable serviceware may alleviate some waste production, not all compostable alternatives are free of perfluoroalkyl and polyfluoroalkyl substances (PFAS), which negatively impact both human and environmental health (Chiang et al., 2018; Goossen et al., 2023; Timshina et al., 2024).

Against this backdrop, a large, urban California school district launched a project designed to reduce the solid waste generated by the school lunch program. The initiative focused on replacing single-use packaging and utensils with reusable alternatives such as metal trays, utensils, and bulk condiment dispensers (Figure 1) in ten





elementary schools. Before project implementation, the school district used single-use compostable trays and spork kits (a plastic spork, plastic straw and paper napkin packaged in plastic). Compostable milk cartons without a straw and non-compostable juice boxes with straws wrapped in film plastic continued to be offered at all lunch periods. Schools received a daily delivery of clean reusable metal trays and utensils and returned dirty serviceware through a contracted company. Students brought a resolution to the school board advocating for this change, and the school district received a grant, which enabled this project. The district recycling coordinator supported the launch and monitoring of this project across the district.

Figure 1: Example of an Elementary School Lunch Served on a Reusable Stainless-Steel Tray







Limited studies are exploring the implementation of reusable serviceware in K–12 school foodservice. Understanding the perceptions of key stakeholders—including foodservice staff, principals, and parents/guardians—is essential for such programs' long-term success and scalability. This study aims to explore the perceptions of these stakeholders regarding reusable serviceware implementation in school lunches, assess the level of support for reusable serviceware, and identify the facilitators and barriers to successful implementation. By analyzing these perceptions, this paper aims to provide insights into the practical challenges of integrating reusable serviceware into school lunch programs and offer guidance for other districts looking to adopt similar waste reduction initiatives.

METHODOLOGY:

This cross-sectional qualitative study assesses school staff and parent/guardian perceptions of transitioning to reusable serviceware in an urban California school district. Details about the school district are available in Table 1. The [blinded] Institutional Review Board and the school district's board and superintendent approved the study. We utilized the Consolidated Criteria for Reporting Qualitative Research (COREQ), a 32-item checklist, to guide the interview and focus group reporting (Tong et al., 2007).

	Participating Schools (mean (SD))
Percent of students eligible for free and	
reduced price meals	0.23 (0.16)
Total school enrollment	655.40 (180.28)
Race/ethnicity	
% American Indian	0.00 (0.00)
% Asian	0.66 (0.23)
% Pacific Islander	0.00 (0.00)
% Filipino	0.03 (0.02)
% Latino	0.17 (0.17)
% African American	0.01 (0.01)
% White	0.07 (0.05)
% Other	0.03 (0.03)

Table 1: Characteristics of the Bay Area California District's Participating Schools (N=10)

School Staff Interview Recruitment and Sample

We conducted semi-structured phone or video interviews with school staff (n=19) during May–June 2024 from ten schools participating in the reusable serviceware transition. The foodservice director (n=1), all participating schools' principals and secretaries (n=10), and the lead foodservice staff (n=10) were emailed a link to book an interview with up to 3 reminders (combination of email and phone). Interviews occurred during paid working





hours. A total of 19 interviews were completed; 2 participants were not interviewed due to non-response (one foodservice staff, and one principal) (Table 2).

Table 2: Participant Characteristics: School Staff Interview Participants (N=19); Parent/Guardian Focus Group Participants (N=23)

	Interview participants (n (%))
Position	
Principal	9 (47%)
Foodservice staff	9 (47%)
Foodservice Director	1 (5%)
	Focus group participants (n (%))
On average, how often does your child	
eat school lunch?	
1–2 days per week	12 (52%)
3–4 days per week	6 (26%)
Every day	5 (22%)
Did your child attend the same	
elementary school as last school year	
2022-2023?	
No	8 (35%)
Yes	15 (65%)

Parent Focus Group Recruitment and Sample

We conducted semi-structured online focus groups with parents/guardians (n=23) in May–June 2024. We emailed a flyer to all participating schools' principals and secretaries with three email reminders. Schools then disseminated the flyer through parent communication channels, including newsletters and social media. A total of 49 parents/guardians completed the eligibility survey; 37 were eligible and available, 14 did not attend, and 23 representing five schools attended across five focus groups (Table 2). Each parent/guardian was provided a \$50 electronic Amazon gift card for participation.

Instruments and Data Collection

Participants provided verbal consent prior to beginning the interview or focus group. Facilitators [blinded] utilized an interview or focus group guide developed by researchers trained in public health nutrition and school foodservice staff from the participating district to address perceptions of the reusable serviceware transition, including successes and challenges, and to mirror quantitative data collection efforts. Facilitators had previous experience with qualitative interviewing, focus group facilitation, or motivational interviewing, and all received training on focus group facilitation. There was no relationship established prior to study commencement between participants and facilitators. Participants were introduced to facilitators and research





aims and told that the discussion was for research purposes and to inform the district of potential program improvements.

Focus groups lasted 50–60 minutes and were recorded via Zoom (Version 6.1.11, Zoom Video Communications, Inc., San Jose, CA, 2024). Interviews lasted 20–30 minutes and were recorded via Zoom or a recording device. Co-facilitators [blinded] took notes during data collection, which were reviewed following each session. Audio recordings were transcribed verbatim using Notta.ai (Version 4.20.2, Notta, Tokyo, Japan, 2024). Researchers [blinded] reviewed all transcripts alongside audio recordings to check for errors and data immersion. Transcripts were not returned to participants.

Analysis

Transcripts were analyzed following the framework method for its benefits of a clear, systematic analysis structure (Goldsmith, 2021). One researcher [KF] developed an initial codebook and then reviewed and approved by other research team members [DLL, CF, LDR] prior to coding, using key themes identified from the interview guide and notes. Three researchers [blinded] coded transcripts using ATLAS.ti (Version 24, ATLAS.ti Scientific Software Development GmbH, Berlin, Germany, 2024), and reviewed by another coder for accuracy and reliability. To improve validity, researchers employed triangulation by analyzing combined data from all interviewee types. The coding team discussed coding differences, refinements, and new themes, resulting in a final codebook. Researchers discussed data saturation throughout the process and agreed that additional data collection was unnecessary. Findings were not shared with participants.





RESULTS:

Theme categories and themes are outlined in Figure 2 and discussed along with illustrative quotes, edited for grammar and vocal disfluencies.



Figure 2: Network Map of Reusable Serviceware Transition Theme Categories and Themes





1. Lessons Learned for Reusable Serviceware Implementation in Schools

1.1 Broad Acceptance

Participants provided positive feedback regarding the reusable serviceware, including the improved appearance of the trays and food on the trays. One foodservice staff said, *"The students are excited to see that it's a stainless-steel tray. It looks more attractive, so they're excited about having that rather than just a plain paper tray."* [Foodservice staff (FS).4] School staff reported decreased food spills, as the compostable trays were often unstable, especially when moisture was absorbed from foods. One foodservice staff said, *"[The reusable trays] have helped [students] not drop their food... which helps because if we run out of food at the end of the lunchtime, the kids at the end don't really get options."* [FS.14]

Participants described how students, including younger students, adapted to the weight of the trays. One parent said, "My kindergartener, initially she felt it was very heavy, the plates, but then she got used to it." [Parent/guardian Focus Group (PG).34] The new trays also addressed concerns about chemicals in the compostable trays. One foodservice staff noted, "[The paper trays] had chemicals, so it's definitely healthier for all schools to change to the metal plates." [FS.16] Additional positive feedback on the trays included more space on the tray for food and maintaining the temperature of food. Further, the reusable serviceware provided an alternative to disposable and fast-food culture. One parent described her child's experience: "The plates they use and cutlery, it all seems closer to home than eating at a restaurant." [PG.3]

While participants noted initial concerns, including student misuse and logistical questions, these issues generally did not materialize. A principal said, *"There was some concern that we would lose silverware, which I think to some degree you're going to lose a percentage. But generally speaking, collecting it is really just as easy as before."* [Principal (P).3] A principal said, *"They just pick it up every night and there's trays ready for them the next morning, bright and early."* [P.5]

1.2 Hygiene and Cleaning

Hygiene and cleaning emerged as a concern among parents. Some parents said they were skeptical initially, but messaging and education from the school and foodservice staff helped put them at ease. Further, the supply chain for reusable serviceware being cleaned and delivered daily functioned seamlessly. One foodservice staff said, "One of the parents, they were worried like, "Is it going to be clean enough for the kids?" We're like, "They go to an industrial dishwasher like a restaurant, you have plates in a restaurant. It's very similar." That was at the beginning. But there are no issues now that they see it." [P.13]

1.3 Foodservice Staff Workload

Foodservice staff mentioned less preparation time and increased efficiency. One foodservice staff said, "There's less prep time, and I don't have to worry about separating trays because it's really easy to just grab one [tray] when they're stacked. I'll have more room in my workspace because the trays don't need to be separated." [FS.14] The reusable trays also improved the efficiency of the lunch line. One foodservice staff said, "It did actually save a lot of time because... when they're stuck together, the paper trays were harder to take apart. With these ones





[the metal trays], it was quick. So, I was definitely going faster with the serving time." [FS.16] Overall, there was minimal change to the foodservice staff's job responsibilities. The foodservice director (FSD) said, "There was literally no change in their job more or less. It was just different." [FSD.1] Further, participants described decreased waste around the school due to the reusable serviceware and sorting systems, which minimized the janitorial staff workload. The foodservice director said, "They don't have to throw [the trays] in the dumpster... the janitors thought it was so much easier." [FSD.1]

Foodservice staff identified areas of their workload that have changed, including how the weight of the metal trays impacted their workload, especially in the process of counting trays. One foodservice staff said, *"Usually I can carry 200 [compostable] trays at one time. Now I can carry maybe ten or fifteen... Because I don't want to hurt myself." [FS.20]* Most staff stated that while the trays are heavier, they learned to work with them. For example, *"They're pretty heavy, and we tried to only grab five or ten. But sometimes, in the middle of service, trying to get the food out to the kids quickly, you start grabbing big handfuls, and they're heavy; sometimes, they stick together a little bit. That makes it a little bit difficult when you're used to handling a really light tray. But I think we adapted to it pretty good." [FS.10]*

1.4 Sorting and Adult Supervision

Many schools had waste sorting systems established for composting, recycling, and landfilling, and adding an additional stream for reusable serviceware to the sorting procedures was seamless for the school and students. One principal explained, "Our [transition] has been super successful, because we haven't had to change anything big and the kids are already sorting." [P.11] While students learned the new sorting processes, there were still sorting challenges, including students accidentally throwing utensils in the trash. This issue required consistent adult supervision or extra work from the foodservice staff to remove items from the bins. A principal explained, "There are still some students that may just throw everything in one place. We're constantly checking and... reminding students. That's always a challenge with everything. It's not going to be perfect." [P.7] A foodservice staff member shared, "[The janitor] tried to be at the trash can area just to make sure that they are not accidentally trashing the utensils. It takes a little bit of her time to monitor that." [FS.4] Participants also noted that staff or volunteers must monitor if students take utensils they do not need or if students who pack lunch and borrow utensils forget to return them.

1.5 Training and Support

Participants described how the school district administrators' support allowed for a smooth transition, including solving supply chain issues and offering additional support to foodservice staff. The district recycling coordinator's assistance in the transition was especially helpful. One principal commented, "[The district recycling coordinator] does an excellent job, she's very knowledgeable, she's very clear with her directions or communications." [P.11]

School staff noted that training for students, volunteers, and foodservice staff, which included a school-wide assembly, was beneficial. Several principals stated they appreciated knowing about upcoming changes so they could prepare their communications. One said, "[I] make sure all of that information that's pertinent to





transitions or lunches gets passed onto families, teachers, and students, and we use a variety of channels of communication. I'm just trying to make sure that they know ahead of time it's coming so that they're prepared." [P.17]

1.6 Financial Viability

Participants questioned the financial viability of reusable serviceware due to cleaning and transporting services. A parent/guardian stated, "I wonder how costly that becomes for [the district]... It's nice to have those trays, but I'm curious to see what was the setback." [PG.24] A principal echoed this sentiment, asking, "[If we continue] is going to be depending on, is it cost efficient?" [P.7] The foodservice director commented on the financial viability of the transition, stating that a grant facilitated starting up the program: "The ongoing cost of washing these things, we pay for it ourselves, \$150,000 a year. That's a lot for only a third of our elementaries. And we did get a grant for \$50,000. But that's a one-time grant... Until we can figure out how to make our own dishwasher or build our own central kitchen with a dishwasher, I think we'll just keep going with just these ten schools and not expand past that." [FSD.1]

1.7 Issues with Bulk Condiment Dispensers

Participants described issues with bulk condiment dispensers, including students excessively pumping condiments, broken condiment pumps that were not replaced, and unusable dispensers due to missing parts. One principal explained, *"It took a while for us to get the condiment dispensers, and it's been hit or miss. They'll still send the little packages of ketchup, for example, when we have the dispenser because they don't send the larger one [bulk package] that fits in the dispenser." [P.3]*

2. Impact of Reusable Serviceware Implementation in Schools

2.1 Reduction in Waste

Participants were pleased with the waste reduction, citing a positive environmental impact and a cleaner school environment. Foodservice staff described the disposable utensil packets as a large contributor to excess waste. One said, *"They used to grab the utensils only for the straw for their milk. It would be a lot of waste, and it wasn't even being used."* [FS.14] Additionally, a parent/guardian volunteer said, *"The school is cleaner than before, because when there were paper plates and plastic spoons around, kids were not taking responsibility of putting things in place."* [PG.18]

2.2 Community and Student Support for Environmentalism

Participants expressed their support for environmentalism, as well as the students'. One principal said, "I was really happy to eliminate [the plastic waste] because I do personally have concerns about all the plastic that ends up in the oceans." [P.9] Principals and foodservice staff confirmed that environmentalism is an important value among students, and that value motivated students to adopt reusable serviceware. The foodservice director explained, "They're all really cognizant about environmental concerns and I feel like that can't be understated ... they're getting taught that you have to take care, be good stewards of the environment. I feel like they're the ones who drive it or are going to keep driving things like this happening." [FSD.1]





2.3 Opportunity for Student Learning and Habit Development

All participant types expressed students formed habits around using reusable serviceware and limiting trash. Parents/guardians saw school initiatives as an important learning opportunity for children. One said, *"The kids learn a lot about reusing, recycling... Then the same lessons are carried back at home."* [PG.5] Principals agreed that the reusable serviceware transition evoked students' regard for the environmental impact of both solid and food waste at school and home. One principal said, *"It's teaching our kids to be more aware of the environment that they're going to be growing into."* [P.9] Further, participants commented on the importance of combating a disposable and fast-food culture. One foodservice staff said, *"Just in the whole context of less waste, I think this is something that the kids have to learn how to do as well, not waste. Not build on the waste that has already been done every day by everyone."* [FS.14]

Students also quickly learned the new sorting process, adapted to heavier trays, and learned how to open milk cartons and drink milk without a straw. Foodservice staff were instrumental in helping students to adapt by providing guidance and reminders. One explained, *"Now the kids have to learn how to open their milk a different way... We always just tell them we're trying to save the turtles. Then they get it." [FS.10]*

3. Participant Recommendations for Program Continuation and Expansion

3.1 Beverage Dispensers

Foodservice staff said they want reusable serviceware expanded to beverages, with drink dispensers and reusable cups rather than milk and juice cartons. Some desired to transition from milk and juice to water as the primary beverage at school lunch. One principal said, *"If there was a cooler or something with cups, so that students could be encouraged to just drink water."* [P.9] All elementary schools in the district have water refill stations, typically located outside of the cafeteria and sometimes within the cafeteria; however, students must bring their own reusable water bottles. The foodservice director noted that the district plans to implement bulk milk dispensers and reusable cups at participating schools.

3.2 Other Ideas

Participants provided other ideas for program continuation or expansion, including expanding kitchen infrastructure for dish-washing, compostable juice cartons, compostable bags for trash bins, an end-of-year assembly with information on school's waste reduction, and lessons during welcome week of school to review expectations, teach students about cafeteria clean-up, and practice sorting.

DISCUSSION:

Many school systems utilize pre-packaged foods and disposable serviceware as a cost-effective and timesaving means to providing school lunches (Ghiselli et al., 1994). Particularly following the COVID-19 pandemic, many schools adopted packaged or processed meals to adhere to food and pandemic safety guidelines (Jowell





et al., 2023), increasing the use of food packaging and single-use plastics. These practices not only increased waste but also perpetuated a disposable, fast-food culture in schools. Our findings suggest that reusable serviceware benefits the school community by making the school lunches feel more environmentally friendly and more 'like home,' offering a positive alternative to the prevailing disposable culture and potentially supporting participation in school meals by students.

Research to promote school-based recycling or waste reduction has demonstrated that environmental education is well-received by students; students value environmental issues and are important advocates for environmental initiatives (Altikolatsi et al., 2021; Browne et al., 2023; Goldberg et al., 2015; Prestin & Pearce, 2010; Sánchez-Llorens et al., 2019; Schupp et al., 2018). These findings are consistent with our results, which demonstrate that students as young as elementary school value and prioritize environmentalism, suggesting that reusable programs will be widely accepted among students and school communities. Moreover, using reusable serviceware in school meals is only one of many activities that schools can undertake to reduce waste. Further studies are needed to demonstrate the environmental impact of such initiatives.

Further, research suggests chemicals from disposable or compostable serviceware and plastic packaging may be present in school foods (Careghini et al., 2014; Fasano et al., 2012) posing risks to student health (Caldwell, 2012; Chen et al., 2014; J. FW. Cohen et al., 2023; Rochester, 2013). Our findings add that parents and the school staff are aware of this potential concern and support efforts to eliminate plastics and disposables because of concerns about chemicals and the potential long-term impacts on student health. The implications of non-toxic serviceware may be another important reason for implementing a reusable program and facilitating acceptance among the school community.

Strengths and Limitations

Our findings have limited generalizability due to a small sample size only at the elementary school level from a single California school district, lack of direct student input, lack of parents/guardians from five of ten participating schools, and convenience sampling of parents/guardians for focus groups. Therefore, findings may not apply to schools in other settings. Lastly, focus groups are time-consuming and, in some cases, limit researchers' ability to address all questions in the guide.

CONCLUSIONS AND APPLICATION:

Reusable serviceware were widely accepted across the school community for many reasons, including improved aesthetics, improved appearance of food, decreased food spills, reduced exposure of foods to chemicals from compostable trays, larger space on the tray for food, better temperature maintenance of food on the tray, decreased solid waste, and an alternative to disposable and fast-food culture. Initial concerns regarding the reusable serviceware included that the trays would be too heavy for students, misuse by students, and efficiency of the cleaning and delivery of reusable serviceware to school sites. However, these initial concerns were either quickly addressed or did not materialize. Issues with bulk condiment dispensers





should be anticipated, and hygiene and cleaning have emerged as a primary concern among parents. School staff should anticipate providing communications and messaging that provides reasons to adopt a reusable serviceware program and addresses anticipated concerns.

While the foodservice staff's work tasks changed, their job responsibilities and overall workload stayed the same. Beneficial impacts included more efficient processes for serving, improved efficiency of the lunch line, and decreased waste hauling. Staff concerns included that the trays would be too heavy for staff and the logistics of setting up sorting systems. While many staff agreed that these challenges were overcome with time, training and support should be offered to foodservice staff to facilitate a smooth transition and address any initial concerns.

Students quickly learned new sorting processes; however, adult supervision was required to ensure accuracy. Schools should consider parent volunteers, student volunteers or clubs, foodservice staff, principals, and/or custodians to provide supervision. Supervisors should provide reminders and monitor that food, waste, recyclables, and reusable serviceware are properly sorted. They should anticipate removing items from incorrect bins, ensuring students are only taking needed utensils, and reminding students who pack lunch to return borrowed utensils.

Training from school district administrators and a program coordinator who provides support will help facilitate a seamless transition to reusable serviceware. The school-wide kick-off assembly was helpful and may need to be repeated yearly until students and staff are accustomed to the change. Providing key information to principals ahead of time is essential for the school to have adequate time to inform parents and the community of upcoming changes. However, the financial viability and sustainability of a reusable serviceware program remains a key concern. Districts looking to implement this type of program should consider financial streams, including grants and partnerships to fund startup costs such as metal trays and foodservice staff trainings. Schools may also need to invest in dishwashers or pay for a service to clean and deliver serviceware. Future studies and total cost analyses that factor in environmental considerations (including emissions from transportation, purchased energy, and waste) are needed to compare the resources needed for and the impact of disposable versus reusable serviceware in schools.

School districts considering implementing reusable serviceware may consider these points as reasons to adopt a reusable program and strategies to overcome challenges.

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ABSTRACT

PURPOSE/OBJECTIVE

Explore principal, foodservice staff, and parent perceptions of implementing reusable serviceware in elementary school lunch settings.

METHODS

Cross-sectional qualitative study conducted May–June 2024 in one California school district which recently transitioned to reusable serviceware. School staff (n=19) participated in phone interviews and were purposively sampled. Parents (n=23) participated in virtual focus groups (n=5 groups) and were convenience sampled. Verbatim transcripts were coded and analyzed using the framework method.

RESULTS

Reusable serviceware was widely accepted for many reasons, including improved aesthetics and food appearance, decreased food spills, reduced exposure of foods to chemicals from compostable trays, larger tray space for food, better temperature maintenance of food, and an alternative to disposable, fast-food culture. Initial concerns included that trays would be too heavy for students, misuse by students, and efficiency of the cleaning and delivery contracted service. However, these concerns were quickly addressed or did not materialize. School staff reported issues with bulk condiment dispensers, hygiene emerged as a concern among parents, and financial viability and sustainability remain a key concern among all. Parents and school staff identified a reduction in solid waste, community and student support for environmentalism, and the opportunity for student learning and habit development as positive impacts of implementing reusable serviceware.

APPLICATIONS TO CHILD NUTRITION PROFESSIONALS

While many staff agreed that the challenges of heavy trays and the logistics of setting up waste sorting systems were overcome, training should be offered to facilitate a smooth transition. Students quickly learned new sorting processes; however, adult supervision is required to ensure accuracy. School staff should anticipate providing communications and messaging highlighting reasons to adopt reusable serviceware and addressing anticipated concerns. Districts looking to implement this type of program should consider grants and partnerships to fund startup costs, including reusable serviceware, staff trainings, and dishwashers or cleaning contract services. Future research is needed to evaluate the environmental impacts of switching from disposable to reuseable serviceware in schools.





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