



Dispenser Pilot Review



AMERICAN DAIRY
ASSOCIATION NORTH
EAST



PRIME
CONSULTING

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Thank You

Special **THANK YOU** to all the project team members who made the pilot possible.



POPLAR BLUFF
SCHOOL DISTRICT

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chartwells |
eat. learn. live.



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Background

Milk consumption by students in schools has long been a priority for the national and local dairy council organizations. Dairy farmers have long valued the establishing of milk drinking habits by students in their formative years. As a result, the dairy council(s) have participated in many different innovation experiments to find ways to grow children's consumption and love for milk.

In recent years, with an eye toward environmental stewardship, various school districts and support organizations have experimented with offering milk via dispensers rather than individually packaged servings. Most of these pilots/studies have recapped a portion of the full picture, but to-date, no single pilot has been found that was comprehensive in scope and measurement.

In multiple research projects bulk milk dispensing has been recommended as an opportunity to increase milk consumption and/or decrease carton waste. Many students and teachers have also voiced displeasure with the current milk carton available. The research is summarized in the appendix and includes: Nourish to Flourish National Conference on improving school meals, two different student research groups at the FUTP 60 Student Ambassador Summit, World Wildlife Fund Food Waste Warrior Report, and DMI research on Youth Milk Concepts and Insights.

Background

The going-in hypothesis for many in the project was the dispenser's ability to deliver colder milk, along with the similar-to-home "milk in a cup" experience would deliver growth in milk consumption.

With this background, Mr. Rick Naczi, of American Dairy Association North East and Ms. Madlyn Daley, Mr. Mark Blake and Mr. Scott Dissinger of Dairy Management Inc., requested Prime develop an integrated proposal to fill knowledge gaps and to provide a comprehensive look at the dispenser proposition from an independent point-of-view.

To develop the fully integrated proposal the four key factors of focus will include:

- Milk sales increase
- Waste reduction and life-cycle assessment
- Student consumption increase (nutrition benefit)
- Economic and financial benefits for industry and schools

Objective & Scope

The project plan was developed at the request of Ms. Madlyn Daley, Mr. Mark Blake and Mr. Scott Dissinger of Dairy Management Inc. (DMI), along with Mr. Rick Naczi of the American Dairy Association North East (ADANE) to answer the questions:

- How do milk dispensers perform in K-12 schools?
 - Milk sales
 - Waste reduction, life-cycle assessment
 - Student consumption increase (nutrition benefit)
 - Economic and financial benefits for industry and schools
- Under what conditions is a dispenser proposition worthy of dairy council support?

To address these questions, a project plan was developed to:

- Design and measure 3 pilot cells in a total of 9-12 schools
 - ADANE cell, likely in upstate New York with 5-8 schools.
 - 2 for DMI in partnership with Chartwells with 2 schools each (RI & MO).
- Analyze and report pilot results and develop implications for a comprehensive milk dispenser proposition.
- Establish success criteria for milk dispensers in schools.

The original plan was interrupted by the Covid-19 pandemic that closed all schools part-way into the pilot period.

Milk Dispensers in Schools Project Plan

Phase 1



Establish Success Criteria

A. Recap Literature/Past Studies, Map Learnings & Identify Gaps

B. Develop Proforma Impact models for:

- Consumption
- Economics
- Environmental/Life Cycle

C. Assess Probability of Success for 3 Metric Areas

D. Review Success Criteria from Consumption, Economic & Environmental Perspectives

Go/No Go Decision for Pilot

Phase 2



Design/Conduct & Measure Pilot(s)

ADANE

- TBD
- NY or PA

Meet w/USDA to Understand Compliance/Reimbursement Issues

Different Test Plans/Cells to Cover Various Key Criteria

- Milk Consumption vs. Waste
- Milk Offerings & Use
- How Served: Reusable Cups or Disposable Cups
- Operational/Environmental Impact
 - Costs: Equip, Trash, Utilities
 - Energy Usage & Cost
 - Labor Time & Cost
 - Water Usage & Cost
 - Equipment Requirements
- Overall S.W.O.T., Financial Impact & Lifecycle Analysis
- Challenges that Emerge
- Student and Staff Surveys

Draw from Chartwell/DMI Pilots in RI, MO, Others

Phase 3



Report Results & Implication

Project Report

- Basis for Interest
- Executive Summary
- Best Practices
- Implication
- Measurement Details
 - Individual Pilot & Aggregate for Each of the 3 Focus Areas
 - Incl. Comparisons to Gable Top
- Presentation of Results & Implications

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Executive Summary: *Preface*

The dispenser pilot was planned for a range of school environments.

- Originally planned to include 4 pilot schools with Chartwells (2 each in MO and RI), and several (2-3) schools in Upstate, NY. Only the Poplar Bluff, MO and Chariho, RI schools implemented before the Covid-19 related shutdown.
- As a result, student consumption measurement was limited and the environmental impact analysis was not completed. The partial analysis is provided in this report.
- The dispenser pilot was originally scheduled for 68 days in Poplar Bluff, MO and only lasted 25 days
- The dispenser pilot was originally scheduled for 52 days in Chariho, RI at the High School and 42 days at the Middle School. The pilot only lasted 15 days in the High School and 5 days at the Middle School.

Waste evaluation in the 4 pilot schools when using cartons (pre-conversion to dispensers) occurred as planned. The waste evaluation when milk was dispensed into a reusable plastic cup did not occur, due to early school shutdowns. Student and staff surveys were also scheduled for April, and therefore could not be conducted.

The amount of milk used was measured for each school's duration using the dispensers.

- Prime secured sales data from each processor, along with leftover/unused bags at the time of Spring break, or the Covid-19 shutdown, whichever occurred first.

Executive Summary: *Results – Chariho, RI*

- Chariho, RI is a high-income district with minimal milk use before the pilot – only 1.6 servings per student in cartons across the district (vs. 3.2 national average).
- The conversion from cartons to dispenser occurred on February 24th in the High School, providing 15 days of experience before early dismissal on March 13 due to Covid-19 pandemic shutdown. The original pilot before Covid-19 was scheduled to include 52 days and end on June 12.
- The conversion from cartons to dispenser occurred on March 9th in the Middle School, providing 5 days of experience before early dismissal on March 13 due to Covid-19 pandemic shutdown. The original pilot before Covid-19 was scheduled to include 42 days and end on June 12.
- Chariho, RI pilot length was very short, so too little data to draw conclusions.

Executive Summary: *Results – Poplar Bluff, MO*

- Poplar Bluff, MO is a low income district that served milk with nearly every meal (breakfast and lunch). The district also had very strong flavored milk development.
- During the advance planning work, the processor alerted the team that Strawberry and Vanilla would not be available in bags and equaled 23% of milk servings. We elected to move forward with the pilot study to see if that loyalty could be transferred from flavors to the benefits of dispensed milk.
- The conversion from cartons to dispenser occurred on February 10th, providing 25 days of experience before early dismissal on March 12 for spring break due to Covid-19 pandemic shutdown. The original pilot before Covid-19 was scheduled to include 68 days and end on May 21.
- Milk use levels were very mixed.
 - Small elementary school had positive results (+11%).
 - Larger middle school experienced -30% in milk usage.
 - Overall, -18% across the 2 schools.

Executive Summary: *Results*

- The change in milk use levels were very mixed.
 - Chariho, RI schools were unchanged.
 - Poplar Bluff, MO saw a positive result in their small elementary school (+11%), but a sizeable decline in the larger middle school (-30%) for an overall decline of -18%.
 - The flavor elimination in Poplar Bluff likely drove the decline in milk use.
- Unfortunately, the additional test cell schools from Upstate NY could not join the pilot in time before the Covid-19 related shutdown. These 3 schools are much more representative of the broader universe of K-12 schools and would have provided a nice balancing for the entire pilot sample.

Given the unusual profiles of the 4 schools and the shortened pilot period, the net of the experience was not representative of a broad enough portion of K-12 schools to draw any mainstream conclusions.

Executive Summary: *Challenges to Dispensers*

- The Covid-19 virus has challenged the school nutrition community in many ways. Some of the most striking challenges are congregating versus social distancing and the touching of common surfaces. Eating together in the cafeteria and using the same equipment, in this case the dispenser handle, are critical to any dispenser proposition.
- This test was not able to develop a way for dispensers to support remote feeding, beyond manually filling cups in the cafeteria and using lids (and either cooler bags or tubs with ice) to transport them to the feeding site.
 - The original plan was to test remote feeding in Chariho Middle School in RI, but was not able to be implemented due to Covid-19.
 - The project team recognizes solving for remote feeding will be important for dispenser use in many schools.

Executive Summary : Conditions For Testing

To develop a list of conditions favorable or not for a dispenser form of milk service, Prime evaluated this pilot, other pilot reports, and interviewed a range of industry participants. We encourage this list be used before considering dispensers further.

Conditions Favorable

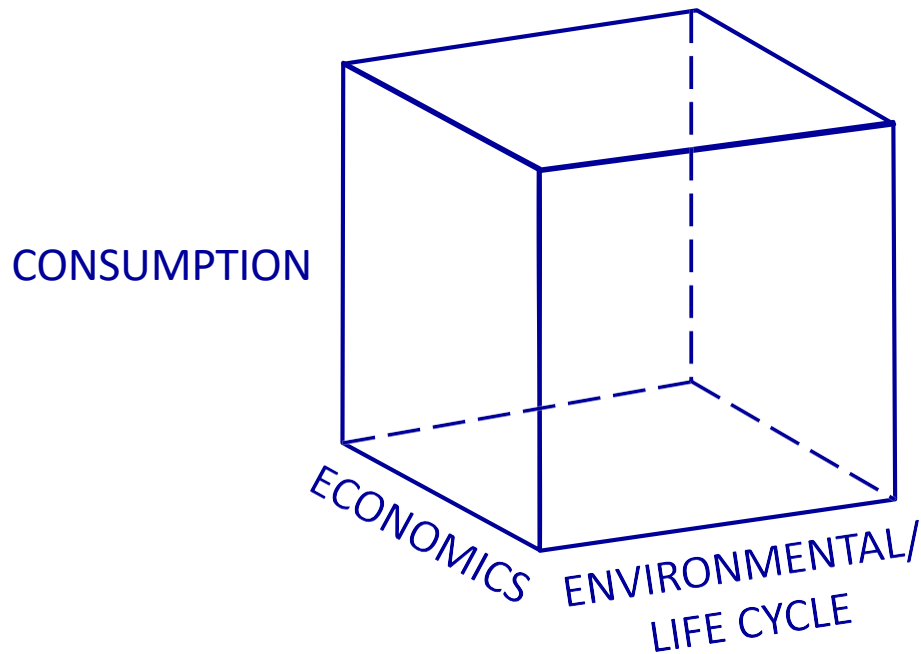
- Availability of bulk milk
- Central service location
- Dishwasher available
- Labor available for mid-service bag changes, bag lifting and dishwashing
- Flavors: White & Chocolate only
- Inventory Mgt. - fewer calendar breaks
- Larger student population
- Student self-service
- Cups with markings or portion control at 8 oz. to insure serving size compliance

Challenges/Conditions Unfavorable

- Availability of bulk milk
- Alternative service locations outside cafeteria (Moving milk to students - BIC)
- No dishwasher
- No labor available for mid-service bag changes, bag lifting and dishwashing
- 2+ flavors or desire for in/out flavors
- Inventory Mgt. - more frequent calendar breaks
- Smaller schools

Executive Summary: Evaluating Milk Dispensers for K-12 Schools

To evaluate a dispenser proposition, we recommend measurement along 3 dimensions that can be integrated to create an integrated Go/No Go decision.



Key Metrics

- **Consumption:** Milk servings per student (Used/dispensed and net consumption after waste).
- **Economics:** Capital and fully-loaded operating costs vs. other package options.
- **Environmental:** Change in Co₂, water, cleansers, solid waste (packaging) and other environmental factors.

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Chariho, RI district foodservice is managed by Chartwells. The district is upscale with 18% Free/Reduced students.

Milk use was very low before the pilot, averaging 1.6 servings per student weekly, compared to 3.2 nationwide.

Milk was served in cartons before the pilot – 1% White and Fat Free Chocolate.

2 pilot schools:

- High school (1,113 students) converted to dispenser on Feb. 24th
 - School shut down early on March 13 due to Covid-19 = 15 days
- Middle school (952 students) converted to dispenser on Mar. 9th
 - School shut down early on March 13 due to Covid-19 = 5 days

Reusable plastic cups were used for dispensing milk.

Remaining 4 district schools – Elementary schools (1,031 students) with cartons throughout.

Pilot Schools had Minimal Milk Waste from Carton Packages



Each pilot school's milk waste was measured before the carton packages, were replaced by the dispenser (see Appendix for the measurement methodology).

The Middle and Sr. High schools were found to have very low milk waste when serving cartons. The milk waste study in cartons at lunch was:

- Sr. High School 6.5%
 - Middle School 4.6%
- Total 6.0%

In past studies, Prime found Middle/Sr. High schools to have much lower milk waste than Elementary, but rarely this low. Historical waste from milk in cartons:

- Elementary schools = 12-30%
- Middle Schools and High Schools = *15-20%

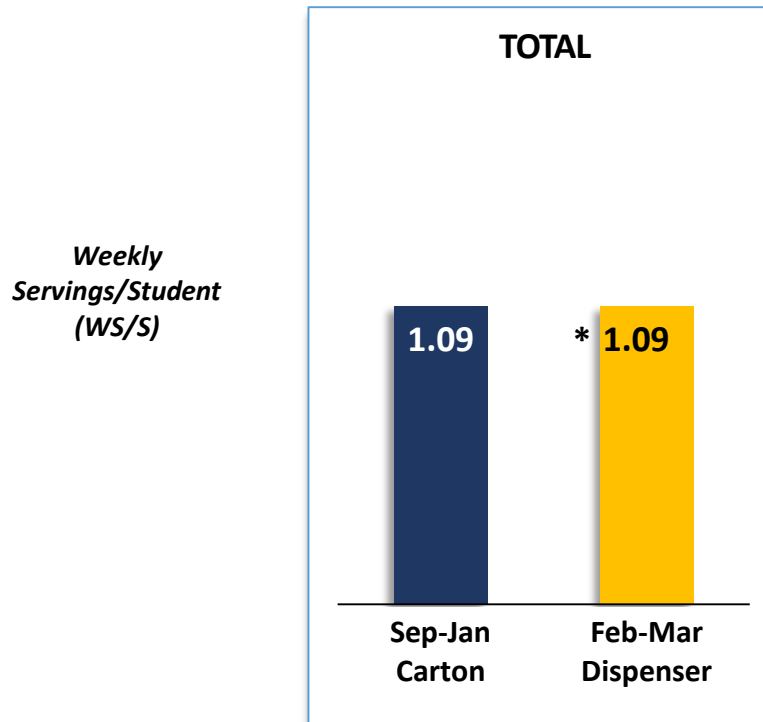
*Middle schools on the higher end and High Schools on the lower end

During Abbreviated Dispenser Pilot - Milk Use Did Not Change in Chariho, RI



During the shortened dispenser pilot, the milk servings per student were unchanged, compared to the earlier months of carton service. (Net milk usage was not available by school.)

Data Represents Milk Usage, Not Consumption Net of Waste



- Middle School averaged 1.18 WS/S
- High School averaged 1.02 WS/S

Pilot Schools Exhibited No Change vs Slight Increase in Elementary Schools With Cartons During Covid-19 Shortened Test Period



The elementary schools, that stayed in cartons, saw a slight increase in milk use. No change in products offered, service models or menus occurred.

Data Represents Milk Usage, Not Consumption Net of Waste

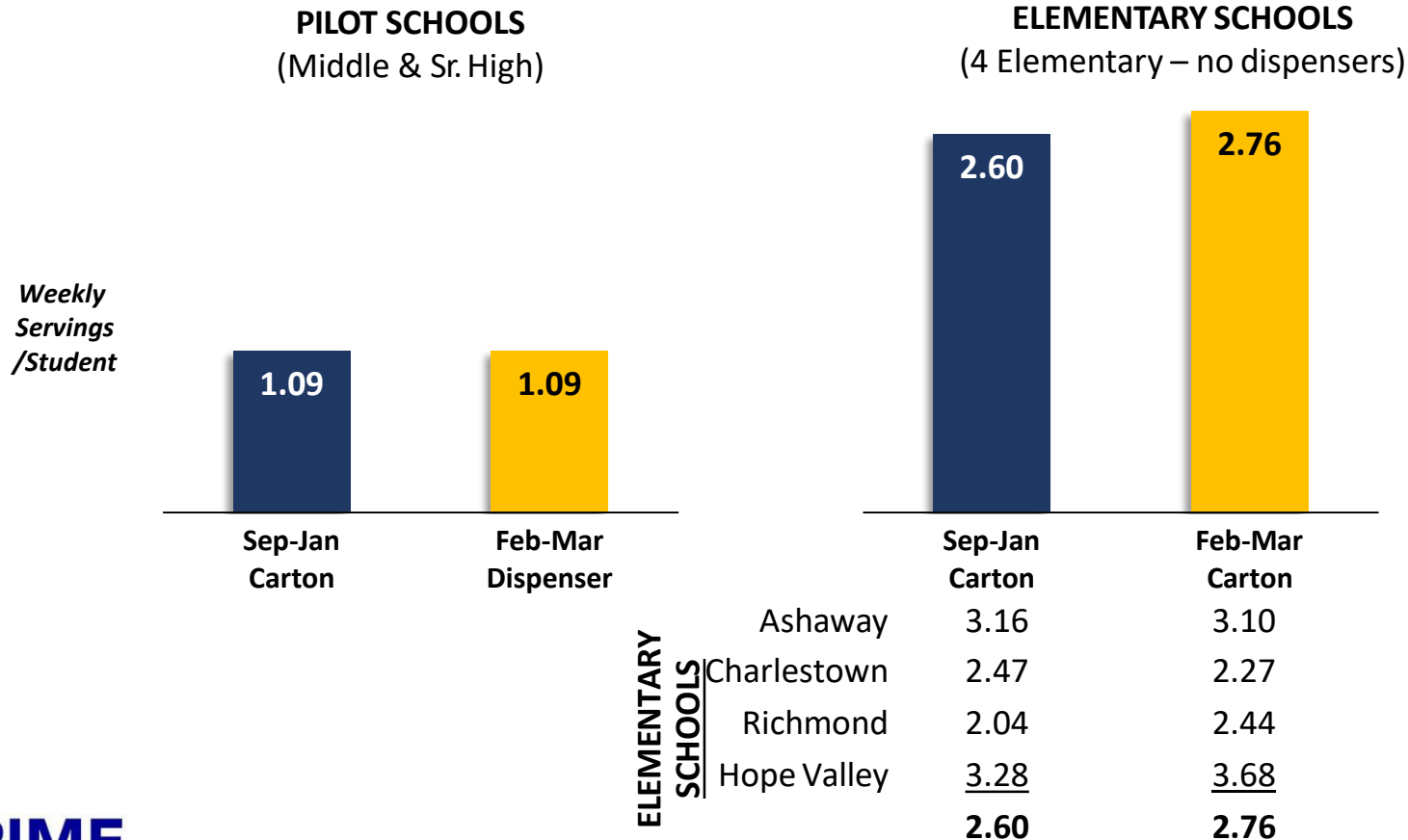


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Poplar Bluff, MO district food service is managed by Chartwells. The district is economically challenged, with 75% of students qualifying as Free/Reduced.

The schools were serving 4 flavors before the pilot.

- 1% White
- 1% Strawberry
- 1% Chocolate
- 1% Vanilla

Strawberry and vanilla accounted for 23% of milk units before the dispenser pilot.

2 pilot schools:	<u>Students</u>	<u>F/R%</u>	<u>Alt. Breakfast</u>
• Lake Road Elementary	251	99%	No
• Poplar Bluff Middle	1,173	68%	Yes <i>Breakfast After the Bell in the gym</i>

For the pilot, the district did not implement a way to offer dispensed milk for alternative service breakfast, so they continued to buy cartons for that part of their meal service.

Reusable plastic cups were used for dispensing milk.

Pilot Schools had Sizeable Milk Waste from Cartons



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Each pilot school’s milk waste was measured before the carton package was replaced by the dispenser (see the Appendix for the measurement methodology).

The pilot schools had very high waste levels, as the school served milk with every meal to nearly every student.

<i>Milk Waste – Pre</i>	AMONG OPENED CARTONS		INCLUDING UNOPENED	
	<i>Breakfast</i>	<i>Lunch</i>	<i>Breakfast</i>	<i>Lunch</i>
Lake Road Elementary	33%	37%	55%	45%
Poplar Bluff Middle	30%	18%	36%	18%

At Lake Road Elementary, nearly every student received a milk at breakfast (avg. 160 out of 251 students). 256 cartons were used at lunch on an average day, indicating some likely received 2 servings.

In the middle school, students used 184 milks at breakfast on an average day, with 36% waste. Lunch waste was much lower at 18%, with 770 milks used on an average day across the students. Unopened cartons were very low, averaging only 2-3 per day.

Results point to need of Pre/Post Student Survey on why students are not drinking milk served

Pilot Schools had Different Sales Results: Together -18% vs. Cartons



Data Represents Milk Usage, Not Consumption Net of Waste

WEEKLY MILK SERVINGS PER STUDENT				PILOT TI 5 weeks	ME Last 3 weeks	LAST 3 WEEK S VS. PRE	
	Students	F/R %	Pre-5 Weeks Ending 2/17				
Lake Road Elementary	235	99%	11.87	13.53	13.22		11
Poplar Bluff Middle*	1,098	68%	6.24	4.89	4.36	-30%	
TOTAL PILOT	1,333	74%	7.23	6.41	5.92	-18%	
Remainder of District	3,298	73%	5.45	4.55	4.88	-10%	

Lake Road Elementary (very small enrollment) had very high trial that lasted 1-2 weeks. The remaining 3 weeks were still positive ,but faded in week 3 to below carton levels.

The Middle school students, after the initial trial week (for dispensers), used less milk than cartons during the remaining weeks before Spring break. The sharp decline may trace to the elimination of strawberry and vanilla, which were 23% of their carton volume.

* Grades 5-6

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Pilot Observations

INVENTORY MANAGEMENT

Schools need to address the potential inventory surplus at the end of scheduled school breaks.

- Each bag contains 5 gallons, or 80 servings. Therefore, a half full bag in the dispenser was equal to throwing out 40 servings. The reported waste was:
 - Poplar Bluff: 8 bags or 640 servings in the 2 pilot schools (0.5 days supply)
 - Chariho: 12 bags or 960 servings in their 2 pilot schools (2 days supply)

CHANGING EMPTY BAGS MID-SERVING PERIOD

The pilot schools were faced with empty bags in the dispenser during service periods. While schools with multiple dispensers could direct the student to another dispenser, periodically, a bag change would be needed mid-service.

- Staff indicated this could be accommodated but no doubt there was some amount of time students faced “out-of-stock” for a given flavor. This can lead to lost sales and should be avoided by having sufficient dispensers.

Pilot Observations

FLAVOR OFFERING

In the Poplar Bluff, MO pilot, students had the choice of 3 flavors, plus white milk in cartons. The pilot proceeded with only white and chocolate bulk bag 1% milk in dispensers.

- Strawberry and Vanilla flavors = 23% of milk units in the middle school (5th and 6th graders).
- As a result, this turned into a test of dispenser vs. flavor choices. Flavor choices won.
- In the abbreviated period, the 2 schools reducing flavor choices declined -18%, while the rest of the district declined -10%. For middle schoolers, the impact was -30%.

In future dispenser pilots, we strongly recommend requiring flavor choices not be sacrificed in order to implement a dispenser approach to milk service.

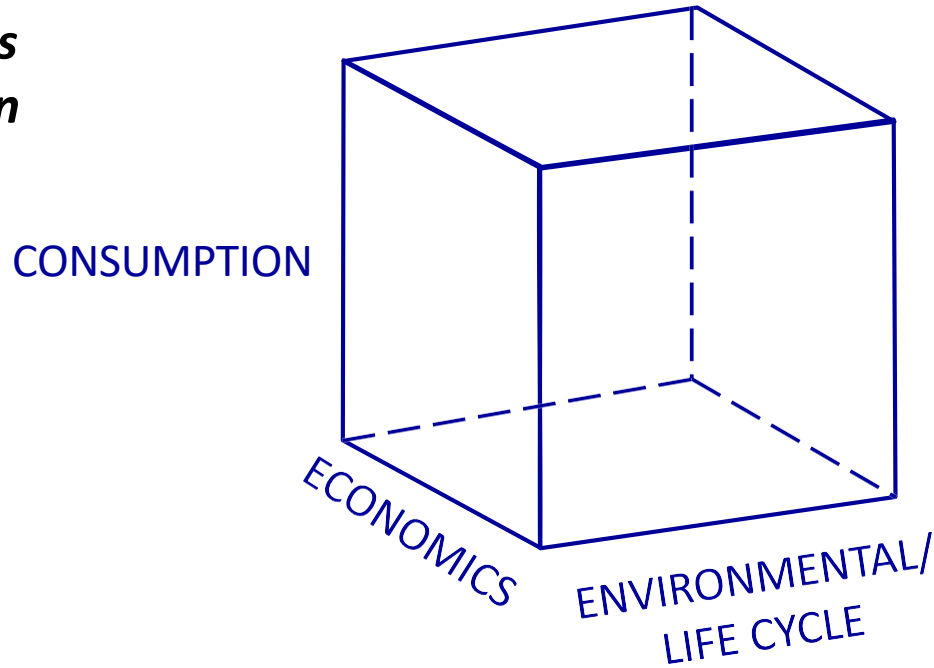
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Evaluating Milk Dispensers for K-12 Schools

3 Dimensions for Evaluation



Key Metrics

- **Consumption:** Milk servings per student (Used/dispensed and net consumption after waste)
- **Economics:** Capital – Fully-loaded Operating (Ongoing vs. other package options)
- **Environmental:** Annual Change in CO₂, water usage, cleansers, solid waste (packaging) and other relevant environmental factors.

Consumption Model

The goal is to measure the change in milk used/dispensed by students, compared to other packaging available for schools. Today, that will mostly be gable top cartons with a small amount of plastic bottles and aseptic paper containers.

As an example, the measurement includes:

Individually Packaged

of Milk Containers Used

÷ Students

= Milk Servings/Student for ____ Time Frame

- Waste (% or oz/serving)

= **NET CONSUMPTION**

Dispenser

of Servings Dispensed (assumes 8oz servings)

÷ Students

= Milk Servings/Student for ____ Time Frame

- Waste (% or oz/serving)

= **NET CONSUMPTION**

Weekly Milk Servings per Student & Current Potential

Definitions

Weekly milk servings per student is the simplest and most comprehensive measure of milk development. The calculation is as follows:

$$\text{Weekly Milk Servings per Student} = \frac{\text{Milks Used in a Week}}{\text{Students at the School/ District}}$$

Schools/processors can compare their current performance against calculated “current potential.” A school’s/district’s potential is defined as the number of potential milk servings at lunch (*5 per week*), plus breakfast (*adjusted for participation*).

$$\text{Potential for Milk Servings} = \frac{5}{\text{Lunches per Week}} + \left[\frac{5}{\text{Breakfast per Week}} \times \frac{\%}{\text{Served}} \right] = \frac{\text{Current Potential}}{\text{Current Potential}}$$

Processors are encouraged to evaluate and identify growth opportunities within their school customers using these metrics.

Economics Model

The economics for dispensers should be evaluated on a fully-loaded basis. This means all costs associated acquiring, serving and cleaning-up milk in a school setting.

	<i>Carton</i>	<i>Bulk Milk for Dispensing</i>
CAPITAL	Milk box*	Dispenser* with cart/table Dispenser Trays and cups
OPERATING		
<i>Acquisition</i>	Carton cost	Bulk bag cost
<i>Cafeteria Ops</i>	Labor to load/change box	Labor to load/change bags
		Labor for cup washing
		Dishwasher utilities**
	Solid waste cost	Sold waste cost

* Should include cafeteria layout and any electrical wiring cost to locate near the end of the serving line

Dispenser as Replacement for Cartons: Key Questions

Several pilot tests have occurred replacing cartons with dispensers. The primary motivation appears to be reducing waste and 'sustainability' goals.

- Many report dispensers reduce waste by 80+%, reducing tipping fees and landfill use. Most pilots did not measure added water use, or a "net environmental impact".
- What are the costs?
 - Equipment: Dispenser, reusable plastic glasses, carts and dishwasher racks.
 - Equipment: Dishwasher – Does the school have and use one?
 - Variable Items: Water, utilities, soap, and labor for cleaning glasses and storing them daily.
- What are the benefits/challenges?
 - Milk served at colder temperature.
 - Thus far, limited to white and chocolate (no strawberry, other flavors) at lunch.
 - Will students drink more and/or waste less?
- What are the hurdles?
 - USDA serving size requirement/portion control – How satisfied/verified?
 - Potential Spills are a roadblock
 - How to handle with alternative breakfast service?
 - Staff time, water, soap and electricity to wash and handle glasses each day.
- What is the net financial and environmental impact? And what should the goal be?

Proforma Economics Model: *School Equipment Capital Cost*

Prime used equipment costs from this pilot along with the Clackamas County, OR pilot to develop an estimated cost for each type of equipment*. These were then projected to a total cost for the average size school at each grade level.

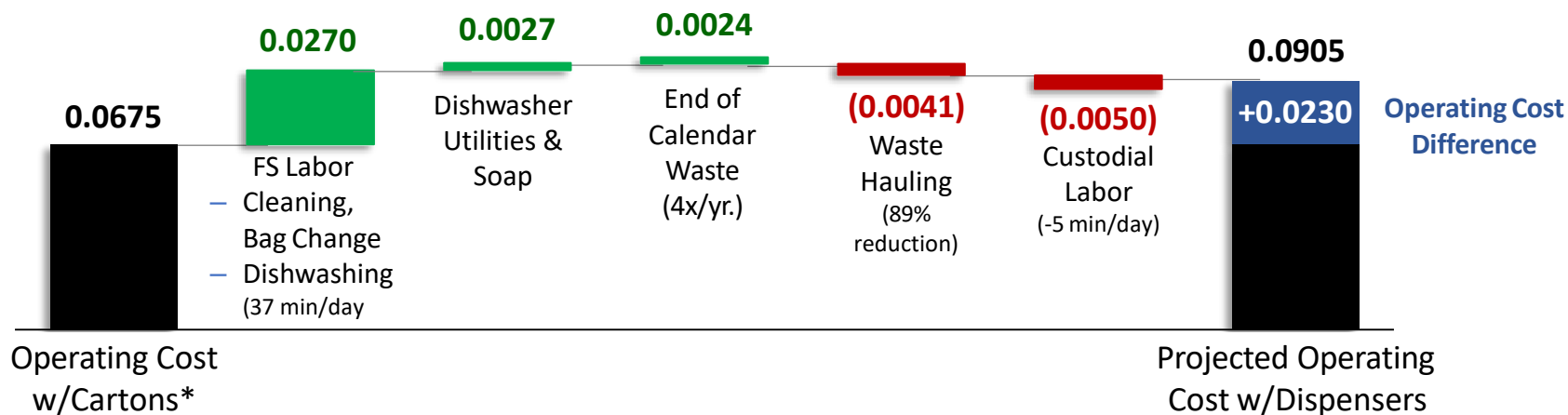
	Cost Each *	TYPICAL SCHOOL (Students)		
		Elementary 550	Middle 900	Sr. High 1,200
Dispenser (3 Spigot)	\$2,600	(2) \$5,200	(3) \$7,800	(2) \$5,200
Industrial Cart for Dispenser	600	1,200	1,800	1,200
Dishwashing Trays (1/25 cups)	30	690	828	828
Washable Cups (Case of 36)	35	559	671	671
2 Carts to Move Trays	275	275	275	275
Milk Crates, Misc.	175	175	175	175
Total Equipment		\$8,099	\$11,549	\$8,349
Excluding Dispenser		\$2,899	\$3,749	\$3,149

The Hubert Company assisted in providing equipment performance information to project 'average' utility and operating expenses.

Proforma Economics Model: *School Operating Cost – Projected for an Average Elementary School – Not completed in this pilot due to Covid-19*

Cafeteria operating expenses are projected to increase \$0.023 per serving when using dispensers compared to cartons.

School Operating Cost per Milk Serving



Ordering, accounts payable, delivery/receiving and utilities for dispensers vs. milk boxes were all unchanged activities. Projection excludes cost of equipment or related depreciation/amortization expense.

* Prime modeling based on large district cost details from another pilot. Carton Cost breakdown:

Ordering	18%	Rec'v./Put away	18%	Move w/in School	14%
Accounting	4%	Handle crates	46%	Inventory Loss	<1%

For dispensers modeling utilized Hobart 'spec-sheets' provided by the Hubert County.

Environmental/Life Cycle Model – Not completed for this pilot due to Covid-19

The goal is to measure the impact on the environment associated with changing from individual serving packages (in this case cartons) to bulk packages and the use of dispensers and reusable cups.

	<i>Carton</i>	<i>Bulk Milk for Dispensing</i>
EQUIPMENT	Milk box*	Dispenser* with cart/table Dishwasher Trays and cups
OPERATING	Cartons	Bulk bags
<i>Utilities/Energy</i>	kWh, CO2	kWh, CO2
<i>Water</i>	Gallons	Gallons
<i>Soap</i>	CO2	CO2
<i>Solid and Liquid Waste</i>	CO2	CO2

* Should include cafeteria layout and any electrical wiring cost to locate near the end of the serving line.

Integrating 3 Dimensions for Evaluation

Recommend that the planning team moving forward consider developing a rubric to evaluate the outcome of the pilot. Each measurement dimension should be evaluated separately before integrating the 3 models together. A thought starter is shared below:

	OUTCOME FROM DISPENSERS		
	<i>Not Desired</i>	<i>Indifferent</i>	<i>Desired</i>
CONSUMPTION MODEL <i>Servings per Student</i>	Decrease ($<-2\%$)	No Change ($\pm 2\%$)	Increase ($>2\%$)
ENVIRONMENTAL/LIFE CYCLE <i>Reduction in water, solid waste (packaging), CO₂</i>	Increase	No Change	Decrease
ECONOMICS <i>Fully-loaded Cost-to-serve</i>	Increase	No Change	Decrease

Conditions Favorable for Dispenser Consideration

To develop a list of conditions favorable or not for a dispenser form of milk service, Prime evaluated this pilot, other pilot reports, and interviewed a range of industry participants. We encourage this list be used before considering dispensers further.

Conditions Favorable

- Availability of bulk milk
- Central service location
- Dishwasher available
- Labor available for mid-service bag changes, bag lifting and dishwashing
- Flavors: White & Chocolate only
- Inventory Mgt. - fewer calendar breaks
- Larger student population
- Student self-service
- Cups with markings or portion control at 8 oz. to insure serving size compliance

Challenges/Conditions Unfavorable

- Availability of bulk milk
- Alternative service locations outside cafeteria (Moving milk to students e.g. BIC)
- No dishwasher
- No labor available for mid-service bag changes, bag lifting and dishwashing
- 2+ flavors or desire for in/out flavors
- Inventory Mgt. - more frequent calendar breaks
- Smaller schools

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Appendices

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- ✓ Fuel Up to Play 60 Student Ambassador Summit Research
- ✓ DMI Youth Milk Concepts and Insights
- ✓ World Wildlife Fund Food Waste Warrior Report
- ✓ Recap of 5 Dispenser Pilots/Conversions
- ✓ Consumption/Waste Measurement Methodology

Nourish to Flourish



“How might we enable excitement and innovation through the creation of a self-service “Milk Bar” where kids can choose at each occasion the milk in the flavor and formulation they desire and thereby increase milk consumption at school.”

*March 2017 Conference: over 200 individuals (including students) from over 170 organizations representing the entire school ecosystem (school nutrition directors, teachers, parents, brands Distributors, USDA, and foundations).

Nourish to Flourish

Milk dispensing 2.0

Goal:

- **Build a successful “business model” for milk vending machine with consistent product delivery on three different flavorings using 1% milk**

Guardrails

- 8 oz. or 12 oz.
- Flavors in conjunction with current milk options
- Address calorie limit
- Restocking done before and after lunch (can't weigh more than 25 lbs.)
- Sanitization

Target

- Middle and high school (Urban / Suburban / Large rural / small rural)?
- School meal program or A la carte?

Success criteria

- Increase participation
- Increase consumption
- Reduce waste
- Margin for stakeholders

Anticipated cost – \$200 – 500K

Nourish to Flourish

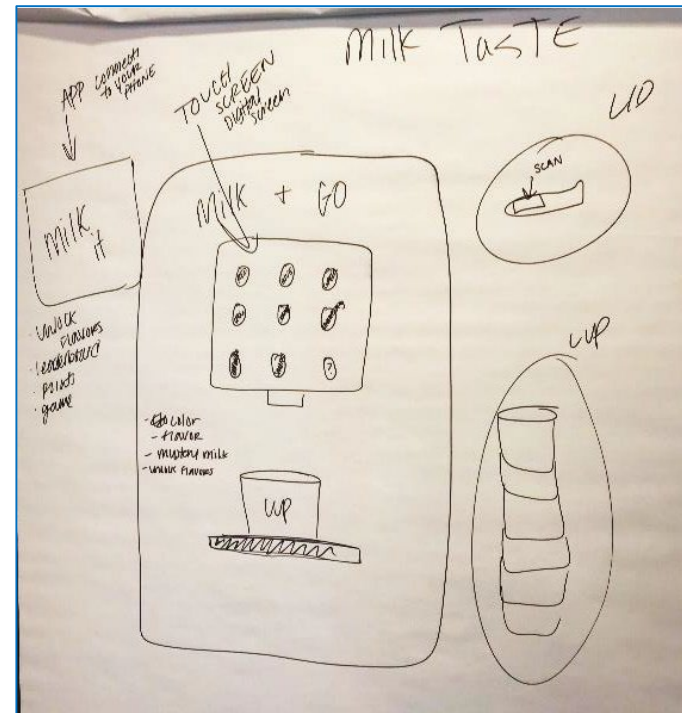
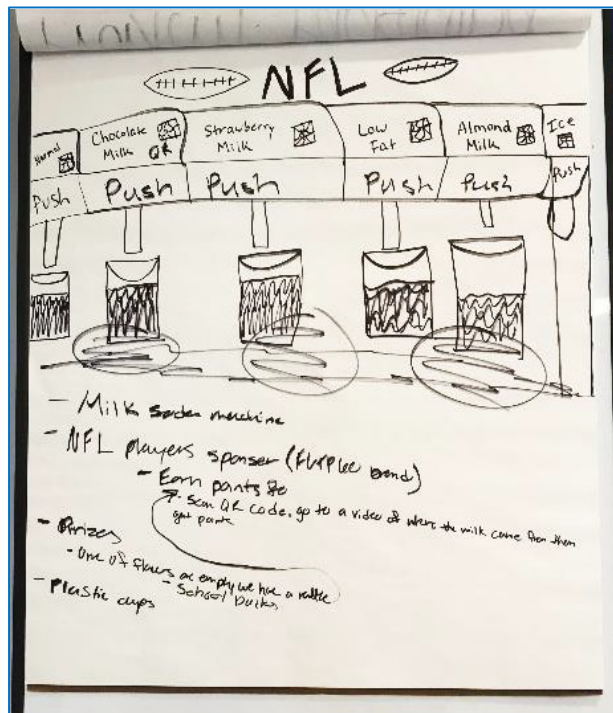
Questions to answer during pilot testing?

- What to dispense?
- Experience of dispensing?
- Space requirements?
- How many and what type of flavors?
- Formulations (no artificial colors, clean label)
- Number of dispersions (capacity of machine based on ADP)
- Product certifications (NSF)
- School district will buy?
- Where it fits best: School program vs. ALa Carte?
- Brand messaging through equipment (e.g. local)
- How to monitor and control consumption?
- Ease of operation and maintenance?

2019 FUTP60 Student Ambassador Summit: Design Thinking

Two student group breakouts identified dispensers as a potential solution to the dislike some students have toward paperboard cartons.

One group drew a dispenser-like machine while the other imitated the Coke “freestyle” machine that allows consumers to make custom flavors.

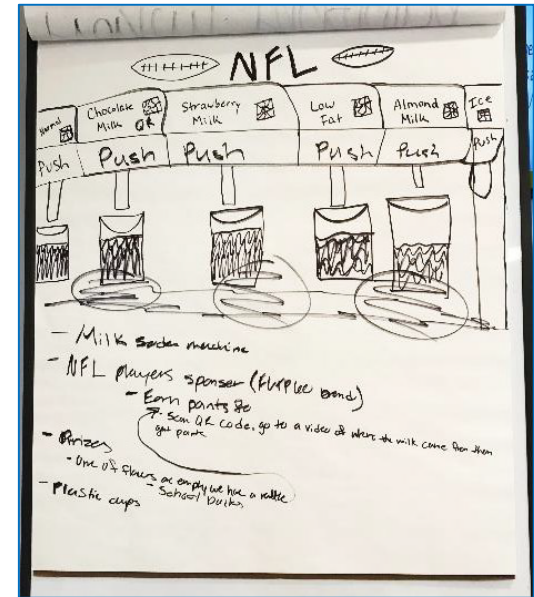


Source: Hubert Design Thinking Session Notes, 2019 FUTP60 Student Ambassador Summit, attended by over 200 student leaders from across the US. Breakout groups included approximately 12 students per group.

Group 1: Problem to Solve – School Milk

Pain Point: Chose to Fix Issue with Current School Milk Cartons

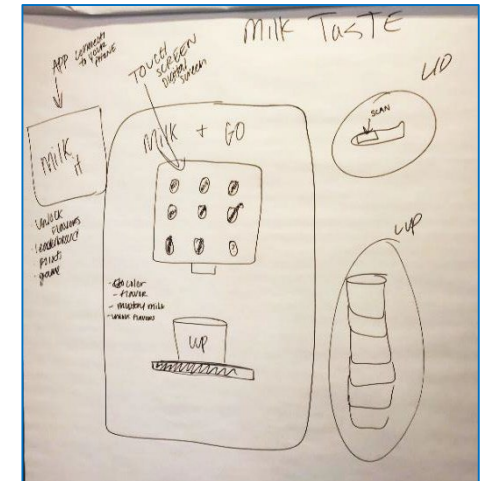
- Solution – unaided the group discussed and designed a multi-spigot milk dispenser.
- The group drew a prototype design of a dispenser with multiple spigots to serve: White milk, chocolate milk, strawberry milk, iced coffee flavored milk, lactose free milk and plant-based beverage.
- Marketing plan was to decorate the dispenser with FUTP 60 or NFL Theme. Have an NFL Team or player endorsement for the dispenser and milk to explain health benefits with posters, other signage, dispenser graphics and potential player visit to school.
- When exposed to a dispenser machine the students reacted strongly to the idea with some more in-depth suggestions related to signage, machine operation (speed and drips) and labeling of flavors.



Group 2: Problem to Solve – School Milk

Pain Point – Group Wants Better Tasting School Milk & More Attractive Cartons

- Solution – unaided the group discussed and designed a flavor machine with a screen to pick a flavor additive. They also discussed flavored straws with multiple flavors for milk, as well as character cartons or see-thru cartons for their milk.
- Drew a prototype design of a flavor machine with a screen to push buttons to add flavors to milk. They wanted ice cream and banana milk flavorings. They wanted clear cartons to add color to the flavorings and also proposed characters/designer looking cartons. They want to make milk fun.
- Marketing plan was to decorate the cartons with characters such as Pokemon Go and get prizes for finding Pokemon's. Advertising standard flavors and seasonal flavors on the screen of the flavor dispenser. There could also be an advertisement on the screen of the flavor machine by an NFL player with positive milk messaging and nutrition information.
- When exposed to a dispenser machine, the students reacted strongly to the idea with some more in-depth suggestions related to signage, speed of dispensing and desire for touch screen.



DMI Youth Milk Concepts and Insights



Top-Tier “Winner” Results for School Concepts Winner: Potential beyond marketplace expectations



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Opportunity Score
Parents of Children 6-17

Kids Purchase Interest
Score by Grade Level

<u>Grade School Kids*</u> <small>(Age 6-10)</small>	80%
<u>Junior High Kids*</u> <small>(Age 11-14)</small>	81%
<u>High School Kids*</u> <small>(Age 15-17)</small>	69%



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Opportunity Score
Parents of Children 6-17

Kids Purchase Interest
Score by Grade Level

<u>Grade School Kids*</u> <small>(Age 6-10)</small>	74%
<u>Junior High Kids*</u> <small>(Age 11-14)</small>	74%
<u>High School Kids*</u> <small>(Age 15-17)</small>	63%



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Opportunity Score
Parents of Children 6-17

Kids Purchase Interest
Score by Grade Level

<u>Grade School Kids*</u> <small>(Age 6-10)</small>	71%
<u>Junior High Kids*</u> <small>(Age 11-14)</small>	60%
<u>High School Kids*</u> <small>(Age 15-17)</small>	62%



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Opportunity Score
Parents of Children 6-17

Kids Purchase Interest
Score by Grade Level

<u>Grade School Kids*</u> <small>(Age 6-10)</small>	75%
<u>Junior High Kids*</u> <small>(Age 11-14)</small>	59%
<u>High School Kids*</u> <small>(Age 15-17)</small>	52%

Green font indicates that score is above average in age cohort.

Confidential

October 2019 Presentation

World Wildlife Fund Food Waste Warrior Report 2019

Funded by the Kroger Foundation



The report highlights:

- Food waste could be costing \$9.7M per day, or \$1.7B every school year
- On average, each of the 46 participating schools produced approximately 39.2 pounds of food waste per student per year
- On average, each of the 46 participating schools produced approximately 28.7 cartons of milk waste per student per year

Milk Waste Delivery Method:

- 8 oz Cartons – averaged 32.7 cartons per student per year
- Gallon Jug – averaged 11 - 8 oz. cartons per student per year
- Dispenser – averaged 4.5 – 8 oz. cartons per student per year
- Recommendation: Schools should consider serving bulk milk

<https://www.worldwildlife.org/publications/food-waste-warrior-report-2019>

Appendix – Notes from reviewing from recent studies

Pilot Area	Milk Sales Increase	Waste Reduction - LCA	Student Consumption Increase (Nutrition Benefit)	Economic and Financial Benefit for Industry and Schools
Clackamas, OR	✓	* ✓		
Bellingham, WA				
Vermont				
Harrisonburg, VA	✓	* ✓	✓	
New London-Spicer, MN	✓	* ✓		* ✓
* Not complete data				
Chartwell's Pilot**	✓	✓	✓	✓

**Comprehensive pilot suspended due to Covid-19

Appendix: Notes from Reviewing Recent Studies

Clackamas County, OR Schools FAQ document

- One-time equipment purchases (\$4,241) were detailed.
- Ongoing variable costs were not mentioned, except that kitchen staff found the extra time ‘negligible’.
- Two different write-ups were provided. One said they used 3 gallon bags (‘5 gallons were too heavy’). The other said they used 4 gallon bags.
 - Either way, 48 or 64 servings, for a school of 400 students (at average milk use) that would translate to 3-5 bags each lunch, so multiple changeovers mid-serving. Labor and staffing cost difference versus cartons were not addressed.
- Email from OR dairy council recapped claims and included less waste. From 4 gallon to 1 gallon. What was the cause? More consumption or fewer servings taken? Hard data was not provided.

Bellingham, WA District. All references were soft and qualitative (“No specific numbers but school nutrition director *feels* milk numbers are constant, but all milk served now is consumed”). “Feels” is not factual and “all served is now consumed” is very unlikely.

Vermont paper (2016) references several case studies, but the data for each is only partial. A single school of 170 students was referenced. The paper concludes there is no single right answer, and that situation-specific circumstances should drive the choice.

Appendix: *Notes from Reviewing Recent Studies* (cont'd)

Bluestone Elementary, Harrisonburg, VA (2019) (Project by Masters candidate)

- Partial measurement for lunch over short period. Several holes in data collection called out in paper. Variable costs not detailed.
- Breakfast in the Classroom was offered in this school and they used shelf stable cartons. This pilot did not address alternative service locations for bulk milk dispensing.
- Waste collection occurred during roughly week 3 of dispenser use. The only volume measurement was when waste was being measured. With just under 600 students and 488 lunches per day, why was milk volume only 300 milks over 5 days? The table in their write-up does not show time frame. Could it be daily?
- No discussion/data on initial equipment purchase, ongoing variable costs or net impact.
- Impressions came from staff surveys.
- Did not see lower tipping fee info or net environmental impact.

New London-Spicer, MN (2015) workshop provides a good list of factors to measure, even though only partial data on themselves.

- Baseline measurements included: Energy consumption, solid waste, water waste
- Single school results provided for:
 - Milk servings and waste (gallons/pounds)
 - Energy use in kW/year for carton vs. dispenser
 - Staff labor (minutes per day for both foodservice and custodial staff) for carton vs. dispenser
 - Monthly costs: milk, electricity, water, trash hauling, labor
 - Monthly Revenue: milk

Consumption/Waste Measurement

Approximately 10 years ago, Prime conducted a review of consumption studies published over the prior two decades. During this research we:

- Found 3 different approaches each referred to as “plate waste surveys”:
 1. Actual weighing of discarded food and milk.
 2. Trained observers grading a plate (*usually 5-6 point scale*).
 3. Interviewing the children after finishing their lunch.
- Concluded #2 and 3 would not be effective or accurate for milk. A trained observer could not see the remaining milk in a carton (the “pre” condition), and we don’t think children will accurately communicate how much milk they actually drank.

As a result, Prime has used approach #1, actual weighing of the discarded milk (and food), in numerous waste studies over the past decade.

We have refined this into 2 different weight-based measurement protocols that have been used in nearly a dozen different studies. We propose to measure waste in the dispenser pilot using a similar methodology.



Consumption/Waste Measurement (cont'd)

The district personnel measured the pilot “pre” condition (serving milk in gabletop cartons or plastic bottles) by weighing the package at the trash station after the student has finished their meal. This has proven the most efficient and accurate methodology in nearly a dozen studies over the past decade.



For milk served in a reusable glass, pouring out of remaining milk into a bucket near the trash station will be the most efficient and accurate methodology.

- Whether the students or an adult empties the remaining milk into a bucket will depend upon the way the dishwasher racks are configured (bottom of the glass up or down?).

We planned to conduct 2 waves of waste measurement at each school, each 5 days (Mon-Fri) long:

- “Pre/Current” at least 2 weeks before the conversion to a dispenser, and before any announcement of the change.
- “Test” waste measurement wave during weeks 6-10 of the pilot. We want the ‘newness’ to wear off to read an ‘ongoing’ consumption level.

Due to Covid-19 interruption of school, the measurement of waste from dispensed milk consumed from a reusable glass was not possible.