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The Dairy Case Management Program:

Does It *Mooove* More Milk?

A Case Study of the Northwestern Hudson Valley Market

Todd M. Schmit*, Harry M. Kaiser*, and Chanjin Chung**

***Research Associate and Professor, respectively, Cornell Commodity Promotion Research Program**

****Assistant Professor, Department of Agricultural Economics, Oklahoma State University, Stillwater, Oklahoma**

Department of Applied Economics and Management
College of Agriculture and Life Sciences
Cornell University, Ithaca, New York 14853

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- Develop and maintain comprehensive databases relating to commodity promotion research and evaluation.
- Facilitate the coordination of multi-commodity and multi-country research and evaluation efforts.
- Enhance both public and private policy maker's understanding of the economics of commodity promotion programs.
- Facilitate the development of new theory and research methodology.

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Executive Summary

Fundamental strategy changes can be seen in the marketing of generic commodity promotion, with a move away from advertising toward non-advertising programs. A corresponding change in evaluation methods is required, to identify the consumer and market impacts of non-advertising programs and the benefits to the producers who fund them. This report addresses this need by evaluating the Dairy Case Management Program (DCMP) operated by the American Dairy Association and Dairy Council (ADADC) in the Northwestern Hudson Valley Market in New York State. The DCMP is operated with ADADC program staff and retail/category managers to improve the management, appearance, and operation of the dairy case in retail stores. The DCMP program in the market included 61 retail stores, constituting 65% of all stores and over 91% of total milk sold.

For retail managers, the expectation of greater profit enhancement is likely the main appeal of the program for retail managers. This can be achieved by improved management, balanced dairy case designs, and sales volume enhancement. Milk producers are interested in improving the image of the milk category to improve its market competitiveness and in moving additional product, with the ultimate goal of increasing overall consumption. Stressing a long-term management perspective and continually evaluating dairy case operation can allow retailers to adapt to a changing marketplace and gain greater understanding of their consumer base, for their own benefit as well as that of the producers of their product.

Store progress reports indicated that existing conditions of case design, hygiene, rotation, stocking, and ordering were relatively strong, with all stores demonstrating improvement during the program. Evaluation across store types indicates that convenience and drug stores should emphasize hygiene, case design, and ordering improvements. Particular attention to hygiene and ordering issues is also warranted for supermarkets, while program implementation in mass merchant stores should highlight stocking and ordering procedures.

DCMP strategies recommended modest increases in product variety, facings, and linear footage. Supermarket designs showed little change in product counts, but increased facings and space allocation for beverage and lactaid products, while mass merchant designs emphasized increasing the number of beverage milk and gallon size products. Convenience store design changes centered on increases in beverage product counts, facings, and space allocations. Drug store designs showed overall increases in product counts, facings, and linear footage, and were particularly strong for beverage products.

Estimated DCMP impacts indicated that the program was effective at increasing the average daily volume (ADV) by 4.4% across all stores, implying an average store volume gain of 8.5 gallons per day. The DCMP was relatively more effective in supermarkets and mass merchants (a 5.3% ADV gain) than in convenience and drug stores (a 4.1% ADV gain), resulting in gains of 24.2 and 2.2 gallons per day, respectively. Overall volume gains were largely the result of gains in the standard, unflavored fluid milk category, but positive and significant volume gains were also realized for beverage milk and lactaid products in supermarkets and mass merchants.

Evaluation of the DCMP in the Northwestern Hudson Valley Market revealed that in-store results support the program's overall goals and objectives. In addition, the DCMP was effective at increasing retail sales and the overall market volume of fluid milk products sold. This should be encouraging to milk producers and prove useful in exploring additional partnering opportunities with milk processors. In addition, the local success exhibited here may aid in implementation of DCMP across larger regions.

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I. Introduction

Dairy farmer check-off contributions are used to fund a variety of generic commodity promotion programs, generic advertising, consumer education efforts, and product research. Historically, generic advertising of fluid milk and cheese has constituted the majority share of check-off budgets. Consumer familiarity with the "Got Milk" and "The Power of Cheese" campaigns highlights some of the potential benefits to producers aiming to increase consumption of their products. In addition, fluid milk processors' generic promotion and advertising efforts provides additional ammunition for eliciting greater demand in the fluid milk market.

In recent years, however, relatively constant annual dairy farmer check-off revenues, combined with strong increases in media advertising costs, has prompted a shift in milk producer check-off dollars away from generic advertising to other non-advertising commodity promotion activities, in the hope of better utilizing scarce check-off resources to achieve the highest benefit to milk producers. Furthermore, while the dairy industry continues to undertake significant "above-the-line" advertising and promotion, there remains a fundamental gap in the sales and promotion of milk at the store level (ADADC, 2003).

Because of data limitations and other factors, evaluating the relative demand impacts and benefits from this "portfolio" of check-off investment opportunities is difficult, if not impossible. Fundamental strategy changes in the marketing of generic commodity promotion, from advertising to non-advertising programs, will require alternative evaluation methods to identify the consumer and market impacts of non-advertising programs and benefits to the producers who fund them. This report achieves this objective with respect to a growing program aimed at improving fluid milk sales in retail stores: the Dairy Case Management Program (DCMP).

While a retail-level dairy case management program is distinctly different from consumer-oriented advertising campaigns, purchasing decisions and strategies at the retail level can significantly affect marketing initiatives and, in particular, the impact of advertising and promotion programs in the dairy industry (McLaughlin and Perosio, 1996). Furthermore, the retail channel is the principal channel of milk distribution in the U.S., responsible for 74 percent of fluid milk sales (McLaughlin and Perosio, 1996).

In general, the DCMP is a category management (CM) program aimed at improving the management, appearance, and operation of the dairy case in retail stores. Retailers have long recognized category management as a promotional tool for marketing their products, and grocery retailers have applied various methods of using space in dairy cases to encourage consumers to buy dairy products. While previous studies have focused on evaluating various promotions and advertising activities, limited attention has been paid to the effectiveness of category management at the retail level on increasing either retailer profits or the movement of dairy products.

The DCMP is operated through regional American Dairy Association and Dairy Council (ADADC) offices, using a hands-on approach, working closely with retail managers throughout the entirety of the program. This report contains a general description of the retail CM approach, followed by a case-study evaluation of a DCMP operated in an upstate New York market in 2002. We highlight DCMP objectives, strategies, and procedures aimed at increasing the per

capita consumption of fluid milk and heightening the profile of this beverage category in retail outlets.

Research staff from the Commodity Promotion Research Program (CCPRP) at Cornell University and at Oklahoma State University assisted in the administration and evaluation of the DCMP in the upstate New York market through three main project components: (*i*) data programming and management, (*ii*) aggregate sales analysis of DCMP, and (*iii*) micro-sales analysis of specific DCMP activities. After giving our general description of the DCMP program, we describe each of these components and discuss the analysis and sales modeling results. We close with some summary conclusions and implications of the DCMP evaluation project and comments on data limitations and areas for evaluative improvements.

What is Category Management?

The concept of category management (CM) was introduced in the 1980s to improve efficiencies in buying and merchandising practices and to allow retailers to tailor their product presentation to their consumer base. The concept involves optimizing the retailer's most valuable assets: shelf space, inventory, and customer traffic (McLaughlin and Hawkes, 1994). The process involves managing product categories as strategic business units and customizing them on a store-by-store basis to satisfy customer needs (Nielsen Marketing Research (NMR), p. 9). It is not a short-term decision framework, but a long-term philosophy, a data-intensive approach requiring continual evaluation of sales, product mix, and customer base.

NMR (p. 12) defines CM as a circular process of five general stages: (*i*) reviewing the category, (*ii*) targeting consumers, (*iii*) planning merchandising, (*iv*) implementing strategy; and (*v*) evaluating the results. Such a process requires particular attention to product mix and variety, shelf and space allocation, inventory needs, and promotional effectiveness to maximize category sales. While CM got off to a slow start in the 1980s, a 1993 survey of 60 supermarket retailers, representing 60% of total U.S. grocery sales, found that 73% of retailers were "very committed" to CM, most commonly applying procedures to reduce duplicate store keeping units (SKU), reallocating shelf space, strengthening the performance of private label products, optimizing retail pricing, and increasing product variety (McLaughlin and Hawkes, 1994). In addition, McLaughlin and Perosio (1996) surveyed dairy directors and buyers from 17 wholesale and retail supermarket companies serving New York State and found a distinct shift in management emphasis from a simpler buying or procurement function alone to total category profitability through implementation of CM in the dairy department.

Clearly, the expectation of greater profit provides an incentive for retailers to adopt CM programs. However, to milk producers, who fund DCMP efforts through their check-off investments, the underlying expectation is that these activities will increase per capita consumption. A changing marketplace demands strategic changes by retailers, to improve their understanding of today's consumers and align product categories with consumers' diversified needs (NMR, p. 24). A CM program aimed at understanding consumer preferences and strategically redefining a category accordingly should increase sales growth. It is reasonable then to hypothesize that a successful multi-store/market application could increase market volume movements and overall per capita consumption levels.

The Dairy Case Management Program

CM programs are increasingly used throughout retail stores, across numerous categories. The application of the DCMP program is therefore both timely and appropriate. The most common constraints to adopting CM programs in retail stores, as identified by retail managers, are the lack of information system support and the need for education and training (McLaughlin and Hawkes, 1994). It makes no sense to redefine a business and marketing strategy if the understanding and skills necessary to implement the strategy are inadequate. The DCMP is a CM program for fluid milk products at retail stores where program personnel provide the education and training to category managers, passing on that intellectual property and (it is hoped) imparting a long-term structural change in the management and operation of the category. The program's overall mission is to transform milk from simply a commodity, or low-profile category, into a high-profile beverage and white milk category that is a consistently valued product (ADADC, 2003).

Staff from ADADC offices select markets for DCMP implementation and strive to provide the widest store coverage in the market possible. The Hudson Valley Region DCMP program was conducted in the summer of 2002, with over 200 stores participating, and ran in four separate cycles, by geographic area. Store participation in the region included 65% of all supermarket, mass merchant, convenience, and drug stores. However, participating stores accounted for **over 91%** of average weekly volume (in total store dollars). Table 1.1 shows the distribution of stores across the four program cycles; Figure 1.1 shows the general geographic locations of program cycles based on retail store locations.

ADADC DCMP staff work with ProCorp USA, Inc., a marketing agency specializing in category management implementation, to conduct the retail store programs and work with retail/category managers. Program objectives are three-fold: (*i*) increase the per capita consumption of fluid milk, (*ii*) improve the position of fluid milk as a high-profile beverage and fluid milk category,

Table 1.1 Hudson Valley Market Store Participation, by Cycle, 2002..

				Number of Stores				
Cycle	General Location	Time	AWV	Total	Super-market	Mass Merchant	Conven-ience	Drug
1	Northeast	June	13.27	73	11	5	45	12
2	East	July	11.02	50	15	3	20	12
3	Northwest	July	15.24	63	16	4	27	16
4	Southeast	August	3.78	21	11	0	3	7
		Total	43.31	207	53	12	95	47

Note: There are approximately 321 total stores identified in the Hudson Valley Region; the 207 participating stores represent 65% by number, but 91% of average weekly volume. AWV=average weekly store volume, $ million. A good rule of thumb is that fluid milk sales represent about 3% of total store sales.
Source: ADADC (2003).

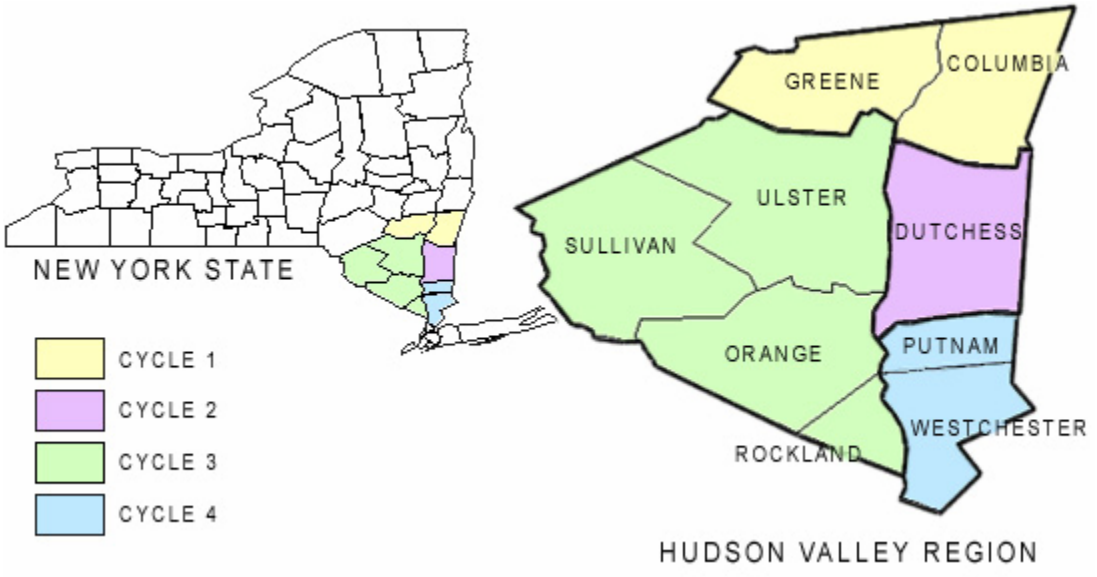


Figure 1.1 Map of Hudson Valley Market Area and DCMP Cycles.

and (*iii*) improve the management of milk ordering and handling (ProCorp USA, 2003). The integration of these objectives makes good sense, and is compatible with milk producers' interests. That is, educating retail/category managers improves the management, operation, and appearance of the dairy case with respect to the customer base it serves. Such adaptations improve the positioning of fluid milk as a higher-profile product, which highlights its nutritional benefits and makes it more competitive in the nonalcoholic beverage market. Improving the profile and image of the fluid milk product across stores in market areas should not only encourage transfers of milk purchases across stores but also result in an increase in overall consumption levels.

DCMP objectives are addressed using various program elements and measured with a variety of tools (Figure 1.2). Stock control evaluates ordering, product variety, hygiene of the dairy case, and rotation of product. To better use valuable shelf space, planogram designs consider shelf management and presentation of the product (examples of planogram designs are illustrated in Figure 1.3). Category communication elements include improving communication among store staff and management, area and regional managers, and buyers and merchandisers, as well as working with processors and retailers to achieve category growth.

Planograms are updated to accommodate the new milk management focus. The "meal solution" or fluid milk section of the category (i.e., unflavored, standard fluid milk products greater than 16 ounces in size) comprises whole, reduced fat, low fat, and skim milk products that are vertically merchandised, with each product in its own section. The store's fastest-selling section is placed in the highest-traffic area and merchandised with gallon, half-gallon, and quarts at eye level. Lactose-reduced and organic products are integrated into the fat content sections. All sizes are placed next to each other, from left to right and top to bottom, with all options placed at eye level (ProCorp USA, 2003).

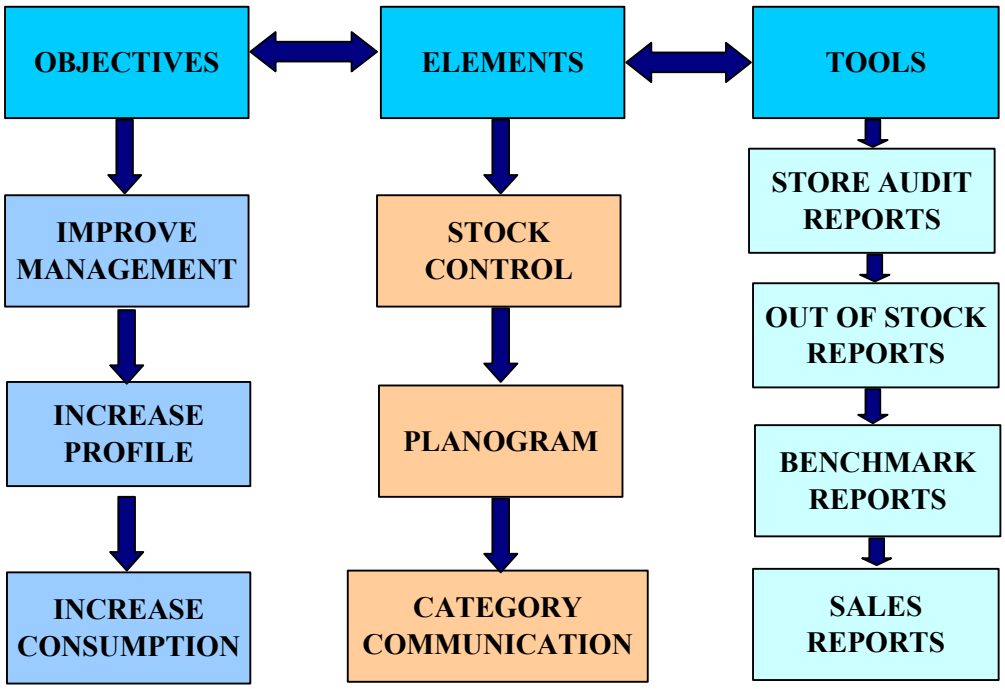


Figure 1.2 Dairy Case Management Program Objectives, Elements, and Tools..

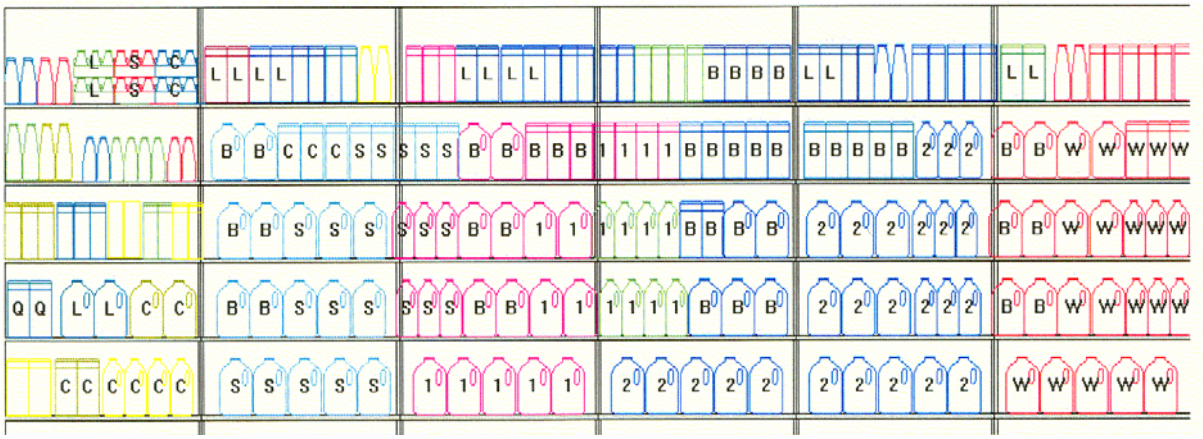
Planogram designs are split into beverage and fluid milk sections wherever possible, and beverage milk is positioned next to other non-milk beverage products (e.g., orange juice) in the dairy case, with dual locations in meal areas. The beverage section is composed of flavored milk plus single-serving, unflavored fluid milk products. This section can be isolated from the fluid milk section and have additional locations within the store. Increasing overall milk space by using secondary coolers or adding doors is also considered. The planogram design uses a vertical trade-up philosophy by evaluating existing stockweight days and facings per product. The intended result is to make the milk category an exciting destination by presenting all options at eye level (ProCorp USA, 2003).

Various evaluative tools are used to measure the progress in achieving program objectives. Weekly reports are prepared and shared with retailers to measure the progress of program implementation over time. Stores are scored during each site visit, on entry and exit, on the basis of several factors, including hygiene, sets, rotation, stockweight, and ordering (Figure 1.4). After the entry inspection, program staff discuss issues with store personnel and resolve all possible issues during the store visit. Program staff then score store displays again, before exiting the store.

Each week, a Store Audit Summary Report (SAR) is submitted to store management summarizing information from the individual site visits that week. Information summarized on the weekly Store Audit Summary is described in Table 1.2. Stock inventories are tracked closely to determine whether product is being stocked out frequently enough, adequate stock is available until the next delivery, and product facings are balanced with sales rates, and whether ordering procedures need to be adjusted (an example of a weekly SAR is shown in Figure 1.5).

Supermarket:

Branded integrated product by fat content
Creation of Beverage section
Size trade up



Convenience/Drug Store:

Increase space from other categories
Integrate by fat content

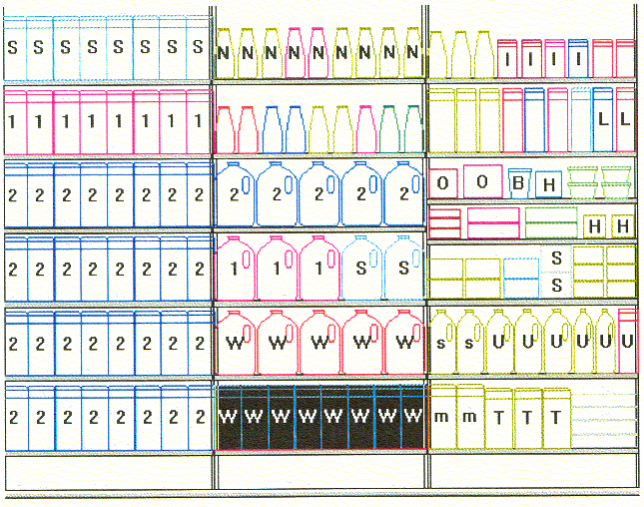
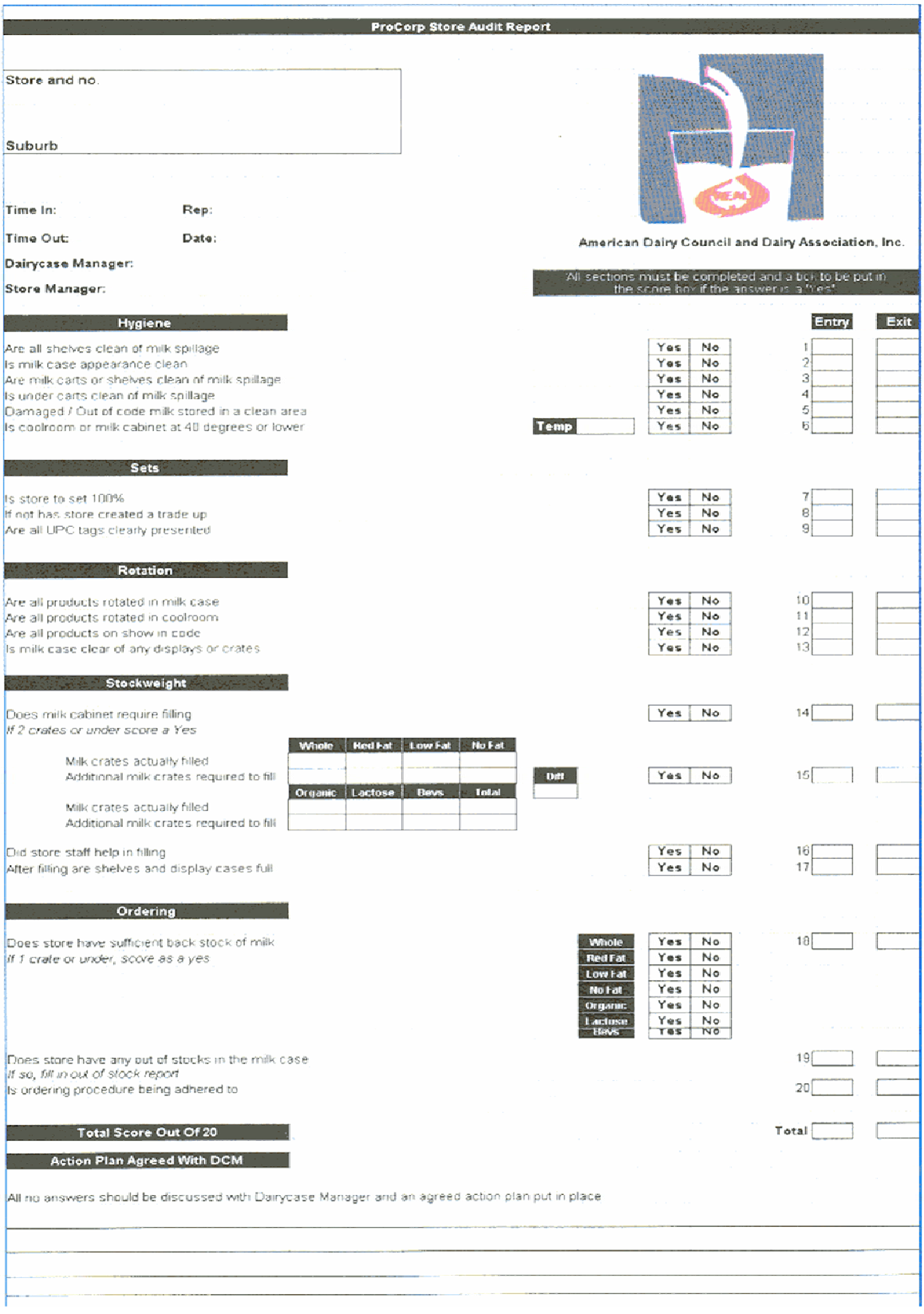


Figure 1.3. Planogram Examples and Design Objectives (Source: ProCorp USA, 2003).



ProCorp Store Audit Report

Store and no.

Suburb

Time In: Rep:

Time Out: Date:

Dairycase Manager:

Store Manager:

American Dairy Council and Dairy Association, Inc.

All sections must be completed and a tick to be put in the score box if the answer is a "Yes"

			Entry	Exit
Hygiene				
Are all shelves clean of milk spillage	Yes	No	1	
Is milk case appearance clean	Yes	No	2	
Are milk carts or shelves clean of milk spillage	Yes	No	3	
Is under carts clean of milk spillage	Yes	No	4	
Damaged / Out of code milk stored in a clean area	Yes	No	5	
Is coolroom or milk cabinet at 40 degrees or lower (Temp)	Yes	No	6	
Sets				
Is store to set 100%	Yes	No	7	
If not has store created a trade up	Yes	No	8	
Are all UPC tags clearly presented	Yes	No	9	
Rotation				
Are all products rotated in milk case	Yes	No	10	
Are all products rotated in coolroom	Yes	No	11	
Are all products on show in code	Yes	No	12	
Is milk case clear of any displays or crates	Yes	No	13	
Stockweight				
Does milk cabinet require filling *If 2 crates or under score a Yes*	Yes	No	14	

	Whole	Red Fat	Low Fat	No Fat
Milk crates actually filled				
Additional milk crates required to fill				

	Organic	Lactose	Bevs	Total
Milk crates actually filled				
Additional milk crates required to fill				

Diff

	Yes	No	15	
Did store staff help in filling	Yes	No	16	
After filling are shelves and display cases full	Yes	No	17	
Ordering				
Does store have sufficient back stock of milk *If 1 crate or under, score as a yes*	Yes	No	18	

Whole	Yes	No
Red Fat	Yes	No
Low Fat	Yes	No
No Fat	Yes	No
Organic	Yes	No
Lactose	Yes	No
Bevs	Yes	No

Does store have any out of stocks in the milk case *If so, fill in out of stock report*	19		
Is ordering procedure being adhered to	20		
Total Score Out Of 20	Total		

Action Plan Agreed With DCM

All no answers should be discussed with Dairycase Manager and an agreed action plan put in place

Figure 1.4. Store Audit Report Site Visit Form (Source: ProCorp USA, 2003).

Store Audit Report

Week Commencing March 12, 2001

Store: Hinchinbrook

W/C	Rep	# of Visits	Final %	Total Score In	Total Score Out	Diff %	Temp	Presentation of Product	Rotation	Coolroom	Inventory Whole	Inventory 2%	Inventory 1%	Inventory skim	Inventory Lac	Inventory Bev	Inventory Total	Stock Comments	Brand Support Comments
Week 8 Mar 12	Liz	3	95	19	19	0	40	Good	Good	Good	0	0	0	0	0	0	0	Low stockweight on 3/13,14.	Spoke to the DCM about increasing beverage line.
											0	0	0	0	0	1	1		
Week 7 Mar 5	Liz	5	97	18.8	19.4	-3	40	Good	Good	Good	0	1	1	0	0	0	2	Low stockweight on 3 visits.	Discussed increasing order of Lactaid products to fill shortfalls.
											0	3	0	0	0	0	3		
Week 6 Feb 26	Liz	5	98	18.8	19.6	-4	40	Shelves not clean of spills (2/28 and 3/1).	Good	Good	0	1	1	0	0	0	2	Low stockweight on 3/1 and 3/4.	Discussed stockweight with the Manager and advised to increase order of faster selling lines. Reminded the DCM that hygiene needs to be monitored daily.
											0	0	0	0	0	1	1		
Week 5 Feb 19	Liz	5	86	14.4	17.2	-16	36.6	Shelves not clean of spills (2/23).	Products out of code on show (2/23)	Back cooler is not free from spills (2/22).	3	9	5	4	0	3	24	Low stockweight on all visits.	Spoke with the Store Manager about cleaning the milk spills in the back cooler. Reminded the Store Manager that some products are close to date and need to be removed soon.
											3	3	2	2	3	6	19		
Week 4 Feb 12	Elizabeth	5	85	11.8	17	-31	43	Shelves not clean of spills on all visits.	Products not rotated (2/14). Products not in code (2/14).	Temp above 40 on all visits.	3	11	4	4	0	4	26	Low stockweight on all visits.	Spoke to Store Manager about the need to lower the temperature in the milk case and cool room.
											1	1	0	1	11	10	24		
Week 3 Feb 5	Elizabeth	5	75	12.2	15	-19	40	Shelves not clean of spills (2/5&7&9). Milk case appearance not clean (2/7&9).	Products not rotated (2/9). Products not in code (2/9).	Back cooler not clean of milk spillage (2/5&7). Temp above 40 (2/7&8). Products not rotated (2/9).	8	15	5	9	0	4	41	Low stockweight on entry and exit on all visits	Store has positive attitude, but are having issues with hygiene and rotation.
											2	2	2	0	13	12	31		
Week 2 Jan 29	Matt, Ed, Elizabeth	4	95	18	19	-5	34	Good	Good	Good	3	4	1	1	1	0	10	Low stockweight (1/31, 2/1)	Spoke to Store Manager about low stockweight. Hygiene, rotation, and planogram look great.
											0	0	0	0	1	1	2		
Week 1 Jan 22	Matt, Ed	2	95	19	19	0	38	Good	Good	Good	1	2	0	0	0	0	3	Good	Stores hygiene, rotation, and planogram look good.
											0	0	0	0	2	0	2		

Figure 1.5. Weekly Store Audit Summary Report (Source; ProCorp USA, 2003)

Table 1.2. Weekly Store Audit Summary Report Item Description..

Item	Description
In Score	Entry audit score, averaged for the week
Out Score	Exit audit score, averaged for the week
Difference	Difference between In and Out Scores (%)
Temperature	Average temperature of front refrigeration
Presentation	Narrative noting issues to address with cleanliness of fridge, shelves, and products, and codes on milk
Coolroom	Narrative noting issues to address with temperature of back refrigeration, codes on milk, and stock packed away correctly.
Rotation	Narrative noting issues to address with rotation of product, codes on milk
Inventory	Inventory counts of product stocked by program staff over the week and additional amount of stock needed to meet customer demand.
Stock	Narrative noting issues to address with stocking and inventory, ordering, stocking timeliness, and facings.
Brand Support	Narrative noting other store issues.

Source: ProCorp USA, 2003

Inventory, stocking, and ordering procedures are closely monitored during the DCMP program. Weekly Out of Stock (OOS) reports are submitted to store managers along with the weekly audit summaries. The OOS report helps measure the store's progress during the DCMP, highlighting ordering and filling problems and identifying possible solutions. Out of stocks are differentiated by type, to address the particular cause of the problem. Specifically, out of stocks are identified as (*i*) out of stock in store (highlights an ordering issue), (*ii*) not on show, available in coolroom (highlights filling and spacing issues), (*iii*) undelivered by supplier (not under the control of retailer), or (*iv*) out of code (out of date, as a result of stock not being sold quickly enough). Trend line graphics accompanying the OSS report summarize current results and those of the previous week, differentiated by product type--i.e., fluid milk (unflavored, greater than 16 oz. package), beverage milk (flavored milk and unflavored 16 oz. or less), and lactaid milk. Examples of the report and trend lines are shown in Figures 1.6 and 1.7, respectively.

Benchmark Reports (BMR) are also prepared weekly for DCMP staff to provide overall store scores in five standard benchmark categories – planogram, hygiene, rotation, stockweight, and ordering. The scoring system is an indication of each store's weekly progress and the scores reflect the number of benchmarks achieved during the course of that week. Stores not achieving benchmarks for a particular category are highlighted to address priority areas for improvement. In the first three weeks all categories but ordering are included in the scoring (maximum score of 4); subsequently all five categories are scored (maximum score of 5). It is only when a store does not achieve its benchmarks by the end of the week that the score is reduced and the issue is highlighted. An example of a BMR is displayed in Figure 1.8.

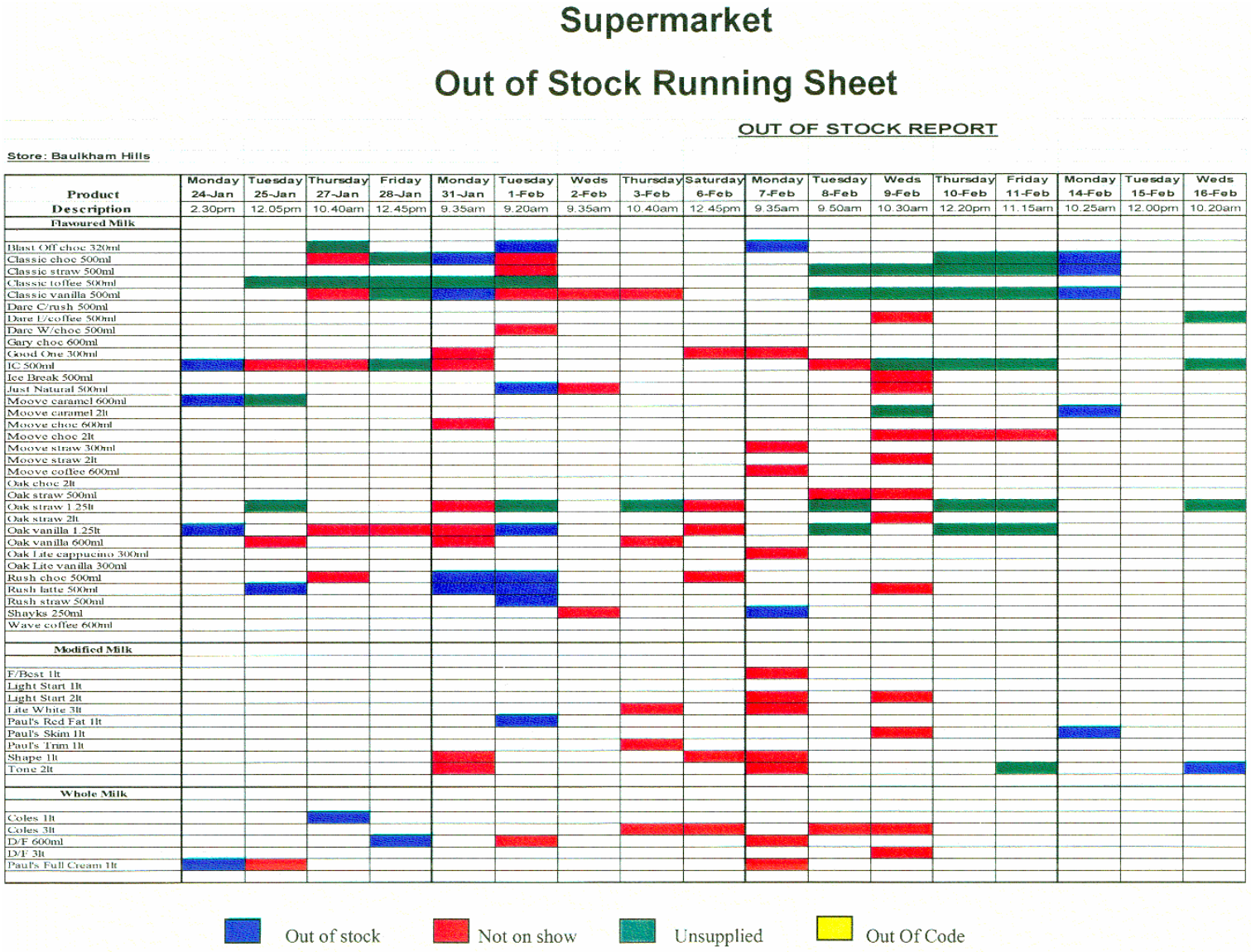


Figure 1.6. Example of Weekly Out of Stock Report (Source: ProCorp USA, 2003).

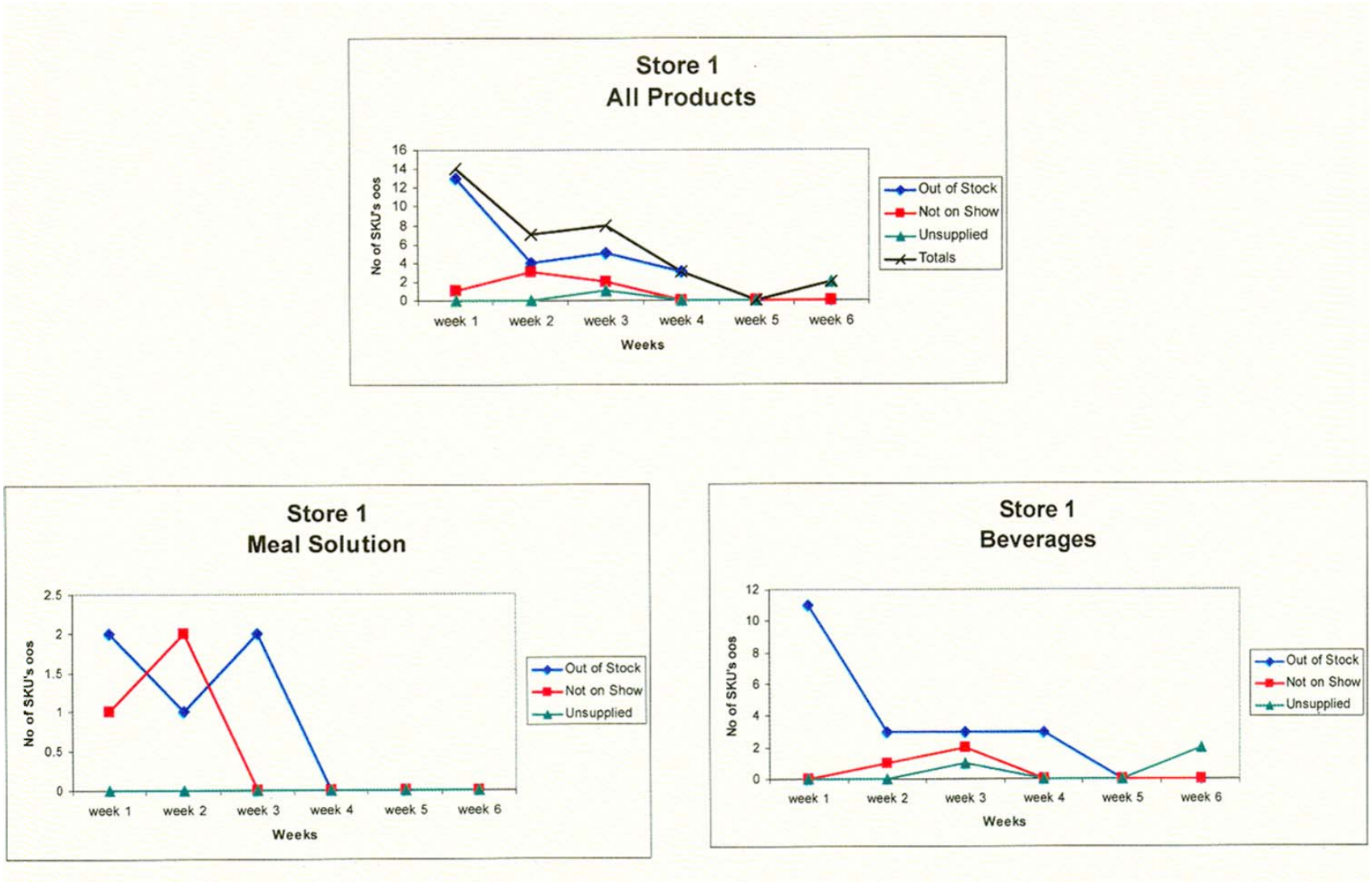


Figure 1.7. Example of Weekly Out of Stock Trend Lines (Source: ProCorp USA, 2003).

HUDSON VALLEY NORTHWEST MARKET CONVENIENCE STORE BENCHMARK REPORT			
Week Commencing: August 5, 2003			
STORE	**BENCHMARK OUT OF 5**	**ISSUE**	**BRAND SUPPORT COMMENTS**
C-Store A	4	Planogram	Spoke to the store manager about the importance of having pricing tickets on display at all times
C-Store B	4	Stockweight	Spoke to store manager about packing out more regularly
C-Store C	4	Ordering	Spoke to store manager about increasing orders to reduce low stockweight
C-Store D	5	-	Store is to benchmark
C-Store E	3	Hygiene, Ordering	Spoke to dairy case manager about the importance of a regular cleaning regime and to increase orders to reduce low stockweight and out of stocks
C-Store F	4	Rotation	Spoke to store manager about the importance of maintaining a regular rotation schedule
C-Store G	5	-	Store is to benchmark

Figure 1.8. Example of Weekly Benchmark Report (Source: ProCorp USA, 2003).

The final tool used to evaluate store progress and sales results from the DCMP is a comparison of monthly sales of fluid milk products over time. Sales of fluid milk products by store are obtained and presented to store managers upon completion of the DCMP. The monthly sales figures compare sales (in volume sold) for six months – two months prior to program operation, two months during program operation, and two months after program operation. In addition, monthly sales figures are compared to the previous year's sales. These figures exert a significant influence on managers to support and maintain the operational change taking place within their stores with regard to the fluid milk category. The process involved in managing and cleaning the raw input data from stores to produce store template files and output data files will be discussed in detail below. The retail store templates include aggregate milk templates (at the store and product type level), as well as individual store templates (at the UPC and product type level). Examples are shown in Figures 1.9 and 1.10.

Our report continues now with a description of the three main project components completed by CCPRP and other research staff in the DCMP operated in the Northwestern Hudson Valley market. After providing some demographic statistics of the study area, we start with the data programming and management component. This includes a description of both the programming process translating sales input data into store sales templates and the process involved in organizing DCMP information over the 8-week program period, including store audit, out of stock, and benchmark reports. The data management section is followed by a descriptive analysis of the DCMP store activities from the reports highlighted above, and an aggregate sales analysis estimating the sales impacts of the DCMP program, disaggregated by store and product types. We close with some brief comments on the micro-sales analysis investigating and quantifying particular DCMP activities (the full report is included in a separate report), and some summary conclusions and directions for future efforts.

Coles - Area 4
All Products

STORE	AUG 1998	AUG 1999	%	SEP 1998	SEP 1999	%	OCT 1998	OCT 1999	%	NOV 1998	NOV 1999	%	Oct/Nov Totals 1998
Brighton	0	19524		0	25087		0	19617		0	19408		0
Caringbah	30748	35140	14	42646	42835	0	33077	34840	5	40532	34876	-14	73609
Hurstville	52492	54748	4	60897	64497	6	49319	54359	10	37916	55284	46	87235
Illawong	20917	28408	36	30634	35223	15	25113	28613	14	26195	29720	13	51308
Kareela	47983	48732	2	58750	61391	4	45850	49291	8	47977	48434	1	93827
Miranda	22083	23277		27577	28325	3	26036	24186	-7	23010	23938	4	49046
Ramsgate	45160	43341	-4	59166	54570	-8	47296	44316	-6	44214	43346	-2	91510
Sylvania	46040	43418	-6	55515	54604	-2	44171	45245	2	45103	45725	1	89274
TOTALS	265423	277064	4	335185	341445	2	270862	280850	4	264947	300731	14	535809

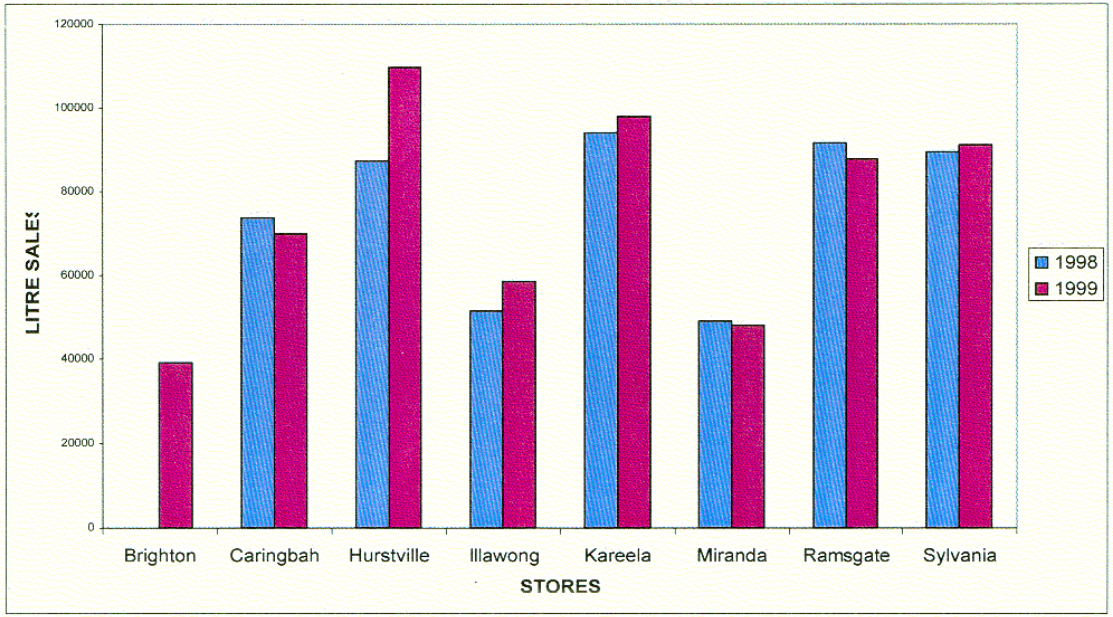


Figure 1.9. Example of Aggregate Sales Report for Multiple Store Chain, All Milk Products (Source: ProCorp USA, 2003).

Coles Ramsgate
Beverages

PRODUCT	AUG 1998	AUG 1999	%	SEP 1998	SEP 1999	%	OCT 1998	OCT 1999	%	NOV 1998	NOV 1999	%	Oct/Nov Totals 1998	Oct/Nov Totals 1999
Flavoured 2lt	498	712	43	586	1018	74	528	720	36	564	790	40	1092	1510
Flavoured 1lt	-	62		46	78	70	142	87	-39	114	30	-74	256	117
Flavoured 600ml	212	359	69	366	512	40	340	358	5	325	330	2	665	688
Flavoured 500ml	169	234	38	240	423	76	257	401	56	273	310	14	530	711
Flavoured 300ml	443	375	-15	710	438	-38	499	401	-20	377	317	-16	876	718
TOTALS	1322	1742	32	1948	2469	27	1766	1967	11	1653	1777	8	3419	3744

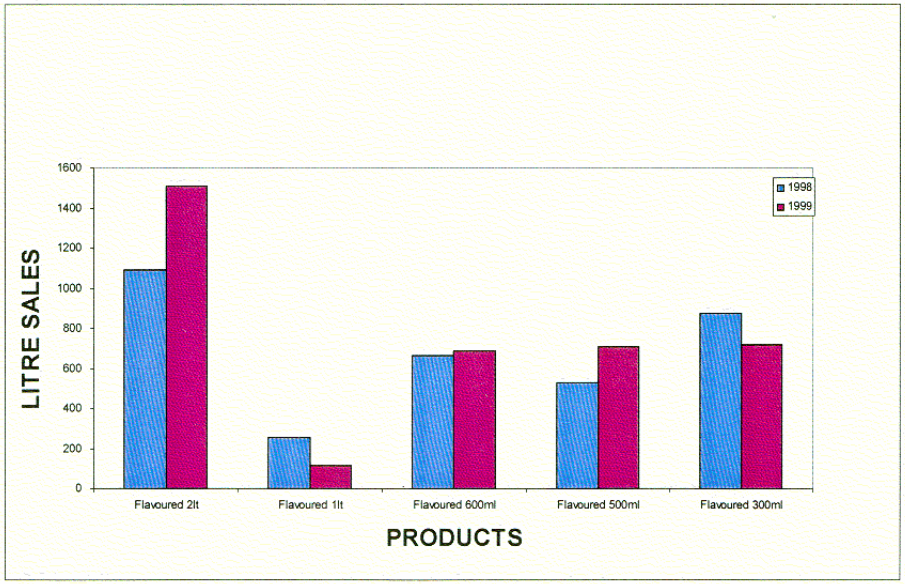


Figure 1.10. Example of Individual Store Sales Report for Beverage Milk (Source: ProCorp USA, 2003).

II. The Northwestern Hudson Valley Market DCMP

The Northwestern Hudson Valley Market area is primarily located primarily in the northwest geographical area of the Hudson Valley territory (see Figure 1.1). The 8-week program cycle ran from July through August 2002. Of the original 63 identified participating stores, 61 completed the duration of the in-store DCMP cycle.[1] A wide array of store types participated, including 25 convenience stores, 16 drug stores, 16 supermarkets, and 4 mass merchants. Stores were located in 25 different cities/towns, in four counties – Orange (36), Rockland (8), Sullivan (11), and Ulster (8). A list of participating store chains is given in Figure 2.1. Analyzing DCMP effectiveness across a wide variety of store types and sizes will provide useful information on the relative effectiveness of this type of effort in improving movement of fluid milk products. While supermarkets and mass merchants serve higher store traffic and move considerably more fluid milk products, the large number of convenience and drug stores in the market illustrates the importance of this segment to overall milk movement.

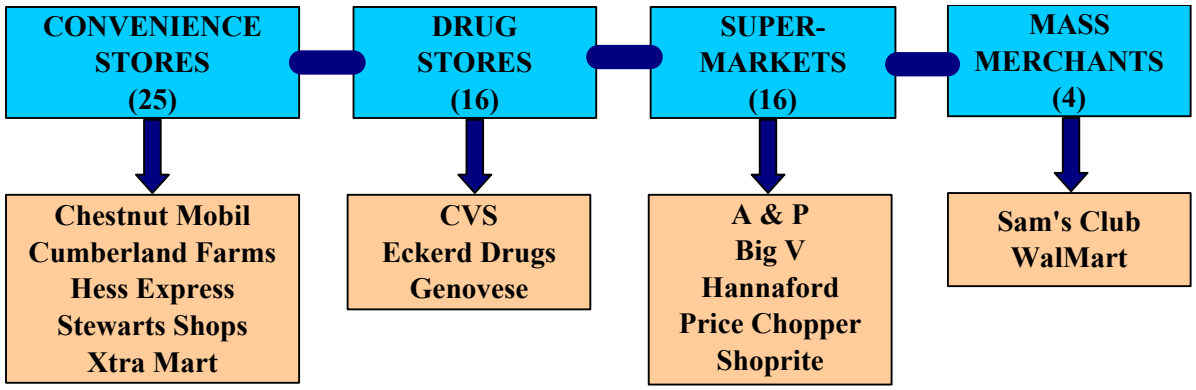


Figure 2.1. Participating Store Chains in the Northwestern Hudson Valley Market, 2002.

Store size and sales volume of fluid milk products varied widely across participating stores (Table 2.1).[2] In 2002, average daily volume exceeded 11,000 total gallons. As expected, this movement was dominated by supermarket sales, covering 63% of total milk sales in the area (Figure 2.2). Mass merchants (18%) and convenience stores (15%) were also significant contributors to total milk movement, with drug stores lagging further behind (5%). Average per store daily volume is highest in supermarkets and mass merchants, followed distantly by convenience and drug stores. As expected, the predominant source of milk movement on a volume basis is standard, unflavored fluid milk products (96%). Gains in beverage milk products were evident in all store types since 2001, but relative volume movement is small at 6% of fluid milk sales, with the largest proportion sold in convenience stores. Finally, lactaid products represent a small proportion of volume and are sold almost exclusively in supermarkets.

[1] Statistics and descriptions using sales data are based on 59 stores that submitted monthly sales reports (two stores did not provide sales data). Forthcoming DCMP in-store program statistics are based on the full sample of 61 stores.
[2] The origin, management, and output of sales data will be described in the next section. We add these statistics here to further clarify the distribution of stores involved.

Table 2.1. Average Daily Volume, by Year and Store Type.[a]

		Average Daily Volume (Gallons)									
		Total Movement		Per Store							
				Total		Fluid Milk		Beverage Milk		Lactaid Milk	
Stores	No.	2001	2002	2001	2002	2001	2002	2001	2002	2001	2002
All Stores	59	10,713	11,328	181.6	192.0	174.0	183.7	4.9	5.7	2.7	2.6
Convenience Stores	25	1,731	1,706	69.2	68.3	65.3	64.1	3.8	4.0	0.1	0.1
Drug Stores	14	461	417	32.9	29.8	32.6	29.5	0.2	0.3	0.1	0.0
Mass Merchants	4	1,380	2,092	344.9	523.0	338.8	507.8	6.2	15.2	0.0	0.0
Supermarkets	16	7,142	7,113	446.4	444.6	426.3	424.6	10.3	10.6	9.8	9.5
C/D [b]	39	2,191	2,123	56.2	54.4	53.6	51.7	2.5	2.7	0.1	0.1
S/M	20	8,522	9,205	426.1	460.3	408.8	441.2	9.5	11.5	7.8	7.6

[a] Northwestern Hudson Valley Market. Volume movement using monthly sales data from May through October, 2001 and 2002.
Fluid Milk = Unflavored fluid milk greater than 16 oz., Beverage Milk = Flavored milk and unflavored 16 oz. or less.

[b] C/D = convenience stores and drug stores, S/M = supermarkets and mass merchants.

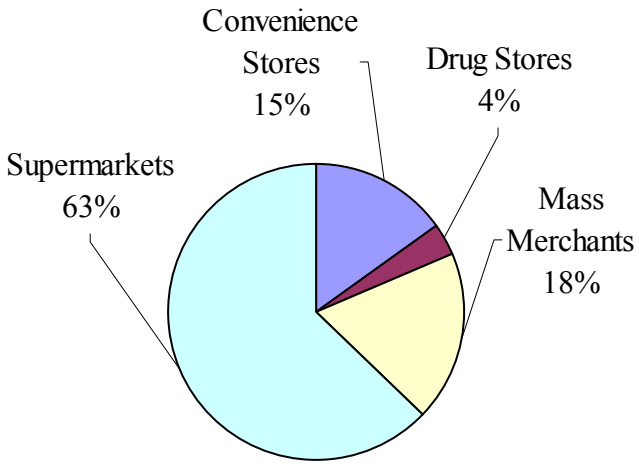


Figure 2.2. Total Volume Movement, May – October 2002, by Store Type, Northwestern Hudson Valley Market.

Demographics of the Study Area

According to county-level 2000 census data (U.S. Census, 2003), the geographical territory of the Northwestern Hudson Valley market represents a sizable population: nearly 900,000 people, or 5% of the state population (Table 2.2). Additional demographic statistics are included in Table 2.2 on a county-level basis and for the region as a whole. Understanding the demographics of the study area is useful for constructing hypotheses about the potential effects of DCMPs in other areas of the state. One could reasonably expect geographical areas with similar characteristics to show similar results. But evaluation of DCMP in a variety of markets is, of course, necessary for a fuller understanding of its overall effectiveness.

It is clear from Table 2.2 that the population of the Northwestern Hudson Valley market area has a lower proportion of minority races than does New York State as a whole, and a considerably higher proportion of non-Hispanic whites. While housing values in Rockland County (closest to the New York City area) are considerably higher than those of neighboring counties to the northwest, average regional housing values are similar to the state average. Home ownership rates are nearly 70% for all counties in the study area, far exceeding the state average of 53%.

Median household income levels are higher than the state average, while per capita income levels are quite similar, consistent with the higher number of persons per household relative to the state average. Population distribution by sex is similar across all counties, with roughly an even split between males and females, and is consistent with the overall distribution in the state. The area is further characterized by a population with a slightly higher proportion of people below the age of 18, and a lower proportion of those over 65. The land area of the four counties comprises approximately 3,000 acres, or roughly 6.5% of the state. Persons per square mile varies considerably by county – Rockland County is the highest at 1,646, while the more distant Sullivan Count has only 76 persons per square mile (U.S. Census, 2003).

Given data availability, it will be useful to analyze sales data for the other cycle territories in the Hudson Valley Market that participated in the DCMP during the summer of 2002. Variation of DCMP impacts across market territories can then be compared relative to the regional demographic statistics to see if any particular demographics appear to respond better to the DCMP.

Table 2.2. Demographic Characteristics of the Northwestern Hudson Valley Market Study Area, by County.*

Variable	County				4-County	New York State
	Ulster	Sullivan	Rockland	Orange		
Population (2000)**	177,749	73,966	286,753	341,367	879,835	18,976,457
Race:						
White	88.9%	85.3%	76.9%	83.7%	82.7%	67.9%
African American	5.4%	8.5%	11.0%	8.1%	8.5%	15.9%
Asian	1.2%	1.1%	5.5%	1.5%	2.7%	5.5%
Other	4.5%	5.1%	6.6%	6.7%	6.1%	10.7%
Ethnicity:						
Hispanic/Latino	6.2%	9.2%	10.2%	11.6%	9.9%	15.1%
White, Non-Hispanic	85.5%	80.1%	71.7%	77.6%	77.5%	62.0%
Sex:						
Male	51.8%	50.2%	48.4%	50.4%	49.8%	48.2%
Female	48.2%	49.8%	51.6%	49.6%	50.2%	51.8%
Age:						
Less than 5	6.8%	6.4%	6.6%	7.9%	7.1%	6.7%
5 through 12	12.2%	11.0%	12.0%	13.5%	12.4%	11.3%
13 through 18	7.8%	7.3%	8.6%	8.5%	8.3%	7.7%
19 through 25	7.3%	8.3%	7.6%	8.4%	8.0%	8.8%
26 through 45	31.1%	32.5%	29.5%	32.7%	31.5%	31.3%
46 through 65	21.7%	21.4%	24.5%	19.4%	21.7%	21.6%
Over 65	13.1%	13.0%	11.2%	9.7%	11.1%	12.6%
Housing:						
Units	77,656	44,730	94,973	122,754	340,113	7,679,307
Homeownership Rate	68.0%	68.1%	71.7%	67.0%	68.7%	53.0%
Median Value, Owner Occupied	$113,100	$93,300	$242,500	$144,500	$157,963	$148,700
Households (HH):						
Number	67,499	27,661	92,675	114,788	302,623	7,056,860
Persons per HH	2.47	2.50	3.01	2.85	2.78	2.61
Median HH Income	$42,551	$36,998	$67,971	$52,058	$53,434	$43,393
Per Capita Income	$20,846	$18,892	$28,082	$21,597	$23,168	$23,389
Percent Persons In Poverty	11.4%	16.3%	9.5%	10.5%	10.9%	14.6%
Geography:						
Land area (square miles)	1,126	970	174	816	3,086	47,214
Persons Per Square Mile	158	76	1,646	418	285	402

* The study area comprising participating stores (61) was contained within 4 counties: Orange (36), Rockland (8), Sullivan (11), and Ulster (6).

** Population statistics based on 2000 Census, Source: US Census Bureau State & County QuickFacts (http://quickfacts.census.gov/qfd/states/36).

III. Data Programming and Management

Research staff from CCPRP worked closely with staff from both ProCorp, USA and ADADC to collect, clean, organize, analyze, and output DCMP store activity, price, and sales data. Data collection and management were focused in three main data areas: (*i*) DCMP store data, (*ii*) store sales data, and (*iii*) supplemental store and state price data. We describe each of these below.

DCMP Store Data

The DCMP store data consisted of data received by ProCorp, USA from the store reporting documentation and planogram designs described earlier (see Figure 3.1). Benchmark Reports (BMR), Store Audit Reports (SAR), Out of Stock Reports (OOS), and Planogram designs were received in both hard copy and electronic format. The BMR, SAR, and OOS report were received weekly over the program period. During the first two weeks of the cycle, program staff time is occupied with reviewing existing store formats and cleaning and scoping the entire case for appearance, odors, lighting, and functionality. Therefore, most BMR, SAR, and OOS data were received only for weeks two through eight. Two sets of planogram data were received for each store – one for the existing case design, or "Pre-Planogram," and one for the DCMP recommended revised design, or "Post-Planogram." Planogram data files were on a store, UPC basis for both the Pre- and Post-Planogram designs. We compare these two sets of planograms to ascertain product changes in size, type, and distribution as a result of DCMP efforts. BMR and SAR data files were on a store and weekly basis. OOS reports were also on a store and weekly basis, differentiated by product classification.

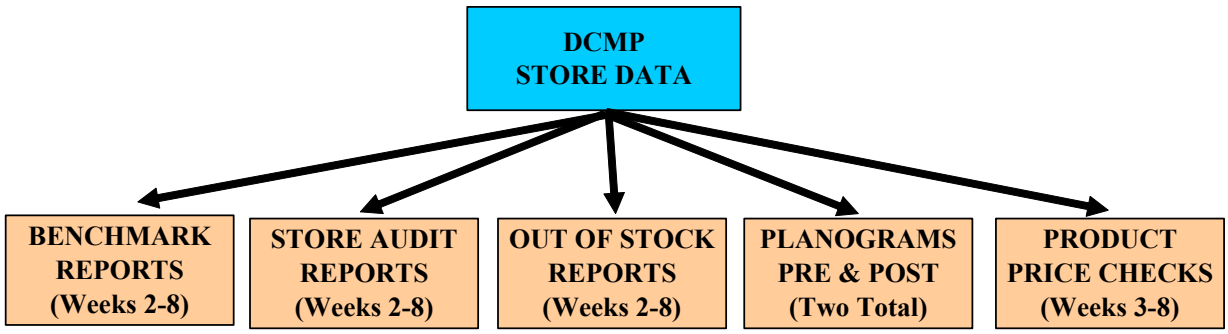


Figure 3.1. Available Data from DCMP Activities and Reports.

In addition to collecting data via these reports, DCMP store staff conducted price sampling on products from various categories depending on product availability in the stores (i.e., some fields were left blank in the data when the product was unavailable or not collected). Gallon products were emphasized in the supermarkets and mass merchants, and 2% and half-gallon products in the convenience stores and drug stores, as these are the major price points for the store types, respectively. Specifically, products sampled for supermarkets and mass merchants included eight products: house brand white milk gallons (whole, 2%, 1%, and skim), one name brand white milk gallon (2%), store brand white milk half-gallon (2%), one chocolate milk gallon, and one chocolate milk pint. Products sampled for convenience and drug stores included five

products: 2% house brand white (gallon, half-gallon, and quart), house brand chocolate pint, and name brand chocolate pint. General descriptors were included, rather than UPC codes for the products, but the same products were sampled during the six weeks of price collection. Average weekly product prices are shown in Table 3.1. Average product prices included are for unflavored, gallons (across fat categories) for supermarkets and mass merchants, and for unflavored, 2% half-gallons for convenience and drug stores. Flavored products are not included in Table 3.1 because of limited or intermittent price sampling over the program period. Price advantages are evident for larger stores; however, drug stores, which on average move less volume than convenience stores, appear to have a relative price point advantage over convenience stores.

Table 3.1. Average Fluid Milk Product Prices from Store Sampling, by Store Type. [a]

		Supermarkets		Mass Merchants		Convenience Stores		Drug Stores	
Week		Mean	Range	Mean	Range	Mean	Range	Mean	Range
Number	Date	($/gallon)				($/half-gallon)			
3	22-Jul	2.43	[2.05, 2.60]	2.23	[2.03, 2.41]	1.58	[1.30, 1.89]	1.28	[1.01, 1.69]
4	29-Jul	2.40	[2.05, 2.69]	2.20	[1.92, 2.41]	1.58	[1.30, 1.89]	1.34	[1.09, 2.09]
5	05-Aug	2.42	[1.94, 2.69]	2.20	[1.92, 2.41]	1.59	[1.30, 1.89]	1.28	[1.09, 1.79]
6	12-Aug	2.43	[2.05, 2.60]	2.06	[1.85, 2.41]	1.60	[1.30, 1.98]	1.30	[1.09, 1.79]
7	19-Aug	2.41	[1.90, 2.60]	2.20	[1.93, 2.41]	1.57	[1.30, 1.89]	1.30	[1.09, 1.79]
8	26-Aug	2.44	[2.05, 2.59]	2.20	[1.93, 2.41]	1.57	[1.30, 1.89]	1.29	[1.09, 1.79]
Monthly	July	2.44	[2.08, 2.60]	2.22	[1.92, 2.41]	1.58	[1.30, 1.89]	1.33	[1.09, 2.09]
	August	2.45	[2.08, 2.60]	2.20	[1.93, 2.41]	1.58	[1.30, 1.89]	1.30	[1.09, 1.79]

[a] Supermarket and Mass Merchant prices represent average unflavored milk gallons, across fat categories; convenience and drug stores represent average unflavored milk, 2%, half-gallons.

Research staff at CCPRP organized all DCMP store data into a database format using Microsoft Access. The database design is useful in that all stores and weeks were uniquely identified by store identification and week number. The design structure contains linkages across data files for customized outputting of data in a wide variety of formats, based on user preferences and intended use. Analysis and discussion of the DCMP store data are offered in the next section, following a description of the remaining data collection and management efforts.

Store Sales Data

A large portion of the time spent on data programming and management component was invested in improving the formatting of sales data to allow for more efficient processing of the electronic data received from stores.[3] Originally, ADADC staff received monthly sales data (on a volume base) from participating stores. Data collected included two months during the DCMP program, two months prior to the program, two months after the program, and the prior year's months over the same time period. Store-level data was organized by UPC (or individual

[3] Special appreciation is extended to Sandy Mott at ADADC for assistance and technical advice during this process. A cooperative effort resulted in improved DCMP data management at ADADC and the generation of analytically useful data for estimation of DCMP milk sales volume impacts.

product) basis, with input formats varying widely across stores. Electronic data files were requested whenever possible and were normally received in spreadsheet formats. For some smaller stores, hard-copy wholesale shipping records were used instead and entered into store template files manually.

The nature of the electronic data received also varied across stores. Such variations included formats for multiple stores in a chain and spreadsheet arrangements (by time, by store, by product type, etc.). Some sales reports contained additional items in the dairy case that needed to be purged from sales records (e.g., eggs, cheese, creamers, and soy products). Finally, information necessary to classify products by container size and product type (fluid, beverage, and lactaid) was often not separately fielded in the store input data files and required an arduous manual process to tag the product observations.

Given the number of products and number of stores in our sample, a different programmatic approach was investigated. The goal of this component was to develop a data management program that increased the efficiency in reading, cleaning, and outputting store sales data to ADADC spreadsheet templates (individual store and aggregate chain levels), and to statistical data formats for program evaluation.

Some cautions and considerations are worth mentioning at this point. Developing data management programming code can be difficult and time consuming, but once developed the program should improve the efficiency of data gathering, cleaning, collection, and output for current and future DCMPs -- which translates into time savings! Store's products and supplies change over time; code needs to be developed to account for such changes over time in order to appropriately categorize fluid milk products and eliminate non-milk products from the data files. Program code needs to general enough to appropriately classify products, but specific enough to avoid unwanted deletions of acceptable products. Finally, for some stores, only hard-copy sales data were available. In these cases, it was impossible for CCPRP staff to gain efficiencies, and ADADC staff continued to process this data in-house.

Collection and management of store sales data were completed with assistance from ADADC staff, who provided technical insights, discussed data formats and products available, and reviewed current output store templates as discussed above. After input data formats for several stores were reviewed, programming code was developed to read, clean, and output sales data to the appropriate formats. The efficiency gains due to improved data management should reduce the time needed for this activity by ADADC staff in the future.

Figure 3.2 provides a general representation of the historical data management process conducted for electronic, monthly sales data. Upon receiving the sales data, ADADC staff cleaned it and manually selected products. This was done largely by scrolling through sales records and "cutting and pasting" data to updated spreadsheets. Given the sizes and formats of some store types, this was often a difficult and time-consuming process. Once selected and cleaned, the product records were copied to the individual store UPC templates (see Figure 1.9) by product class – Fluid Milk, Beverage, and Lactaid. The individual store/UPC templates were then linked to aggregate store/chain templates for the individual product type categories, as well as the total of all milk products in the dairy case (see Figure 1.10).

The revised data management process is shown in Figure 3.3. Here, upon receipt of the store data, programming code was developed based on the reporting data structure and then used to read, clean, and output the data. The programs were structured to identify and output unique identifiers of interest (e.g., size of container, fat content, beverage type, and flavor) that may be combined in single data fields. The outputted data automatically created electronic data sets for total product and individual product types for each store, and were transformed into Excel workbooks and worksheets. The individual store ADADC template files were then redefined so as to be linked to these created Excel files. Finally, the aggregate template files were linked to the individual store templates as before.

While the revised process may seem more complicated than the original, proper application reduced staff time investments by shifting from manual to automated reading, cleaning, and outputting of store sales data. For example, a store (or multiple stores under a single chain) may have a large file requiring cleaning and labeling. Each month, under a manual process, one would need to page through a number of records, and "cut and paste" accordingly. Given the same monthly format over time, once the code is initially written, subsequent monthly files can be processed in a matter of seconds.

Fifty-nine (of the original 61) stores submitted monthly store level data. Programming code was developed and applied for 7 different chains and 38 individual stores (65%). ADADC staff continued to process sales data from stores with only hard-copy formats, and stores with simpler input files (e.g., limited products, clean formats). The programming code developed was unique for each store/chain, but after the original code was developed, succeeding store codes involved simple revisions from the original code based on differences in input formats. Programmatic processing is particularly useful for chains with a large number of stores, large data files, and files requiring a large amount of cleaning. Improved use and application of programmatic data management can be achieved by requesting similar file formats from all stores. With consistent input formats across stores, processing time could be reduced dramatically.

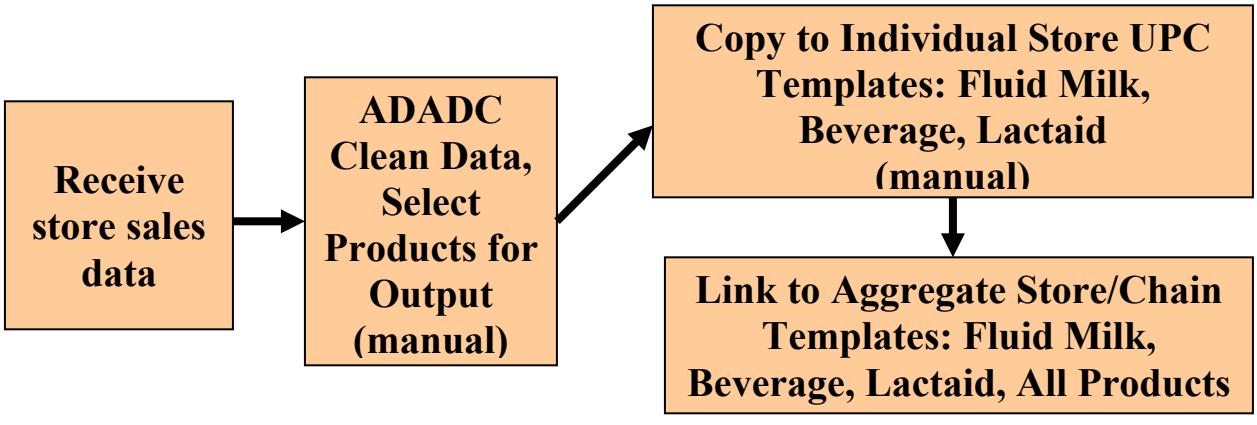


Figure 3.2. General Schematic of Historical Sales Data Management Process.

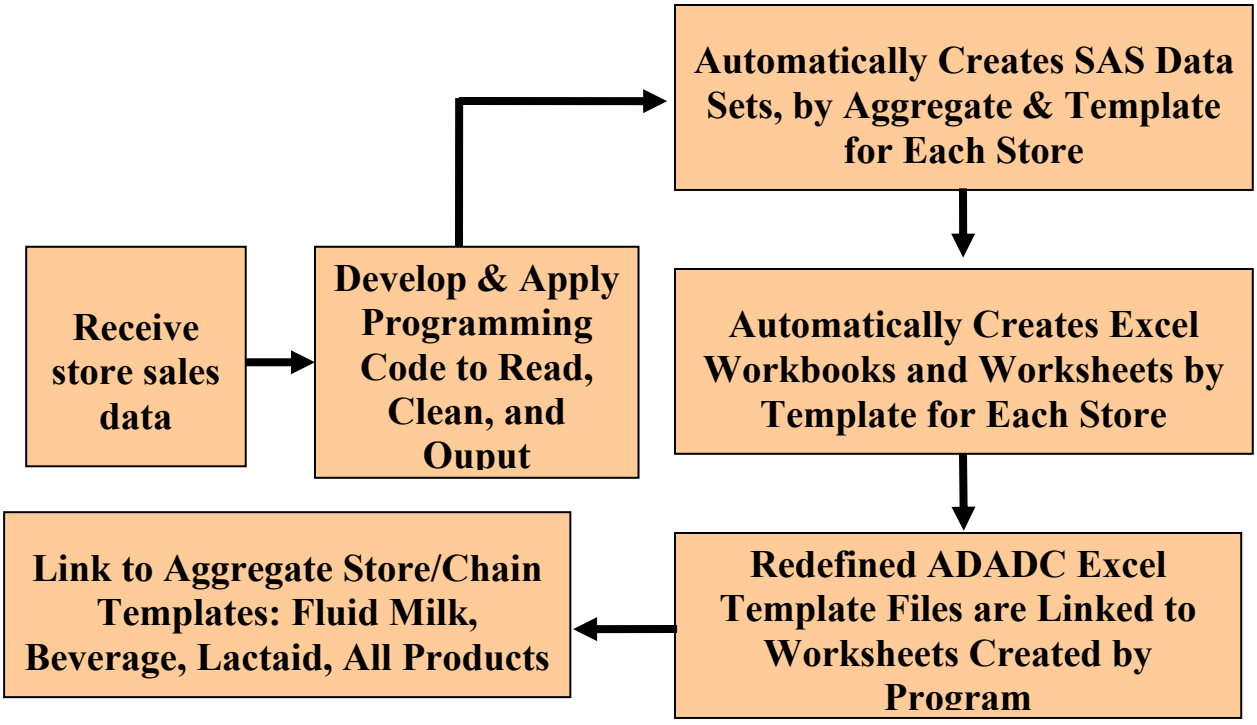


Figure 3.3. General Schematic of Revised Sales Data Management Process.

Supplemental Store and State Price Data

Given the limited availability of specific store-level price data, it was necessary to supplement the weekly store price data described above with additional sources, to provide for estimates of store-level price variation across the sales data time period (i.e., May through October, 2001 and 2002). While the use of more aggregate data potentially masked particular store price promotions during these additional time periods, sales analysis using the available monthly-level data can also mask particular weekly price promotions. In addition, price promotions for fluid milk products are not as frequent as for other store products and response to the price promotions is limited due the inherent perishability of the product. McLaughlin and Perosio (1996) estimate that upstate New York supermarkets, on average, price promote whole milk once per quarter, lowfat milk 4.0 times per quarter, skim milk 2.7 times per quarter, and private label milk products 3.6 times per quarter.

Using the price series listed in Table 3.1, weekly store prices were converted to monthly average store prices in order to associate store prices with the monthly-level sales data. While some chocolate-flavored products were also sampled, several missing weekly prices limited the use of this data for the purpose of computing reliable monthly averages. The prices used are assumed to be appropriate proxies for average unflavored, fluid milk products in the dairy case.

To supplement the weekly product price sampling, ADADC staff collected weekly price information on gallon and half-gallon unflavored fluid milk products, by fat content (private and

name brands) from four supermarkets in the Northwestern Hudson Valley market area. The data encompassed the period January through October 2002.[4] To augment the additional price information for months in 2002, we assume that the variation in monthly prices (averaged over gallon and half-gallon products) from May through October 2002 is representative of relative price changes for the individual DCMP participating stores. Therefore, relative price variations for May-October 2002 from the supplemental store price data were applied to the July-August average DCMP store prices to interpolate average store prices for the remaining months of 2002 (i.e., May-June and September-October, 2002). Relative price changes in gallon-size products in the supplemental store price data were used for supermarkets and mass merchants, while relative changes in half-gallon-size products were used for convenience and drug stores.

In order to more accurately estimate DCMP milk volume impacts, we decided to use sales data from both 2001 and 2002, which meant that estimates of average store prices for May-October 2001 were needed. We assumed that average monthly prices for upstate New York (NYS) supermarkets (gallon and half-gallon products) would serve as an appropriate price proxy. Relative monthly price variations from available upstate, supermarket data (New York State Department of Agriculture and Markets, 2001 and 2002) between 2001 and 2002 were applied to the store-level 2002 price data to provide an estimate of DCMP store price variation in 2001.

Correlation estimates between the supplemental supermarket data and the NYS average supermarket prices were high ($\rho_{x,y} = 0.86$ for gallons and $\rho_{x,y} = 0.94$ for half-gallons), lending support to the extrapolation procedures used.[5] Thus, it was assumed that 2001 relative price changes in DCMP stores followed the relative cross-year variation indicated by the upstate New York monthly statistics. As above, variation in gallon prices was used for supermarkets and mass merchant stores, while variation in half-gallon prices was used for convenience and drug stores. Figure 3.4 displays the average supplemental store prices, along with the respective New York upstate estimates, while Figure 3.5 displays the 2001 and 2002 average monthly upstate supermarket prices.

[4] Again, specific UPC identifications for the products were not recorded; however, we are assuming that the same product brands were sampled throughout the sampling period.

[5] The correlation coefficient ($\rho_{x,y}$) is used to determine the relationship between the two price series. In other words, how does the relative variation in the two series compare? A correlation coefficient of 1 implies that the relative variation is identical.

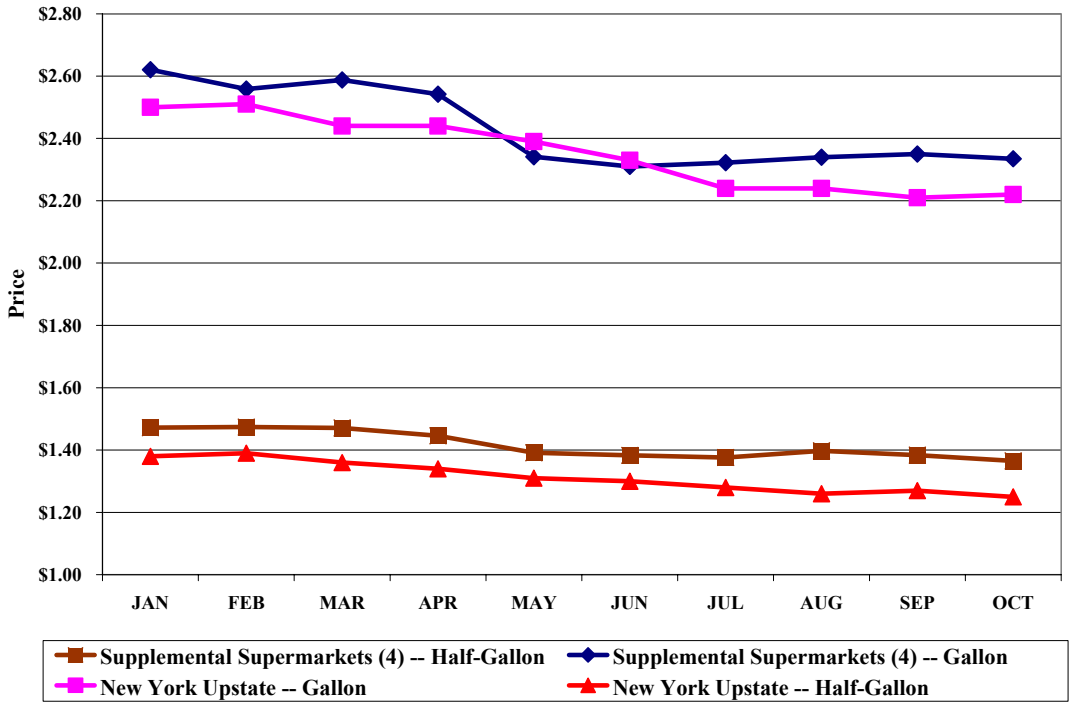


Figure 3.4. Average Monthly Supplemental and New York Upstate Supermarket Prices for Unflavored, White Milk, Gallons and Half-Gallons, 2002.

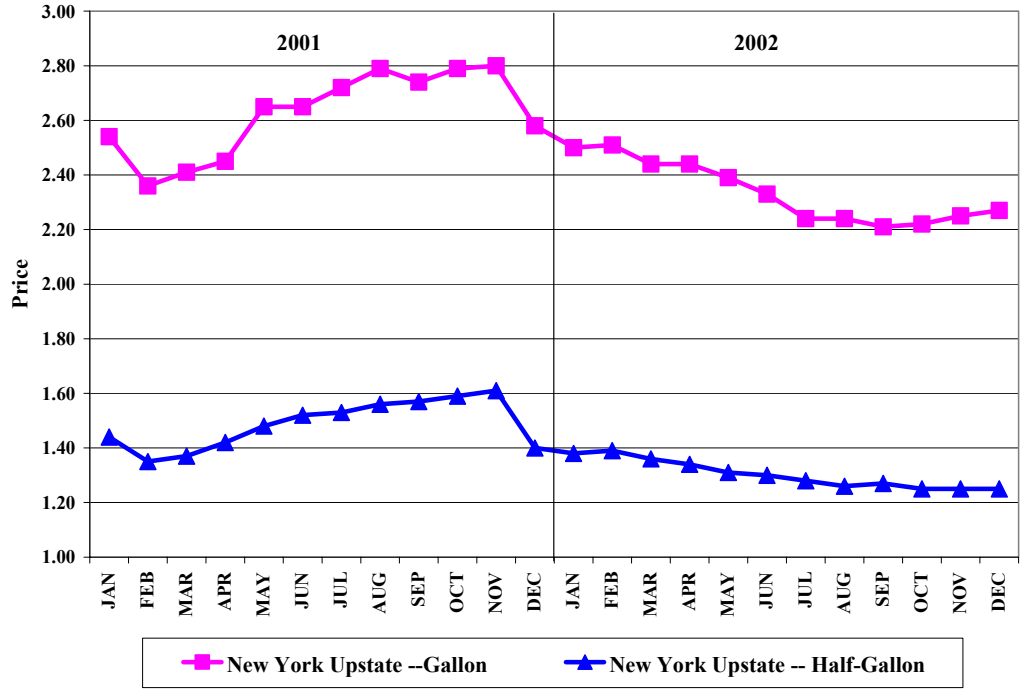


Figure 3.5. Average Monthly New York Upstate Supermarket Prices for Unflavored, White Milk, Gallons and Half-Gallons, 2001 and 2002.

IV. Descriptive Analysis of DCMP Store Results

The following descriptive analysis highlights performance relative to benchmarks, audit scoring, stocking issues, and out of stock trends during the 8-week DCMP period. In addition, using the pre- and post-planogram designs, we highlight changes in dairy case design by evaluating total product numbers and distribution of products by container size and product type. This information will be useful both for evaluations of current in-store activities in the selected market and to point to particular issues that may need to be emphasized in different store types. It is also useful to ADADC staff when evaluating the direct in-store adjustments made during the DCMP period.

Benchmark Standards

Benchmark Reports (BMRs) were prepared each week for program staff, to provide an overall store score in achieving benchmarks. During weeks two and three, four categories were scored: Planogram, Hygiene, Rotation, and Stockweight. In weeks four through eight, Ordering was added as a fifth benchmark category. The Planogram benchmark incorporates acceptability of the display case through proper placement of pricing tickets and adherence to planogram design. Hygiene relates to the overall cleanliness and appearance of the display case and adherence to regular cleaning schedule. Rotation relates to maintaining a regular rotation schedule for proper movement of product with respect to expiration dates. Stockweight relates to having appropriate levels of stock in both the display case and coolroom, and the ability of staff to pack out stock on a regular basis. Ordering deals with balancing ordering levels with product movement to prevent low stockweights and out of stocks.

Normalized Benchmark Scores (on a basis of 100) were computed and averaged by store type (Figure 4.1).[6] One would expect that overall benchmark scores would improve during the DCMP period. This appears to have occurred across all stores following some transition in the first few weeks, but small declines in average scores were evident in the last week of the program for supermarkets and mass merchants. While the latter may be somewhat discouraging, normalized scores after week four were above 90 for all store types, indicating an average benchmark score of at or above 4.5. Thus, while a few stores may have not been achieving benchmarks, most stores were achieving full benchmark scores by the end of the program period. In fact, even early in the program period (weeks 2-3), average benchmark scores ranged from 90 to 100 on a normalized basis.

Looking more closely at the types of benchmark deficiency, we can identify specific problems in stores not achieving full compliance. Figure 4.2 displays the (weighted) percentage of all stores not achieving particular benchmarks by program week. Early in the program, attention was directed mostly to hygiene and planogram deficiencies. Both benchmark categories showed substantial improvement over the program period. Stocking issues were evident by week four , as product variety and planogram changes occurred, but decreased to near zero by the end of the

[6] Normalized Benchmark Scores and forthcoming program scoring statistics are weighted by average daily store volume during the program period. This is done to reflect total market conditions on the volume of milk moved, providing larger weights to stores that move more milk (e.g., supermarkets and mass merchants). For comparison, the unweighted average scores follow similar patterns.

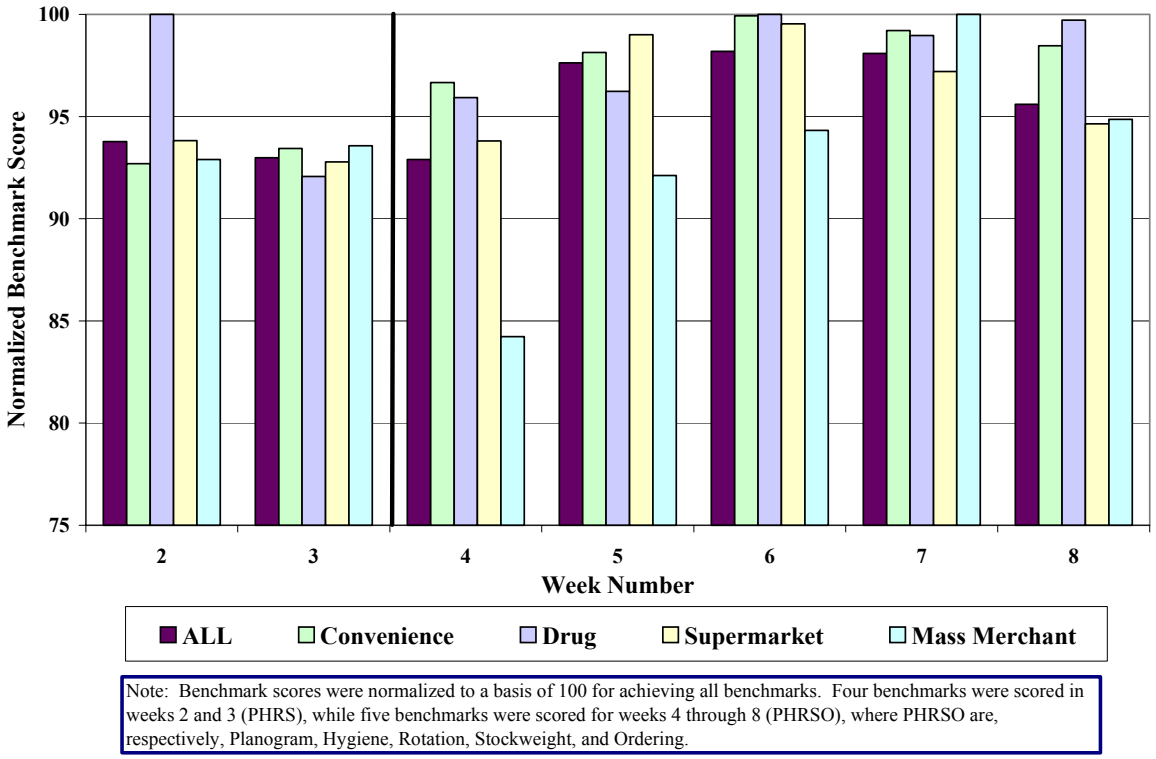


Figure 4.1. Average Normalized Benchmark Scores, by Store Type.

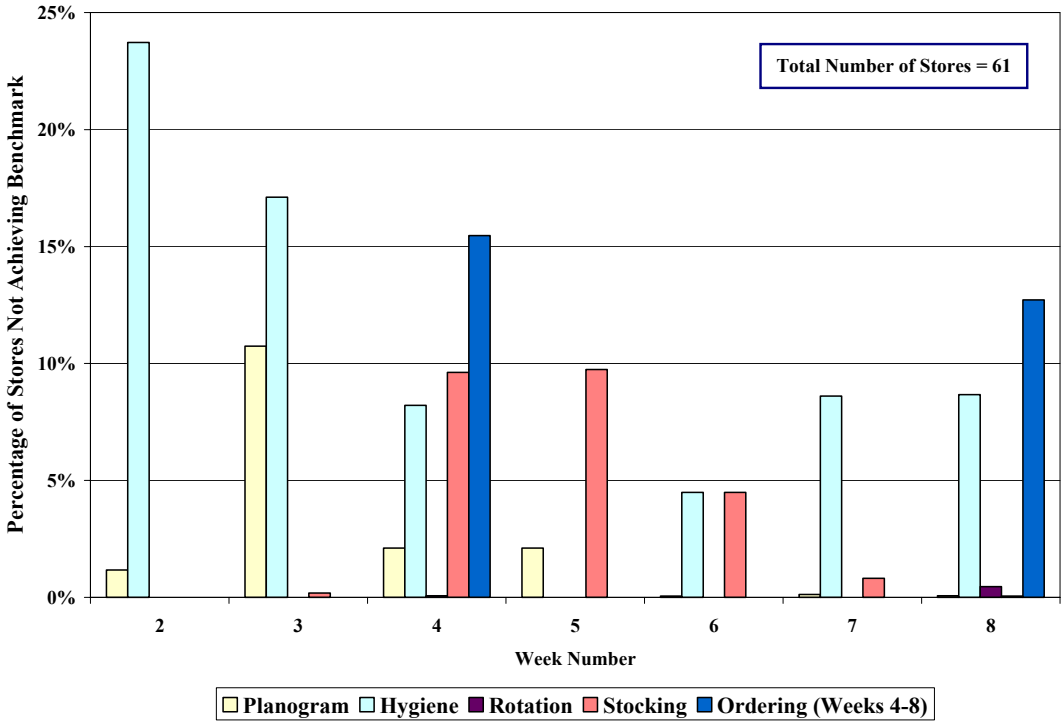


Figure 4.2. Percentage of All Stores Not Achieving Benchmarks, by Week Number.

program cycle. When the ordering benchmark was first introduced in week four, problems were evident in about 15% of program stores; these were likely due, in part, to changes in product mix with a revised planogram design and the need to reconfigure ordering schedules with suppliers. Rotation issues seemed the least problematic throughout the program period. However, after early rotation problems appeared to have been resolved, new problems appeared to return during the final week of the program period. This may indicate a loss of integrity of planogram design or altered supply schedules.

Figure 4.3 looks at benchmark issues by store type. Particular categories differentiated by store type can give program personnel information on what areas to focus on for future DCMP applications in particular store types. For example, hygiene issues seemed to need more attention in convenience stores and supermarkets, while problems in planograms were most evident in convenience and drug stores. Ordering concerns were not apparent at all in drug stores, but do appear to need attention in supermarkets and mass merchants. Stocking concerns are most evident in mass merchant stores, whose general display is dominated by a larger, quickly moving volume, but with limited numbers of different products.

Store Audit Summary

As mentioned above, stores were scored with an audit report form on each visit, and a weekly Store Audit Summary (SAR) was prepared (see Figures 1.4 and 1.5). Store visits increased from three to four times per week during the early stages of the DCMP, to five times per week in the final two weeks. As with the benchmark standards, stores were scored on a number of items, including hygiene, sets (similar to planogram), rotation, stockweight, and ordering. On each visit, a store was scored on both entry and exit (total possible score of 20). Overall, scores were impressive, and average scores (weighted by volume) across all store types showed distinct improvement over the DCMP period, with exit scores reaching a low in week two of 18.4 (a 92 normalized percentile) and a high in week six of 19.1 (a 96 normalized percentile) (Figure 4.4). A small dip in average scores was exhibited over the final week of the program, which is consistent with the average benchmark scores over the program period. Comparing entry and exit scores, it is clear that some of the negative scoring areas were resolved during the site visit.

While changes in average weekly audit scores varied by store type, an increasing trend was evident across all types (Figure 4.5). Furthermore, the dip in average scores in the final weeks of the program period seemed largely the result of a small reduction in supermarket scores, while the remaining store types continued to show strong performance throughout. The stability in weekly audit scores for convenience and drug stores in the final three weeks of the program is particularly encouraging.

As with the descriptive breakdown on benchmark reporting, we evaluate the source of scoring problems with the weekly SARs. Given the similarity of reporting categories, we would expect similar trends over time in reporting areas and areas of emphasis. Four general categories are differentiated on the weekly SARs: presentation, rotation, coolroom, and stock. The category components are self-explanatory and similar to those differentiated on the BMRs (Figure 4.6).

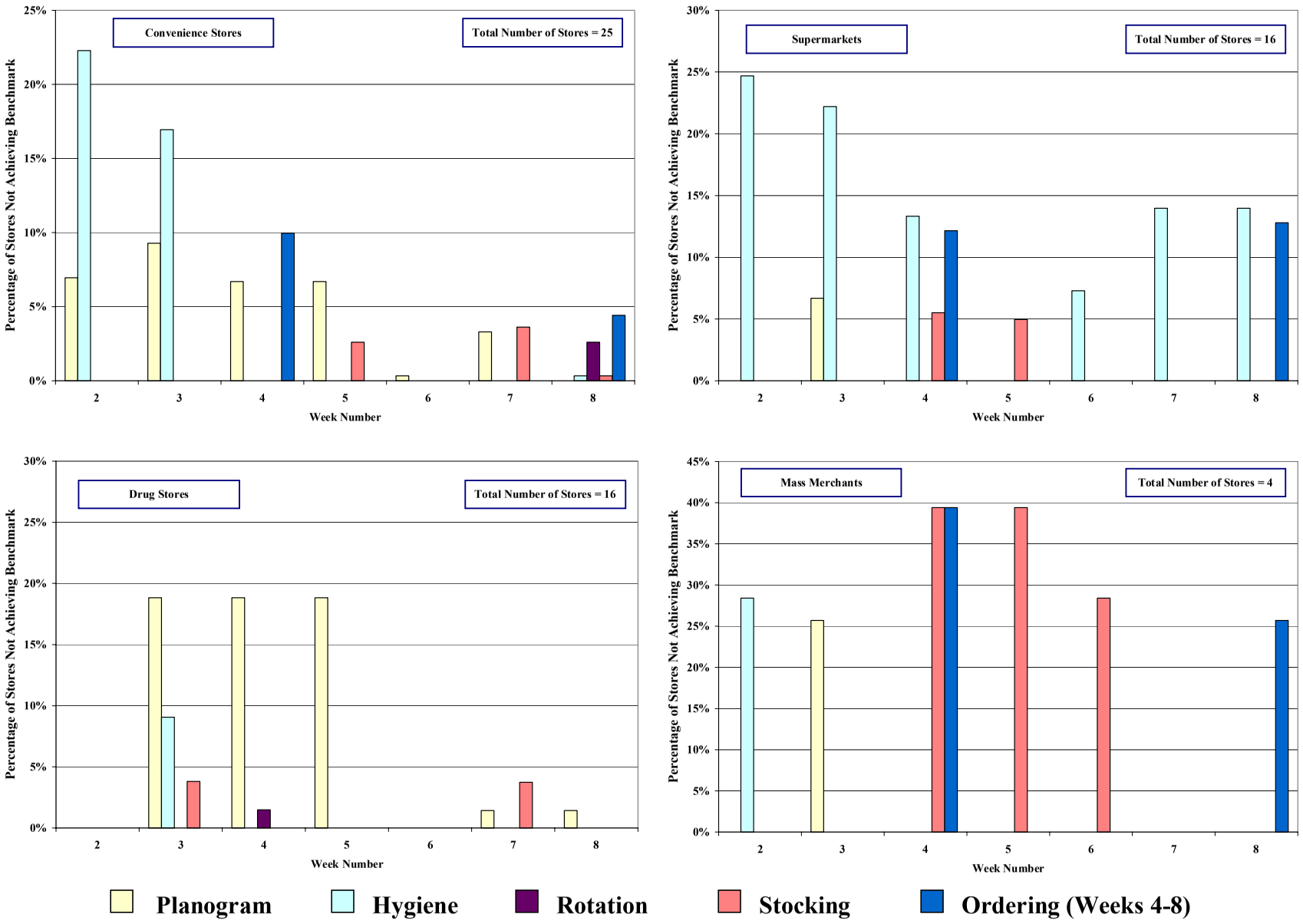


Figure 4.3. Percentage of Stores Not Achieving Benchmarks, by Store Type and Week Number.

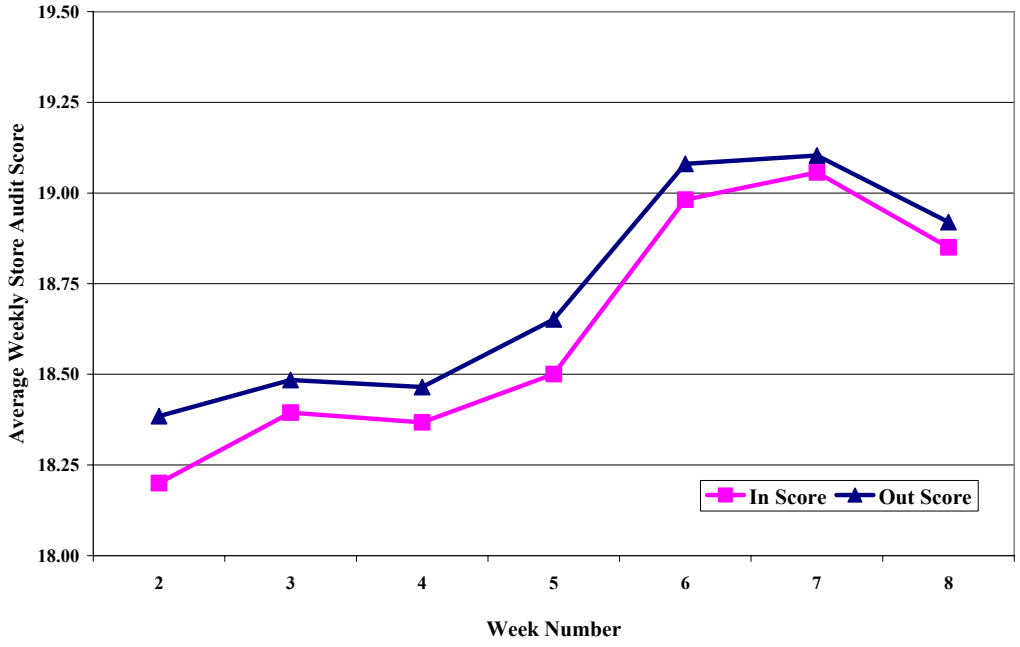


Figure 4.4. Average Weekly Store Audit Scores, All Stores (Total Scoring Points = 20).

Presentation of the display case and coolroom conditions were clearly the main areas of concern early in the program period (Figure 4.6). During weeks two and three, over 35% of stores needed improvements in their product presentation. This finding is consistent with benchmark achievement, where noted areas of concern early in the sample period were hygiene and planogram. While product presentation was in need of attention early in the sample period, a consistent reduction of deficiencies in this area was evident throughout the program period, reaching a low mark in week eight (less than 15% of stores). Coolroom issues were also important to address early in the program period, with over 35% of stores having problems to address. Comments to improve stocking performance were more variable during the program period, but affected less than 15% of program stores. The SAR scores were also consistent with stocking issues identified in the BMRs. Finally, rotation issues appeared to be the least likely category deficiency, with problems reported in less than 5% of stores, which is consistent with the low occurrence of missed benchmarks for rotation on the BMRs.

Reviewing average scores differentiated by store type, it is clear that overall presentation in the dairy case needs to be emphasized early in the program period for all store types (Figure 4.7). The downward trend in presentation concerns across all stores is evidence of the success of program staff to improve this important category. Coolroom issues also seem important for all store types, particularly for supermarkets and drug stores. Stocking problems were also evident in convenience and drug stores, but both showed distinct improvement during the program period. This is perhaps to be expected in the smaller store type because of the nature of its sales, where fluid milk represents a distinct (and small) component of overall store sales, relative to

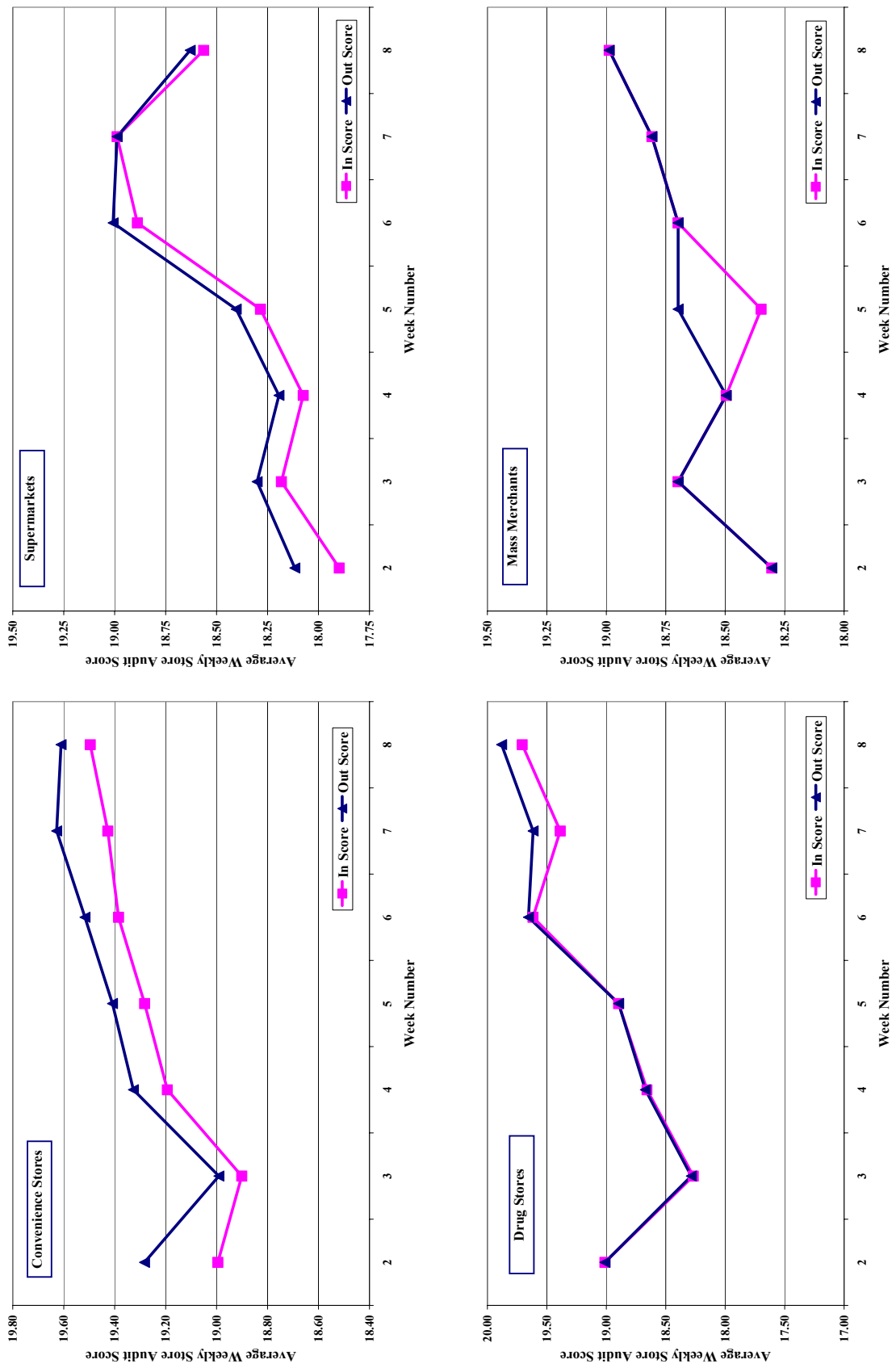


Figure 4.5. Average Weekly Store Audit Scores, by Store Type (Total Possible Scoring Points = 20).

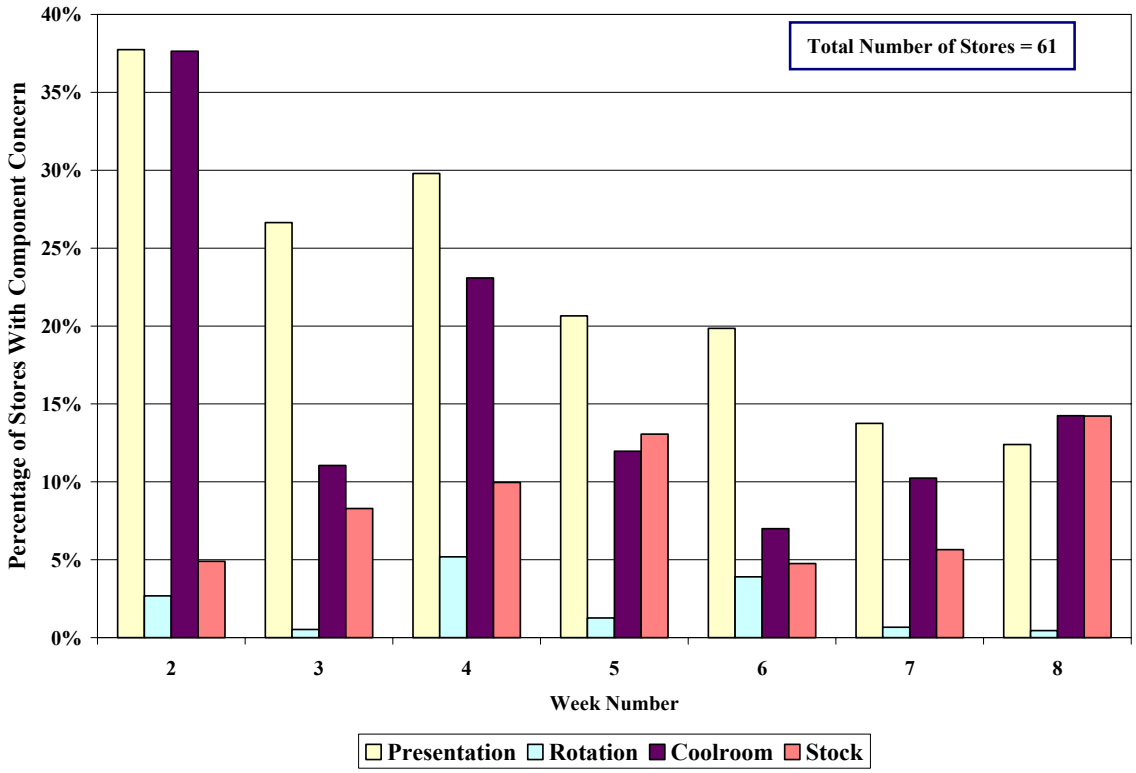


Figure 4.6. Percentage of All Stores with SAR Component Concerns, by Week Number.

many other non-food products. While stocking issues were highlighted on BMRs for mass merchants, surprisingly, they were not highlighted on the weekly audit summaries. However, coolroom issues did occur earlier in the program period and may have been related to the stocking component. These aside, stocking issues, like presentation, need to be emphasized to category managers across all store types.

Stocking Requirements

Program staff report on the amount of product filled or packed out by program staff during the week, as well as the amount of product low on stockweight. The amount of product (in crates) packed out by program staff during the week indicates if the store is not packing out stock frequently enough. The low on stockweight counts (in crates) is a shortfall indicator, or the amount of stock that the store needed to have full stockweight. Once the staff member has packed out as much stock as they can from the coolroom, they can determine how many more crates the store requires in order to be at full stockweight until their next delivery. This stock tracking is designed to highlight ordering issuea, as it represents the additional stock a store could order to ensure they have full stockweight until their next delivery (ProCorp USA, 2003).

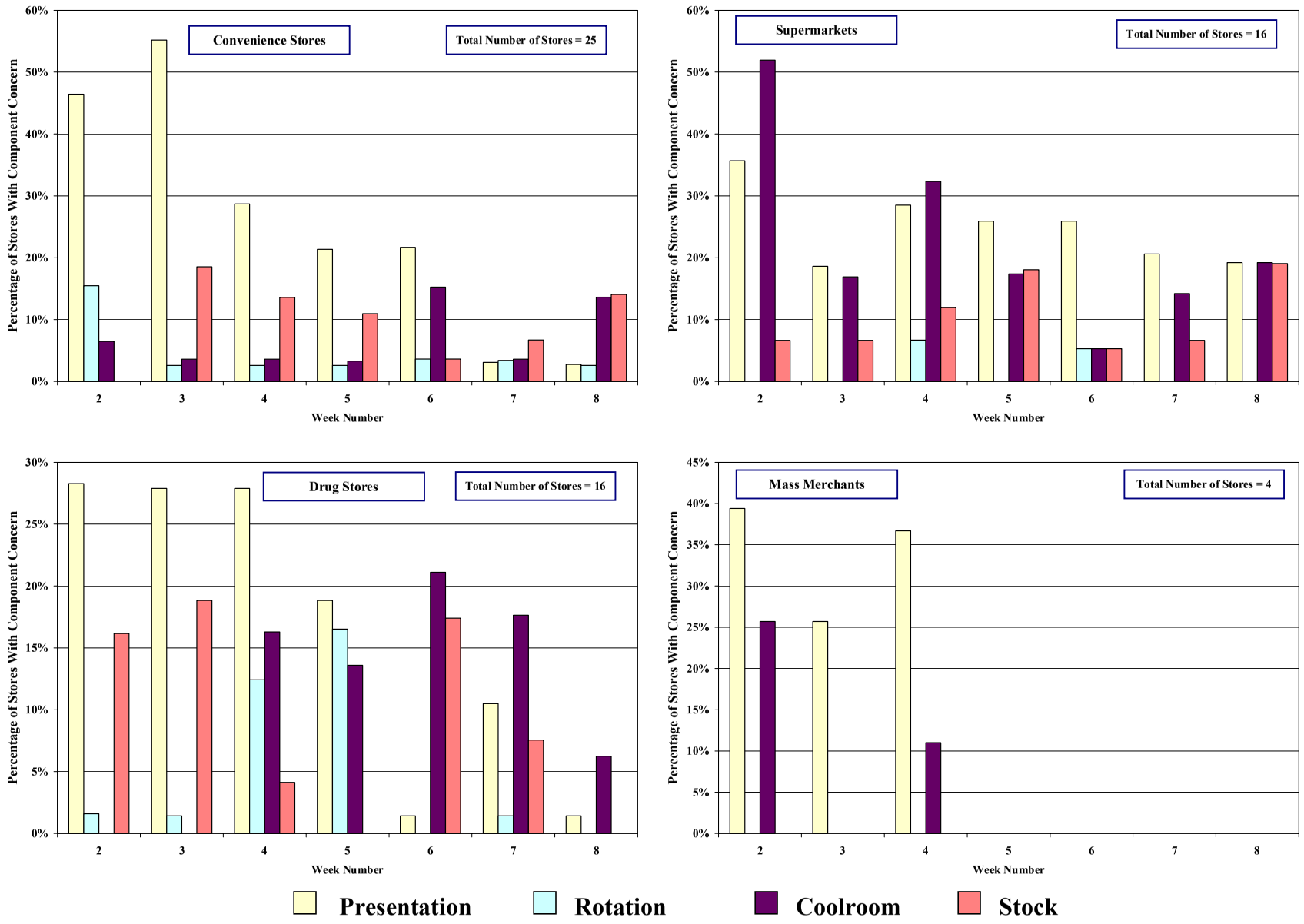


Figure 4.7. Percentage of Stores With SAR Component Concerns, by Store Type and Week Number.

Stockweight is the amount of product in the milk cabinet available to the customer. 'Full Stockweight', therefore, generally refers to having enough stock in the front cabinet at all times to meet customer demand until the next delivery. A store cannot be expected to pack out stock every single time a sale is made; maintaining full stockweight means ensuring that the front cabinet is always as full as possible, i.e., that all products are on show to the customers at all times. If a store is not filling frequently enough, stockweight gets low and "Not on Shows" occur – i.e., product is not available to the customer, but is in the back coolroom (ProCorp USA, 2003).

One way a store can solve stockweight issues, besides ordering enough to last until the next delivery, is to balance the amount of facings each product has. If the facings are balanced correctly (i.e., the fastest selling items get the most facings to accommodate the rate of sale, the slower selling products get fewer facings) all products should need filling at the same time. In this way, the store is able to fill all products simultaneously, without any products going out of stock, and without any products going out of code (i.e., out of date as a result of stock not being sold quickly enough). The DCMP aims to balance the fluid milk display case by the end of the 8-week program period, enabling stores to maximize sales and minimize waste (ProCorp USA, 2003).

The amount of product filled by program staff and the amount of product low on stockweight were included in the store program database. Given the predominance, by volume, of fluid milk products in the dairy case (i.e., standard, unflavored products in containers greater than 16 oz.), stocking levels are dominated by the fluid milk category. Table 4.1 shows the amount of product filled relative to average daily volume (ADV) across store types. Fill levels are relatively low compared with ADV, ranging from 1.4% to 4.6% across store types. Low stockweight levels are generally higher, ranging from 2.8% to 15.3%. Mass merchants, supermarkets, and drug stores had higher average fill percentages (4.6%, 3.0%, and 3.8%, respectively) than convenience stores did, indicating that these store types would benefit from program staff attention on stocking schedules and rotation. In addition, it appears that drug stores would benefit from attention to ordering with suppliers, to ensure adequate stockweights until the next delivery.

The average program statistics in Table 4.1 highlight primary DCMP staff concerns, particularly early in the program. Usually, the challenge for supermarkets and mass merchants is keeping stock on show, while for convenience and drug stores it is getting the stock in the store. In supermarkets DCMP staff try to address this by balancing the planogram: products that are underfaced (i.e., the product sells out before the store can re-stock it) receive more facings, while products that are overfaced (usually typified by out of codes) are given fewer facings. Program staff work to balance the planogram over the 8-week program period, with the aim of having all products run low at the same time, so that stocking issues are addressed without requiring more labor or resources at the store level (ProCorp USA, 2003).

Many convenience and drug stores have little (or even no) back cooler space, which contributes to their ordering problems. In addition, these store types usually receive fewer deliveries per week than the higher volume supermarkets and mass merchants, and therefore have to plan for more days of supply (ProCorp USA, 2003). Not surprisingly, these store types typically have higher required stockweight percentages above their fill percentages.

Table 4.1. Average Product Filled and Low on Stockweight Over DCMP Period, by Store Type.

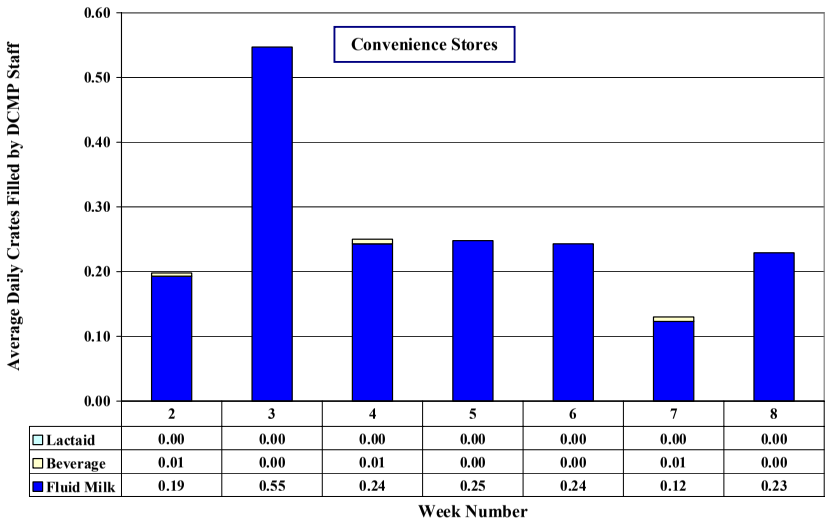
		Total Product Filled in Dairy Case		Total Product Low on Stockweight	
Store Type	**ADV[a]**	**GPD[b]**	**%**	**GPD[b]**	**%**
Convenience	68.3	1.0	1.4	3.2	4.7
Drug	29.8	1.1	3.8	4.6	15.3
Supermarket	444.6	13.3	3.0	12.7	2.9
Mass Merchant	523.0	24.3	4.6	29.7	5.7

[a] ADV = Average Daily Volume, in gallons, May – October, 2002.
[b] GPD = Gallons Per Day, average daily product amounts during DCMP period, July–August 2002.
Note: amount filled or low on stockweight were included in the database in 'crate' units. Since most crates hold four gallons of product (the exception is half-gallon crates that can hold up to 9 half-gallon containers), and products stocked were not differentiated by size, we convert crate units to gallons using a 4-to-1 ratio. Any errors in conversion will not materially affect the results across categories as the same ratio was applied to all stock levels, and the conversion gives a better indication of amounts stocked in comparison with product moved.

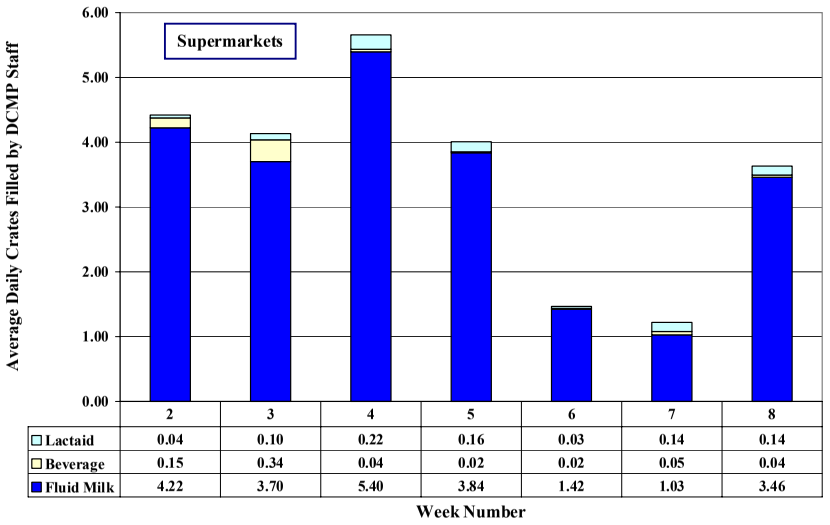
To evaluate DCMP performance in addressing these issues, we evaluate how stocking levels changed during the program period. The average number of crates filled by program staff during the DCMP period, differentiated by store type, is displayed in Figure 4.8, while product amounts low on stockweight are indicated in Figure 4.9. With the exception of a slight increase in product filled in week eight, all store types generally exhibited decreased fill levels during the program period -- most notably drug stores which had relatively high fill levels on a volume basis. The increase in fill levels for convenience stores, supermarkets, and mass merchants at the end of the program period may indicate a loss of program integrity during the program cycle or, more importantly, a need to continue to emphasize balanced stocking and ordering programs as product availability or consumer trends vary. Similar decreasing trends over the program period were exhibited for stockweight levels across all store types. Decreasing trends in total product filled and low stockweight levels indicate that DCMP objectives to improve stocking, rotation, and ordering of products were attained.

Out of Stock Trends

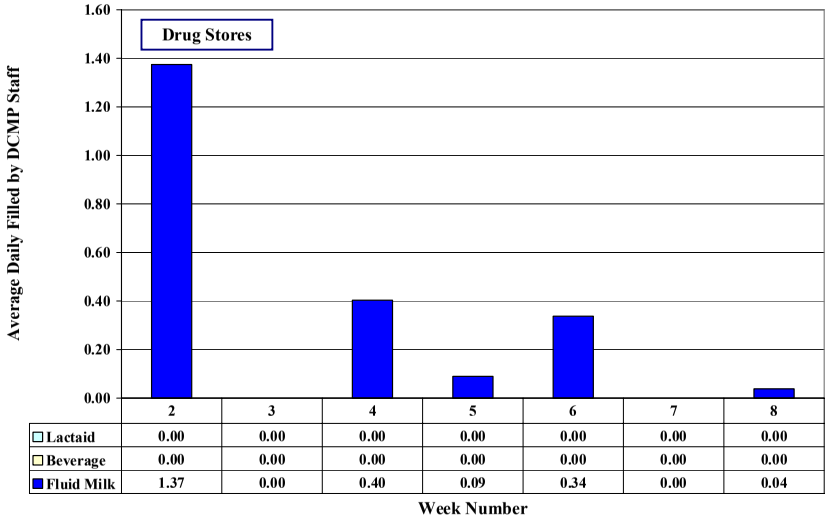
Tracking product out of stocks is another important tool in the measurement of store progress during the DCMP. Out of stock reporting highlights ordering and filling problems at the store level and helps staff find solutions (ProCorp USA, 2003). Out of stocks are listed by product and are included with the weekly SAR. Products are identified that were out of stock by date of store visit and grouped by product category (i.e., fluid milk, beverage, and lactaid milk). The cause of the out of stock is also reported. As described earlier, out of stock types include: (*i*) out of stock in store (reveals an ordering issue), (*ii*) not on show, available in coolroom (reveals filling and facing issues), (*iii*) undelivered by supplier (not under the control of retailer), and



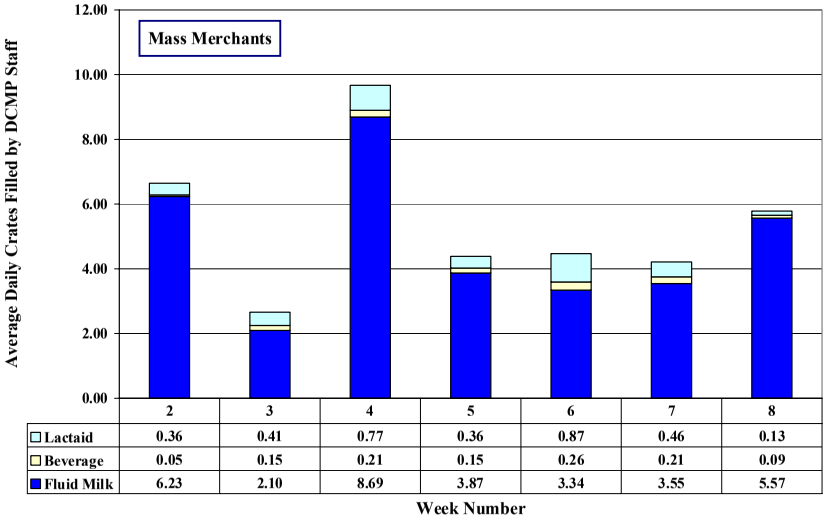
	2	3	4	5	6	7	8
Lactaid	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Beverage	0.01	0.00	0.01	0.00	0.00	0.01	0.00
Fluid Milk	0.19	0.55	0.24	0.25	0.24	0.12	0.23



	2	3	4	5	6	7	8
Lactaid	0.04	0.10	0.22	0.16	0.03	0.14	0.14
Beverage	0.15	0.34	0.04	0.02	0.02	0.05	0.04
Fluid Milk	4.22	3.70	5.40	3.84	1.42	1.03	3.46

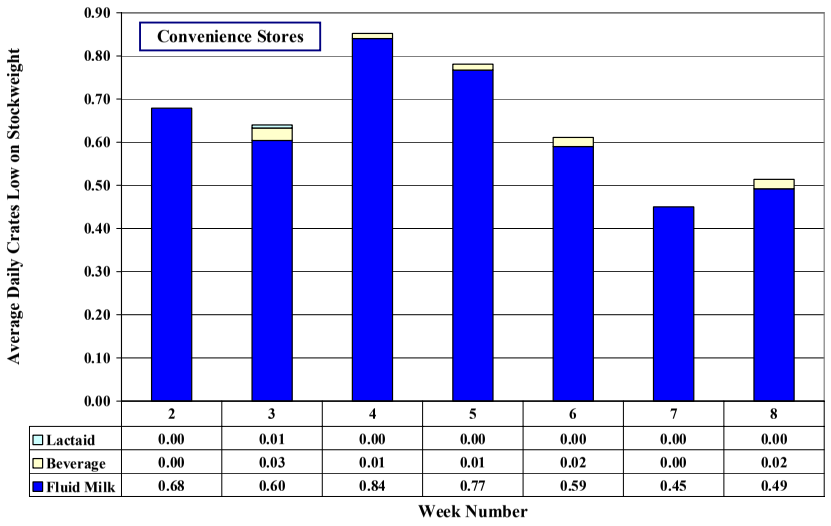


	2	3	4	5	6	7	8
Lactaid	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Beverage	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fluid Milk	1.37	0.00	0.40	0.09	0.34	0.00	0.04

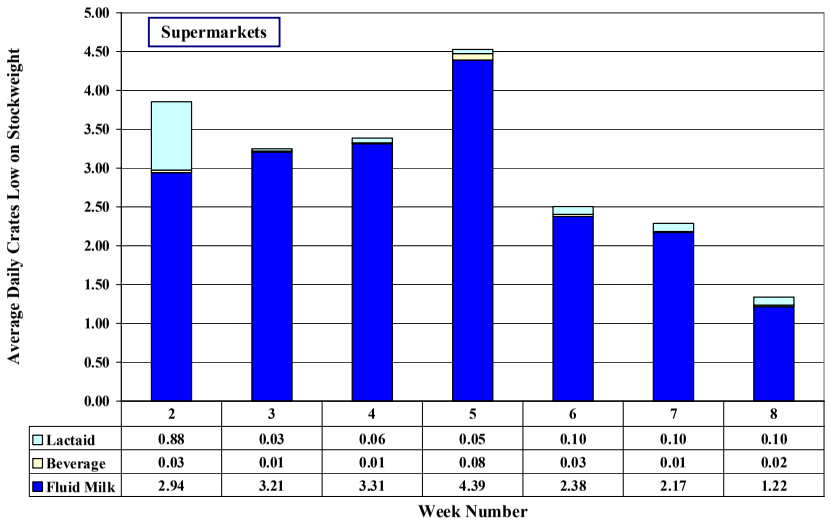


	2	3	4	5	6	7	8
Lactaid	0.36	0.41	0.77	0.36	0.87	0.46	0.13
Beverage	0.05	0.15	0.21	0.15	0.26	0.21	0.09
Fluid Milk	6.23	2.10	8.69	3.87	3.34	3.55	5.57

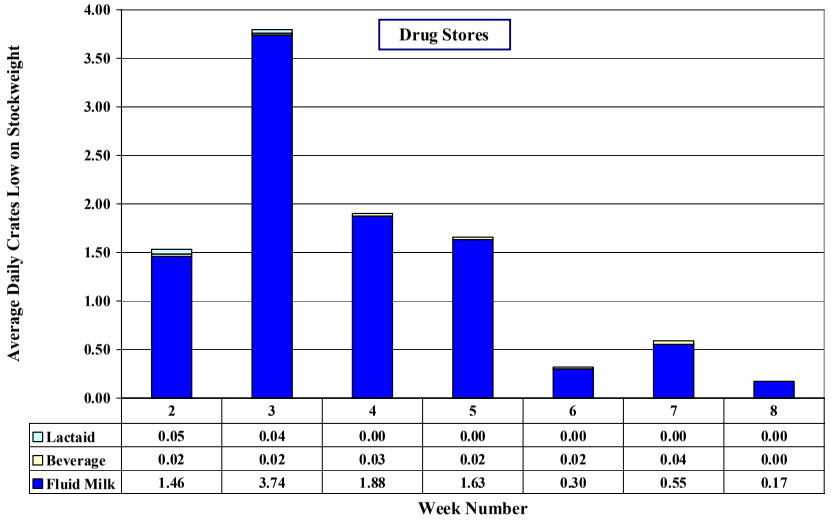
Figure 4.8. Average Daily Crates Filled by DCMP Staff, by Product Type and Week Number.



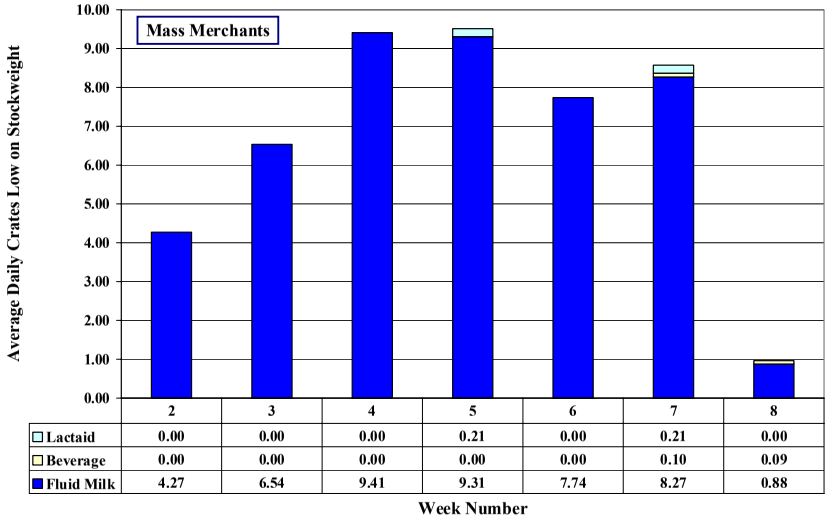
	2	3	4	5	6	7	8
Lactaid	0.00	0.01	0.00	0.00	0.00	0.00	0.00
Beverage	0.00	0.03	0.01	0.01	0.02	0.00	0.02
Fluid Milk	0.68	0.60	0.84	0.77	0.59	0.45	0.49



	2	3	4	5	6	7	8
Lactaid	0.88	0.03	0.06	0.05	0.10	0.10	0.10
Beverage	0.03	0.01	0.01	0.08	0.03	0.01	0.02
Fluid Milk	2.94	3.21	3.31	4.39	2.38	2.17	1.22



	2	3	4	5	6	7	8
Lactaid	0.05	0.04	0.00	0.00	0.00	0.00	0.00
Beverage	0.02	0.02	0.03	0.02	0.02	0.04	0.00
Fluid Milk	1.46	3.74	1.88	1.63	0.30	0.55	0.17



	2	3	4	5	6	7	8
Lactaid	0.00	0.00	0.00	0.21	0.00	0.21	0.00
Beverage	0.00	0.00	0.00	0.00	0.00	0.10	0.09
Fluid Milk	4.27	6.54	9.41	9.31	7.74	8.27	0.88

Figure 4.9. Average Daily Crates Low on Stockweight by Product Type and Week Number.

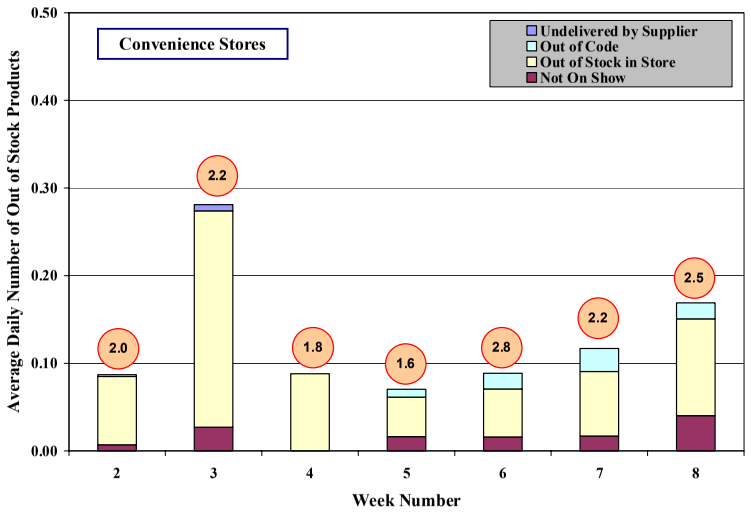
(*iv*) out of code (out of date, as a result of stock not being sold quickly enough). Stores also receive trend lines broken down by product category representing totals of the product listing numbers by week.

Out of stock data in the DCMP database were used to evaluate overall causes of out of stocks and identify product types most affected for the various store types. Since the number of store visits per week can vary over the program period, the average daily number of out of stocks was computed for each store over the seven weeks of out of stock data (weeks 2-8). We then computed volume-weighted trend statistics by store type over the program period.

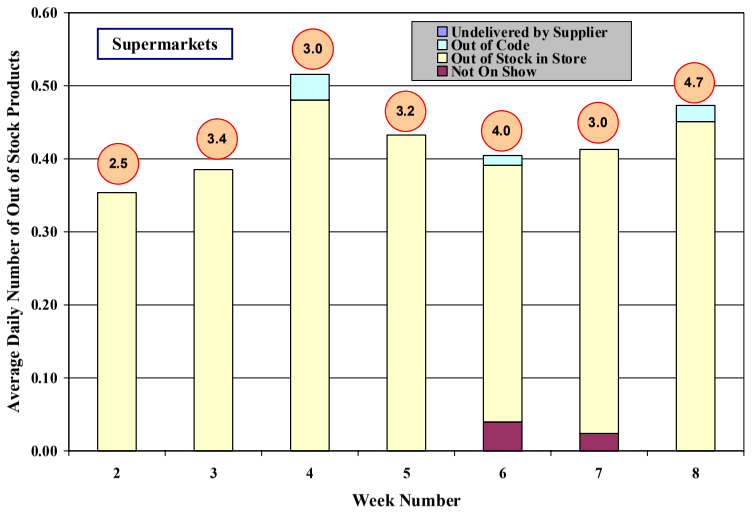
Average daily out of stocks appeared quite low for all store types (Figure 4.10). For example, the maximum weekly average daily out of stock number occurred for mass merchants in week eight at a level of around 0.55. With less than one product, on average, out of stock per day, it appears that this issue does not deserve much attention. However, important issues can sometimes be clouded by aggregate statistics, so we include in Figure 4.10 the maximum store average daily out of stocks by week for each store type. This also gives an indication of the extent of out of stocks across store types. With the exception of mass merchants, average daily out of stocks were similar across store types, even though daily volume levels across stores differ substantially. It would appear that convenience and drug stores, the latter especially, have the highest out of stock numbers, relative to store volume. Emphasizing stocking, rotation, and ordering issues in these store types would seem to be important. Out of stocks in mass merchants were generally lower than in other store types, which is intuitively plausible given the relatively lower number of individual products stocked in higher volume.

"Out of stocks in the store" was clearly the most dominant out of stock category across all store types (Figure 4.10). This indicates an ordering issue that was also highlighted in the benchmark standard and audit report evaluations, where stocking and ordering were shown to be areas in need of improvement. Products not on show (but available in the coolroom) were an important component of overall out of stocks for convenience stores. Products out of code were relatively minor, while few if any problems occurred with products being undelivered by suppliers. In addition, no clear reductions in the overall out of stocks by store type were apparent, with the possible exception of drug stores. Given the relatively low numbers to begin with, this is perhaps to be expected. In addition, out of stocks seemed to be of little consequence to mass merchants, but increased significantly in week eight. Given the limited number of stores in this category (4), wide apparent swings can be shown that reflect a relatively minor change and that may reflect introduction of a new product with inadequate ordering.

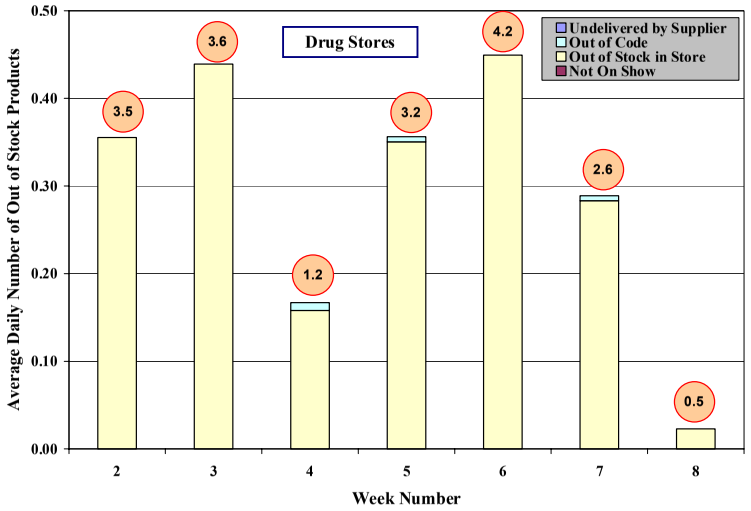
Out of stocks were largely the result of out of stocks to fluid milk products, except in mass merchant stores (Figure 4.11). This is to be expected given the predominance of this category in the display case. In addition, stocking and ordering issues with more limited display cases may be driving these out of stocks. Relatively high proportions of out of stocks (compared to the volume available) in beverage products for convenience stores and supermarkets were also evident. Reduction of much of these out of stocks could be achieved by increasing the number of facings in the beverage, along with improved ordering protocols for this product type (i.e., reducing out of stocks in convenience stores). Increased facings and linear footage allocated to beverage products was evident in revised planogram designs advocated by DCMP staff (see next section for more detail). Out of stocks for fluid milk products were also evident in convenience



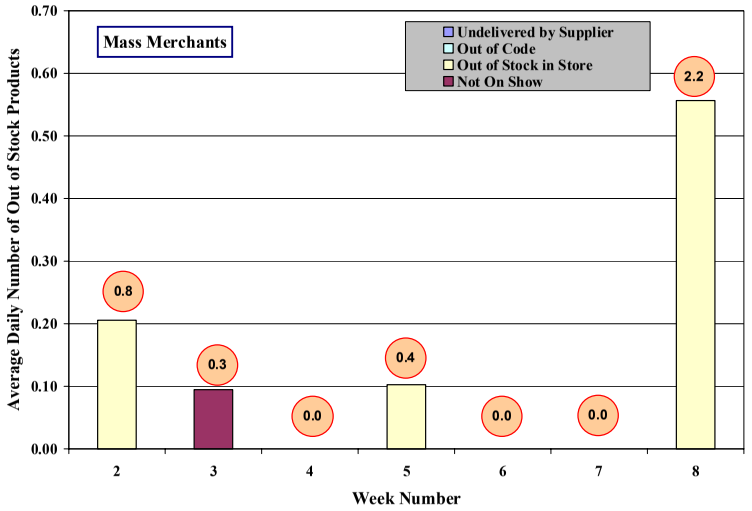
Note: Numbers in circles above the week columns indicate the maximum daily average of out of stocks (all product types) across all stores, the minimum was always zero; i.e., at least one store had no out of stocks for that week.



Note: Numbers in circles above the week columns indicate the maximum daily average of out of stocks (all product types) across all stores, the minimum was always zero; i.e., at least one store had no out of stocks for that week.

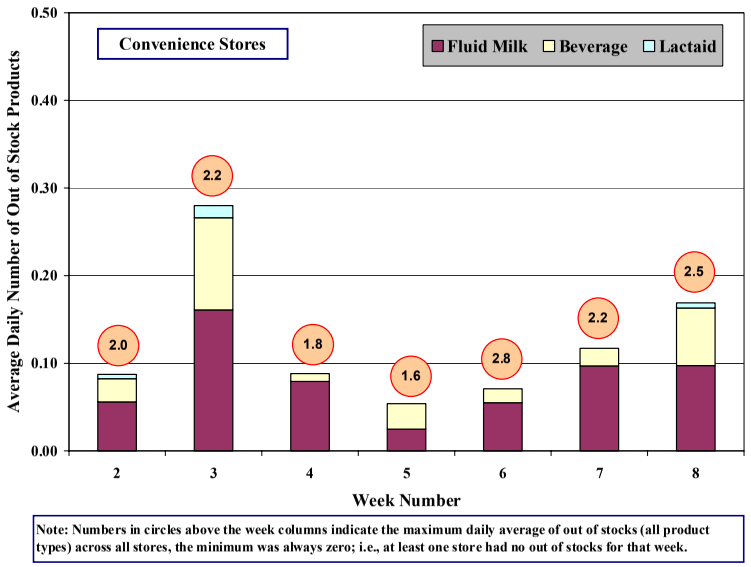


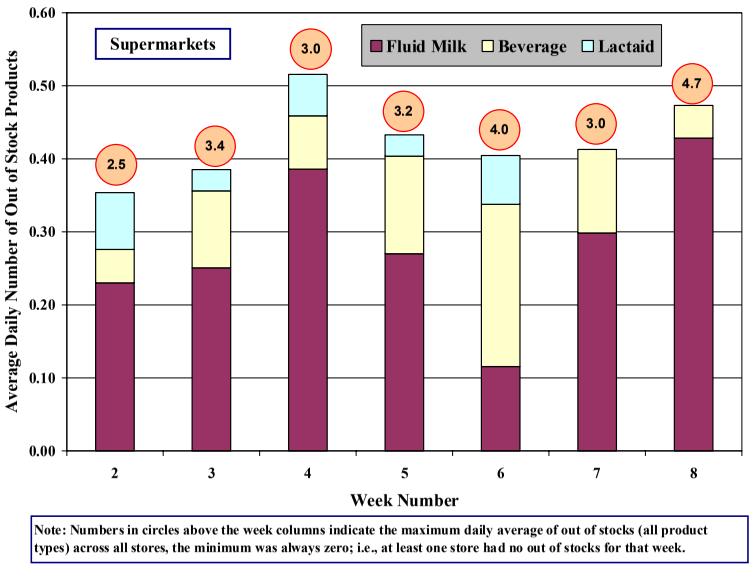
Note: Numbers in circles above the week columns indicate the maximum daily average of out of stocks (all product types) across all stores, the minimum was always zero; i.e., at least one store had no out of stocks for that week.

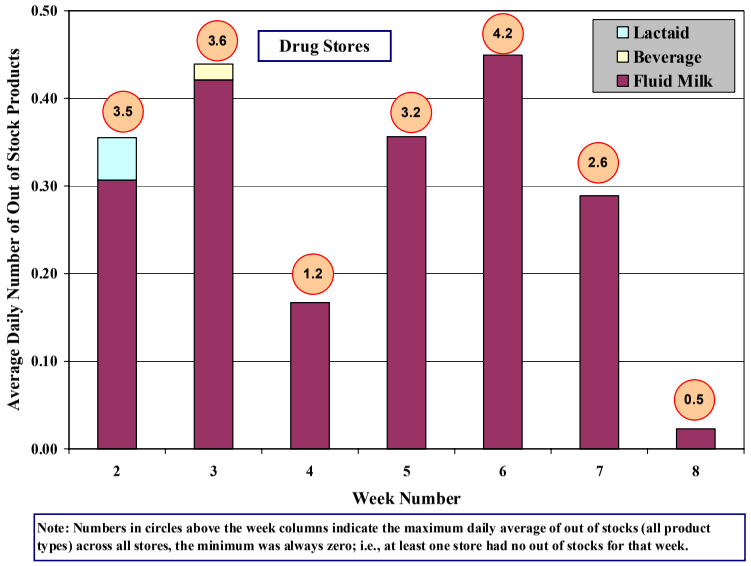


Note: Numbers in circles above the week columns indicate the maximum daily average of out of stocks (all product types) across all stores, the minimum was always zero; i.e., at least one store had no out of stocks for that week.

Figure 4.10. Average Daily Number of Out of Stock Products by Out of Stock Type and Week Number.







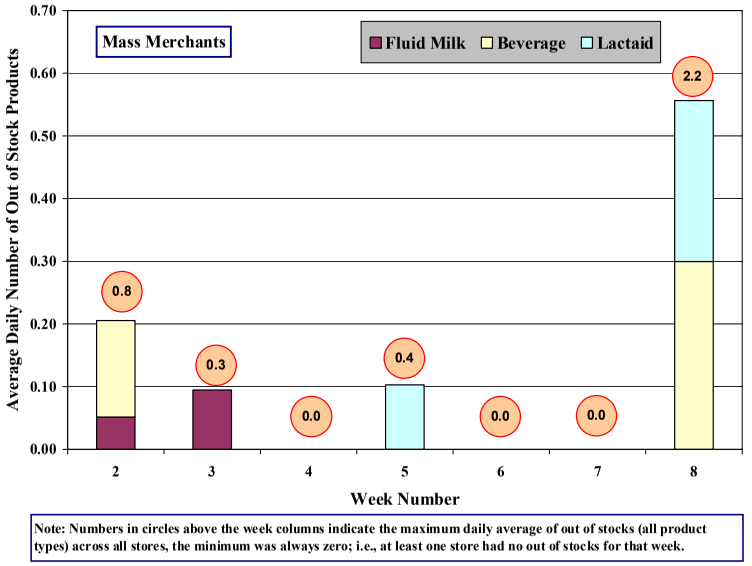


Figure 4.11. Average Daily Number of Out of Stock Products by Product Type and Week Number.

stores and supermarkets, but at a lower level than for beverage products. Mass merchants showed out of stocks in lactaid products late in the program period, likely because this product was introduced as a result of DCMP recommendations and ordering was not yet calibrated to demand.

Dairy Case Design Adjustments

Through the DCMP, dairy case planograms were redesigned to accommodate the new milk management focus. Using sales data and facing allocation for products, balanced planograms were developed and augmented with improved ordering and stocking programs in order to maximize sales in the dairy case and improve efficiencies in operation. Program staff identified and redesigned the milk ingredient (standard, fluid milk products), beverage, and lactaid products according to program implementation as described in detail in Section I. Generally, beverage and fluid milk sections were separated wherever possible, with positioning of beverage milk products next to higher-priced juice products. A vertically oriented merchandising technique was used that integrated accounting for stockweight days coverage and facings per product. Lactose reduced and organic milk products were also integrated into the fat content sections.

Preliminary analysis of product counts and distribution was conducted based on sales data, with individual products identified by type and container (Table 4.2). We used sales data for May and June 2002 as the "pre" period, and sales data for September and October 2002 as the "post" period. Given the two-month time period for comparison, product counts may be overstated; for example, if a store switched from Brand A white whole gallons to Brand B white whole gallons during a particular two-month period, counts based on unique UPC numbers would count this as two products, while only one of that particular kind of product was on display at any one time. The number of new milk-based products presented to store managers over the course of a year can be surprisingly large. McLaughlin and Perosio (1996) estimated that approximately 85 new products are presented each year (i.e., nearly 200% of the average number of products on display); 35 of these are accepted and 25 current products deleted, for a net gain of about 10 new milk-based products each year. Furthermore, they estimated that larger firms can expect to net 16 new products each year, while smaller firms can expect to net around zero. We include the time-comparative analysis here to show the dimension of products available to the various stores and to evaluate actual product changes made by retailers before or during the DCMP or by program staff to further implement program objectives. Particular changes recommended during the DCMP will be highlighted by comparing actual pre- and post-planograms.

The sales data product counts show that stores used, on average, approximately 37 different milk products (excluding creamers, soy products, etc.) in the dairy case. As expected, the number of products was greatest in supermarkets (74) and lowest in drug stores (16). While volume movement of milk products is high in mass merchant stores, the number of products (24) is similar to that in convenience stores (22). This is due to the fact that, historically, mass merchant stores concentrated on moving a large volume of product, with a limited variety. As will be seen later, DCMP program staff recommended a diversification of products, particularly with the introduction of beverage products. The aggregate product count numbers are consistent with McLaughlin and Perosio (1996), who estimated that the average number of unique milk products (i.e., UPCs) in the dairy case for twelve supermarket chains and five wholesale buyers in upstate

New York was 43. In addition, the International Dairy-Deli Association (1990), using a national survey of supermarkets, estimated that the average number of UPCs of milk in the dairy department was 77.

While fluid milk products were the largest-moving category on a volume basis, beverage products, in terms of the number of individual products, garnered a much higher share of product sales counts (Table 4.2). This is due, in large part, to the limited number of individual product facings, but a large variety (e.g., in size, flavor, and fat content) of products available. Increases in the number of beverage products, consistent with DCMP strategies, occurred in all store types between the pre- and post-program time periods. As expected, lactaid product counts were a distant third and were concentrated primarily in supermarket sales. Even so, increases in lactaid products were evident from the sales data, which was an objective of the DCMP.

The distribution of product sales by container size basis shows increases in products less than a quart in size, particularly for supermarkets. This reflects the increased facings and sales of beverage products indicated in the DCMP strategies and procedures. Increases in sales of products with smaller product sizes in mass merchants were also evident, bucking a historical trend of limiting varieties to larger product sizes (e.g, gallons). Convenience and drug stores also showed lower sales of products in gallon and half-gallon containers, but strong increases in sales of products quart-sized or smaller.

To better isolate display case changes due to DCMP efforts, and to avoid potential duplication of product counts based on replacement of like products, we compare the designs for the pre- (or existing) planograms with the recommended post-planograms to be implemented during the program period. These two planograms offer two snap-shots in time, highlighting specific recommendations for changes in display case design. Differences from product sales counts can be due to replacement of like products (as mentioned earlier), incomplete implementation of recommended planogram adjustments, or changes to planogram design in the two months following the 8-week program period, when program staff no longer monitor store activities. In any event, a review of recommended planogram adjustments reveals to what extent particular program strategies are followed the field. In addition, by analyzing the planogram design data, we can review not only product counts and distributional changes, but also overall spacing allocation adjustments (i.e., product facings and linear footage) in the dairy case. Changes in product counts, facings, and linear footage based on recommended planogram adjustments are shown in Tables 4.3, 4.4, and 4.5, respectively.

Product count numbers in all store types except mass merchants are lower than in counts using UPC sales data (Table 4.3), which likely reflects replacement of products with those in similar categories. Higher mass merchant numbers are somewhat inconsistent with counts from the sales data, which may be due to several reasons. First, the introduction of additional milk products appears to have occurred by the May/June product sales count period, but prior to the beginning of the DCMP period in July. In addition, recommended increases to product lines for fluid, beverage, and lactaid products (post-planogram, Table 4.3) did not appear to be long lasting, as reduction in all counts is evident from the September/October sales count period. Planogram counts in the other store types are more consistent with the sales count reporting, with lower numbers reflecting replacement of like products.

Table 4.2. Pre- and Post-DCMP Period Comparison of Average Product Counts Using UPC Sales Data.[a]

	All Stores			Supermarkets			Mass Merchants			Convenience Stores			Drug Stores		
Category	**Pre**	**Post**	**Change**	**Pre**	**Post**	**Change**	**Pre**	**Post**	**Change**	**Pre**	**Post**	**Change**	**Pre**	**Post**	**Change**
All Products	37.1	38.9	4.9%	73.8	77.7	5.3%	24.3	27.0	11.3%	21.6	23.0	6.6%	16.1	15.2	-5.9%
Fluid Milk	18.4	18.0	-2.2%	35.1	34.4	-1.9%	16.0	16.9	5.5%	10.2	10.1	-0.5%	9.8	8.5	-13.3%
Beverage Milk	13.4	15.6	16.1%	23.6	27.8	17.9%	8.3	10.1	22.7%	10.9	12.3	13.6%	4.7	5.1	8.5%
Lactaid Milk	5.3	5.4	1.7%	15.2	15.5	2.1%	0.0	0.0	0.0%	0.6	0.6	0.0%	1.7	1.6	-3.0%
Gallon	5.4	5.3	-0.9%	8.6	8.6	-0.7%	8.5	8.4	-1.5%	4.0	4.0	0.0%	1.8	1.7	-5.6%
Half Gallon	14.3	14.2	-1.0%	33.9	34.3	1.0%	8.3	9.5	15.2%	4.6	4.6	-1.0%	5.7	4.1	-28.9%
Quart	9.8	10.6	8.0%	21.2	22.4	5.4%	2.3	3.4	50.0%	5.1	5.7	11.7%	4.4	4.9	10.2%
Less than Quart	7.6	8.9	16.1%	10.0	12.5	24.3%	5.3	5.8	9.5%	7.9	8.8	11.1%	4.2	4.6	8.3%

[a] Product counts based on the number of unique products in the May/June (Pre) and Sept./Oct. (Post) monthly sales periods using the 59 stores with available sales data.

Table 4.3. Pre- and Post-DCMP Period Comparison of Average Product Counts Using Store Planogram Designs.[a]

	All Stores			Supermarkets			Mass Merchants			Convenience Stores			Drug Stores		
Category	**Pre**	**Post**	**Change**	**Pre**	**Post**	**Change**	**Pre**	**Post**	**Change**	**Pre**	**Post**	**Change**	**Pre**	**Post**	**Change**
All Products	27.3	27.5	1.0%	46.3	46.3	0.1%	47.0	45.8	-2.7%	19.6	20.2	2.9%	13.6	14.0	3.2%
Fluid Milk	15.9	15.8	-0.2%	27.5	27.7	0.7%	24.3	22.8	-6.2%	10.8	11.0	1.5%	9.2	9.0	-2.3%
Beverage Milk	8.5	8.9	4.0%	11.4	11.4	0.5%	17.3	17.5	1.4%	8.3	8.7	4.8%	3.3	3.9	17.4%
Lactaid Milk	2.8	2.8	-1.2%	7.4	7.2	-2.5%	5.5	5.5	0.0%	0.5	0.5	0.0%	1.1	1.1	6.7%
Gallon	5.0	5.1	0.7%	7.9	8.1	1.6%	10.3	10.5	2.4%	3.8	3.9	2.1%	2.4	2.2	-8.8%
Half Gallon	9.8	9.6	-2.1%	21.3	20.7	-2.6%	18.8	17.8	-5.3%	4.3	4.4	3.7%	4.0	3.8	-5.4%
Quart	6.9	7.1	3.2%	12.4	13.1	6.1%	10.0	9.5	-5.0%	4.6	4.7	0.9%	3.6	3.8	3.9%
Less than Quart	5.6	5.8	4.0%	4.7	4.4	-5.3%	8.0	8.0	0.0%	6.9	7.2	4.1%	3.5	4.2	20.4%

[a] Product counts based on the number of unique products in the Pre- and Post Planogram data files using the 59 stores with available data.

Table 4.4. Pre- and Post-DCMP Period Comparison of Average Product Facings Using Store Planogram Designs.[a]

	All Stores			Supermarkets			Mass Merchants			Convenience Stores			Drug Stores		
Category	**Pre**	**Post**	**Change**	**Pre**	**Post**	**Change**	**Pre**	**Post**	**Change**	**Pre**	**Post**	**Change**	**Pre**	**Post**	**Change**
All Products	92.4	93.0	0.7%	184.6	184.6	0.0%	212.3	216.0	1.8%	43.0	43.4	0.8%	40.7	41.7	2.5%
Fluid Milk	73.8	73.9	0.2%	151.3	150.6	-0.5%	174.5	175.5	0.6%	30.2	30.2	0.3%	34.4	35.3	2.7%
Beverage Milk	14.2	14.6	2.6%	20.8	20.9	0.6%	30.8	33.5	8.9%	12.4	12.7	2.3%	5.1	5.3	2.8%
Lactaid Milk	4.4	4.5	2.7%	12.6	13.1	4.0%	7.0	7.0	0.0%	0.5	0.5	0.0%	1.2	1.1	-5.9%
Gallon	35.5	35.5	-0.1%	69.9	70.4	0.8%	116.0	113.0	-2.6%	16.5	16.7	1.0%	7.3	7.0	-3.9%
Half Gallon	33.4	34.0	1.6%	70.3	69.1	-1.7%	64.5	72.3	12.0%	10.4	10.6	1.5%	23.6	24.7	4.8%
Quart	14.4	14.4	-0.5%	36.8	37.3	1.4%	16.0	14.5	-9.4%	5.4	5.3	-1.5%	4.6	4.3	-6.3%
Less than Quart	9.0	9.2	2.3%	7.7	7.8	0.8%	15.8	16.3	3.2%	10.8	10.9	1.1%	5.3	5.7	8.1%

[a] Product facings based on the allocation of unique UPC products in the Pre- and Post Planogram data files using the 59 stores with available data.

Table 4.5. Pre- and Post-DCMP Period Comparison of Average Product Linear Footage Using Store Planogram Designs.[a]

	All Stores			Supermarkets			Mass Merchants			Convenience Stores			Drug Stores		
Category	**Pre**	**Post**	**Change**	**Pre**	**Post**	**Change**	**Pre**	**Post**	**Change**	**Pre**	**Post**	**Change**	**Pre**	**Post**	**Change**
All Products	34.6	34.9	0.6%	69.7	69.8	0.1%	86.8	87.8	1.2%	15.5	15.6	0.9%	13.8	14.1	1.9%
Fluid Milk	29.5	29.5	0.1%	59.5	59.4	-0.2%	75.9	75.6	-0.4%	12.4	12.4	0.4%	12.4	12.6	2.1%
Beverage Milk	3.8	4.0	4.0%	6.3	6.4	1.4%	8.5	9.8	15.5%	3.0	3.1	2.7%	1.2	1.2	2.7%
Lactaid Milk	1.4	1.4	1.0%	3.9	4.0	1.7%	2.4	2.4	0.0%	0.1	0.1	0.0%	0.3	0.3	-5.9%
Gallon	17.7	17.7	-0.1%	34.8	35.1	0.9%	57.9	56.4	-2.6%	8.3	8.3	1.0%	3.6	3.5	-3.9%
Half Gallon	11.1	11.3	1.5%	23.6	23.1	-1.9%	21.2	24.0	13.1%	3.4	3.5	1.0%	7.9	8.2	4.8%
Quart	3.7	3.7	0.0%	9.6	9.8	1.9%	4.1	3.7	-9.2%	1.3	1.3	-1.5%	1.1	1.1	-6.2%
Less than Quart	2.1	2.1	2.7%	1.8	1.8	1.2%	3.6	3.7	3.2%	2.5	2.5	1.7%	1.2	1.3	8.4%

[a] Product linear footage based on the allocation of unique UPC products in the Pre- and Post Planogram data files using the 59 stores with available data.

A comparison of pre- and post-planogram designs shows that product variety increased, on average, a modest 1% across all stores, with the largest relative increases in drug stores and supermarkets. Increases in the number of beverage milk products were evident across all store types, particularly in drug stores, and apparently at the expense of a small number of fluid milk products. Lactaid milk products continue to be emphasized in supermarkets, although increased numbers are recommended for mass merchants. Increases in smaller container sizes were emphasized for convenience and drug stores (4.1% and 20.4% increases in less-than-quart categories, respectively), while increases in the number of gallon products at the expense of half-gallon products occurred for supermarkets and mass merchants.

While product counts are useful for addressing the issue of product variety in the display case, equally important are the number of facings these products receive and total space allocation for milk product items. Increased facings of milk products were recommended for all store types, particularly for drug stores and mass merchants (Table 4.4). Special emphasis was placed on increasing facings of beverage products in all store types, and lactaid products in supermarkets. This is consistent with trends in consumer demand for single-serving, flavored, and lactose-reduced milk products. As mass merchant stores are beginning to augment the stocking of these items in the dairy case, DCMP recommendations complemented this trend by recommending facing increases of nearly 9%. Even though reductions in product counts (or variety) of half gallons in mass merchants were recommended, expanded facings of these products, as well as the single-serve type containers were pursued during the DCMP program. Increases in these two size categories were also highlighted for convenience and drug stores.

ACNielsen (1990) estimate that the average linear footage per store for milk is 54.2 lf, with the eastern U.S. figure being slightly lower at 46.5 lf. Average linear footage allocations for the participating stores in the Northwestern Hudson Valley Market, as computed from planogram designs, is slightly below this estimate (34.9), but includes a relatively high proportion of convenience and drug stores with considerably lower case volumes than supermarkets or mass merchants. Also, average store sizes in the ACNielsen estimates may differ from our upstate New York sample. Proper space allocation to items in the dairy department is highly important to total store sales. McLaughlin and Perosio (1996) estimated, using a survey of 17 upstate New York retail store chains and wholesalers, that the dairy department represents 10.3% of all store sales, but only 5.9% of total store space allocation.[7] Furthermore, milk sales in the dairy department have been estimated to be the highest of all included products, at $643 per store per month linear foot.[8] Milk sales are also high relative to dairy department profitability, at $16.46 per square foot, below only butter ($18.52) and sour cream ($17.11) (Willard Bishop Consulting, 1990). These profitability levels are lower than those of many non-dairy and non-food products, but milk products are certainly not a "loss leader" as is often hypothesized.

[7] Note that these estimates are based on the entire "dairy department." The authors estimate that approximately 36% of the items in the dairy department are non-milk products, while around 25% of the items are fluid milk products (McLaughlin and Perosio, 1996).

[8] The refrigerated dairy department, as defined by the industry, often includes many other dairy and non-dairy products. These (along with their comparable average sales per store per month linear foot) include: cheese ($227), margarine ($169), yogurt ($117), orange juice/drinks ($241), dough products ($127), eggs – fresh ($348), remaining juices/drinks ($400), cottage cheese ($242), pudding/desserts ($78), butter ($330), and sour cream ($228) (A.C. Nielsen, 1990).

Modest increases in total linear footage of milk products in the dairy case were recommended (or feasible) for all store types (Table 4.5). Drug stores represent the smallest volume mover of milk, but nonetheless a concerted effort was made to increase the total allocation of fluid milk and beverage space in their more limited coolers. As with product facings, increases in space for beverage products was stressed for all store types, particularly for mass merchants. Even though it appears that mass merchants had already begun incorporating beverage products in their display case before the DCMP, further increases in space allocated to these products were recommended. Changes in space allocations for supermarkets were modest, but on average reflected slight increases in all size categories, with the exception of half-gallon products. This is in contrast to drug stores, where recommended increases in space allocation centered on half-gallon and single-serving containers.

Over all stores, DCMP strategies recommended modest increases in product counts (variety), facings, and linear footage. These increases were primarily the result of increases in the beverage milk category and products less than a quart in size. Supermarket designs, on average, showed little change in overall product counts, but increased facings and linear footage of beverage and lactaid products were pursued, with corresponding lower space allocations to half-gallon size products. Mass merchant design recommendations emphasized increasing the number of beverage milk and gallon size products, with simultaneous increases in facings and space allocations for beverage products and half-gallon containers. Convenience store design changes centered on increases in product counts for beverage products, as well as facings and space allocations. Drug store recommendations showed the highest relative changes in product counts, facings, and linear footage, and were particularly strong for beverage products, complemented by increases in facings of half-gallon and single-serving products.

V. Aggregate Sales Comparison and Analysis

Using the available sales data (monthly May-October, 2001-2002) we evaluated general milk volume changes across months, years, and pre-, during-, and post-DCMP program periods. These general volume changes give us some idea of the effectiveness of DCMP efforts. But because they do not separate volume movements from other changes in store operation, price effects, seasonality, and other factors, these comparisons serve largely to highlight volume movements in the market area and track more aggregate changes in sales and volumes over the time period evaluated. The subsequent aggregate sales DCMP regression analysis allows us more effectively to isolate DCMP volume impacts and determine differences in effectiveness across store types.

Descriptive Sales Analysis

Table 2.1 provided us with an estimate of the average daily volume (ADV) of milk products sold across all stores (e.g., 11,328 gallons per day in 2002), as well as the ADV on a per store basis (e.g., 192 gallons per day in 2002). The estimated volume movements also showed increases in total market ADV between 2001 and 2002 of 5.7% (Table 5.1). This increase may be the result of several factors, including market population changes, income effects, or increases in per capita demand from promotion and advertising efforts, including activities at the retail level (e.g. the DCMP). Gains in total market movement were the result of gains in volume sales in mass merchant stores, one (of the four) of which increased store size considerably between 2001 and 2002. The large increase in mass merchants was largely offset by transfers away from other store types, particularly for fluid milk products. However, consistent with previous findings, all store types showed increases in volume sales of beverage products.

As expected, larger stores in the market area (i.e., supermarkets and mass merchants) contributed the majority share (81%) of total volume sales (Table 2.1). However, because of the number of convenience stores in the market area, convenience store volume movement from all stores exceeded that of the mass merchants, which are more limited in number. A visual representation of 2002 volume sales by store and product type is shown in Figure 5.1. Sales volume for all stores was dominated by sales of fluid milk products. However, as expected, beverage products represent a higher relative proportion in convenience and drug store categories, and lactaid products a lower relative proportion. This is consistent with these types of store having smaller dairy case sizes and functioning in a "stop-and-go" environment. Accordingly, while most volume movement is in gallon containers, relatively higher contributions to sales volume for convenience and drug stores come from smaller container sizes, particularly half-gallon and single-serving containers (Figure 5.2).

When considering changes in retail demand (or sales) of milk products on a monthly time frame, it is important to account for seasonal effects; likewise for isolating the impact of the DCMP on sales volume. Gross seasonality trends for participating stores in the program market area are displayed in Figure 5.3. Using May as the base month, we can see that sales volume levels are generally highest in September and October, but distinct changes in this seasonal trend are apparent across the two years. This is likely due, in part, to the transition in store operations for mass merchants and the introduction of additional convenience stores in 2002. On average, sales levels tend to be lower in the summer months; however, particular increases in June 2002

Table 5.1. Average Annual Gross Volume Changes, by Store and Product Type, 2001 to 2002 [a]

	Store Type						
Product	**All**	**Conven-ience**	**Drug**	**Super-market**	**Mass Merchant**	**C/D**	**S/M**
Total Products	5.7%	-1.4%	-9.5%	-0.4%	51.6%	-3.1%	8.0%
By Product Type: [b]							
Fluid Milk	5.6%	-1.9%	-9.7%	-0.4%	49.9%	-3.6%	7.9%
Beverage Milk	16.6%	7.1%	22.5%	2.3%	147.5%	7.5%	21.2%
Lactaid Milk	-3.0%	8.4%	-36.6%	-3.1%	0.0%	-0.5%	-3.1%

[a] Northwestern Hudson Valley Market. Volume movement using monthly sales data from May-October, 2001-2002. C/D = Convenience and Drug stores; S/M = Supermarkets and Mass Merchants.

[b] Fluid Milk = unflavored fluid milk products, greater than 16 ounces in size; Beverage Milk = all flavored milk products and unflavored products 16 ounces or less; and Lactaid Milk = all lactaid milk products.

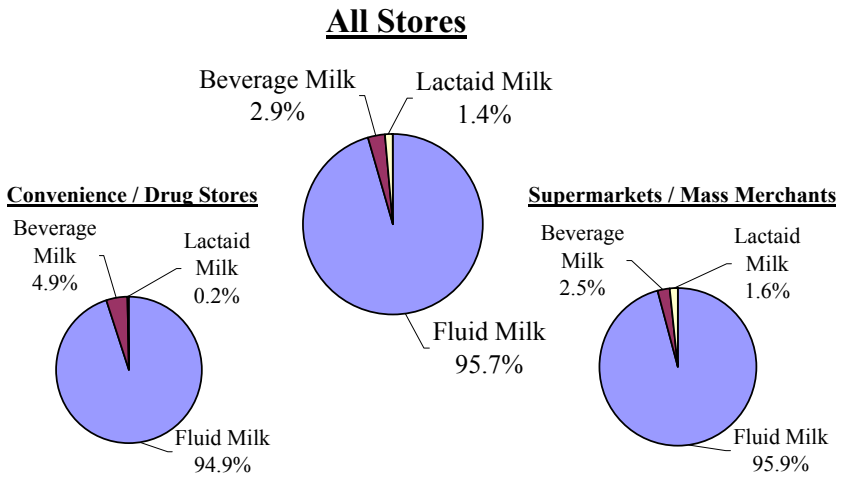


Figure 5.1. Decomposition of Milk Volume Sales by Product Type.

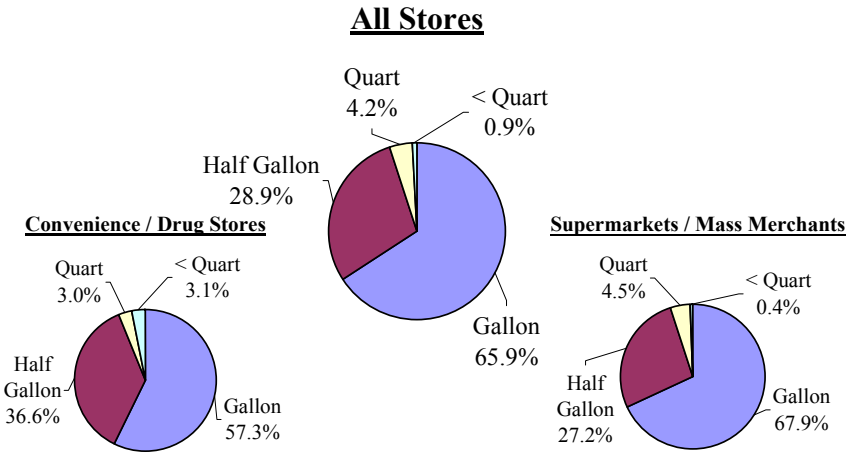


Figure 5.2. Decomposition of Milk Volume Sales by Container Size.

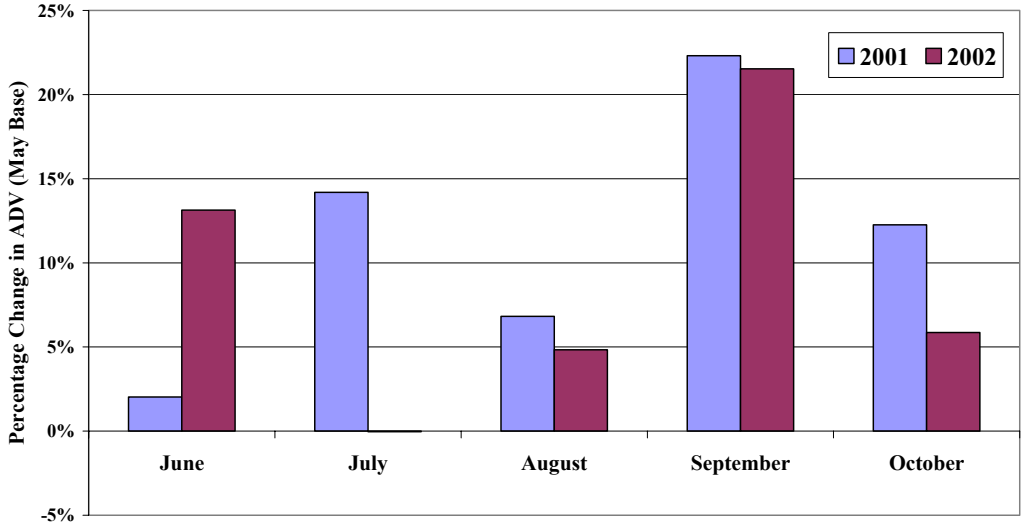


Figure 5.3. Average Monthly Seasonal Trends in Market Average Daily Volume.

occurred because of increased promotion activities (recall the familiar "June is Dairy Month" promotion) for a large supermarket chain with several stores in the market area. These sales were spread over the months of May and June for 2001. Therefore, it will be necessary to account for both seasonal patterns and changes across years in order to accurately isolate the estimated impact of DCMP on sales volume.

Annual gross volume changes can be further differentiated across the six months of available data to determine whether overall changes in volume can be identified within particular monthly periods. Because the number of stores in each of the four store types is small, we aggregate participating stores into small (i.e., convenience and drug stores) and large (i.e., supermarkets and mass merchants) groupings. Because of the higher relative volume movement in larger stores, aggregate statistics will largely follow trends from the large store grouping. Because of mass merchant store expansion, large store volume changes were positive for nearly all study months (Figure 5.4). The annual volume changes across months for the larger stores were generally mirrored in the opposite direction for smaller store types, indicating a transfer of milk sales to the larger stores from their expansion and marketing activities. An average reduction in sales volume from 2001 for July was, however, evident for both store classifications.

We also tracked annual volume changes by product type to ascertain the composition of aggregate milk volume changes. As Table 2.1 shows, annual changes in sales volume in the study market area for fluid milk, beverage milk, and lactaid milk were +5.6%, +16.6%, and -3.0%, respectively.[9] Volume changes for fluid milk and beverage milk products across the study

[9] Note that percentage changes across product types are based on different base volumes, with high volume in fluid milk and much lower volumes in beverage and lactaid milks. A 1% change in fluid milk volume therefore constitutes a higher amount of volume change than, say, a 1% change in beverage milk volume. Even so, a decomposition of annual volume changes by product type helps make clear whether volume changes across product types follow similar or differing patterns.

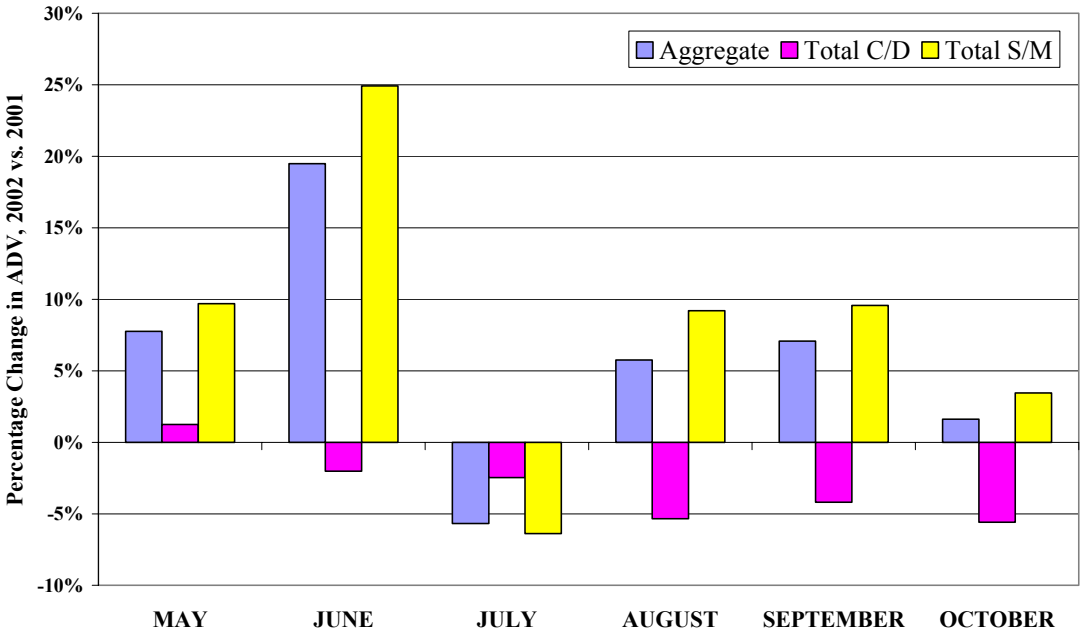


Figure 5.4. Average Annual Gross Volume Changes in ADV by Store Type.

period months follow the same directional pattern, although relative changes in volume are considerably higher for beverage milk products (Figure 5.5). This is to be expected, given the program emphasis on increasing products and facings of beverage products. The overall 3% sales volume loss in lactaid products was largely the result of lower volume sales in July; however, the final three months of monthly data show considerably smaller annual percentage changes. In addition, the direction of volume changes across months does not mirror that for fluid milk and beverage milk products. This is due, in part, to low initial volume levels, which can make for relatively large percentage changes from modest actual volume changes. For example, the 3% reduction in sales volume for lactaid products in 2002 represents less than 0.10 gallons per day per store, or approximately 4.8 gallons per day across the 59 participating stores with available sales data. Annual volume changes in product types across the study months for the large and small volume stores are displayed in Figures 5.6 and 5.7, respectively.

Aggregate Sales DCMP Regression Analysis

Using the monthly sales data described above, regression analysis was used to estimate the particular volume impacts due to the DCMP in the Northwestern Hudson Valley Market stores. Regression analysis is a useful tool for isolating independent sources of variation in explanatory variables (e.g., variation in sales volume from the DCMP) to variation in the dependent variable (e.g, variation in average daily volume of milk products). Both overall market volume impacts of the DCMP and sales volume impacts by store type were estimated. Since information was not available on store traffic or changes in market competition and other factors, using the complete sample of stores in the regression analysis should mitigate the impact of these unknown factors and provide reliable market aggregate estimates.

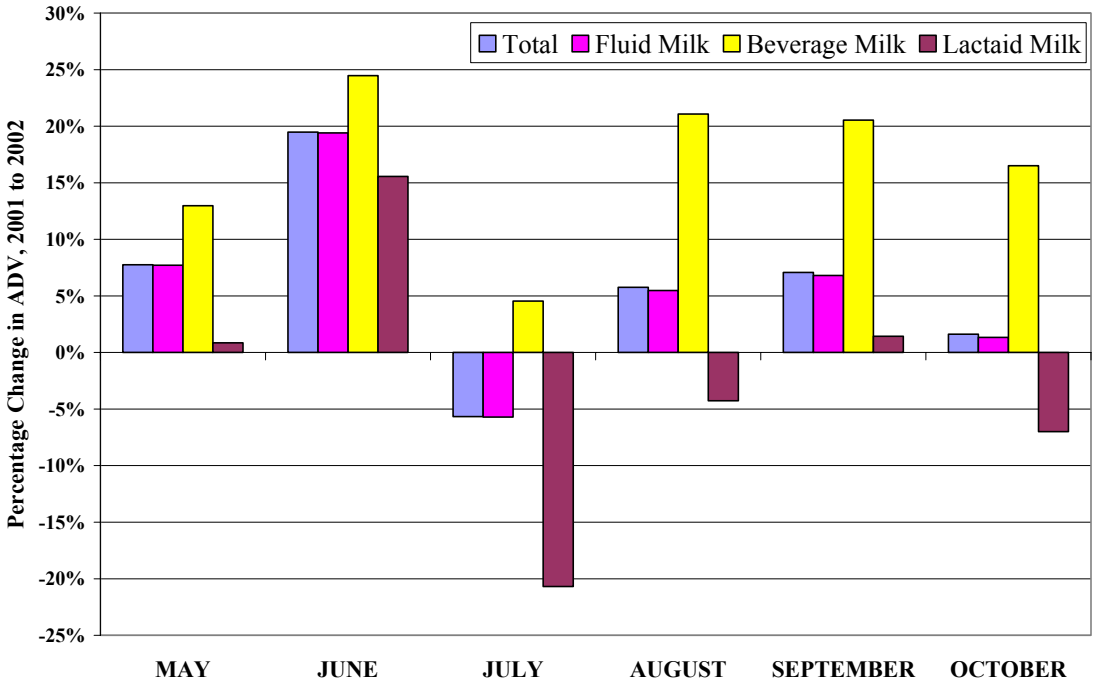


Figure 5.5. Average Annual Gross Volume Changes in ADV by Product Type.

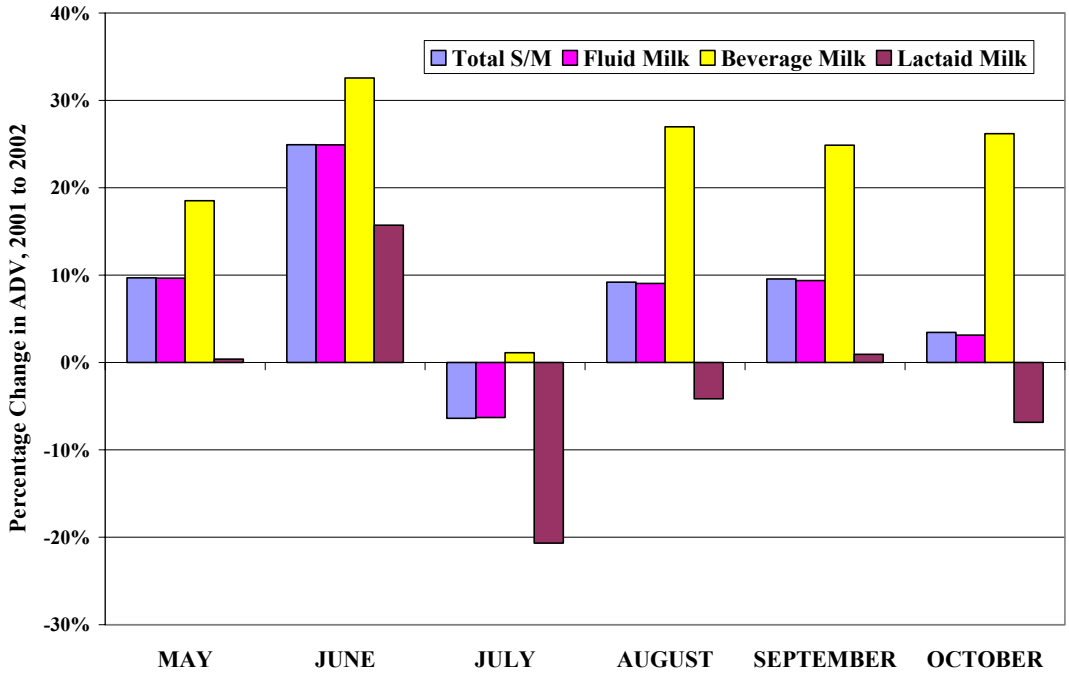


Figure 5.6. Average Annual Gross Volume Changes in ADV, Supermarkets and Mass Merchants, by Product Type.

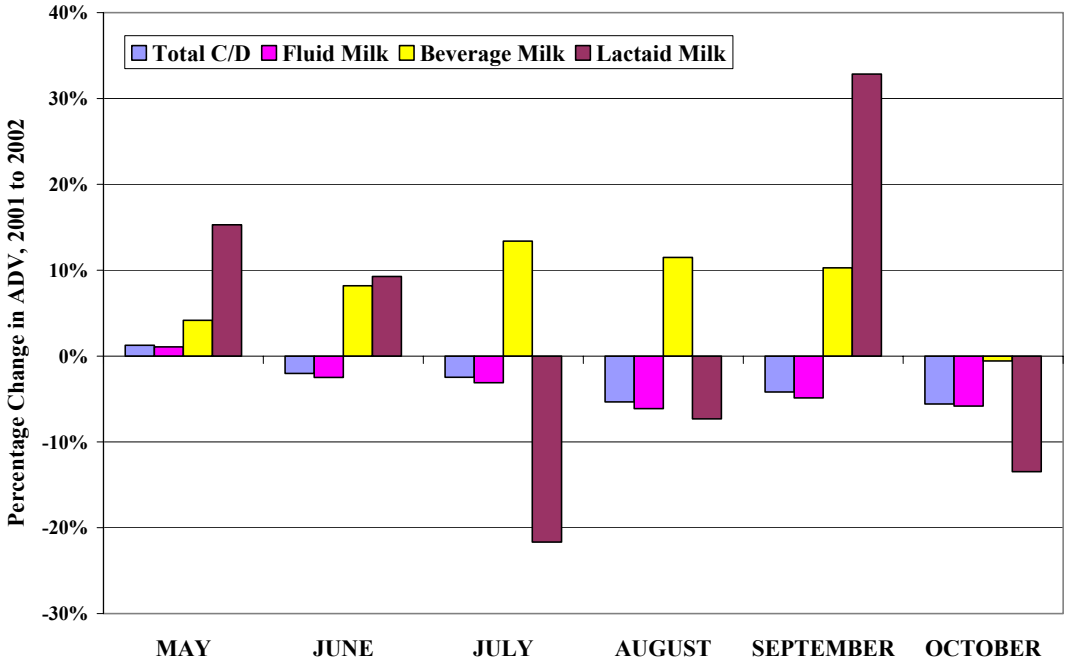


Figure 5.7. Average Annual Gross Volume Changes in ADV, Convenience and Drug Stores, by Product Type.

U.S. Census data in the market area indicate an average population increase from 2001 to 2002 of approximately 1.3% (U.S. Census, 2003).[10] Since the change in total store numbers for the entire market area is uncertain, and given that our sample contains five stores that were new in 2002, it is assumed that increases in market competition due to an increase in the number of stores will offset any population adjustment impact.[11]

The estimated increase since 2001 in annual disposable income, deflated by the Consumer Price Index for food at home in the New York/New Jersey census region (U.S. Department of Labor, 2003), was calculated at roughly 3% (Economagic, 2003). Income elasticity estimates in the literature are relatively low; for example, an income elasticity of 0.034 was estimated for fluid milk purchased for at-home consumption by Schmit et al. (2002) using recent household purchase data. This implies that for a 1% increase in real income, fluid milk demand would increase 0.034%, holding all other demand factors constant. A modest income adjustment combined with a relatively low elasticity estimate would imply minor volume adjustments due to income changes. In addition, only state level annual estimates are available, and would be invariant across stores. Therefore, income effects are ignored in the regression analysis.

[10] Percentage population changes from July 2001 to July 2002 for the four counties in the Northwertern market area (Sullivan, Ulster, Orange, and Rockland) were averaged, weighted by 2001 county population changes. Population changes ranged from 0.8% in Ulster County to 2.1% in Orange County (U.S. Census, 2003).

[11] Recall that a total 61 stores participated in the Northwestern Hudson Valley Market DCMP. Four cycles (or programs) were completed in the Hudson Valley area with 65% store participation, accounting for over 91% of average weekly volume.

The dominant factors affecting changes in sales volume for the DCMP stores are hypothesized to be price variation, seasonality, cross-year variation, individual store impacts (e.g., from unique management, operation, or other unknown factors), and the DCMP. The following regression equation explaining the variation in store Average Daily Volume (ADV) was used:

$$(1) \quad ADV_{i,t} = \beta_0 + \beta_1 P_{it} + \sum_{s=6}^{10} \delta_s MO_{s,it} + \sum_{y=1}^{2} \lambda_y YR02_{y,it} + \alpha DCMP_{it} + u_{it}$$

$$i = (1,\ldots,N),\ t = (5,6,7,8,9,10),$$

where *ADV* is the average daily sales volume in gallons for the i^{th} store at the t^{th} time period, *P* is the average fluid milk price, *MO* are monthly dummy variables to account for within-year seasonality, *YR02* are annual dummy variables to account for across-year variation by store type (1 = convenience/drug stores, 2 = supermarket/mass merchants), *DCMP* is a dummy variable capturing the post-DCMP test period (i.e., September and October, 2002), β_0, β_1, δ_s, λ_y, κ_i, and α are parameters to estimate, and u_{it} is the residual error term to capture other unaccounted for store influences.[12] Using both years of available sales data (i.e., 2001 and 2002) provides for more efficient parameter estimation, and allows for both annual adjustment and seasonality effects to be isolated from overall volume changes.

Since individual store differences and variation in store programs, promotions, displays, and operation are difficult to capture, we used a one-way, fixed effects estimator. Given the wide variety of store types, sizes, and operational changes, a fixed effect model allows us better to identify and isolate individual store variation in volume from DCMP effects. Since both overall store impacts of the DCMP and the relative impacts by store type are useful to the evaluation of DCMP effectiveness, a supplemental regression equation differentiating these store type impacts was estimated. Specifically, we estimated the following:

$$(3) \quad ADV_{i,t} = \beta_0 + \beta_1 P_{it} + \sum_{s=6}^{10} \delta_s MO_{s,it} + \sum_{y=1}^{2} \lambda_y YR02_{y,it} + \alpha_1 DCMPCD_{it} + \alpha_2 DCMPSM_{it} + u_{it}$$

$$i = (1,\ldots,N),\ t = (5,6,7,8,9,10),$$

where *DCMPCD* and *DCMPSM* are dummy variable expressions for the DCMP post-test periods by convenience/drug stores and supermarket/mass merchants, respectively, and α_1 and α_2 are the estimated individual marginal impacts of the DCMP for these respective store types.[13] Price data used in the econometric models consisted of the store price and extrapolated price data as described in Section III.

[12] Recall that the DCMP in-store period occurred during the eight weeks of July and August 2002. While many of the DCMP recommendations may have been instituted during this time, continual changes occurred throughout the program. In addition, it was felt that longer-run DCMP sales impacts should be estimated *after* the time period when program staff visited the stores so that impacts would be based on actual store management following the program cycle. Therefore, September – October 2002 was the time period selected for measuring volume changes attributable to the DCMP.

[13] Regression models are estimated using the PROC TSCSREG procedure in SAS, Version 8.1.

For ease of exposition, specific regression results and test diagnostics are given in Appendix Table 5.1. We briefly highlight the general results here and emphasize the estimated DCMP volume impacts. R-square levels for the models (i.e., measuring the amount of explained variation in ADV) were relatively high for all models, ranging from 97% to 98%. That is, the models did a good job statistically of explaining the variation in ADV over time and across stores. While the significance of individual monthly seasonal dummy variables varied, F-tests for all models except for lactaid products indicated that seasonality was statistically important for the model. Strong positive seasonality estimates occurred with beverage products for the months of July and August, the time period when children (who are expected to be high-demand users of this product) are out of school, prompting parents and children to buy more of these products for home or immediate use.

Two sets of models were run for the all product and fluid milk categories, with and without the estimated price variables for gallon and half-gallon fluid milk products. Given the limited amount of unique store-level price data and the fact that aggregating to a monthly basis may mask weekly promotions that would affect overall volume movement, insignificant price response in the models was not surprising. Also, extrapolation of the supplemental market and upstate price series prevented any additional relative variation across store types beyond the two-month program period. Given the inconsistent and limited price data for beverage products, and the fact that lactaid product prices were not collected, price variables were not included in these product models. To a large degree, seasonal pricing behavior is correlated with seasonal demand levels. Therefore, we assume that for product models without a price variable, price response behavior is captured effectively through the seasonal and cross-year specifications. These models result in more conservative estimates of DCMP volume impacts and will be used when estimating market impacts and the value of the volume gains.

Estimated DCMP impacts from the regression models indicated that the program was effective at increasing ADV across all stores, on average, from 4.4% to 6.0% (Table 5.2). Using the average store ADV of 192 gallons per day, this implies an average store volume gain of 8.5 to 11.6 gallons per day. The DCMP appeared relatively more effective in supermarkets and mass merchants (average volume gain of 5.3% to 6.4%) than in convenience and drug stores (average volume gain of 4.1 to 5.8%), and resulted in conservative average daily volume gains across all products of 24.2 and 2.2 gallons per day, respectively. The larger relative percentage gains for supermarkets and mass merchants are to be expected, due in part to more flexibility in space use in these store types, compared with the much more limited space and redesign options in smaller stores. Even so, positive and statistically significant overall changes in volume were realized for both store classes.

Given that the dominant share of total milk volume movement is dues to sales of fluid milk products (see Figure 5.1), it is not surprising that gains in fluid milk volume largely mirror the overall product results (Table 5.2). Over all stores, ADV gains from DCMP activities were conservatively measured at 4.4%. Furthermore, ADV gains from the DCMP were positive and significant for both store classes (Figure 5.8), with gains of 5.2% and 4.1% for supermarkets/mass merchants and convenience/drug stores, respectively. Strong DCMP gains in the largest dairy case category are encouraging evidence of the program's effectiveness in moving more milk in both smaller and larger stores.

Table 5.2. Estimated Average Daily Volume Gain from DCMP.[a]

Store/Product Type	% Volume Gain		ADV	Change in ADV (gpd)	
	Model 1	Model 2	(gpd)	Model 1	Model 2
All Stores	6.04	4.40	192.00	11.60	8.44
By Store Type:					
C/D	5.84	4.05	54.40	3.18	2.20
S/M	6.39	5.25	460.30	29.41	24.17
By Product Type:					
Fluid Milk	6.09	4.41	183.70	11.19	8.10
Beverage Milk	--	-1.90	5.70	--	-0.11
Lactaid Milk	--	9.04	2.60	--	0.24

[a] With the exception of the beverage milk product type, all estimated volume gains are statistically significant at the 15% level or less. Model 1 contains an average monthly fluid price variable (not statistically significant), Model 2 does not.
ADV = Average Daily Volume in gallons per day (gpd), based on 2002 sales volume levels.

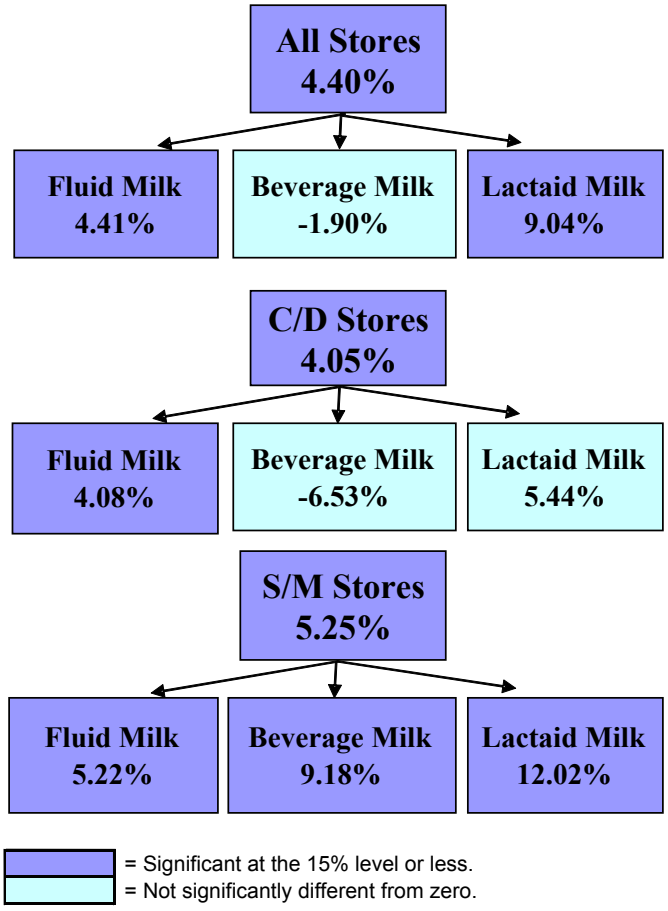


Figure 5.8. Decomposition of DCMP Sales Volume Impacts, by Store and Product Type.

While DCMP efforts emphasized increases in space allocations for beverage products (i.e., around 4% based on planogram recommendations), average store impacts were negative (-1.90%), but not statistically different from zero. Even a 1.9% decline would imply only a one-tenth of a gallon reduction in ADV for beverage products. This can be further explained by examining the disaggregated DCMP volume impacts by store and product type in Figure 5.8. The "all store" result is realized by apparent decreased volume in convenience and drug stores (-6.5%) offset some by statistically significant gains in supermarkets and mass merchants (+9.2%). The direction of these estimates can be seen, to some degree, from Figures 5.6 and 5.7. Here, maintained seasonal and cross-year gains for beverage products were apparent for the larger stores (Figure 5.6), while convenience and drug stores showed a negative volume change in October from the previous year and a September change lower than the relative changes in the previous two months (Figure 5.7). Comparing the three two-month periods, cross-year gains appear higher during the DCMP program period (July and August), followed by the pre-DCMP period (May and June), than during the post evaluation period. This may indicate that increases in volume were better attained under the close monitoring of program implementation during the market cycle, and that a loss of program integrity and operational design occurred after in-store visits. In any event, the potential inability to maintain positive (and significant) volume changes from DCMP efforts in the beverage category is more than offset by the larger relative volume fluid milk category, resulting in a 4.05% increase in total store volume, on average, for convenience and drug stores.

Lactaid milk volume across all stores showed a relatively large (and statistically significant) percentage increase due to DCMP efforts of over 9%. However, a 9% volume gain in lactaid milk products is equivalent to just under one quart gained per day, on average, across stores. DCMP volume gains in the lactaid product category were positively contributed to from both store type classes, but stronger (and statistically significant) influences were attributed to the larger stores where lactaid milk products are more available. Given the limited number of stores selling lactaid products, volume gains were significant only for the large store and all store classes. The positive estimate for convenience and drug stores was not statistically different from zero. This is not surprising given that ADV of lactaid products in these smaller stores is only 0.1 gallons per day, on average, with many smaller stores not carrying any lactose-reduced products. The 7.6 gallons per day ADV of lactaid products in supermarkets and mass merchants, combined with 12% DCMP volume gain, still implies only a realized volume gain of less than a gallon per day, on average, in this store class. Even so, given the relatively recent introduction of lactose-reduced products in the dairy case, positive volume gains from this program are a promising result.

The econometric estimates indicate that the DCMP was effective at increasing sales volume in participating program stores. To put these estimates in proper perspective we can transform the volume gain estimates to a value of incremental volume. Using the more conservative estimate of an ADV gain across stores of 8.44 gallons per day, multiplying this by the number of participating stores in the market implies an average daily market gain of over 515 gallons. With a little more math this implies that on an annualized basis the gain is 15,658 hundredweight (cwt) per year. If we value this incremental gain using an average Class I price differential of $2.79/cwt (i.e., the incremental value of milk designated for fluid rather than manufactured purposes), the additional market value to milk producers would be approximately $48,000 per year. Given the cost of the program (i.e., roughly $2,000 per store), this implies that, assuming

maintained sales enhancement, the program would pay for itself in 2.5 years. While a relatively short time line for cost recovery, this long-term perspective underscores the importance of program staff to implement a long-run philosophy of the DCMP and continual evaluation required to maintain program success. Doing so will keep retailers in tune with changes in consumer demand, to maintain or enhance sales volume, and ultimately consumption levels of fluid milk products.

VI. Micro-Econometric DCMP Analysis

The final component of the CCPRP project components involved the use of econometric modeling to evaluate, in a more micro-sense, sales volume impacts of specific DCMP activities. The econometric analysis incorporates factors such as store type, store location, and dairy case design changes (e.g., size, facings, space allocation, and position) to decompose the sales effects into these component factors. Space allocation and location effects can be modeled to evaluate case designs so as to maximize retailer profits and fluid milk sales. This econometric modeling exercise goes one step further than the previous section, which treated DCMP impacts as one aggregate explanatory variable. The results of this approach will be presented in a supplemental report to this document. For reference, we include the current citation for this paper.

Citation:[14]

Chung, C., D. Dong, T.M. Schmit, H.M. Kaiser. 2003. "Economic Evaluation of Category Management of Dairy Cases in Grocery Stores." Western Economics Association International Annual Meeting. July.

[14] The July paper is currently being updated and revised. For updated information, please contact the corresponding author, Chanjin Chung, at Oklahoma State University.

VII. Conclusions

Fundamental strategy changes can be seen in the marketing of generic commodity promotion, with a move away from advertising toward non-advertising programs. A corresponding change in evaluation methods is required, to identify the consumer and market impacts of non-advertising programs and the benefits to the producers who fund them. This report addressed this need by evaluating the Dairy Case Management Program (DCMP) operated by the American Dairy Association and Dairy Council (ADADC) in the Northwestern Hudson Valley Market in New York State. The DCMP is operated with ADADC program staff and retail/category managers to improve the management, appearance, and operation of the dairy case in retail stores.

Potential benefits to both retailers and milk producers are apparent in retail promotion programs. For retailers, the expectation of greater profit is likely the main appeal of the DCMP. This can be achieved by improved management operations of the dairy case, balanced dairy case designs, and sales volume enhancement. Milk producers are interested in improving the image of the milk category to improve its market competitiveness and in moving additional product, with the ultimate goal of increasing consumption of their product. Stressing a long-term management perspective and continually evaluating the dairy case operation can allow retailers to adapt to a changing marketplace and gain greater understanding of their consumer base, for the benefit of both themselves and the producers of their product.

The DCMP program conducted in the Northwestern Hudson Valley Market, with 61 participating stores, was used as a case study for evaluation. Over 65% of retail stores (including convenience stores, drug stores, supermarkets, and mass merchants) in the Hudson Valley Market participated, accounting for over 91% of milk sold. Analyzing the effectiveness of the DCMP program across several store types is useful for measuring differences in success and identifying particular program elements that should be stressed.

Benchmark and store audit scores indicated that existing conditions of planogram, hygiene, rotation, stockweight (i.e., available product for display), and ordering were relatively strong, and that all stores demonstrated improvement from baseline levels during the program cycle. Evaluation across store types indicated that convenience stores needed to focus on hygiene, case design, and ordering procedures, while drug stores needed to focus on case design and ordering. Particular attention to hygiene and ordering issues was warranted for supermarkets, while program implementation in mass merchant stores should highlight stocking and ordering procedures.

Limited available stock space for convenience and drug stores indicates that these stores require additional attention to stocking and ordering programs to ensure adequate stockweights until the next delivery. The challenge for supermarkets and mass merchants is keeping stock on show, that is, implementing rotation procedures to keep stock in the display case in a timely manner. All store types indicated improvement in this area during the program cycle. Some loss of program integrity was evidenced by slightly lower store audit scores and increased rotation and stockweight problems late in the program, which highlights the need for program staff to continue to emphasize balanced stocking, ordering, and rotation procedures as product adjustments occur or consumer trends vary.

Out of stock levels were relatively small, with most occurrences coming from beverage products. This is due, in part, to the limited number of facings generally given to these products and a growing demand for them. Increased facings of beverage products were accordingly recommended for all store types. Using sales data and facing allocations, balanced planograms were developed and augmented with improved ordering and stocking procedures to maximize product sales, eliminate waste, and improve operation efficiencies.

DCMP strategies involved modest increases in product counts (variety), facings, and linear footage across all stores. These increases were primarily the result of increases in the beverage milk category and products less than a quart in size. Supermarket designs, on average, showed little change in overall product counts, but increasing facings and linear footage of beverage and lactaid products. Mass merchant designs emphasized increasing the number of beverage milk and gallon size products, with simultaneous increases in facings and space allocations for beverage products and half-gallon containers. Convenience store design changes centered on increases in product counts for beverage products, as well as facings and space allocations. Drug store recommendations showed the highest relative changes in product counts, facings, and linear footage, and were particularly strong for beverage products.

Estimated DCMP impacts indicated that the program was effective at increasing the average daily volume (ADV) by 4.4% across all stores. This implies an average store volume gain of 8.5 gallons per day. While both supermarket/mass merchants and convenience/drug stores showed positive and statistically significant increases in sales volume as a result of the DCMP, supermarkets and mass merchants showed relatively stronger volume gains (i.e., a 5.3% ADV gain) than convenience and drug stores (i.e., a 4.1% ADV gain), resulting in ADV gains of 24.2 and 2.2 gallons per day, respectively. Overall volume gains were largely the result of gains in the standard, unflavored fluid milk category (5.2% and 4.1% for supermarkets/mass merchants and covenience/drug stores, respectively). In addition, positive and significant volume gains were realized for both beverage milk and lactaid products in supermarkets and mass merchants.

Expressing volume gains on an annualized basis and valuing at the average Class I price differential, the additional market value to producers is $48,000 per year, enough for the program to pay for itself in 2.5 years. While a relatively short time line for cost recovery, this long-term perspective underscores the importance of program staff to implement a long-run philosophy of the DCMP and continual evaluation required to maintain program success. Doing so will keep retailers in tune with changes in consumer demand, to maintain or enhance sales volume, and ultimately consumption levels of fluid milk products.

Evaluation of the DCMP in the Northwestern Hudson Valley Market revealed that in-store results supported the program's overall goals and objectives. In addition, the analysis presented here provides guidance to program staff on areas of emphasis to be most effective. The positive volume impact of the DCMP should be encouraging to milk producers and prove useful in exploring additional partnering opportunities with milk processors. In addition, the local success exhibited here may lead to more widespread implementation of DCMP.

As the final component of the in-store DCMP activities, follow-up store visits occur approximately sixteen weeks after program completion. Program staff re-evaluate the dairy case following the Benchmark and Store Audit Reports discussed earlier. Comparing the 16-week

store reports with those at the completion of the DCMP will be very useful to gauge long-term program integrity and managers' adherence to the category management philosophy. A post-program visit has not yet occurred, but when it does and store data becomes available, a supplemental report will be provided to investigate these issues.

A necessary element of a comprehensive evaluation is the availability of suitable data. Further program evaluations could be enhanced with additional data collection, particularly with respect to weekly sales and price data for all fluid milk products, to account for price promotions, additional information on non-price promotion activities at the retail level, and store traffic levels. Data management and efficiency of sales data processing could be further improved by requesting consistent sales data formats from retailers across all stores. Finally, conducting multi-market evaluations with differing demographic profiles can provide useful information on the relative impacts of these programs across differing demographic segments.

Appendix Table 5.1. Parameter Estimates from DCMP Sales Volume Regression Models.[a]

	All Products				Fluid Milk				Beverage Milk		Lactaid Milk	
	Model 1		Model 2		Model 1		Model 2		Model 2		Model 2	
Variable	Total	Store Type	Total	Store Type	Total	Store Type	Total	Store Type	Total	Store Type	Total	Store Type
Intercept	3.850 *** (0.305)	3.855 *** (0.307)	4.226 *** (0.058)	4.226 *** (0.058)	3.815 *** (0.311)	3.818 *** (0.314)	4.201 *** (0.059)	4.201 *** (0.059)	0.440 *** (0.109)	0.440 *** (0.109)	-4.582 *** (0.133)	-4.571 *** (0.134)
ln(Price)	0.286 (0.228)	0.281 (0.229)			0.293 (0.232)	0.291 (0.235)						
June	0.010 (0.022)	0.010 (0.022)	0.011 (0.022)	0.012 (0.022)	0.010 (0.023)	0.010 (0.023)	0.012 (0.023)	0.012 (0.023)	0.042 (0.042)	0.042 (0.042)	-0.035 (0.053)	-0.035 (0.053)
July	-0.004 (0.023)	-0.004 (0.023)	0.003 (0.022)	0.003 (0.022)	-0.004 (0.023)	-0.004 (0.023)	0.003 (0.023)	0.003 (0.023)	0.062 * (0.042)	0.062 (0.042)	-0.006 (0.053)	-0.006 (0.053)
August	0.037 * (0.023)	0.038 ** (0.023)	0.047 *** (0.022)	0.047 *** (0.022)	0.036 * (0.024)	0.036 * (0.024)	0.046 *** (0.023)	0.046 *** (0.023)	0.132 *** (0.042)	0.132 *** (0.042)	0.021 (0.053)	0.021 (0.053)
September	0.006 (0.029)	0.006 (0.029)	0.022 (0.026)	0.022 (0.026)	0.004 (0.030)	0.004 (0.030)	0.021 (0.027)	0.021 (0.027)	0.127 *** (0.050)	0.127 *** (0.050)	-0.090 * (0.061)	-0.071 (0.057)
October	-0.031 (0.029)	-0.030 (0.029)	-0.014 (0.026)	-0.014 (0.026)	-0.034 (0.030)	-0.034 (0.030)	-0.017 (0.027)	-0.017 (0.027)	0.093 ** (0.050)	0.093 ** (0.050)	-0.101 ** (0.061)	-0.091 * (0.057)
Year_2002_CD	-0.098 *** (0.042)	-0.098 *** (0.043)	-0.146 *** (0.019)	-0.145 *** (0.019)	-0.102 *** (0.044)	-0.102 *** (0.044)	-0.151 *** (0.019)	-0.150 *** (0.020)	0.072 *** (0.035)	0.087 *** (0.036)	-0.155 *** (0.052)	-0.143 *** (0.055)
Year_2002_SM	0.041 (0.044)	0.039 (0.046)	0.005 (0.024)	0.008 (0.026)	0.040 (0.045)	0.038 (0.047)	0.008 (0.025)	0.010 (0.026)	0.142 *** (0.046)	0.105 *** (0.049)	-0.117 *** (0.061)	-0.128 *** (0.066)
DCMP	0.060 *** (0.030)		0.044 ** (0.027)		0.061 *** (0.030)		0.044 ** (0.027)		-0.019		0.090 * (0.059)	
DCMP_CD		0.058 ** (0.033)		0.041 * (0.030)		0.059 ** (0.034)		0.041 * (0.030)		-0.065 (0.056)		0.054 (0.083)
DCMP_SM		0.064 ** (0.039)		0.053 * (0.033)		0.063 ** (0.040)		0.052 * (0.032)		0.091 * (0.064)		0.120 * (0.079)
R-Squared	0.986	0.986	0.985	0.985	0.985	0.985	0.985	0.985	0.973	0.973	0.982	0.982
Seasonality Test (Null Hypothesis: All Seasonality Parameters = 0):												
F Value	1.70 *	1.69 *	1.77 *	1.77 *	1.66 *	1.66 *	1.71 *	1.71 *	2.56 ***	2.56 ***	1.08	0.90
Prob. > F Value	0.13	0.13	0.12	0.12	0.14	0.14	0.13	0.13	0.03	0.03	0.37	0.48

a Dependent variable is the natural logarithm of Average Daily Volume (ADV) for each product product category, by store, by month. Standard errors in parentheses.

For clarity, individual fixed effect store estimates are not printed, but are available from the authors upon request. In all cases, an F-test rejects the null hypothesis of no fixed effects at any reasonable significance level.

* denotes significance at the 15% level, ** denotes significance at the 10% level, *** denotes significance at the 5% level or less.

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