The Dairy Case Management Program: Does It Mooove More Milk?

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ABSTRACT

High increases in media advertising costs have caused a shift away from generic advertising to other promotional activities. A relatively new retail-level promotional activity is the Dairy Case Management Program aimed at improving the management, appearance, and operation of the dairy case. An evaluation of the Northwestern Hudson Valley Market program demonstrated increases in sales volume for both supermarkets/mass merchants and convenience/drug stores. However, the value of volume gains compared with program costs indicates a cost recovery time of over two years. Therefore, program success depends on the implementation of a long-run strategy with continual evaluation.

Key Words: category management, dairy check-off, retail promotion

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Dairy farmer check-off contributions are used to fund a variety of generic commodity promotion programs. Historically, generic advertising of fluid milk and cheese has constituted the majority share of check-off budgets. In recent years, however, relatively stagnant growth in check-off revenues, combined with strong increases in media advertising costs, has prompted a shift away from generic advertising to other non-advertising commodity promotion activities. In addition, mandatory commodity checkoff programs are undergoing increased scrutiny, to substantiate the benefits to the producers who fund them, and challenges have arisen in the courts on the constitutionality of such programs and their possible infringement on the right to free speech.

Fluid milk marketers and promotion personnel contend that 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 fluid milk at the store level (ADADC). While retail-level programs are 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. 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).

Recently, promotion efforts by the American Dairy Association and Dairy Council (ADADC) in the northeastern U.S. have focused on implementing a retail category management (CM) program for fluid milk in the dairy case – the Dairy Case

Management Program (DCMP). The concept of CM was introduced in the late 1980s to improve the efficiencies in buying and merchandising practices by treating classes of products as strategic business categories (McLauglin and Hawkes). The DCMP aims to improve the management, appearance, and operation of the dairy case in retail stores, with the ultimate goal of increasing 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. 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 that makes fluid milk products more attractive and more competitive with other non-alcoholic beverages could increase market volume movements and overall per capita consumption levels.

Fundamental strategy changes in the marketing of generic commodities will require alternative evaluation methods to identify the consumer and market impacts and benefits to the producers who fund them. We address this here by evaluating the DCMP conducted in the Northwestern Hudson Valley Market in New York in 2002. 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 success of such retail-level programs in the fluid milk market should be of interest to commodity promotion program boards, retail managers, wholesale distributors, and product marketers interested in initiating category management programs in retail outlets, and to

academics involved in the food marketing industry. We continue now with a general description of the DCMP operated by the ADADC, highlighting in-store activities and progress results. This is followed by an econometric application estimating store and market milk volume gains as a result of the DCMP. We close with some conclusions and implications of empirical results.

The Dairy Case Management Program

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 consumption. The DCMP is a CM program for fluid milk products at retail stores in which 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).

The ADADC Hudson Valley Region DCMP was conducted in the summer of 2002, with over 200 stores participating, and ran in four separate cycles, by geographic area (Figure 1). Sixty-five percent of all supermarket, mass merchant, convenience, and drug stores in the region participated, accounting for over 91 percent of average weekly volume. The Northwestern Hudson Valley Market area is located primarily in the northwest geographical area of the Hudson Valley territory. Cycle 3 of the eight-week

program ran from July through August 2002, with 61 stores participating: 25 convenience stores, 16 drug stores, 16 supermarkets, and 4 mass merchants.

Program objectives are achieved using various program elements and measured with a variety of tools (Figure 2). Stock control evaluates ordering, product variety, hygiene of the dairy case, and rotation of product. Planogram designs consider shelf management and presentation of the product, for better use of valuable shelf space. Category communication elements include improving communication among store staff and management, area and regional managers, and buyers and merchandisers.

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 benchmarks, including hygiene, planogram conformity, rotation, stockweight, and ordering. 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. 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

Sales reports are generated comparing monthly sales of fluid milk products over time. Sales data are on a monthly, volume basis with individual products specified by Universal Product Code (UPC). The monthly sales figures compare sales 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; however, they do not decompose DCMP sales gains from other temporal elements. This is where the econometric application of the sales data will prove most useful.

To get a sense of store progress during the eight-week DCMP, we provide average in-store performance measures relative to program benchmarks.[1] Comparing benchmark achievement across time and across store type will be useful for evaluations of current in-store activities and will point to particular issues that may need to be emphasized across store types.

Benchmark Reports (BMRs) were prepared each week for program staff, to provide an overall store score in achieving benchmarks; one point was scored for each benchmark achieved. 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 a 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 3).[2] One would expect improvement in benchmark scores during the DCMP period, and this appears to have occurred across all store types 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.

Looking more closely at the types of benchmark deficiency, we can identify specific problems in stores not achieving full compliance. Figure 4 displays the percentage (weighted by store volume) of stores not achieving particular benchmarks by program week. Early in the program, attention was directed mostly to hygiene and planogram deficiencies. Most 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 program cycle. When the ordering benchmark was first introduced in week four, problems were evident in about 15 percent 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.

Particular categories differentiated by store type can give program staff information on what areas to focus on in particular store types. In general, 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 individual products.

Aggregate Sales Comparison

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, 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.

Milk products were classified into three types: (*i*) Fluid Milk – standard, unflavored fluid milk products in packages greater than 16 ounces, (*ii*) Beverage Milk – flavored fluid milk products and unflavored fluid milk products in packages of 16 ounces

or less, and (*iii*) Lactaid Milk – all lactaid fluid milk products. Table 1 provides an estimate of the average daily volume (ADV) of milk products sold across all stores, as well as the ADV on a per store basis. The estimated volume movements demonstrated increases in total market ADV between 2001 and 2002 of 5.7 percent. 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).

Store size and sales volume of fluid milk products varied widely across participating stores (Table 1). In 2002, market ADV exceeded 11,000 total gallons. As expected, this movement was dominated by supermarket sales, covering 63 percent of total milk sales in the area. Mass merchants (18 percent) and convenience stores (15 percent) were also significant contributors to total milk movement, with drug stores lagging further behind (5 percent). As expected, the predominant source of milk movement on a volume basis is standard, unflavored fluid milk products (96 percent). Gains in beverage milk products were evident in all store types since 2001, but relative volume movement is small at 6 percent of fluid milk sales, with the largest relative proportion sold in convenience stores. Finally, lactaid products represent a small proportion of volume and are sold almost exclusively in supermarkets. Gains in total market movement were primarily the result of gains in volume sales in mass merchant stores. The increase in mass merchants was largely offset by transfers away from other store types, particularly for fluid milk products.

As expected, larger stores in the market area (i.e., supermarkets and mass merchants) contributed the majority share (81%) of total volume sales. 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. Sales volume for all stores was dominated by sales of fluid milk products. However, beverage products represent a higher relative proportion in convenience and drug store categories, and lactaid products a lower relative proportion. This is consistent with the fact that these types of stores have smaller dairy cases and function 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.

Annual changes in sales volume in the study market area for fluid milk, beverage milk, and lactaid milk were +5.6 percent, +16.6 percent, and -3.0 percent, respectively.[3] Volume changes for fluid milk and beverage milk products across the study period months follow the same directional pattern, although relative changes in volume are considerably higher for beverage milk products. 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.

DCMP Regression Model

Regression analysis was carried out using the monthly sales data described above, to estimate the particular volume impacts due to the DCMP in the Northwestern Hudson Valley Market stores. 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.[4]

The dominant factors affecting changes in sales volume for the DCMP stores were 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. To mitigate the impact of limited degrees of freedom, supermarkets and mass merchants were classified into a "large store" category, while convenience and drug stores were classified into a "small store" category. This classification also follows from the general similarities in operation and design of the DCMP for these store types.

Given limited information on specific store characteristics and likely differences in store management and operation, we adopt a one-way fixed store effect model. This modeling approach allows us better to isolate non-DCMP related individual store variation from DCMP impacts. The following regression equation explaining the variation in store ADV was used:

$$(1)\quad ADV_{i,t} = \beta_0 + \sum_{s=6}^{10} \delta_s MO_{s,it} + \sum_{y=1}^{2} \lambda_y YR02_{y,it} + \alpha DCMP_{it} + v_i + u_{it}$$
$$i = (1,\ldots,N),\ t = (5,6,7,8,9,10),$$

where *ADV* is the average daily sales volume in gallons for the i^{th} store at the t^{th} time period, *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=supermarkets/mass merchants), *DCMP* is a dummy variable capturing the post-DCMP test period (i.e., September and October, 2002), $\beta_0, \delta_s, \lambda_y, \kappa_i,$ and α are parameters to estimate, v_i are the fixed (nonrandom) store effects to estimate, and u_{it} is the residual error term with standard assumptions to capture other unaccounted for store influences. Since including both the intercept and all the v_i's induces a redundancy, the v_i estimates are included under the restriction that $v_N = 0$.[5]

Two sets of models were originally estimated, with and without price variables. However, given that only limited weekly sampling (i.e., the last six weeks of the in-store program) of a selected group of products occurred, only average store prices were available, rather than UPC-specific prices. In addition, aggregating the price variables to a monthly basis (i.e., to correspond with the sales data) would tend to mask individual price promotion effects. Finally, to relate prices with all twelve months of sales data, extrapolation from more aggregate sources was required. The price models resulted in similar estimation results, with slightly higher estimated DCMP effects; however, the price effects were insignificant. To a large degree, seasonal pricing behavior is likely correlated with seasonality in demand. Therefore, we assume that the unavailable price

impact is effectively captured through the monthly dummy variables, year variable, and the residual term. The non-price models result in more conservative estimates of DCMP volume impacts and will be used when estimating market impacts and the value of volume gains.[6]

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 in-store 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, the period September through October 2002 was selected for measuring volume changes attributable to the DCMP.

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:

$$(3)\quad ADV_{i,t} = \beta_0 + \sum_{s=6}^{10} \delta_s MO_{s,it} + \sum_{y=1}^{2} \lambda_y YR02_{y,it} + \alpha_1 DCMPCD_{it} + \alpha_2 DCMPSM_{it} + v_i + u_{it}$$
$$i = (1,\ldots,N),\ t = (5,6,7,8,9,10),$$

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 store types, respectively.

Empirical Results

For ease of exposition, specific regression results and test diagnostics are given in Appendix Table A1. We briefly highlight the results here and emphasize the estimated DCMP volume impacts. R-square levels for all models (i.e., measuring the amount of explained variation in ADV) were relatively high for all models at over 97 percent. While the significance of individual monthly seasonal dummy variables varied, F-tests for all models except lactaid products indicated that seasonality was statistically important. 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.

Estimated DCMP impacts indicated that the program was effective at increasing ADV across all stores, on average, 4.40 percent (Table 2). Using the average store ADV of 192 gallons per day, this implies store ADV gains of 8.44 gallons per day. The DCMP appeared relatively more effective in supermarkets and mass merchants (ADV gain of 5.25 percent) than in convenience and drug stores (ADV gain of 4.05), and resulted in ADV gains across all products of 24.17 and 2.20 gallons per day, respectively. The larger relative percentage gains for supermarkets and mass merchants were 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.

Given that the dominant share of total milk volume movement is due to sales of fluid milk products, it is not surprising that gains in fluid milk volume largely mirror the overall product results (Table 2). ADV gains from the DCMP were positive and significant for both store classes, with gains of 5.22 and 4.08 percent for supermarkets/mass merchants and convenience/drug stores, respectively. Strong volume 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.

While DCMP efforts emphasized increases in space allocations for beverage products (i.e., around 4 percent based on planogram recommendations), average store impacts were negative (-1.90 percent), but not statistically different from zero. However, even a 1.90 percent decline would imply only a one-tenth of one gallon reduction in ADV for beverage products. The combined-store result is realized by apparent decreased volume in convenience/drug stores (i.e., -6.53 percent, but not statistically significant), offset some by statistically significant gains in supermarkets and mass merchants (+9.18 percent). A closer examination shows that general volume changes were higher during the eight-week in-store program and then drop off during the two-month evaluation period. This may indicate that increases in volume of beverage products 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. This is likely due, in part, to the large number of individual beverage products cycled through store displays and increased influences by wholesale distributors and merchandisers.

Lactaid milk volume across all stores showed a relatively large percentage increase due to DCMP efforts of over 9 percent. However, a 9-percent 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. The 7.6 gallons per day ADV of lactaid products in supermarkets and mass merchants, combined with 12 percent DCMP volume gain, implies a realized volume gain of less than one 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 was 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. Multiplying the ADV gain for all products and stores (i.e., 8.44 gallons per day) 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 this is a relatively short time line for cost recovery, the absence of "immediate" net gains underscores the importance of implementing a long-run management strategy, with continual evaluation to maintain program success.

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 retail-level 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. However, 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.

Store benchmark scores indicated that existing conditions of planogram, hygiene, rotation, stockweight, 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 needed to highlight stocking and ordering procedures. Some loss of program integrity was evidenced by slightly lower scoring and increased rotation and stockweight problems late in the program, which indicates that program staff need to continue to emphasize balanced stocking, ordering, and rotation procedures as product adjustments occur or consumer trends vary.

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 (5.25 percent) than convenience and drug stores (4.05%), with gains being largely the result of volume increases in the standard, unflavored fluid milk category. In addition, positive and significant volume gains were realized for both beverage milk and lactaid products in supermarkets and mass merchants. The value of volume gains compared with program costs indicates a cost recovery time of 2.5 years. Therefore, program success depends on the implementation of a long-run strategy with continual evaluation, which will keep retailers in tune with changes in consumer demand, so as to maintain or enhance sales volume, and ultimately consumption levels, of fluid milk products.

The analysis presented here should provide guidance to program staff on which areas to emphasize 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 and merchandisers. In addition, the local success exhibited here may lead to more widespread implementation of retail-level promotion and marketing activities.

A necessary element of a comprehensive evaluation is the availability of suitable data. Further program evaluations could be enhanced with additional data, 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. Finally, conducting multi-market evaluations with differing demographic profiles can provide useful information on the relative impacts of these programs across differing demographic segments.

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Footnotes

[1] Evaluation of benchmark achievement is just one aspect of the DCMP reporting process. Additional reporting tracks stocking, ordering, and planogram design.

[2] Normalized benchmark scores were weighted by average daily store volume during the program period to reflect total market conditions on the volume of milk moved.

[3] 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. 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.

[4] Census data indicated an annual average population increase in the market area of around 1.3% (U.S. Census). 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 was assumed that increases in market competition due to an increase in the number of stores would offset any population adjustment. The estimated annual increase in real disposable income in the New York/New Jersey census region was roughly 3% (U.S. Department of Labor). Income elasticity estimates in the literature are relatively low. Modest income changes combined with low income elasticity would imply only minor volume adjustments due to income effects. Also, only state-level annual estimates are available, and would be invariant across stores. Therefore, income effects were ignored.

[5] Regression models were estimated using PROC TSCSREG in SAS, Version 8.1.

[6] The additional pricing models and a further explanation of available price data are available from the authors upon request.

Table 1. Northwestern Hudson Valley market average daily volume, by year and store type.[a]

		Average Daily Volume (gallons)		Average Daily Volume Per Store (gallons)							
				Total		Fluid Milk[c]		Beverage Milk[d]		Lactaid Milk[e]	
Store Type[b]	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
Conv. 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
Supermarkets	16	7,142	7,113	446.4	444.6	426.3	424.6	10.3	10.6	9.8	9.5
Mass merchants	4	1,380	2,092	344.9	523.0	338.8	507.8	6.2	15.2	0.0	0.0
C/D	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] Milk volume using monthly sales data, May through October, 2001 and 2002; 59 of the 61 participating stores provided sales data..

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

[c] Fluid Milk = Standard, unflavored milk, in packages greater than 16 ounces.

[d] Beverage Milk = Flavored milk products and unflavored milk in packages of 16 ounces or less.

[e] Lactaid Milk = All lactaid fluid milk products.

Table 2. Average daily volume (ADV) gains from the Dairy Case Management Program.

Store Class [a]	Volume Gain	ADV (gpd)	ADV Change (gpd)
All Products			
All stores	4.40%	192.00	8.44
C/D	4.05%	54.44	2.20
S/M	5.25%	460.27	24.17
Fluid Milk Products			
All stores	4.41%	183.71	8.10
C/D	4.08%	51.66	2.11
S/M	5.22%	441.22	23.03
Beverage Milk Products			
All stores	-1.90% (ns)	5.66	-0.11 (ns)
C/D	-6.53% (ns)	2.67	-0.17 (ns)
S/M	9.18%	11.49	1.05
Lactaid Milk Products			
All stores	9.04%	2.63	0.24
C/D	5.44% (ns)	0.10	0.01 (ns)
S/M	12.02%	7.56	0.91

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

ns = not statistically significant at the 15% significance level or less, gpd=gallons per day

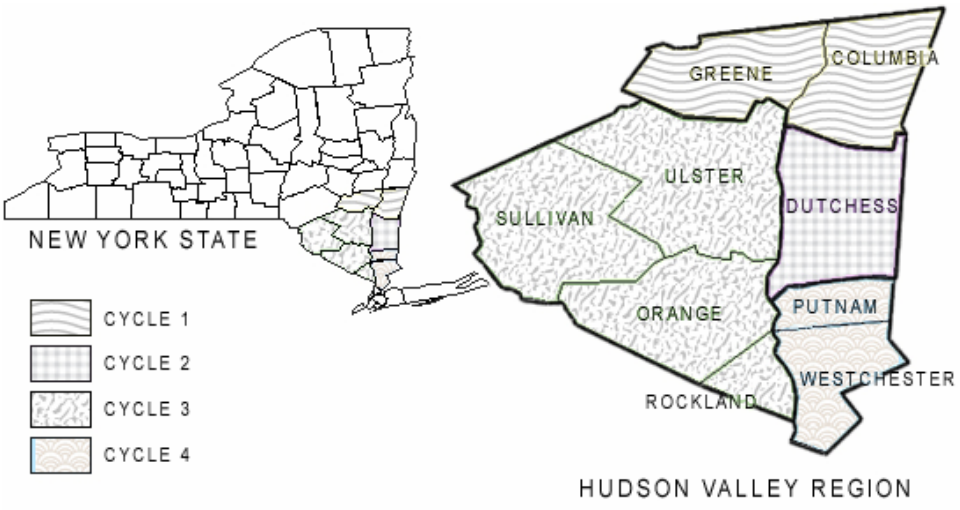

Figure 1. Hudson Valley market area and Dairy Case Management Program cycles.

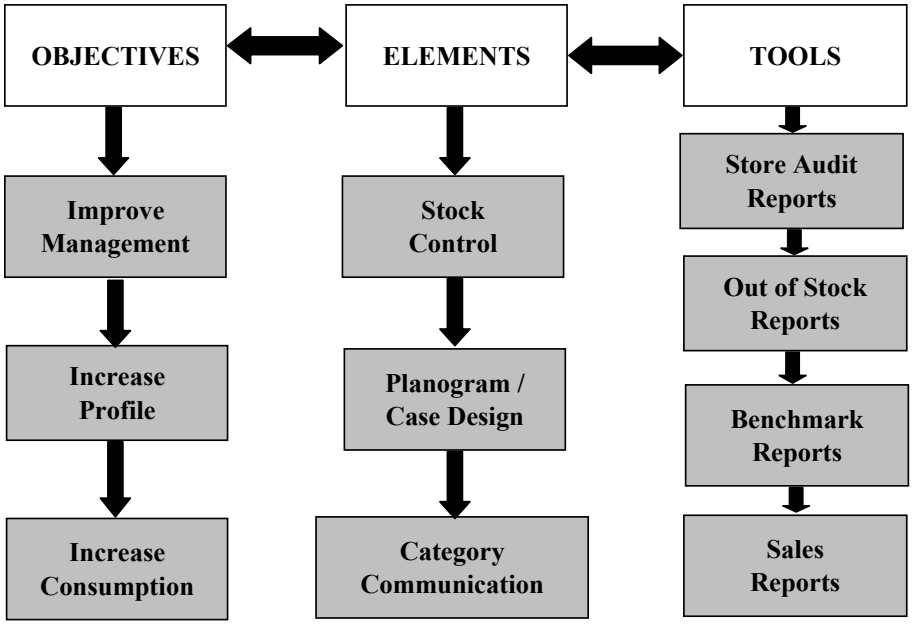

Figure 2. Dairy Case Management Program schematic (ProCorp, USA).

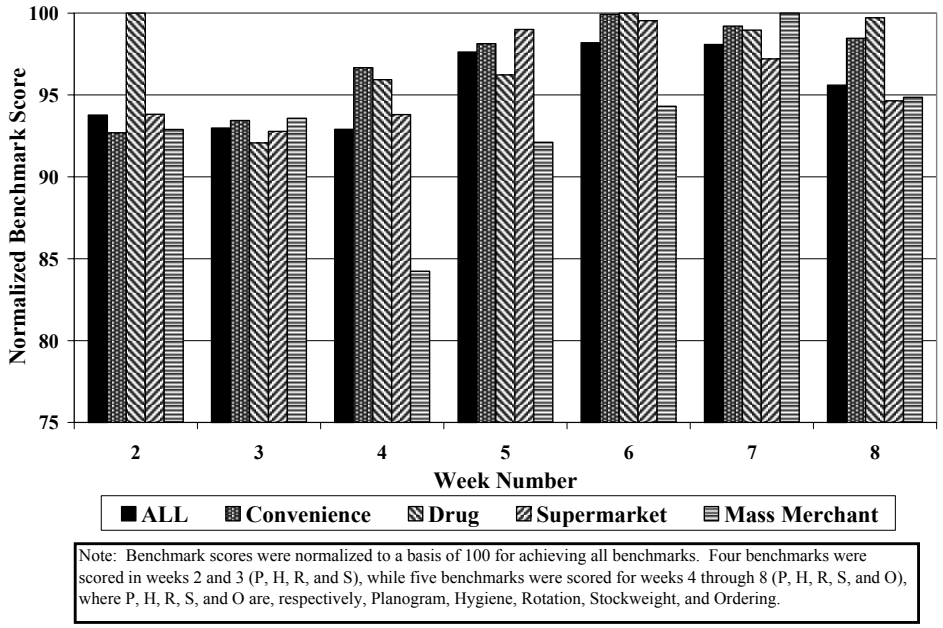

Figure 3. Average normalized benchmark scores, by store type.

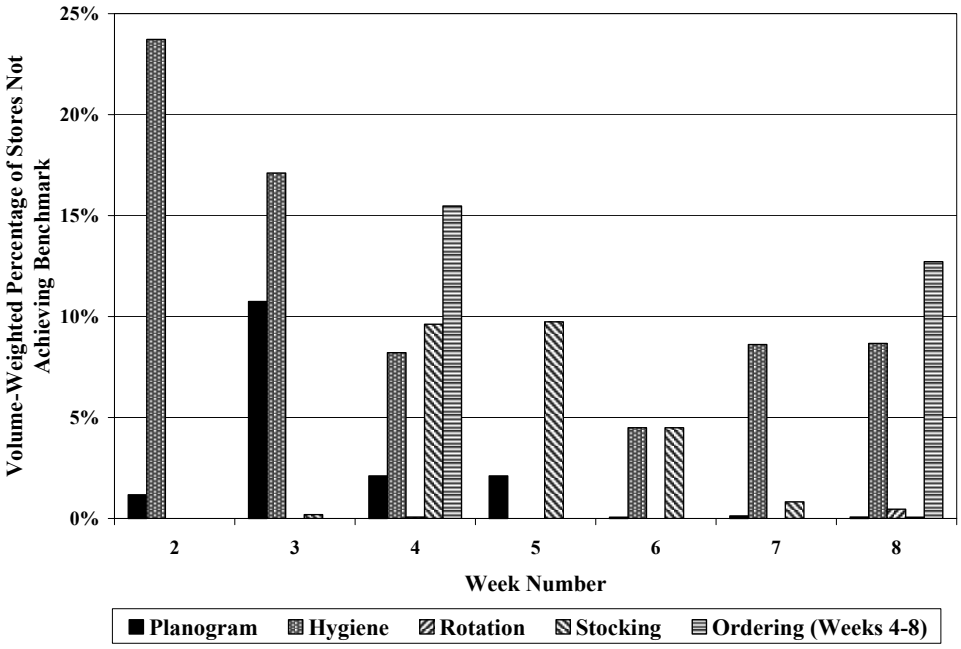

Figure 4. Percentage of stores not achieving benchmark standards, by week.

Appendix Table A1. Parameter estimates from Dairy Case Management Program (DCMP) sales volume models.[a]

	All Products		Fluid Milk		Beverage Milk		Lactaid Milk	
Variable	**Total**	**Store Type**	**Total**	**Store Type**	**Total**	**Store Type**	**Total**	**Store Type**
Intercept	4.226***	4.226***	4.201***	4.201***	0.440***	0.440***	-4.582***	-4.571***
	(0.058)	(0.058)	(0.059)	(0.059)	(0.109)	(0.109)	(0.133)	(0.134)
June	0.011	0.012	0.012	0.012	0.042	0.042	-0.035	-0.035
	(0.022)	(0.022)	(0.023)	(0.023)	(0.042)	(0.042)	(0.053)	(0.053)
July	0.003	0.003	0.003	0.003	0.062*	0.062*	-0.006	-0.006
	(0.022)	(0.022)	(0.023)	(0.023)	(0.042)	(0.042)	(0.053)	(0.053)
August	0.047***	0.047***	0.046***	0.046***	0.132***	0.132***	0.021	0.021
	(0.022)	(0.022)	(0.023)	(0.023)	(0.042)	(0.042)	(0.053)	(0.053)
September	0.022	0.022	0.021	0.021	0.127***	0.127***	-0.090*	-0.071
	(0.026)	(0.026)	(0.027)	(0.027)	(0.050)	(0.050)	(0.061)	(0.061)
October	-0.014	-0.014	-0.017	-0.017	0.093**	0.093**	-0.101**	-0.091*
	(0.026)	(0.026)	(0.027)	(0.027)	(0.050)	(0.050)	(0.060)	(0.058)
YR02CD	-0.146***	-0.145***	-0.151***	-0.150***	0.072***	0.087***	-0.155***	-0.143***
	(0.019)	(0.019)	(0.019)	(0.020)	(0.035)	(0.036)	(0.052)	(0.055)
YR02SM	0.005	0.008	0.008	0.010	0.142***	0.105***	-0.117***	-0.128***
	(0.024)	(0.026)	(0.025)	(0.026)	(0.046	(0.049)	(0.061)	(0.066)
DCMP	0.044**		0.044**		-0.019		0.090*	
	(0.027)		(0.027)		(0.052)		(0.059)	
DCMP_CD		0.041*		0.041*		-0.065		0.054
		(0.030)		(0.030)		(0.056)		(0.083)
DCMP_SM		0.053*		0.052*		0.091*		0.120*
		(0.033)		(0.032)		(0.064)		(0.079)
R-square	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	1.77*	1.77*	1.71*	1.71*	2.56***	2.56***	1.08	0.90

[a] Dependent variable is the natural logarithm of Average Daily Volume (ADV) for each product category, by store, by month. Standard errors in parentheses. For clarity individual store fixed effects are not printed, but are available from the authors upon request. In all cases, F-tests reject 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.