The Potential Impact of Hospital Cafeterias on Dietary Habits: A Case Study of the University of Wisconsin Hospitals and Clinics

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ABSTRACT

Background: Recent research indicates that hospitals are serving an increased role in retail food markets. This article examines the potential effects of pricing strategies on consumer behavior at the University of Wisconsin Hospitals and Clinics.

Methods: Biweekly point-of-sales data from 2015-2017 were collected for the University of Wisconsin Hospitals and Clinics' largest retail cafeteria. *T* tests were used to identify differences in consumer behavior in response to price changes for bottled water, cheeseburgers, and the salad bar and potential impacts for alternatives.

Results: Purchases of bottled water and salad increased after price decreases were implemented; cheeseburger purchases decreased following the price increase.

Discussion: Foodservice pricing strategies can drive significant change in consumer behavior. However, consumer sensitivity to price changes may affect the financial viability of price-centric approaches.

INTRODUCTION

Recent retail trends suggest that hospitals have a growing influence on the behavioral and nutritional outcomes of their communities. The number of nonpatient meals served by hospitals through retail and food security efforts has increased, and hospitals have begun to diversify the sources of food they serve, specifically increasing the proportion of regionally produced food products they procure.[1]

Since 2013, administrators at the University of Wisconsin Hospital and Clinics and American Family Children's Hospital (UWHC) have overhauled their food service operations to 2 primary ends: (1) to encourage increased consumption of fresh produce, bottled water, and lean proteins, along with reduced consumption of sugar-sweetened beverages, processed foods, and red meat in their food retail spaces; and (2) to increase the share of their food budget allocated to locally produced food, to reduce their environmental impact, and strengthen local economies within Wisconsin.[2-3] To these ends, nutritional and culinary service staff at UWHC have employed several behavioral "nudges" to steer visitors towards these "healthier" options.

In this study, we provide an evaluation of one such policy: a 2016 pricing strategy that reduced the prices of the salad bar and bottled water while increasing the price of cheeseburgers. In this work, we analyzed the impact of these price changes on the purchase and suggested consumption of the targeted food and beverage items and other alternatives within UWHC's foodservice operations.

METHODS

In 2016, UWHC implemented permanent pricing changes for food and beverage products across their food service retail spaces, with the intent of encouraging healthier eating habits among patrons. In January 2016, UWHC decreased the salad bar price from $8/lb to $4.99/pound and bottled water from $1 to $0.75. In November 2016, the price of cheeseburgers was increased from $4.25 to $5.50.

For this study, we obtained biweekly point-of-sale data for the Four Lakes Café—the largest food retail space associated with UWHC—from August 2015 to December 2017. Data

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included prices, revenue, and quantities sold for each product sold during the study period (t = 63 biweekly periods). We used a 2-sample *t* test to compare the average quantity sold for each item before and after the pricing changes.

We divided the study period into 3 segments to analyze the individual effects of the salad and cheeseburger policies: the time period prior to implementation of the salad bar policy (August 2015 to December 2015, t = 11), the period after implementation of the salad bar policy and prior to the implementation of the cheeseburger policy (January 2016 to October 2016, t = 22), and the period after the cheeseburger price increase (November 2016 to December 2017, t = 30). In the case of beverage consumption, we compare the time periods before and after the bottled water price decrease (August 2015 to December 2015, t = 11 vs January 2016 to December 2017, t = 52).

Table. Food and Beverage Purchases (Quantity Sold in Units)

Salad Bar Pricing Policy	Pre-Price Change (t = 11 biweekly periods)		Post-Price Change (t = 22 biweekly periods)		
	Mean	SD	Mean	SD	T-stat
Salad Bar	3070.73	267.34	5292.23	611.34	-11.45[a]
Cheeseburger	931.36	78.26	843.95	99.59	2.54[a]
French Fries	1190.27	139.39	1040.27	116.71	3.27[a]
Asian Entree	895.82	48.29	879.95	91.68	0.36
Chipotle Entree	649.00	97.77	581.32	53.80	2.58[a]
Cheeseburger Pricing Policy	**Pre-Price Change (t = 22 biweekly periods)**		**Post-Price Change (t = 30 biweekly periods)**		
	Mean	SD	Mean	SD	T-stat
Salad Bar	5292.23	611.34	6083.43	575.52	-4.77[a]
Cheeseburger	843.95	99.59	691.90	55.10	7.04[a]
French Fries	1040.27	116.71	977.23	82.21	2.28[a]
Asian Entree	879.95	91.68	1173.90	318.13	-4.20[a]
Chipotle Entree	581.32	53.80	568.77	73.86	0.68
Water Pricing Policy	**Pre-Price Change (t = 11 bi-weekly periods)**		**Post-Price Change (t = 52 bi-weekly periods)**		
	Mean	SD	Mean	SD	T-stat
Still Water	1009.36	91.59	1220.64	133.83	-4.98[a]
Fountain Drinks	842.36	122.62	731.79	59.26	4.53[a]
Diet Coke	1153.36	125.29	1288.60	144.35	-2.88[a]

[a] Measured difference significant at the 5% level.

Finally, we also performed *t* tests on three of the most popular fresh-made items and beverages for which we had consistent records throughout the study period: fountain drinks, bottled Diet Coke, french fries, and 2 entrees prepared at the Four Lakes Café Global Harvest station: Asian and chipotle.

RESULTS

The Table lists the total food and beverage units purchased at the Four Lakes Café both before and after pricing changes. Biweekly sales at the salad bar increased from $16,888 to $18,508 after the price decrease (T = -2.24, $P = 0.05$), and again to $21,962 after the increase in cheeseburger prices (T = -5.40, $P = 0.001$). Biweekly sales of cheeseburgers decreased from $3,787 to $3,458 with the salad price decrease, but increased to $3,677 (T = -2.39, $P = 0.05$) after the cheeseburger price increase. Figure 1 illustrates the change in salad and cheeseburger purchases over the study period.

Revenue generated by water bottle sales decreased from $1,009 to $918 with the price decrease (T = 2.75, $P = 0.01$). Figure 2 illustrates the change in bottled water purchases during the study period.

DISCUSSION

The results of the analysis suggest a shift in consumer purchases in each of the cases presented: increases in salad and water purchases and a decrease in cheeseburger purchases. Further, while the number of comparable products in the data were limited, the results indicated a change in the purchase of other competing products as a result of the pricing changes, specifically for french fries and fountain drinks, which both sustained a decrease in purchases as a result. These findings are in line with previous studies. In particular, two other case studies examining the effects of a price drop for salad in retail settings found that reducing salad price by 50% increased salad consumption by 100% to 300%.[4-5] Fewer studies have considered the direct effect of pricing on bottled water and cheeseburgers, though previous research has found that demand for sugar-sweetened beverages is particularly sensitive to price,[6] likely explaining the observed shift from fountain drinks in light of the price decrease for bottled water.

While these results indicate the potential for nudging consumer behavior via price mechanisms, budgetary concerns are a primary barrier to their large-scale implementation. Food service directors operate with limited budgets, thus must weigh financial viability with their broader nutritional objectives.[7] This case highlights that tension; in some instances, a price decrease is counteracted by a larger increase in the quantity purchased, as with the salad bar. In other cases, such as with bottled water, the increase in quantity of purchases is not sufficient to compensate for the decreased price. A 2010 meta-analysis of the price sensitivity of food products indicated that the demand for fruits, sodas, vegetables, and beef is relatively sensitive to price changes.[8] However, these estimates vary significantly across the studies analyzed and, on average, suggested that significant price decreases were unlikely to lead to increases in revenue.

CONSIDERATIONS AND CONCLUSION

There were 2 primary limitations to this study. First, a change in the software used to collect point-of-sale data by UWHC in late

Figure 1. Change in Salad and Cheeseburger Purchases Over the Study Period

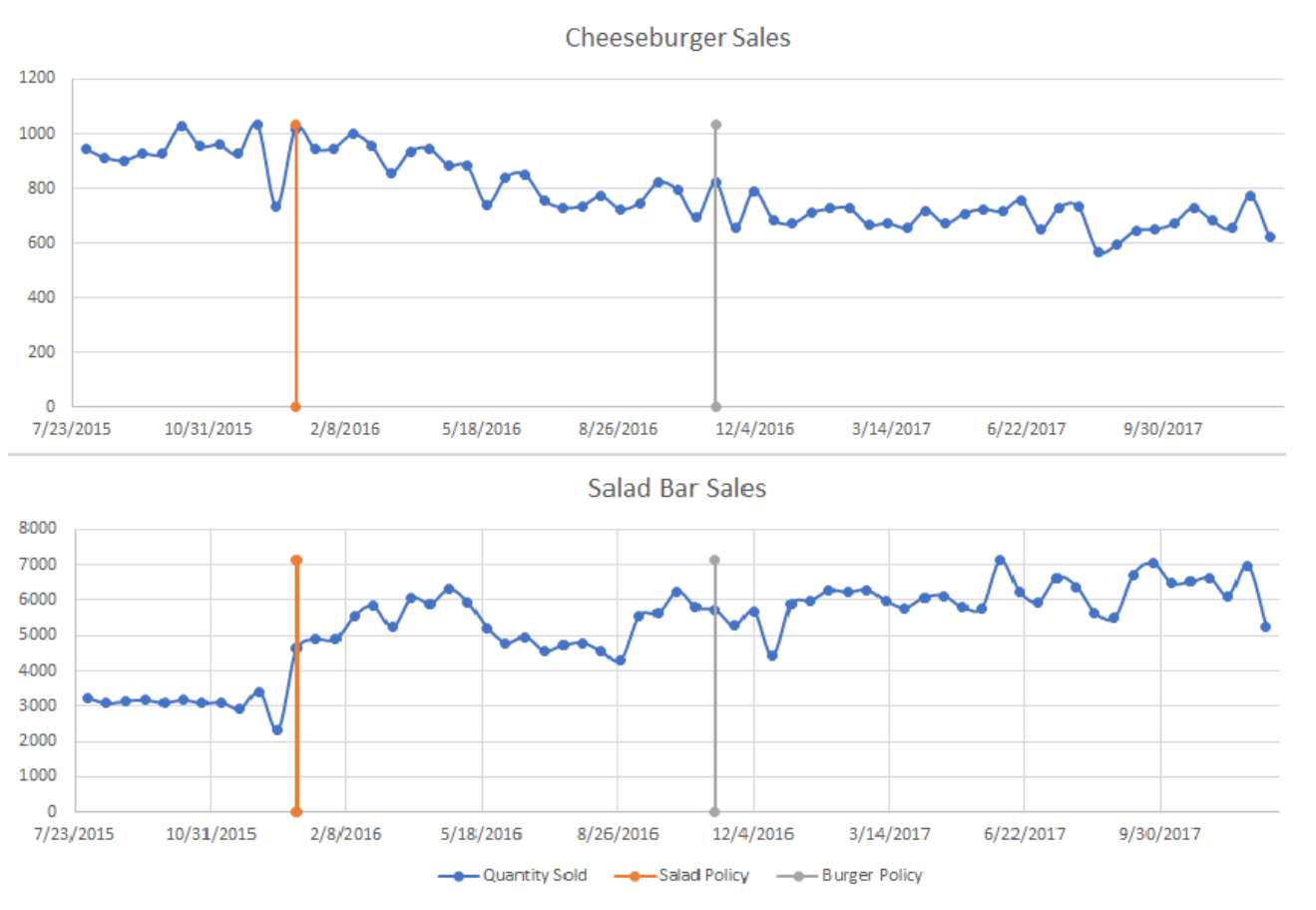
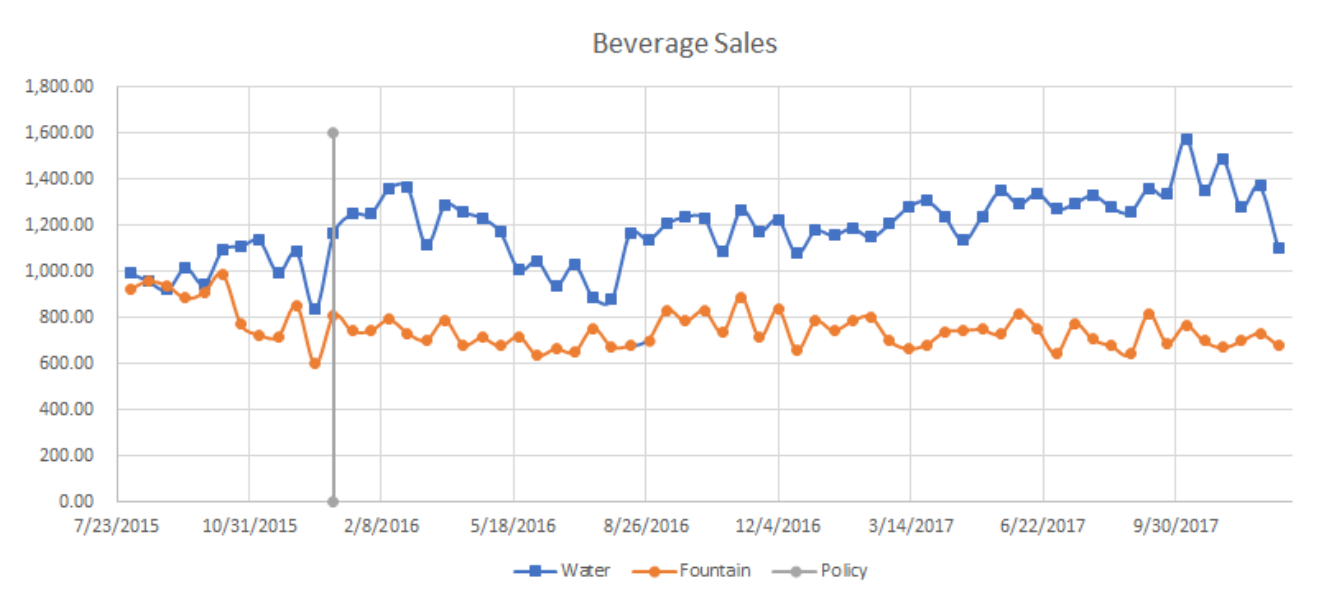


Figure 2. Change in Bottled Water Purchases Over the Study Period



2015 made data prior to August unavailable, limiting the number of observations available for analysis. Second, the policies investigated in this paper were part of a larger program of change implemented by UWHC throughout their culinary services program. As an example, in 2017, UWHC introduced the "Harvest of the Month" campaign, which highlights locally sourced produce in menu items sold in the cafeteria. While the campaign occurred a year after the policies evaluated here, such initiatives could bias the estimates presented.

Future research should investigate both price and nonprice promotions in hospital settings, and their impact on both consumer behavior and revenue generation. A growing body of literature indicates that nonprice behavioral strategies, such as product placement, samples, displaying caloric content, and other signage, affect consumer behavior[9] with less risk of revenue loss than changes to pricing strategies. However, the magnitude of their impact is typically lower than that of price-based strategies. Further, the long-term impact on consumer behavior remains unclear.[10]

With these limitations considered, the results presented in this research indicate a significant role for hospitals to use their culinary services as a tool for accomplishing their broader public health goals. Through a targeted pricing campaign, administrators at UWHC influenced a significant shift away from red meat, associated sides, and fountain drinks to increased consumption of fresh vegetables and bottled water.

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