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# Minnesota AGRICULTURAL ECONOMIST



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## Consumption Trends In Whole, Skim, And Lowfat Milk

By John Schamper\*

### Introduction

U.S. CITIZENS HAVE BECOME increasingly concerned about nutrition and weight control. These concerns have increased the nation's preference for lower fat foods. Consumption of skim and lowfat milk has increased accordingly. More consumption of skim and lowfat milk has been accompanied by less consumption of whole milk.

These trends have been present in most U.S. milk markets. However, they are much more evident in the Minneapolis-St. Paul (Twin Cities) area. On a per capita basis in 1953, the Twin Cities was the highest ranked

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U.S. market for consumption of whole milk. By 1971, the Twin Cities was among the lowest.

At the same time, the Twin Cities' per capita consumption of skim and lowfat milk increased more rapidly than anywhere else in the United States. In 1971, per capita sales were 159 pounds, nearly equal to the 164 pounds for whole milk. That year, per capita consumption of skim and lowfat milk was less than 50 pounds in most other U.S. markets. The second ranked U.S. market for skim and lowfat milk in 1971 was the Puget Sound Federal Milk Order. Its per capita consumption was 109 pounds.

The Twin Cities' trend has important implications for the dairy industry. Such rapid shifts are rare for food. Consumer attitudes and supply considerations for lowfat milk may help



John Schamper inspects one of the Twin Cities' dairies to collect data about the area's milk consumption trends. This article reports these trends and discusses their implications to people in the dairy industry.

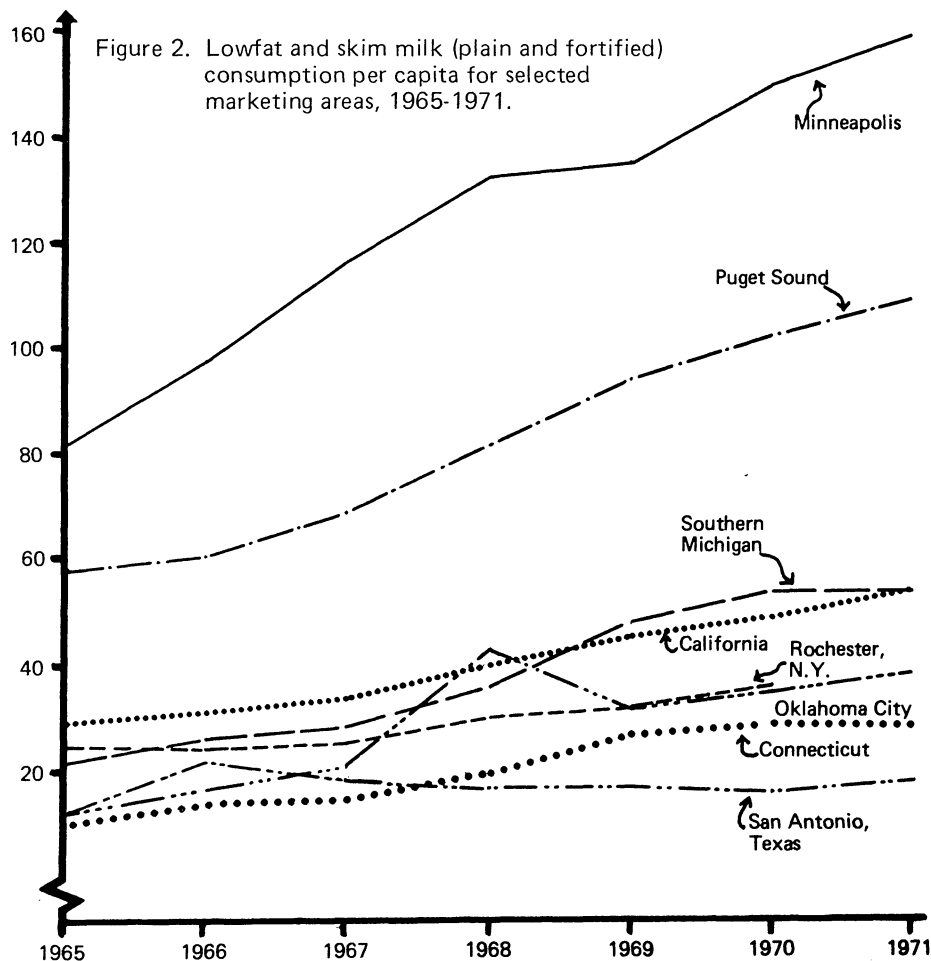
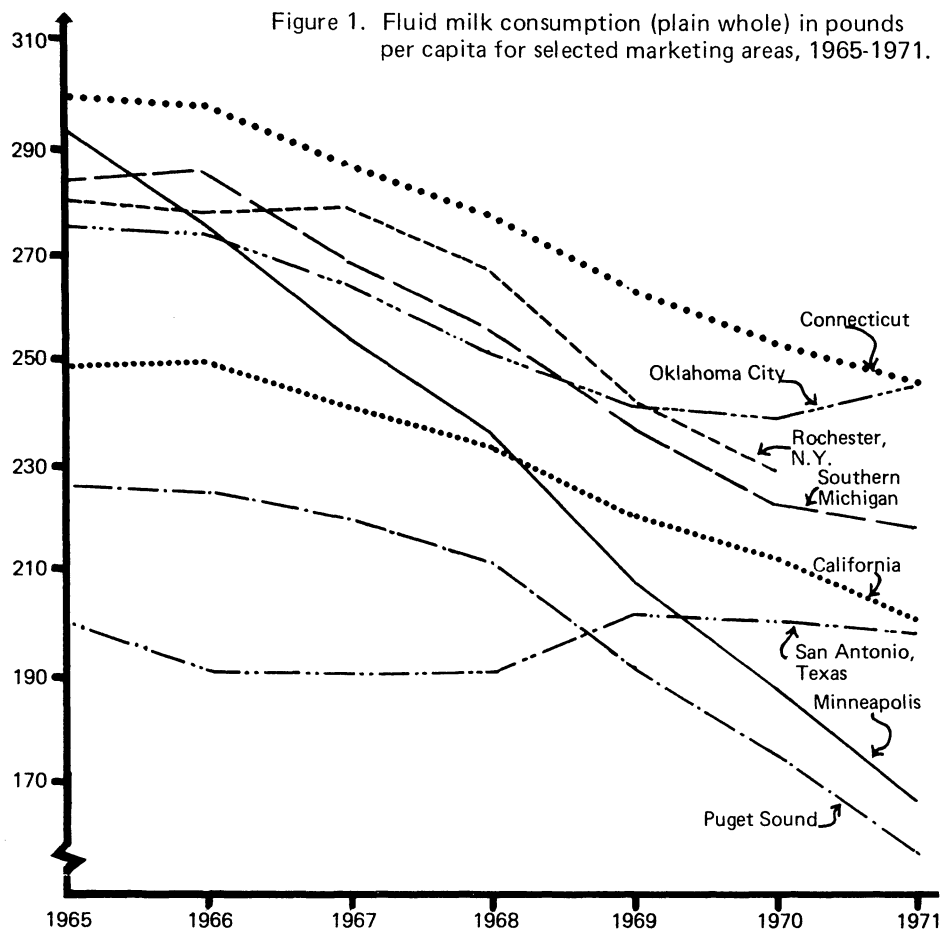
determine the success of other new dairy products. Increased preference for lowfat milk ultimately affects farmers' milk prices.

### Per capita consumption of fluid milk products

*Whole milk.* Table 1 presents total fluid milk consumption of eight U.S. markets. These markets were selected

Table 1. Combined consumption of whole, lowfat, and skim milk products in pounds per capita for selected marketing areas, 1953, 1960, 1965-71.

Year	Marketing area							
	Connecticut	Rochester, N.Y.	Southern Michigan	Minneapolis-St. Paul	Oklahoma Metro	San Antonio, Tex.	Puget Sound	California
1953	336	295	334	357	276	228	298	302
1960	328	319	315	398	305	253	296	303
1965	317	315	332	389	309	241	293	290
1966	316	313	326	387	311	240	297	289
1967	308	315	311	381	305	232	300	287
1968	304	306	307	381	297	230	304	284
1969	295	284	300	356	292	243	295	276
1970	286	273	293	349	299	239	287	270
1971	280	N.A.	284	326	292	233	265	252
1971 as percent 1953	83.3	—	85.0	91.3	105.8	102.2	88.9	83.4



because of one or more of these criteria: (1) To show trends in different parts of the country; (2) Some markets, especially Rochester, N.Y., were similar to the Twin Cities and other cities in racial, vocational, and demographic characteristics; (3) The Puget Sound was the second-ranked market for lowfat milk; (4) To compare the Twin Cities with other high milk-consuming markets.

Consumption data for the Federal Order markets applies to the geographic marketing area of the respective orders. The marketing area of a federal order commonly incorporates the central city and the urbanized area surrounding it.

Several facts are apparent from table 1: (1) the general trend in total fluid milk consumption was down except in the south; (2) in 1971, the Twin Cities was still ranked first in total milk consumption; (3) compared to other markets having per capita milk consumption exceeding 300 pounds in 1953, consumption in the Twin Cities held up well—the 1971 per capita figure was 91.3 percent of that for 1953. For Connecticut, the comparable figure was 83.3 percent, and for California, 83.4 percent. Thus, milk consumption was maintained at a higher level in the Twin Cities than elsewhere. However, this conclusion is dependent on the definition of milk consumption—whether on a product-pound basis or on a milk equivalent basis. The latter shows the amount of producer milk required to produce the milkfat for a given product mix.

*Consumption of plain whole milk.* Table 2 gives per capita consumption of plain whole milk for the eight markets. In 1953, the Twin Cities market was easily ranked first in consumption of plain whole milk. It retained this position in 1960. By 1965, its rank had slipped to second, behind Connecticut. By 1970, it was seventh with per capita consumption only exceeding that of the Puget Sound. Figure 1 demonstrates that the decline in whole milk consumption was much more accelerated in the Twin Cities than in other markets during 1965-71.

The Twin Cities' decline in per capita whole milk consumption placed that market behind some traditionally low-consuming markets in the south. While per capita consumption of whole milk did fall more rapidly in markets with high consumption in 1953, the only other high-consuming market with

a comparable decline was Puget Sound. There, 1971 per capita consumption was 55.8 percent of 1953, compared to 49.4 percent for the Twin Cities. The great decline in the Twin Cities suggests influences peculiar to that market.

*Consumption of skim and lowfat milk.* Table 3 shows sales of plain skim and lowfat milk in the Twin Cities. Table 2. Fluid milk consumption (plain whole) in pounds per capita for selected marketing areas, 1953, 1960, 1965-71.

Cities—about 3.6 percent of plain whole milk sales in 1953—were nearly equal to plain whole milk sales in 1971. The only other market experiencing a similar growth in lowfat milk sales was the Puget Sound. It had per capita sales of 109 pounds in 1971, compared to 159 pounds in the Twin Cities. Figure 2 shows that sales of skim and lowfat milk in the Twin Cities were much higher than in other markets.

*Milk consumption on an equivalent basis.* Table 4 demonstrates the difference in ranking the Twin Cities' per capita milk consumption on an equivalent basis vs. a product-pounds basis. Butterfat components were added for each fluid product consumed, including cream. The amount of producer milk required to produce the consumption items were computed. In 1953, the Twin Cities ranked first among the

Year	Marketing area							
	Connecticut	Rochester, N.Y.	Southern Michigan	Minneapolis-St. Paul	Oklahoma Metro	San Antonio, Tex.	Puget Sound	California
1953	322	295	306	332	253	210	274	277
1960	313	287	289	348	278	230	265	273
1965	299	280	284	294	275	201	227	249
1966	298	278	285	277	274	191	225	250
1967	287	279	268	254	265	190	220	242
1968	278	267	255	235	251	190	211	233
1969	263	242	236	207	241	202	191	220
1970	253	228	223	187	239	201	174	211
1971	244	N.A.	217	164	245	197	153	198
1971 as percent 1953	75.8	77.2*	70.9	49.4	96.8	93.8	55.8	71.48

\*1970 as percent of 1953.

Source: U.S.D.A., Fluid Milk and Cream Report.

Table 3. Lowfat and skim milk (plain and fortified) consumption in pounds per capita for selected marketing areas, 1953, 1960, 1965-71.

Year	Marketing area							
	Connecticut	Rochester, N.Y.	Southern Michigan	Minneapolis-St. Paul	Oklahoma Metro	San Antonio, Tex.	Puget Sound	California
1953	5	N.A.	4	12	4	5	14	9
1960	10	20	12	38	5	8	23	17
1965	12	24	22	82	14	14	57	28
1966	15	24	25	97	17	22	61	31
1967	16	25	28	116	21	19	69	35
1968	20	30	36	133	44	17	82	40
1969	27	31	47	135	31	17	94	45
1970	29	36	54	148	35	16	103	49
1971	29	N.A.	54	159	38	18	109	54

Table 4. Milk equivalent of all fluid items consumed per capita (in pounds) for selected markets, 1953, 1960, 1965-71 \*

Year	Marketing area							
	Connecticut	Rochester, N.Y.	Southern Michigan	Minneapolis-St. Paul	Oklahoma Metro	San Antonio, Tex.	Puget Sound	California
1953	376	328	374	417	275	221	287	310
1960	359	326	330	391	313	249	289	314
1965	337	313	330	370	313	234	279	292
1966	333	309	331	351	312	231	277	287
1967	320	298	310	326	298	226	275	283
1968	311	284	301	308	283	220	275	261
1969	294	261	285	284	273	234	260	249
1970	280	245	271	242	269	231	247	241
1970/1953	74.5	74.7	72.4	58.0	97.8	104.5	86.1	77.7

\*Fluid milk equivalent data represents the quantity of producer milk at average test required to provide the milkfat in the respective product groupings.

Source: U.S.D.A., Fluid Milk and Cream Report.



eight markets. It retained this position until 1968 when consumption in Connecticut was greater. By 1971, the Twin Cities was ranked sixth, just ahead of California, and below one of the Southern markets, Oklahoma Metro.

### Causes of the accelerated lowfat milk consumption trend in the Twin Cities

To explain the Twin Cities' lowfat milk consumption, milk prices and age composition of population were investigated. Whole, skim, and lowfat milk prices for the eight markets were gathered to see whether prices for skim and lowfat milk relative to whole milk were more favorable in the Twin Cities than elsewhere.

Census data for 1960 and 1970 were assembled for the eight markets to determine whether changes in age composition could have been a factor in causing the Twin Cities' rapid rise in lowfat milk sales.

**Price data.** Table 5 gives the average price paid for paper half gallons of whole, lowfat, and skim milk sold in the eight markets during 1969, 1970, and 1971. All three years, the Twin Cities had the lowest prices among these markets for whole and lowfat milk. The Twin Cities' skim milk prices were the second or third lowest in each of these years.

Lower fat milk (skim, 2 percent, etc.) is considered more healthful, and it usually costs less. However, both lower fat and whole milk are considered to be healthful, nutritious drinks. Since the lowfat products have some food value removed, consumer inclinations to buy them—providing health is not a major concern—must depend partly on cost savings.

Table 6 shows the difference between the average price of whole milk and of skim and lowfat (2 percent) milk in the eight markets. The figures indicate that price is not a major explanation for the rapid rise in lowfat milk consumption in the Twin Cities. In 1971, the average difference in the Twin Cities was only 1.25 cents between whole and lowfat milk. More favorable price differences for lowfat milk existed in four markets that year. Similarly, the average difference between whole and skim milk in the Twin Cities was 3.25 cents in 1971. Prices of skim milk were more favorable in four other markets. The data show much the same relationships for 1969 and 1970.

Markets with a more favorable 1971 price difference for lowfat milk included Seattle, Oklahoma City, Los Angeles, and Detroit. That year, skim milk prices relative to whole milk prices were more favorable in Los Angeles, Rochester, New York, Seattle, Detroit,

and Oklahoma City. Generally, the price differences for skim and lowfat milk were greater in markets other than the Twin Cities.

Detroit and Rochester had a more favorable price difference for lowfat and skim milk than did the Twin Cities, but they had a smaller increase in per capita consumption. This seriously weakens the explanation of the rapid rise in lowfat milk consumption as a price phenomenon. Rochester and Detroit are both high milk consumption areas, as is the Twin Cities. Rochester, in particular, is similar to the Twin Cities in racial composition and the proportion of blue collar labor force.

**Changes in age composition of population.** Per capita milk consumption commonly varies by age composition. The prime milk-drinking group is composed of people experiencing their greatest physical growth. A change to a smaller proportion of young persons and a greater proportion of older persons could result in less milk consumed and greater preference for lower fat milk products. Table 7 gives 1970 age composition and the change since 1960 for the eight markets. Correspondence to milk marketing areas is not exact in the Standard Metropolitan Statistical Areas, although the SMSA's incorporate a high proportion of the population of the Federal Milk Orders.

Table 5. Average milk prices paid by consumers for most common grade sold at stores, paper half gallons, eight markets, 1969-71.

	Whole milk			Low fat			Skim milk		
	1969	1970	1971	1969	1970	1971	1969	1970	1971
Hartford, Conn.	54.37	56.08	57.50	N.A.	54.50	N.A.	60.50	61.54	64.45
Rochester, N.Y.	57.25	59.08	58.83	56.43	59.92	61.00	46.62	50.21	49.83
Detroit, Mich.	52.50	53.08	50.25	49.66	50.50	48.99	40.00	46.68	44.71
Minneapolis-St. Paul	41.00	48.58	46.83	39.75	47.25	45.58	38.58	46.33	43.58
Oklahoma City, Okla.	59.17	61.12	59.92	58.08	59.50	58.25	N.A.	N.A.	55.33
San Antonio, Tex.	52.92	53.67	58.92	59.00	60.33	61.00	59.00	59.83	61.00
Everett-Seattle, Wash.	55.04	57.54	58.50	50.00	51.58	50.00	49.00	50.04	50.50
Los Angeles, Calif.	49.00	51.33	53.50	47.00	49.58	52.17	37.00	40.25	43.17

Table 6. Average difference between price of whole milk and price of lowfat milk and average difference between price of whole milk and price of skim milk, eight markets, 1969-71.

	Whole milk — Low fat			Whole milk — Skim milk		
	1969	1970	1971	1969	1970	1971
Hartford, Conn.	N.A.	1.58	N.A.	-6.13	-5.46	-6.95
Rochester, N.Y.	0.82	-0.84	-2.17	10.63	8.87	9.00
Detroit, Mich.	2.84	2.58	1.26	12.50	6.40	5.54
Minneapolis-St. Paul	1.25	1.33	1.25	2.42	2.25	3.25
Oklahoma City, Okla.	1.09	1.62	1.67	N.A.	N.A.	4.59
San Antonio, Tex.	-6.08	-6.66	-0.08	-6.08	-6.16	-2.08
Everett-Seattle, Wash.	5.04	5.96	8.50	6.04	7.50	8.00
Los Angeles, Calif.	2.00	1.75	1.33	12.00	11.08	10.33

Source: U.S.D.A., Fluid Milk and Cream Report.

The Twin Cities' rise in lowfat milk consumption cannot be explained by changes in age composition. Between 1960 and 1970, the Twin Cities realized the greatest proportional increase of the eight areas in the two combined prime milk drinking groups—ages 5-14 and 15-19. At the same time, the Twin Cities' oldest age group—65 years and over—realized the greatest proportional decline. The changes that occurred in population composition of the Minneapolis-St. Paul Standard Metropolitan Statistical Area make explanation by demographic data very difficult.

### Considerations peculiar to the Twin Cities market

Explanation of the rapid increase in lowfat milk consumption must lie in supply-demand considerations peculiar to the Twin Cities. The Upper Midwest location places the Twin Cities in a region that is less tradition-minded than the East. The midwestern milk industry has been less subject to state regulation than in the east and south. Less tradition and less rigid regulation may have generally benefited lowfat milk sales in the midwest.

Several characteristics make the Twin Cities milk market unique even in the Midwest. These characteristics are location, market structure, and competition. Each may have helped

accelerate the trend toward lowfat milk consumption.

### Location

The Twin Cities' location in the middle of the nation's dairy belt has important implications for its fluid milk market. Facilities for making manufactured milk products, especially butter, are numerous. Technical change has resulted in numerous old, fully depreciated facilities that operate on a variable costs basis. As a result, demand is exceptionally strong for residual butterfat obtained from fluid milk standardization or lowfat fluid milk operations. Fewer problems are associated with selling lowfat and skim milk than in areas such as the east and south which have fewer processing facilities and, therefore, a less dependable demand for residual butterfat. In such areas, butterfat may sell at distress prices in some seasons or have to be shipped long distances to a market. Since demand and price for residual butterfat may be higher in the Twin Cities, lowfat milk may represent a better profit opportunity to Twin Cities milk handlers.

### Market structure

The structure of the Twin Cities milk market lessens problems of selling lowfat milk. Twin Cities milk bottlers commonly purchase wholesale milk

from large dairy cooperatives. These cooperatives can offer bottlers custom service unavailable in many other cities. A bottler can order uniform 3.5 percent milk, 2 percent milk, or skim milk. The bottler doesn't have to be concerned with surplus butterfat disposal.

### Competition

The competitive characteristics of the Twin Cities market may also encourage lowfat milk sales. The market has had numerous price wars. During these periods, price competition has usually been concentrated on whole milk. As a result, handlers may have encouraged sales of lowfat and skim milk to both stabilize and increase profits.

### Special importance of fat content of fluid milk products to Minnesota

Because Minnesota's location is relatively distant from major population centers and fluid milk markets, most of its milk has been used for butter, dry milk, cheese items, and other manufactured products. This is because fluid milk has a much higher transportation cost in relation to product value compared to manufactured milk products. As table 8 indicates, Minnesota has, by far, the lowest percentage of of milk eligible for fluid milk markets among the major dairy states.

Table 7. Population distribution by age group for specified areas: 1970 Census. (parenthesis figures represent difference from 1960 Census).

Area	Age group						
	Under 5 Years	5-14	15-19	20-34	35-54	55-64	65 and over
United States	8.4 (-2.9)	20.0 (0.2)	9.4 (2.0)	20.3 (1.5)	22.9 (2.1)	9.1 (0.4)	9.8 (0.6)
Mpls.-St. Paul *	9.3 (-3.5)	21.3 (1.5)	9.3 (2.5)	22.9 (3.2)	20.9 (-2.2)	7.6 (-0.9)	8.7 (-0.5)
California **	8.2 (-2.9)	19.5 (0.3)	9.1 (2.1)	22.1 (2.3)	23.5 (-2.4)	8.5 (0.3)	9.0 (0.3)
Connecticut **	8.4 (-2.6)	19.8 (1.3)	8.7 (2.0)	20.0 (1.9)	24.3 (-2.9)	9.4 (0.5)	9.6 (0.0)
Detroit *	9.0 (-3.4)	21.3 (0.9)	9.3 (2.7)	19.6 (0.9)	24.0 (-2.2)	8.5 (-0.1)	8.1 (1.0)
Oklahoma City *	8.4 (-3.2)	20.1 (0.6)	9.4 (2.2)	22.6 (1.5)	22.8 (-1.6)	8.3 (0.1)	8.4 (0.5)
Rochester, N.Y. *	9.1 (-1.9)	20.1 (1.3)	8.9 (2.3)	20.9 (3.1)	22.5 (-3.1)	8.8 (-0.5)	9.7 (-1.2)
San Antonio *	9.4 (-3.6)	22.1 (0.4)	10.8 (2.1)	21.2 (0.8)	21.3 (0.9)	7.4 (0.3)	7.7 (0.8)
Seattle-Tacoma *	8.4 (-2.9)	19.9 (0.3)	8.9 (2.3)	22.7 (3.8)	23.2 (-2.5)	8.4 (0.1)	8.5 (-1.1)

\* Standard Metropolitan Statistical Area

\*\* Entire state

Source: United States Census Bureau

Table 8. Milk production for five leading dairy states and percent of milk eligible for fluid use, 1972.

State	Milk production, 1972	Percent fluid grade
Wisconsin	19,060	58
California	9,915	89
New York	9,890	100
Minnesota	9,250	32
Pennsylvania	6,685	98

Within the manufactured milk products market, Minnesota has long depended on butter. Butter is a concentrated product with a high degree of storability. In recent years, a growing percentage of Minnesota's milk has been manufactured into cheese, but Minnesota has remained the leading butter state (table 9).

Table 9. Five leading states in butter production, 1972.

State	Butter production (1,000 lbs.)
Minnesota	262,201
Wisconsin	198,669
California	112,379
Iowa	85,261
New York	44,053

These statistics indicate that the demand for Minnesota milk is heavily dependent on the demand for butterfat. The supply of butterfat comes from two sources: from milk produced pri-

marily for use in milk manufacturing plants, and that supply which is basically a byproduct of fluid milk packaging operations. The average fat content of fluid milk products sold on the Minneapolis-St. Paul Federal Milk Order Market was 2.76 percent in 1971. The comparable figure for the United States that year was 3.26 percent. If the average fat content of all fluid milk products sold in the United States were as low as that in the Twin Cities, the increased supply of residual butterfat would have been sufficient to manufacture Minnesota's total butter production.

### Summary

Although the Twin Cities remains highest in U.S. milk consumption in product pounds per capita, its relative rank in milk equivalents consumed per capita has declined. This is because of rapidly rising sales of skim and 2 percent milk and falling sales of whole milk. The increase in per capita consumption of skim and 2 percent milk has been sufficiently rapid in the Twin Cities to place it in a statistical class by itself.

The accelerated trend toward lowfat milk consumption in the Twin Cities cannot be explained by product

price or demographic data. Lowfat and skim milk sold at a less favorable price—relative to whole milk—than in markets where consumption did not increase nearly as rapidly. Changes in age composition were more favorable to increased milk consumption than were changes in other markets. Of the markets included in this study, the Twin Cities had the highest increase in the proportion of persons in the prime milk drinking age and the largest decrease in the proportion of older persons. Market characteristics peculiar to the Twin Cities must account for the trend.

Compared to other locations in the country, the Twin Cities' location in the nation's leading butter manufacturing area has ensured a strong demand for residual butterfat. This ready access to butterfat outlets has removed market complications experienced by handlers selling lowfat milk in other markets. Also, intense competition in the sale of fluid whole milk has encouraged handlers to promote lowfat milk sales since prices for the lower fat products have been more stable. Custom milk supply service available to Twin Cities milk bottlers has reduced complications arising from selling lower fat milk in other cities.

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