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Do healthier foods cost less?

At least two credible sources (one for health, one for cost)

Healthy Eating Index (HEI) 2015 by National Institutes of Health (NIS), healthy foods are suggested as fruits, vegetables, legumes, grains, dairy, egg, meats, seafood, nuts and oils. According to NIH eating healthy are limited in sugar, fat, and sodium, which are labeled in the database. Organic foods are considered as fewer pesticide rather than healthy based on Harvard Health Publishing. The analysis would be focusing among above categories and comparing healthy food which are low sugar, low sodium, low fat against the conventional foods.

The recent published USDA “Liberal” food plan, an adult male or female could cost about 400 to 450 per month on monthly grocery, which average cost about \$4.25 per meal. Dietary Guidelines for Americans (DGA) suggested that an adult diet for male or female required 2,400 calories (mean of two gender) per day, which lead us 754 gram per meal.

Do healthier foods cost less?

Make sure your results are statistically significant (i.e., hypothesis testing or another means)

Our hypothesis test proved that healthier foods labeled with low sugar, low sodium, and low fat are comparatively cost higher than the convention foods without these labels under similar categories (*see figure.1*).

By using the daily 754 gram per meal from DGA with their respective proportion to evaluate the most cost efficient from our selected sample group with both conventional food and healthy foods categories. The result indicates that among the three costs our healthier foods in the database cost the highest among three with \$16.86, followed by our conventional foods cost with \$4.45 and USDA average food cost \$4.25 (*see figure 2*).

With the two test the figures indicated that healthier foods cost more than the conventional food.

Provide your top three actionable insights.

Provide at least one credible source per insight (support your insight with research).

Make sure to go beyond the numbers. Remember that aspects such as a correlation in the data may mean that Whole Foods is already taking advantage of a trend. Try to offer them something new where feasible.

1. According to the analysis between the meat and meat alternatives, the result shown that the meat alternative is comparatively cheaper than the meat. Given the prices are fixed we could promote our plant-based product marketing campaign by introducing the customer with environmentally (*see figure 3 and 4*) friendly concept.
2. When it comes to lamb and mutton wholefood (SOMA) does not offer much of a choice (*see figure 5*). Despite the high fat and cholesterol, lamb contain omega-3 fat content, it is considered as a healthy fat reported by *The Nutrition Insider*.
3. Since we have 36.88 % “Kosher” product. It could increase our customer base if we introducing the “Halal” product too. According to update in 2013, the Muslin population in San Francisco is about 3% of 250,000 Bay Area, which is 7,500 (*see figure 8*).

Appendix

Table 1. Healthy Eating Index (HEI) - 2015

Key recommendations from the DGA	Components of HEI-2015	Comments
Consume a healthy eating pattern that accounts for all foods and beverages within an appropriate calorie level	Total Fruits Whole Fruits Total Vegetables Greens and Beans Whole Grains Dairy Total Protein Foods Seafood and Plant Proteins Fatty Acids Refined Grains Sodium Added Sugars Saturated Fats	The comprehensive nature and density basis of the HEI-2015 accounts for all foods and beverages (except alcohol) within a given calorie level
A healthy eating pattern includes: <ul style="list-style-type: none"> Fruits, especially whole fruits A variety of vegetables from all of the subgroups—dark green, red and orange, legumes (beans and peas), starchy, and other Grains, at least half of which are whole grains Fat-free or low-fat dairy, including milk, yogurt, cheese, and/or fortified soy beverages A variety of protein foods, including seafood, lean meats and poultry, eggs, legumes (beans and peas), and nuts, seeds, and soy products Oils 	Whole Fruits Greens and Beans Whole Grains Dairy Seafood and Plant Proteins Fatty Acids	HEI-2015 includes specific components for fruits, vegetables, grains, dairy, protein foods, and oils HEI-2015 targets subgroups that tend to be lowest in diets of the population, including dark green vegetables and legumes, and seafood and plant proteins
A healthy eating pattern limits: <ul style="list-style-type: none"> Saturated fats and <i>trans</i> fats, added sugars, and sodium 	Saturated Fats Added Sugars Sodium	HEI-2015 includes specific components for saturated fats, added sugars, and sodium, which were quantified in the 2015-2020 DGA <i>Trans</i> fats will be removed from the food supply by mid-2018 ¹⁸
Key Recommendations that are quantitative are provided for several components of the diet that should be limited. These components are of particular public health concern in the United States, and the specified limits can help individuals achieve healthy eating patterns within calorie limits: <ul style="list-style-type: none"> Consume <10% of calories per day from added sugars Consume <10% of calories per day from saturated fats Consume <2,300 mg/day sodium If alcohol is consumed, it should be consumed in moderation—up to 1 drink per day for women and up to 2 drinks per day for men—and only by adults of legal drinking age 	Added Sugars Saturated Fats Sodium	In previous HEI versions, alcohol beyond moderate intake was included in the Empty Calories component. However, in HEI-2015, Empty Calories was replaced with the Added Sugars and Saturated Fats components. A separate specific alcohol component was not included in HEI-2015 because the recommendation regarding alcohol applies only to adults, and only a subset of adults consume it. Calories from alcohol continue to be included in total energy calculations used to score the HEI

Source: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6719291/figure/F2/>

Table 2. Official USDA Food Plan: Cost of Food at Home at Three Levels, U.S Average, October 2022

Age-sex groups	Weekly cost ²			Monthly cost ²		
	Low-cost plan	Moderate-cost plan	Liberal plan	Low-cost plan	Moderate-cost plan	Liberal plan
Individuals ³						
Child:						
1 year	\$35.50	\$40.40	\$48.80	\$154.00	\$175.00	\$211.60
2-3 years	\$37.50	\$45.10	\$54.80	\$162.60	\$195.30	\$237.60
4-5 years	\$38.60	\$47.90	\$57.70	\$167.40	\$207.40	\$250.20
6-8 years	\$54.50	\$65.60	\$76.80	\$236.10	\$284.40	\$332.70
9-11 years	\$58.20	\$75.60	\$88.00	\$252.30	\$327.60	\$381.10
Male:						
12-13 years	\$67.90	\$84.50	\$99.00	\$294.10	\$366.10	\$429.20
14-18 years	\$68.90	\$86.70	\$100.00	\$298.40	\$375.80	\$433.30
19-50 years	\$68.20	\$85.40	\$104.00	\$295.40	\$370.20	\$450.70
51-70 years	\$64.20	\$80.80	\$96.50	\$278.20	\$350.00	\$417.90
71+ years	\$63.40	\$78.50	\$96.20	\$274.70	\$340.10	\$417.00
Female:						
12-13 years	\$58.00	\$69.60	\$85.70	\$251.40	\$301.50	\$371.60
14-18 years	\$57.90	\$69.00	\$85.40	\$251.00	\$299.00	\$370.00
19-50 years	\$59.10	\$72.20	\$92.20	\$255.90	\$312.80	\$399.40
51-70 years	\$57.70	\$71.60	\$86.00	\$249.80	\$310.20	\$372.60
71+ years	\$57.20	\$70.60	\$84.70	\$247.80	\$306.00	\$367.00

Source: [https://fns-](https://fns-prod.azureedge.us/sites/default/files/media/file/CostofFoodOct2022LowModLib.pdf)

[prod.azureedge.us/sites/default/files/media/file/CostofFoodOct2022LowModLib.pdf](https://fns-prod.azureedge.us/sites/default/files/media/file/CostofFoodOct2022LowModLib.pdf)

Table 3. Conversion of Healthy U.S.-Style Dietary Pattern for Adults Ages 19 Through 59 From Daily Intake Portion to Per Meal Intake Portion.

	2400 Calories Level of pattern				
	Measurement	Unit/Day	Gram/Day	Gram/Meal	Percent
Vegetables	3	cup	384	128.00	17.0%
Fruits	2	cup	256	85.33	11.3%
Grains	8	cup	1024	341.33	45.2%
Dairy	3	cup	384	128.00	17.0%
Protein Foods	6.5	oz	184.275	61.43	8.1%
Oils	31	g	31	10.33	1.4%
Calories	320	kcal	754 Gram/Meal		

Note: Calories would be excluded during the hypothesis testing.

Table 4. Healthy U.S.-Style Dietary Pattern for Adults Ages 19 Through 59, With Daily or Weekly Amounts From Food Groups, Subgroups, and Components

CALORIE LEVEL OF PATTERN ^a	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000
FOOD GROUP OR SUBGROUP ^b	Daily Amount of Food From Each Group (Vegetable and protein foods subgroup amounts are per week.)							
Vegetables (cup eq/day)	2	2 ½	2 ½	3	3	3 ½	3 ½	4
	Vegetable Subgroups in Weekly Amounts							
Dark-Green Vegetables (cup eq/wk)	1 ½	1 ½	1 ½	2	2	2 ½	2 ½	2 ½
Red & Orange Vegetables (cup eq/wk)	4	5 ½	5 ½	6	6	7	7	7 ½
Beans, Peas, Lentils (cup eq/wk)	1	1 ½	1 ½	2	2	2 ½	2 ½	3
Starchy Vegetables (cup eq/wk)	4	5	5	6	6	7	7	8
Other Vegetables (cup eq/wk)	3 ½	4	4	5	5	5 ½	5 ½	7
Fruits (cup eq/day)	1 ½	1 ½	2	2	2	2	2 ½	2 ½
Grains (ounce eq/day)	5	6	6	7	8	9	10	10
Whole Grains (ounce eq/day)	3	3	3	3 ½	4	4 ½	5	5
Refined Grains (ounce eq/day)	2	3	3	3 ½	4	4 ½	5	5
Dairy (cup eq/day)	3	3	3	3	3	3	3	3
Protein Foods (ounce eq/day)	5	5	5 ½	6	6 ½	6 ½	7	7
	Protein Foods Subgroups in Weekly Amounts							
Meats, Poultry, Eggs (ounce eq/wk)	23	23	26	28	31	31	33	33
Seafood (ounce eq/wk)	8	8	8	9	10	10	10	10
Nuts, Seeds, Soy Products (ounce eq/wk)	4	4	5	5	5	5	6	6
Oils (grams/day)	22	24	27	29	31	34	36	44
Limit on Calories for Other Uses (kcal/day) ^c	100	140	240	250	320	350	370	440
Limit on Calories for Other Uses (%/day)	6%	8%	12%	11%	13%	13%	13%	15%

Source: https://www.dietaryguidelines.gov/sites/default/files/2021-03/Dietary_Guidelines_for_Americans-2020-2025.pdf

Table 5. Healthy Food and Conventional Food Dataset Selection Based on Difference in Sugar Conscious, Low Sodium, Low Fat

Healthy Food											
category	subcate	product	sugarc	lowsodi	lowfat	price	totalsec	secondarysize	units		Healthy Food
Produce	Fresh Veg	Organic Yellow Bell Pepper	1	1	1	399	46	g			0.0867
Produce	Fresh Her	Organic Mint Bunch	1	1	1	199	11	g			0.1809
Produce	Fresh Veg	Organic Red Cabbage	1	1	1	199	89	g			0.0224
Produce	Fresh Veg	Organic Yellow Onion	1	1	1	249	80	g			0.0311
Produce	Fresh Veg	Mini Cucumbers	1	1	1	299	106	g			0.0282
Produce	Fresh Fruit	Organic Large Hass Avocados	1	1	1	299	200	g			0.0150
Produce	Fresh Veg	Organic Butternut Squash	1	1	1	199	140	g			0.0142
Produce	Fresh Fruit	Lime	1	1	1	69	67	g			0.0103
Produce	Fresh Fruit	Bagged Lemons	1	1	1	399	907	g			0.0044
Produce	Fresh Veg	Organic Leeks	1	1	1	299	89	g			0.0336
Produce	Fresh Veg	Slicing Cucumbers	1	1	1	500	104	g			0.0481
Dairy and	Yogurt	Mixed Berry Greek Drinkable Yogurt	1	1	1	549	944	g			0.0058
Meat	Meat alter	Plant Based Crab Cakes	1	1	1	649	640	grams			0.0101
Bread Ro	Breads	Scandinavian Oat Crispbread	1	1	1	399	102.06	g			0.0391
Frozen Fd	Frozen En	Black Eyed Peas - No Salt Added	1	1	1	269	454	g			0.0059
Frozen Fd	Frozen Fru	Bite Size Aloe Vera Cubes	1	1	1	699	340	g			0.0206
Frozen Fd	Frozen Fru	Organic Cauliflower Florets	1	1	1	319	454	g			0.0070
Conventional Food											
category	subcate	product	sugarc	lowsodi	lowfat	price	servings	totalsiz	totalsiz	total in gra	Conventional Food
Dairy and	Cheese	Whitney	0	0	0	2899	1	1	lb	453.6	0.0639
Dairy and	Cheese	Aged Mimolette	0	0	0	2099	1	1	lb	453.6	0.0463
Dairy and	Cheese	Bellavitano Merlot	0	0	0	1899	1	1	lb	453.6	0.0419
Dairy and	Dairy alter	Vanilla Coconut Yogurt	0	0	0	229	125	125	g	125	0.0183
Dairy and	Dairy alter	Organic Coconutmilk Original	0	0	0	349	240	960	ml	960	0.0036
Dairy and	Milk & crea	Organic Golden Moon Milk	0	0	0	599	240	960	ml	960	0.0062
Meat	Meat alter	Plant-Based Ultimate Chick'n Tender	0	0	0	999	101	404	NULL	404	0.0247
Prepared	Prepared	Split Pea Soup	0	0	0	849	245	24	oz	680.4	0.0125
Prepared	Prepared	Penne alla Vodka with Sausage	0	0	0	1099	340	12	oz	340.2	0.0323
Prepared	Prepared	General Tso Chicken Bowl	0	0	0	1299	16.4	16	oz	453.6	0.0286
Prepared	Prepared	Spicy Salmon Avocado Roll	0	0	0	1149	8.7	8	oz	226.8	0.0507
Prepared	Prepared	Spicy Shrimp Tempura Crunch Roll	0	0	0	1349	254	254	g	254	0.0531
Prepared	Prepared	No Bulgur Tabbouleh & Falafel with T	0	0	0	999	269	9.5	oz	269.325	0.0371
Prepared	Prepared	Italian Wedding Soup	0	0	0	499	14.5	14.5	oz	411.075	0.0121
Prepared	Prepared	Creamy Butternut Mac?1?????	0	0	0	999	397	14	oz	396.9	0.0252
Bread Ro	Breads	Cream Cheese Brioche	0	0	0	839	50	14.1	oz	399.735	0.0210
Bread Ro	Breads	Honey Heritage Whole Grain Bread	0	0	0	999	43	24	oz	680.4	0.0147
Bread Ro	Breakfast	Ladyfinger's	0	0	0	349	33	7	oz	198.45	0.0176
Bread Ro	Rolls & Bu	Soft Pretzel Sausage Buns	0	0	0	639	74	10.4	oz	294.84	0.0217
Bread Ro	Rolls & Bu	Two Bite Cinnamon Rolls	0	0	0	599	57	13	oz	368.55	0.0163
Bread Ro	Rolls & Bu	Multi-Grain One Bun Sandwich Buns	0	0	0	469	75	21	oz	595.35	0.0079
Bread Ro	Rolls & Bu	Limited Edition Dinner Rolls 12 count	0	0	0	369	43	18	oz	510.3	0.0072
Bread Ro	Tortillas &	White Flour Tortilla	0	0	0	599	48	13.5	oz	382.725	0.0157
Frozen Fd	Frozen Fru	Organic Coconut Medium	0	0	0	1099	0	0.97	lb	439.992	0.0250
Frozen Fd	Frozen Pia	Cheese Pizza	0	0	0	999	123	369	g	369	0.0271
Frozen Fd	Frozen Pia	Zucchini Rapini Pizza	0	0	0	879	130	389	g	389	0.0226
Frozen Fd	Frozen En	Chicken Pot Pie	0	0	0	569	227	227	g	227	0.0251
Frozen Fd	Frozen En	Mozzarella Sticks	0	0	0	449	88	227	g	227	0.0198
Meat	Pork	Natural Uncured Genoa Salami 4oz	0	0	0	699	28	112	g	112	0.0624
Meat	Pork	Calabrese Sliced Spicy Salame	0	0	0	769	28	112	g	112	0.0687
Meat	Bacon	Wellshire Thick Sliced Dry Rubbed Ur	0	0	0	999	12	132	g	132	0.0757
Meat	Hotdogs &	365 Country Breakfast Pork Sausage	0	0	0	649	70	420	g	420	0.0155
Meat	Seafood	Tilapia Fillet	0	0	0	899	113	453.5	g	453.5	0.0198

Table 6. T-Distribution Table of Critical Values

one-tailed α	0.10	0.05	0.025	0.01	0.005	0.0005
two-tailed α	0.20	0.10	0.05	0.02	0.01	0.001
df						
1	3.078	6.314	12.71	31.82	63.66	636.62
2	1.886	2.920	4.303	6.965	9.925	31.599
3	1.638	2.353	3.182	4.541	5.841	12.924
4	1.533	2.132	2.776	3.747	4.604	8.610
5	1.476	2.015	2.571	3.365	4.032	6.869
6	1.440	1.943	2.447	3.143	3.707	5.959
7	1.415	1.895	2.365	2.998	3.499	5.408
8	1.397	1.860	2.306	2.896	3.355	5.041
9	1.383	1.833	2.262	2.821	3.250	4.781
10	1.372	1.812	2.228	2.764	3.169	4.587
11	1.363	1.796	2.201	2.718	3.106	4.437
12	1.356	1.782	2.179	2.681	3.055	4.318
13	1.350	1.771	2.160	2.650	3.012	4.221
14	1.345	1.761	2.145	2.624	2.977	4.140
15	1.341	1.753	2.131	2.602	2.947	4.073
16	1.337	1.746	2.120	2.583	2.921	4.015
17	1.333	1.740	2.110	2.567	2.898	3.965
18	1.330	1.734	2.101	2.552	2.878	3.922
19	1.328	1.729	2.093	2.539	2.861	3.883
20	1.325	1.725	2.086	2.528	2.845	3.850
21	1.323	1.721	2.080	2.518	2.831	3.819
22	1.321	1.717	2.074	2.508	2.819	3.792
23	1.319	1.714	2.069	2.500	2.807	3.768
24	1.318	1.711	2.064	2.492	2.797	3.745
25	1.316	1.708	2.060	2.485	2.787	3.725
26	1.315	1.706	2.056	2.479	2.779	3.707
27	1.314	1.703	2.052	2.473	2.771	3.690
28	1.313	1.701	2.048	2.467	2.763	3.674
29	1.311	1.699	2.045	2.462	2.756	3.659
30	1.310	1.697	2.042	2.457	2.750	3.646
40	1.303	1.684	2.021	2.423	2.704	3.551
60	1.296	1.671	2.000	2.390	2.660	3.460
80	1.292	1.664	1.990	2.374	2.639	3.416
100	1.290	1.660	1.984	2.364	2.626	3.390
1000	1.282	1.646	1.962	2.330	2.581	3.300
z	1.282	1.645	1.960	2.326	2.576	3.291

Source: <https://statisticsbyjim.com/hypothesis-testing/t-distribution-table/>

Table 7. Meat and Meat Alternative Data Selection

Meat category						
category	subcategory	product	price	totalsize	totalsi	Price/Gram
Meat	Bacon	Wellshire Thick Sliced Dry Rubbed	999	132	g	0.0757
Meat	Beef	Sliced Roast Beef	599	225	grams	0.0266
Meat	Beef	Ground Beef 80% Lean/ 20% Fat	699	454	grams	0.0154
Meat	Beef	Beef Pastrami	1399	450.5	g	0.0311
Meat	Beef	Sliced Roast Beef	599	140	g	0.0428
Meat	Chicken	Organic Whole Chicken	449	960	grams	0.0047
Meat	Chicken	Organic Plain Rotisserie Chicken	1249	450.5	g	0.0277
Meat	Hotdogs & sausage	365 Country Breakfast Pork Sausag	649	420	g	0.0155
Meat	Pork	Pork Shoulder Butt Bnls S1	599	454	grams	0.0132
Meat	Pork	Boneless Pork Loin Chops	849	454	grams	0.0187
Meat	Pork	Natural Uncured Genoa Salami 4oz	699	112	g	0.0624
Meat	Pork	Sliced Prosciutto	799	56	g	0.1427
Meat	Pork	Organic Ground Pork	899	448	g	0.0201
Meat	Pork	Calabrese Sliced Spicy Salame	769	112	g	0.0687
Meat	Pork	Boneless Pork Loin Chops	849	453.6	g	0.0187
Meat	Seafood	Tilapia Fillet	899	453.5	g	0.0198
Meat	Seafood	Frozen Farm-Raised Seafood Value	2999	904	g	0.0332
Meat	Seafood	Anchovy Fillets In Olive Oil	599	52.5	g	0.1141
Meat	Turkey	Organic oven roasted turkey breas	699	168	grams	0.0416
Meat	Turkey	Ground Turkey (Processed)	799	112	grams	0.0713
Meat	Turkey	Ground Turkey	999	112	grams	0.0892
Meat	Turkey	94% Lean ground turkey thigh	599	112	grams	0.0535
Meat	Turkey	Organic oven roasted turkey breas	699	168	g	0.0416
Meat	Turkey	94% Lean ground turkey thigh	599	112	g	0.0535
Meat Alternative Category						
category	subcategory	product	price	totalsize	totalsi	Price/Gram
Meat	Meat alternatives	Organic High Protein Tofu	419	455	grams	0.0092
Meat	Meat alternatives	Plant-Based Ultimate Chick'n Tende	999	404	grams	0.0247
Meat	Meat alternatives	Organic Southwest Plant Taco Mea	739	360	grams	0.0205
Meat	Meat alternatives	Traditional Seitan Strips	499	325	grams	0.0154
Meat	Meat alternatives	Plant Based Crab Cakes	649	640	grams	0.0101
Meat	Meat alternatives	Thai Curry Tofu Nuggets	629	450	grams	0.0140
Meat	Meat alternatives	Plant Based Ground	739	750	grams	0.0099
Meat	Meat alternatives	Organic Kombu	539	120	grams	0.0449
Meat	Meat alternatives	365 Everyday Value Organic Extra l	269	378	g	0.0071
Meat	Meat alternatives	Cookout Classic Plant-Based Burge	1899	904	g	0.0210
Meat	Meat alternatives	Plant-Based Ultimate Chick'n Tende	999	404	g	0.0247
Meat	Meat alternatives	Traditional Seitan Strips	499	212.5	g	0.0235
Meat	Meat alternatives	Thai Curry Tofu Nuggets	629	450	g	0.0140
Meat	Meat alternatives	Plant Based Ground	739	339	g	0.0218
Meat	Meat alternatives	Organic Kombu	539	48	g	0.1123

Figure 1. SQL query for Healthy Food and Conventional Food T-Test (One Tail)

Figure 1. T-Test One tail		
H0 : Healthy Foods - Conventional Foods ≥ 0		
HA : Healthy Foods - Conventional Foods < 0		
	Healthy Foods	Conventional Foods
Mean	0.0331	0.0284
Variance	0.1817	0.0003
Observations	17	34
Hypothesized Mean Difference	0	
Degree of Freedom (df)	49	
t Stat	0.8666	
t Critical one-tail	1.671	
Rejection region: < -1.671		
t-Stat is more than cut-off point		
Failed to reject Null Hypothesis		
Healthy Foods \geq Conventional Foods		

Figure 2. SQL query for the lowest cost under conventional foods (without low sugar, low sodium, low fat badge) compare against healthy foods with (low sugar, low sodium, low fat badges) by using NIH suggested daily dietary plan.

Lowest Foods From Conventional List			
Lowest Foods From Conventional List			
ID	Conventional Foods	Price/Gram	Price/Meal
165	Organic Cauliflower Florets	0.007	0.899
16	Macho Plantain Bananas	0.007	0.569
103	Limited Edition Dinner Rolls 12 ...	0.007	2.466
53	Non Fat Milk	0.002	0.233
60	Organic Whole Chicken	0.005	0.285
		Total	\$ 4.45
		USDA Liberal Food Plan	\$ 4.25
		Conventional Food in database	is slightly higher than USDA rate
Lowest Foods From Healthy List			
ID	Healthy Foods	Price/Gram	Price/Meal
165	Organic Cauliflower Florets	0.007	0.8994
9	Organic Large Hass Avocados	0.015	1.271
94	Scandinavian Oat Crispbread	0.039	13.331
38	Mixed Berry Greek Drinkabe Y...	0.006	0.744
66	Plant Based Crab Cakes	0.010	0.619
		Total	\$ 16.86
		Lowest Convention Foods	\$ 4.45
		USDA Liberal Food Plan	\$ 4.25
	Healthier foods cost more	not only within the database	but also with USDA price index
	Conclusion: Healthier foods	cost more than conventional	foods

Figure 3. Food Price Comparison Between Healthy Food in database with Conventional Food in database as well as USDA projected average grocery cost

2400 Calories Level of pattern						Lowest foods from Conventional List (low sugar, low sodium, low fat)			
	Measurement	Unit/Day	Gram/Day	Gram/Meal	Percent	ID	Healthy Foods	Price/Gram	Price/Meal
Vegetables	3	cup	384	128.00	17.0%	165	Organic Cauliflower Florets	0.007	0.90
Fruits	2	cup	256	85.33	11.3%	9	Macho Plantain Bananas	0.007	0.60
Grains	8	cup	1024	341.33	45.2%	103	Limited Edition Dinner Rolls 12 cou	0.007	2.47
Dairy	3	cup	384	128.00	17.0%	53	Non Fat Milk	0.002	0.23
Protein Foods	6.5	oz	184.275	61.43	8.1%	60	Organic Whole Chicken	0.005	0.29
Oils	31	g	31	10.33	1.4%		Oil (Not avaialbe)	0.000	0.00
Calories	320	kcal		754.43				Total	\$ 4.48
USDA "Liberal" Food Plan Grocery Projected Rate									\$4.25
Conventional food in database is higher than USDA price index									

2400 Calories Level of pattern						Lowest foods from Healthy List (low sugar, low sodium, low fat)			
	Measurement	Unit/Day	Gram/Day	Gram/Meal	Percent	ID	Healthy Foods	Price/Gram	Price/Meal
Vegetables	3	cup	384	128.00	17.0%	165	Organic Cauliflower Florets	0.007	0.90
Fruits	2	cup	256	85.33	11.3%	9	Organic Large Hass Avocados	0.015	1.28
Grains	8	cup	1024	341.33	45.2%	94	Scandinavian Oat Crispbread	0.039	13.34
Dairy	3	cup	384	128.00	17.0%	38	Mixed Berry Greek Drinkabe Yogurt	0.006	0.74
Protein Foods	6.5	oz	184.275	61.43	8.1%	66	Plant Based Crab Cakes	0.010	0.62
Oils	31	g	31	10.33	1.4%		Oil (Not avaialbe)	0.000	0.00
Calories	320	kcal		754.43			Healthy Food Per Meal	Total	\$ 16.88
Conventional Per Meal Cost									\$4.48
USDA "Liberal" Food Plan Grocery Projected Rate									\$4.25
Healthy Foods in database is Conventional food as well as the USDA suggested average per meal price.									
Conclusion: Healthier food cost higher than regular food.									

Figure 4. SQL query for Meat and Meat Alternative using T-test (one tail)

Figure 2. T-Test One tail		
H0 : Meat - Meat Alternative <= 0		
HA : Meat - Meat Alternative > 0		
	Meat	Meat Alternative
Mean	0.0459	0.0249
Variance	0.0011	0.0006
Observations	24	15
Hypothesized Mean Difference	0	
Degree of Freedom (df)	37	
t Stat	2.2340	
t Critical one-tail	1.684	
Rejection region: > 1.684		
t-Stat is outside cut-off point		
Reject Null Hypothesis		
Meat >= Meat Alternatives		

Figure 5. SQL Query for Meat category content

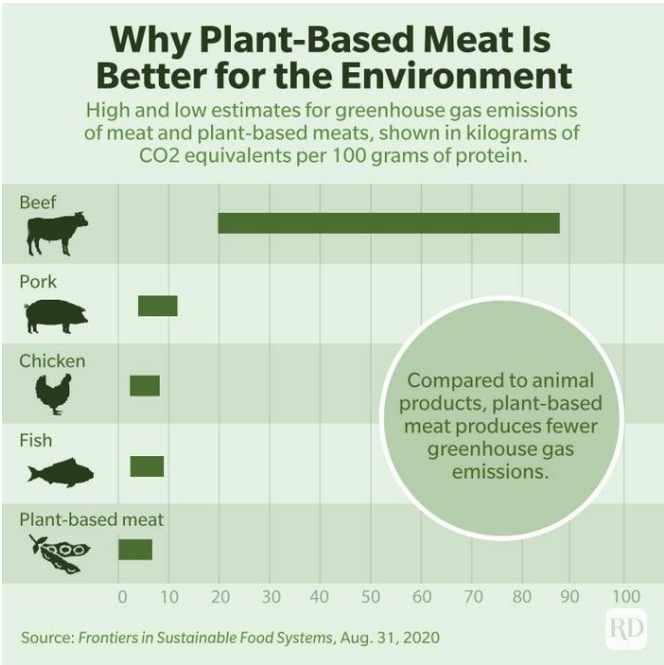
	category	subcategory	COUNT(*)
►	Meat	Turkey	6
	Meat	Beef	4
	Meat	Chicken	2
	Meat	Meat alternatives	16
	Meat	Pork	9
	Meat	Bacon	1
	Meat	Hotdogs & sausage	1
	Meat	Seafood	3

Figure 6. Water Consumption per each pound of food



Source: <https://www.forksoverknives.com/wellness/vegan-diet-helps-environmental-sustainability/>

Figure 7. Gas Emission per 100 grams of protein.

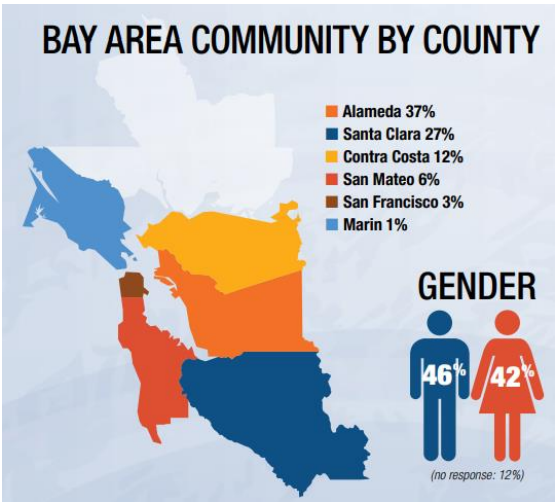


Source: <https://www.rd.com/article/plant-based-meats/>

Figure 8. SQL Query for Kosher Product Proportion

	Number of Kosher Products	Total number of Products	Kosher proporation
▶	104	282	36.88 %

Figure 9. Bay Area Muslim Population 2013



Source: <https://oir.sccgov.org/sites/g/files/exjcpb1026/files/muslim-demo-2013-bay-area.pdf>

Appendix

SQL Script link:

https://github.com/hanklokyaw/supermarket_database_sql_analysis.git

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