Primary Shoppers' Attitudes and Beliefs Related to Fruit & Vegetable Consumption

2012-2016

Produce for Better Health Foundation

About Produce for Better Health Foundation

Produce for Better Health Foundation

Produce for Better Health Foundation (PBH) is a non-profit 501 (c) (3) consumer education foundation whose mission is to motivate Americans to eat more fruit and vegetables to improve public health. PBH partners with government agencies like CDC, non-profit organizations, health professionals, educators, and members of the fruit and vegetable industry to promote increased consumption of fruit and vegetables. We leverage private industry and public sector resources, influence policy makers, motivate key consumer influencers, and promote fruit and vegetables directly to consumers.

Fruits & Veggies—More Matters

Managed by PBH, Fruits & Veggies—More Matters® is the nation's largest public-private fruit and vegetable nutrition education initiative. The foundation of Fruits & Veggies—More Matters is a brand logo and messaging designed to motivate Americans to eat more fruit and veggies. Fruits & Veggies—More Matters' materials are widely featured in print, on websites, and in social media channels like Facebook, Twitter, Pinterest, YouTube, and blogs. Since its inception in 2007, it is estimated that the Fruits & Veggies—More Matters logo has been seen an average of 336 times by every American.

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Executive Summary

Fruits and Vegetables Important to Health

More than four in five shoppers rank physical exercise as the most important factor for good health, followed by proper nutrition. Regarding nutrition, eating more vegetables, less sugar, and more fruit are ranked as factors of most importance to good health. The high level of importance shoppers place on fruits and vegetables is at odds, however, with consumption of them or intentions to serve more. While shoppers self-reported eating or drinking more cups of fruit and vegetables each day in 2014 than in 2012, many of these gains were lost by 2016, consistent with their own perceptions that they don't eat enough of them. Shoppers believe in the importance of fruits and vegetables, but perhaps other components of life like finances and family responsibilities get in the way of acting on those beliefs.

Decline in Perceived Health Benefits

The main reasons shoppers eat fruits and vegetables is to stay healthy, because they like the taste, and because they are part of a balanced diet. However, there continues to be a decline over time in perceived health benefits of fruits and vegetables despite the prominent position respondents place on them for good health. This is of concern because higher nutrition knowledge shows a positive association with dietary intake, especially a higher intake of fruit and vegetables.

Vegetables Can Be A Chore

One in five shoppers thinks eating fruits and vegetables is a chore and don't know how to prepare them, but vegetables are more problematic than fruit. Fruit is generally sweet and more often consumed raw as a snack, a drink, or a dessert. Vegetables, on the other hand, can be bitter and take more skill to prepare. Shoppers enjoy eating vegetables less than fruit, though they want to serve a greater variety of them and learn new cooking techniques.

Shoppers also report that differing family preferences and cost of fruit are the most important factors that make it difficult to eat more fruits and vegetables, followed by lack of availability in restaurants and needing new ideas for preparation. Concern about spoilage significantly peaked in 2014, but returned to a lower level of concern in 2016. Having fast, simple recipes and serving suggestions, coupons, more local availability, and cost savings tips would help shoppers eat more fruits and vegetables overall.

All Form Home Availability Correlates with Higher Consumption

Despite the health benefits of eating more fruits and vegetables, shoppers viewed virtually all of the forms (fresh, frozen, canned, dried, and 100% juice) as less healthy in 2014 than in 2012. In 2016, when vegetables were asked separately from fruit, nearly all forms of fruit were considered less healthy than vegetables. Over time, respondents are less enthusiastic about canned produce and 100% juice, which is disconcerting given that cost and convenience are key barriers to greater consumption and these are convenient, economical choices that are also nutritious. Yet, notably, shoppers who eat the most fruits and vegetables report having more of all forms available in their homes suggesting that all forms are important to meet daily fruit and vegetable recommendations.

Freshness is Most Important Purchasing Factor

Freshness significantly out-ranked cost in 2016 as the factor of most importance to shoppers when purchasing fruit or vegetables, followed by taste and then health. Locally grown ranked significantly higher than organic as an important purchasing factor for both fruit and vegetables.

Grocery Stores Play Critical Role in Food Purchasing Decisions

Shoppers consistently report over time that supermarket flyers, newspaper ads, and signs on supermarket displays are the most effective communication method when it comes to making a food purchasing decision. There has been a steady increase in receptivity by shoppers to internet advertisements, social media posts, text messages, and QR codes, but the use of these as effective point of sale communication methods remains to be seen.

Because so many choices are made with minimal thought or effort, the combination of prominent in-store food displays coupled with actionable information is a very effective way to enhance sales. This, coupled with grocery stores as shoppers' primary location for sourcing fruits and vegetables and more time being spent on making a dinner meal showcases the important role of grocers to increase fruit and vegetable sales and consumption.

Lower Income Shoppers Have Cost Concerns But High Interest

Compared to higher income shoppers, lower income shoppers significantly:

- Rank exercise, nutrition, and family history as less important to health and rank supplements as a more important dietary factor;
- Believe less in the beneficial role fruits and vegetables play in preventing a variety of diseases, but were more likely to be eating fruits and vegetables to manage illness and had a higher desire to learn more about their health benefits;
- Do not have the support they need to include more fruits and vegetables in their family's meals and snacks, and their spouse or partner is less likely to believe it is important to do so;
- View most forms of fruit as more healthy, yet eat less fruit and have less fruit available in the home;
- Rank cost for both fruit and vegetables as an important factor when shopping, believe fruits and vegetables are too expensive, and desire more coupons and cost saving tips; and
- Rely more on a nutritionist/dietitian for information about fruits and vegetables and are less likely to use the Internet.

Fruits & Veggies—More Matters® Becoming More Familiar and Motivating

Regarding Fruits & Veggies—More Matters,[1] the branded social marketing campaign that replaced the previous national 5 A Day program,[2] total "definite" familiarity with the brand grew from 18% in 2012 to 28% in 2016 among all shoppers. Of those aware of the brand, 43% said they find it very motivating, up from 30% in 2012. More than two out of three shoppers appreciate the campaign as a reminder to eat more fruits and vegetables and more than half are favorable toward it.

Shoppers rate fruits and vegetables as very important to good health, yet there has been a decline in their perceived health benefits. Cost also continues to be a concern, yet some of the more economical canned and juiced fruits and vegetables are becoming less favored. Having all forms available in the home, however, correlates with greater consumption of fruits and vegetables. Finally, use of Fruits & Veggies—More Matters as a marketing tool continues to motivate consumers to eat more fruits and vegetables, especially among women and lower income households.

Key Trends

Introduction

For several years, recommendations in public health policy have encouraged an increase in fruit and vegetable consumption by adults and children in the United States.[3, 4] The health benefits of fruit and vegetable consumption continue to grow, with convincing evidence that increasing their consumption reduces the risk of hypertension, coronary heart disease and stroke,[5-8] and probable evidence that certain types of cancer are inversely associated with fruit and vegetable consumption.[9, 10] There is also some evidence that increased consumption of vegetables and fruit may lower the risk of macular degeneration, cataracts, glaucoma, dementia, osteoporosis, asthma, chronic obstructive pulmonary disease, rheumatoid arthritis, irritable bowel diseases, type 2 diabetes mellitus, and prevent body weight gain.[11-16] Despite continued emerging health benefits of fruits and vegetables, daily intake remains well below recommended levels for most Americans.[17-20] Perceived obstacles (including social, personal and economic challenges), intrinsic and or extrinsic motivation, beliefs, confidence in coping with barriers to change behavior (self-efficacy), and self-management are all factors that impact fruit and vegetable intake.[21-24]

Produce for Better Health Foundation (PBH) has been dedicated to increasing fruit and vegetable consumption among Americans since 1991. PBH, Centers for Disease Control and Prevention (CDC), and other national partners launched a call to action, Fruits & Veggies—More Matters, in March of 2007. Fruits & Veggies—More Matters is a branded social marketing campaign that replaced the previous national 5 A Day program[25] as the rallying cry to deliver the benefits of fruits and vegetables to consumers in a way that is designed to change and sustain their behavior over the long term. Fruits & Veggies—More Matters was developed with moms as the primary target audience.[26]

As part of a comprehensive research plan for Fruits & Veggies—More Matters, PBH conducted a baseline survey of primary shoppers in 2012 and follow-up surveys in 2014 and 2016 to identify psychosocial factors associated with fruit and vegetable consumption of primary shoppers, both men and women, as it relates to their consumption of fruits and vegetables. Primary shoppers were defined as shoppers who were either solely responsible for, or normally participated in, their household's grocery shopping. Each survey included 600 primary shoppers and an equal number of male and female shoppers, all ages 18 and older. Most questions were answered using a 5-point Likert scale. For more information about methodology and demographics, see Appendix A and B.

Primary shoppers' responses to questions about various factors related to fruit and vegetable consumption are outlined below.

Factors Important to Health

Recent findings show a decline in fruit and vegetable consumption among three of five attitudinally-divided segments of the population, notably Traditional Health Followers, Natural Health Embracers, and Health Strugglers.[27] These core health consumers, representing 52% of the population, would be expected to embrace healthy eating, but instead these segments reported up to a 13% decrease in vegetable consumption and up to an 18% decrease in fruit and fruit juice consumption between 2009 and 2014.[28] The relevance of fruits and vegetables seems to have declined among this core health audience.

To better understand the relevance of fruits and vegetables compared to other health priorities, shopper respondents in 2016 were asked to rank factors that they believed were most important to good health. Physical exercise ranked highest (84%) with proper nutrition as second most important (80%) (Chart 1). Then, when asked which dietary factors were most important to good health, respondents ranked eating more vegetables (80%), less sugar (71%), and more fruit (68%) as the top three dietary factors of most importance to good health (Chart 2). The high level of importance shoppers place on fruits and vegetables is at odds with their consumption of them. Perhaps shoppers believe in the importance of fruits and vegetables, but other components of life get in the way of

Chart 1: Factors Most Important to Good Health, 2016

Which of the following factors do you believe is most important to good health? (Please select all that apply.)

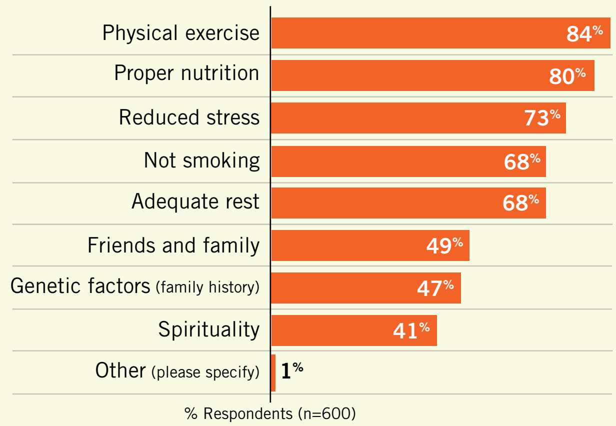
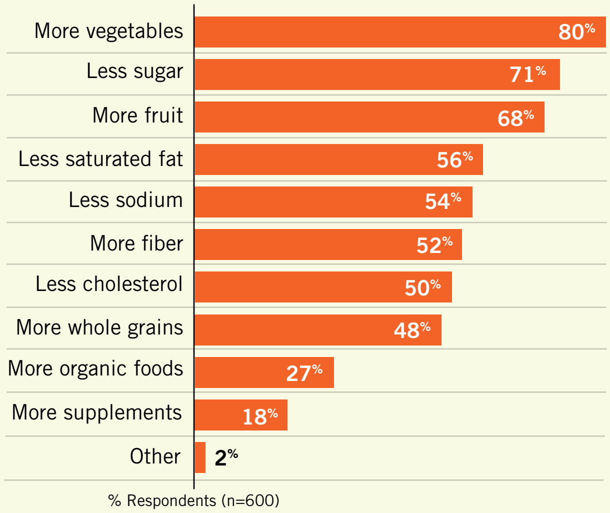


Chart 2: Dietary Factors Most Important to Good Health, 2016

Which of the following dietary factors do you believe is most important to good health? (Please select all that apply.)



acting on those beliefs. Indeed, money, work, the economy, and family responsibilities have ranked higher than personal health concerns as a source of stress for nearly ten years.[29] This is compounded by the fact that eating is a stress management technique for 23% of Americans.[30] Often under stress, these would be less nutritious 'comfort' foods.

Both lower income (<$50,000) and higher income (>$50,000) shoppers rated physical exercise, proper nutrition and reduced stress as the top three factors they believed important to good health, although lower income rated exercise (80%) and nutrition (79%) significantly lower than higher income shoppers (87% exercise, 84% nutrition). All other factors were of equal priority except that lower income rated family history significantly less important (40%) than higher income shoppers (50%).

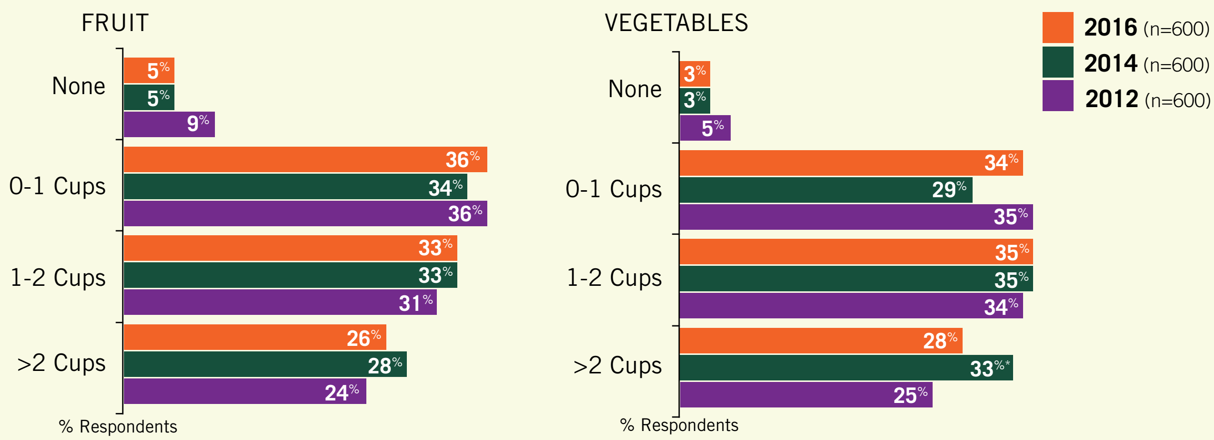
Then, when asked which dietary factors were most important to good health, lower income respondents ranked eating more vegetables (78%), and more fruit (70%) as the top two dietary factors of most importance, with less sugar as the next most important (68%) factor. Higher income shoppers reversed the importance of lowering sugar (71%) and eating more fruit (66%), but vegetables were equally listed as a top factor important to good health (78%). Lower income shoppers also rated supplements more importantly (17%) than higher income (13%).

Self-Reported Intake

Despite respondents' high level of prominence given to nutrition as important to health, and fruits and vegetables in particular, less than a third (28%) of primary shoppers report consuming 2 or more cups of fruit or 2 or more cups of vegetables each day (Chart 3). Dietary recommendations are closer to 2 cups of fruit and 3 cups of vegetables daily.[31] Primary shoppers self-reported eating or drinking more cups of fruit and vegetables each day in 2014 than in 2012, while fewer shoppers reported eating none at all. By 2016, however, many of these gains were lost.

Chart 3: Primary Shoppers' Self-Reported Fruit & Vegetable Consumption

About how many cups of fruit (including 100% fruit juice) do you eat or drink each day?



*Represents statistically significant difference between years.

This is consistent with the perceived adequacy of their fruit and vegetable consumption (Chart 4) where more shoppers in 2016 reported eating too few vegetables, and fewer of them reporting that they ate enough fruit or vegetables. The majority of primary shoppers continue to believe that they do not eat enough fruit and vegetables.

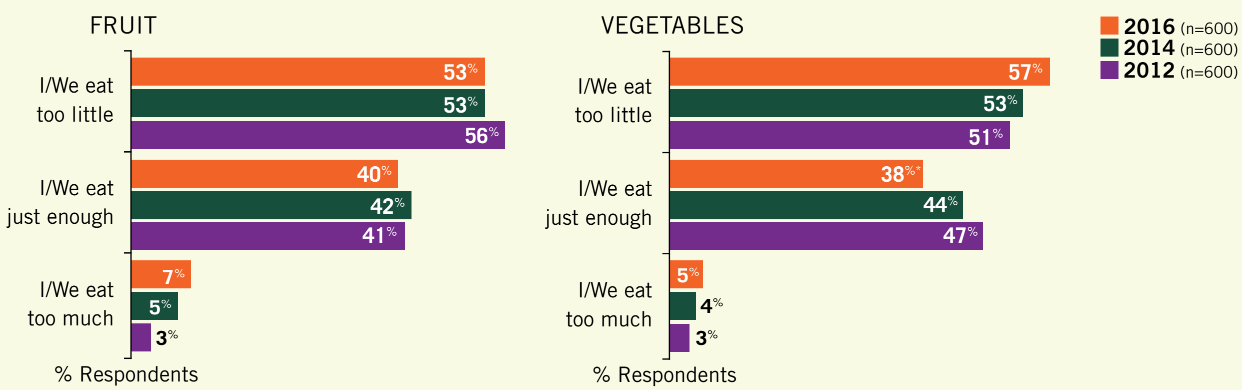
In 2016, households with incomes less than $50,000 were significantly more likely than higher income shoppers to consume no fruit or vegetables each day (Chart 5). In addition, higher income households were significantly more likely than lower income households to consume more than 2 cups of fruit each day, consistent with 2012 and 2014 findings. However, there were no significant differences by income in self-perceptions of fruit and vegetable consumption in 2016, 2014, or 2012. That is, even though lower income shoppers were eating less than higher income shoppers, they didn't perceive themselves as eating too little.

Perceived Benefits

There continues to be a decline in perceived health benefits of fruits and vegetables despite the prominent position respondents place on nutrition, fruit, and vegetables contributing to good health. This is of concern because higher nutrition knowledge shows a positive association with dietary intake,[32, 33] especially a higher intake of fruits and vegetables.[34] In addition, positive attitudes and beliefs about the relationship of consumption of fruits and vegetables to disease prevention have predicted intake of children, mothers, and adults in general.[35-38] Similarly, measures of overall health literacy have been positively related to health promoting behaviors.[39, 40]

Chart 4: Primary Shoppers' Perception About Adequacy of Their Fruit & Vegetable Consumption

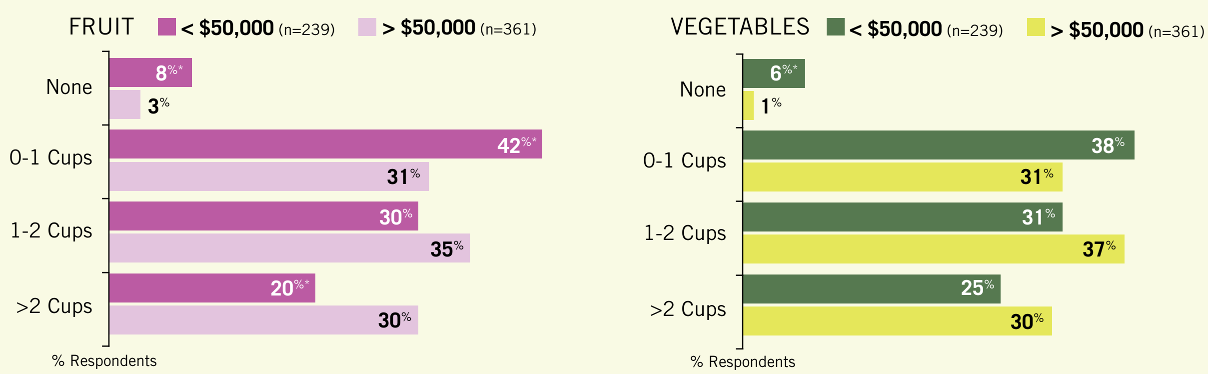
Which of these statements best represents you or your family's eating habits for each of the following?



*Represents statistically significant difference between years.

Chart 5: Primary Shoppers' Self-Reported Fruit & Vegetable Consumption: Cups by Income, 2016

About how many cups of fruit (including 100% fruit juice) do you eat or drink each day?



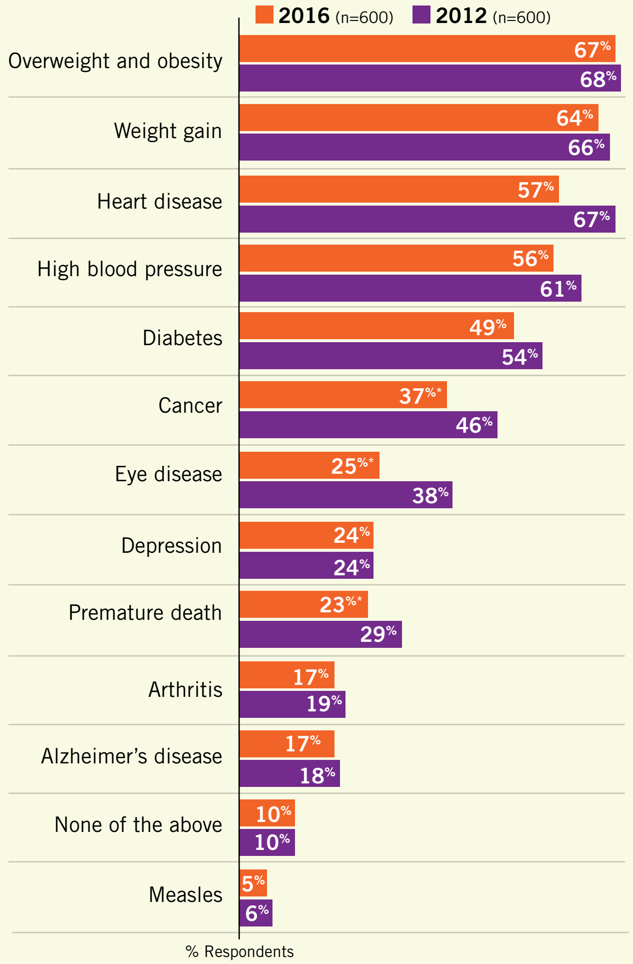
*Represents statistically significant difference between income groups.

The role that fruits and vegetables play in weight control ranked highest among primary shoppers as a perceived benefit of eating fruits and vegetables than the prevention of any other disease state (Chart 6). There was an overall reduction between 2012 and 2016 in those who thought fruits and vegetables were beneficial for preventing various diseases, though this decline was more pronounced because shoppers with children are generally less aware of the disease prevention potential of eating fruits and vegetables, perhaps because of child-focused priorities; the 2016 sample respondent households had more children. The belief in health benefits of various components of fruits and vegetables decreased significantly between 2012 and 2016 (Chart 7), but there weren't differences noted between shoppers with or without children. This is inconsistent with the importance in which they rank fruits and vegetables to health, but consistent with the decline noted earlier in fruit and vegetable consumption among core health consumers.[41] Perhaps shoppers believe in the importance of fruits and vegetables as a whole rather than their individual components,[42] or perhaps shoppers simply have other priorities and don't pay attention to details such as why they are important.

There were few differences in beliefs about health benefits of fruits and vegetables between shoppers by income in 2012, but notable differences in 2016. Compared to higher income households, lower income households believed less in the beneficial role fruits and vegetables play in preventing heart disease, overweight and obesity, cancer, and premature death. Additionally, in those four years, low income shoppers worsened significantly in their belief that fruits and vegetables may be beneficial for preventing heart disease, high blood pressure, cancer, and premature death. This despite the fact that lower income shoppers ranked vegetables and fruit as most important to good health.

Chart 6: Primary Shoppers' Perceived Disease-Prevention Benefits of Fruits & Vegetables

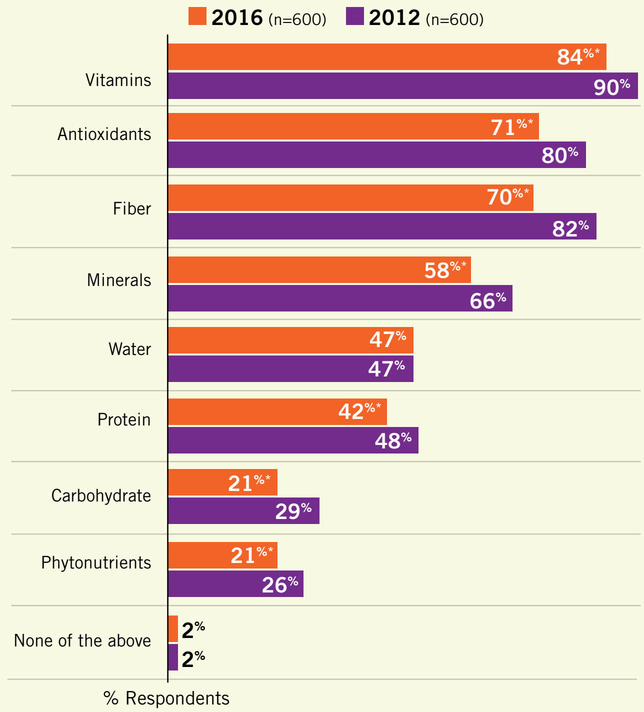
Which of the following do you believe consuming fruits and vegetables may be beneficial for preventing? (Please select all that apply.)



*Represents statistically significant difference between years.

Chart 7: Primary Shoppers' Perception of Healthy Components Associated with Fruits & Vegetables

Which of the following components of fruits and vegetables do you believe may provide health benefits? (Please select all that apply.)



*Represents statistically significant difference between years.

When asked for the most important reasons why primary shoppers themselves eat fruits and vegetables, the main reasons in 2016 included to stay healthy, because they liked the taste, and they are part of a balanced diet (Chart 8). These were also the top three reasons in 2012 and 2014.[43] Notable in 2016 is that 34% said they learned to eat fruits and vegetables as children and 20% said this is what is easily available to eat. Adult fruit and vegetable intake is often related to childhood eating habits and availability, higher liking for the taste, and higher appreciation of the value of a healthy diet, among other factors.[44-46]

Lower income households in 2016 were significantly more likely than higher income households to eat fruits and vegetables to manage illness (17% vs 10%.) They were also less likely to eat fruits and vegetables because they were part of a balanced diet (51%) compared to higher income households (66%). There were no other statistical differences between income groups.

If behavior is indeed influenced by the perceived outcome of the behavior, then this declining belief in the health benefits of fruits and vegetables is worrisome for increasing total fruit and vegetable consumption in the future.

Attitudes and Beliefs

There were no significant changes in the level of importance or intentions to serve fruits and vegetables between 2012 and 2016 (Chart 9). The majority of shoppers believe it is important to include more fruits and vegetables in meals and snacks and that their spouse/partner believes it is important to do so. Generally shoppers indicate they have the support they need to include fruits and vegetables in their family's meals and snacks though there has been a steady decline in this sense of support. Lower income shoppers, however, are significantly more likely than higher income shoppers to report that they do not have the support they need to include more fruits and vegetables in their family's meals and snacks, including that their spouse or partner does not believe it is important to do so.

Chart 8: Primary Shoppers' Reasons Why They Eat Fruits & Vegetables, 2016

Please select up to three of the most important reasons why you, yourself, eat fruits and vegetables.

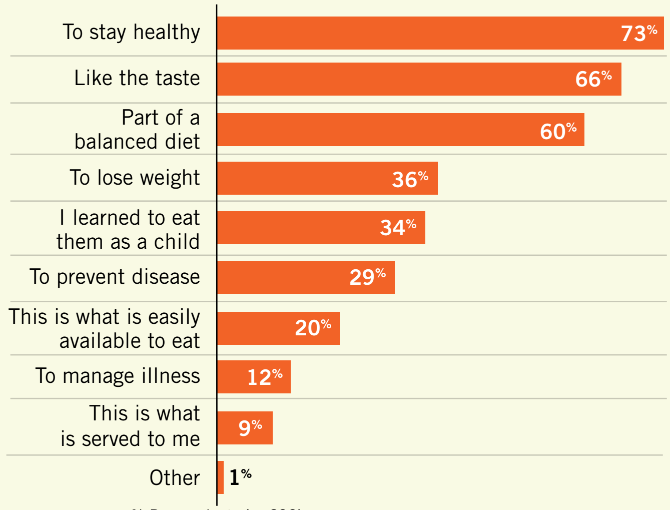
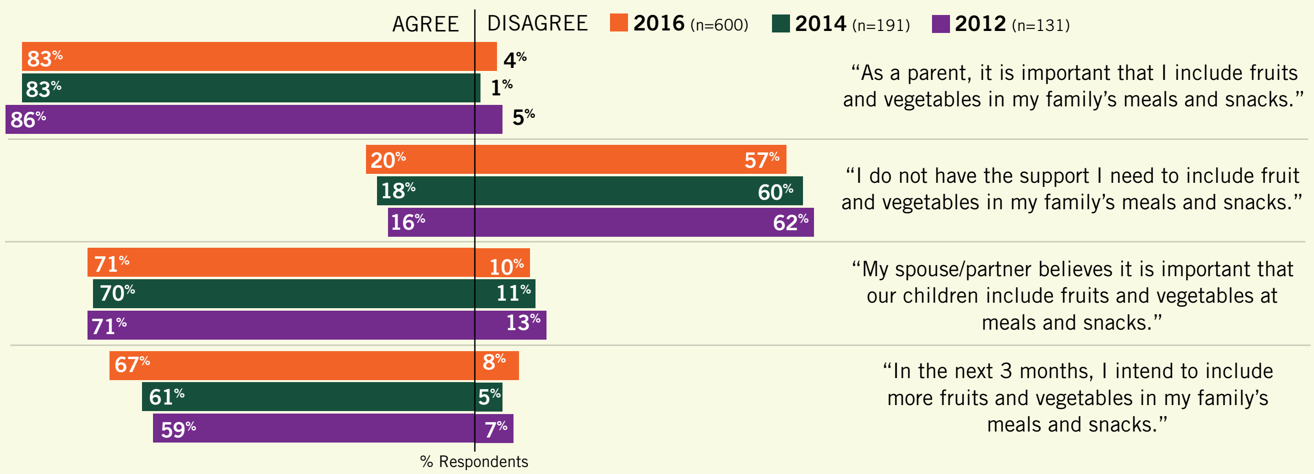


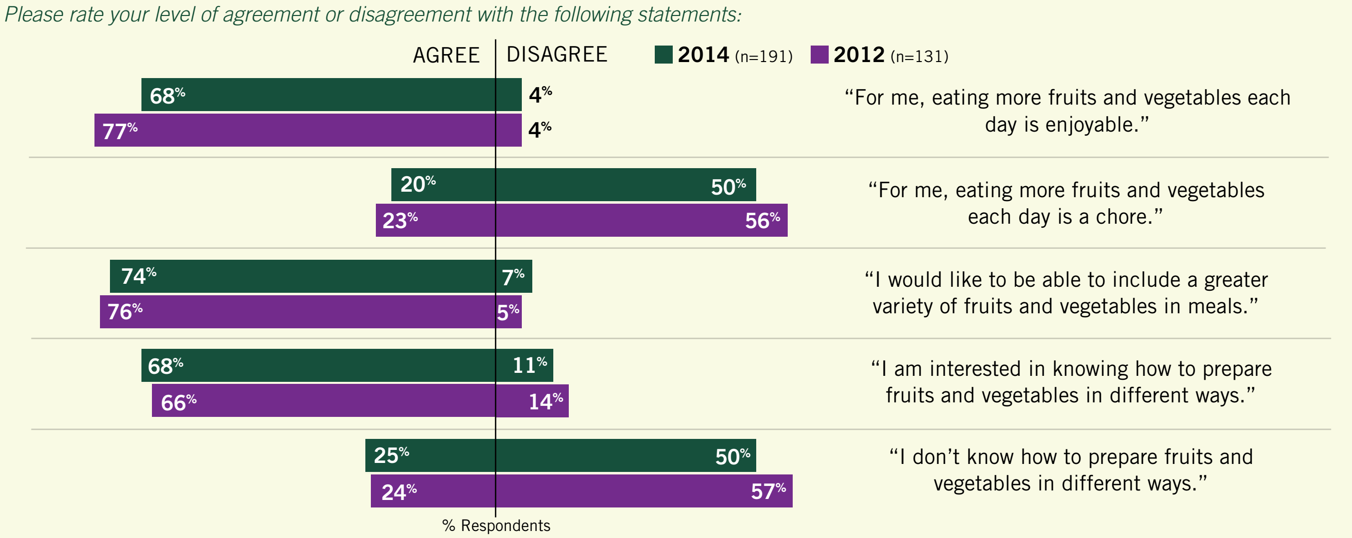
Chart 9: Primary Shoppers with Children: Attitudes Toward Fruits & Vegetables

Please rate your level of agreement or disagreement with the following statements:



Reponses do not equal 100% because mid-point Likert Scale was omitted.
Only asked of primary shoppers with children under the age of 18 living at home.

Chart 10: Primary Shoppers with Children: Attitudes Toward Fruits & Vegetables



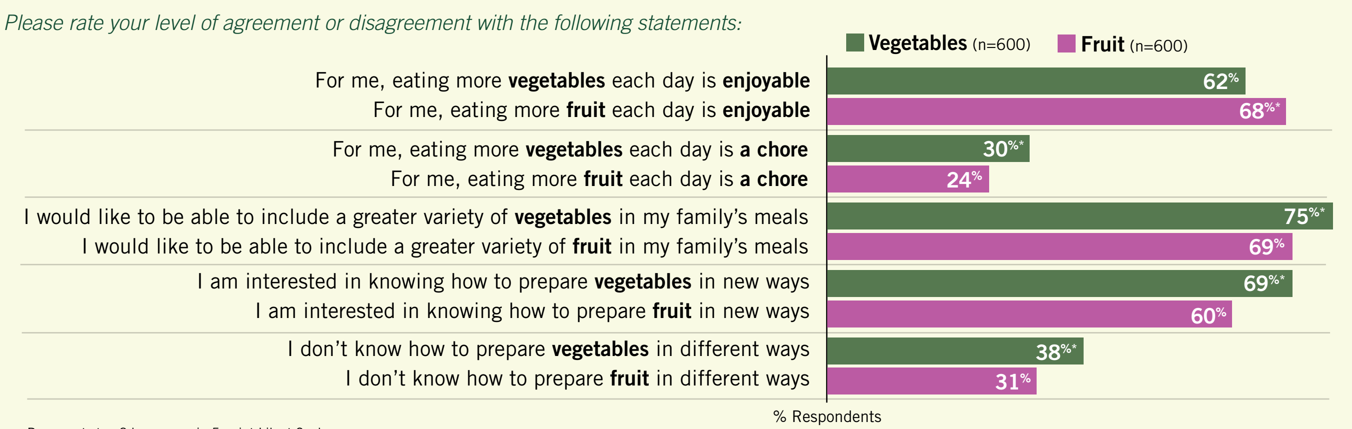
Reponses do not equal 100% because mid-point Likert Scale was omitted.
Only asked of primary shoppers with children under the age of 18 living at home.

In prior years, while most shoppers enjoyed eating fruits and vegetables, one in five viewed it as a chore (Chart 10). The majority said they would like to be able to include a greater variety of fruits and vegetables in meals and snacks, yet one in four didn't know how to prepare them in different ways.

To better understand differences in attitudes about fruit versus vegetables, the 2016 survey asked about each of them separately. Not surprisingly, vegetables are more problematic for shoppers than fruit (Chart 11). They find them less enjoyable than fruit, more of a chore to eat, and require more support with preparation. There was little difference by household income as well.

This is consistent with earlier Fruits & Veggies—More Matters formative work where mothers said they viewed vegetables as less tasty and harder to prepare than fruit.[47] In fact, different intervention strategies for fruit versus vegetables have been suggested given their different taste and manner of consumption.[48, 49] Fruit is generally sweet, and more often consumed raw, as a snack, a drink, or a dessert. Vegetables, on the other hand, can be bitter, are more often cooked, take more skill to prepare, and are consumed as part of a meal. While shoppers enjoy eating fruit significantly more than vegetables and vegetables are more of a chore, they are more interested in and want to serve a greater variety of vegetables compared to fruit (Chart 11).

Chart 11: Primary Shoppers' Attitudes About Fruit vs Vegetables, 2016



Represents top 2 box scores in 5-point Likert Scale.
*Represents statistically significant difference between fruit and vegetables.

Why All Forms of Fruits and Vegetables Matter

All Forms Link to Better Health

Studies demonstrate the importance of fruits and vegetables to health, but none was specific to the 'form' of the fruit or vegetable, e.g. fresh, frozen, canned, dried or 100% juice.[50-54] Fruits and vegetables in all forms provide under-consumed nutrients important to public health. These include folate, magnesium, potassium, dietary fiber, and vitamins A, C, and K. Fruits and vegetables, regardless of form, contain phytochemicals that appear to play an important role in disease prevention.[55-60]

Packaged Fruit & Vegetables are not the Chief Culprits for Sodium & Added Sugar

Fruits and vegetables are not the main contributors to Americans' sugar and sodium intake, regardless of the form in which they are consumed. All fruit, fruit juice, and vegetables, combined, contribute less than 2 percent of the added sugar in the American diet,[61, 62] and vegetables add less than 1 percent of the sodium.[63, 64] Most vegetables on the market today meet FDA's 'healthy' definition, even with all of the juice in the can, which must be represented on the Nutrition Facts box. Draining vegetables can reduce sodium by nearly 40%.[65] Draining heavy syrup from canned fruit can also reduce sugar content.

All Forms Link to Better Health: 100% Juice Can Help Meet Nutrient Goals

Drinking 100% juice can help children and adults reach daily fruit and vegetable goals.[66, 67] On average, per capita consumption of juice for children 4-13 years of age is less than ½ cup (3.75 ounces) per day, which is less than the American Academy of Pediatrics allowance of 4-6 ounces of juice per day.[68] Adult consumption is even lower, around 1/3 cup per day.[69] The Dietary Guidelines state up to half of daily fruit may come from 100% juice.[70] For households who cite cost and higher levels of waste as reasons why fresh fruits and vegetables are not available in their home,[71] combining whole fruit and juice may help increase overall consumption.[72] There is no clear evidence that 100% fruit juice replaces whole fruit in the diet. In fact, compared to non-consumers, people who drank 100% fruit juice also ate more whole fruit.[73] NHANES data show that people drinking 100% fruit juice have better quality diets and more fiber than those who don't drink juice.[74] In addition to providing key under-consumed nutrients and nutrients of concern like vitamin C, potassium, magnesium, vitamin D (fortified) and calcium (fortified), 100% fruit juice contains many naturally occurring phytochemicals and, for some, provides a significant level of these beneficial compounds in the American diet.[75-78] Finally, the majority of studies show that drinking moderate amounts of 100% fruit juice is not linked to overweight or obesity in healthy adults and children.[79-83]

'All Forms' Improves Self-Efficacy

Mothers feel they can help their families eat more fruits and vegetables when they know that all forms (canned, frozen, fresh, dried, 100% juice) help them meet their daily goals.[84] When mothers feel guilty or that they are a 'bad mother' if they don't feed their family fresh fruits and vegetables, they simply 'give up.'[85] For example, three out of four moms (76%) say canned fruits and vegetables help them get produce into their kids' diet[86] and more than half of Americans (56%) feel canned fruits and vegetables are extremely or very important in helping to prepare convenient, nutritious and affordable meals. This fraction rises to two-thirds (67%) of those using federal food assistance (Supplemental Nutrition Assistance Program (SNAP), and Special Supplemental Nutrition Program for Women, Infants, and Children (WIC).[87]

'All Forms' Correlates with Greater Consumption

Shoppers with all forms of fruits and vegetables available in their home report eating more fruits and vegetables overall.[88] Likewise, adults and children who eat canned fruits and vegetables eat more fruit and vegetables overall.[89, 90] In fact, not only do they eat more fruits and vegetables overall, but they also have higher intake of select nutrients, a higher diet quality, and comparable sodium and added sugar intakes than those who don't.[91]

Exclusively recommending one form of fruit or vegetable over another ignores the benefits of each form and limits consumer choice.

All Forms

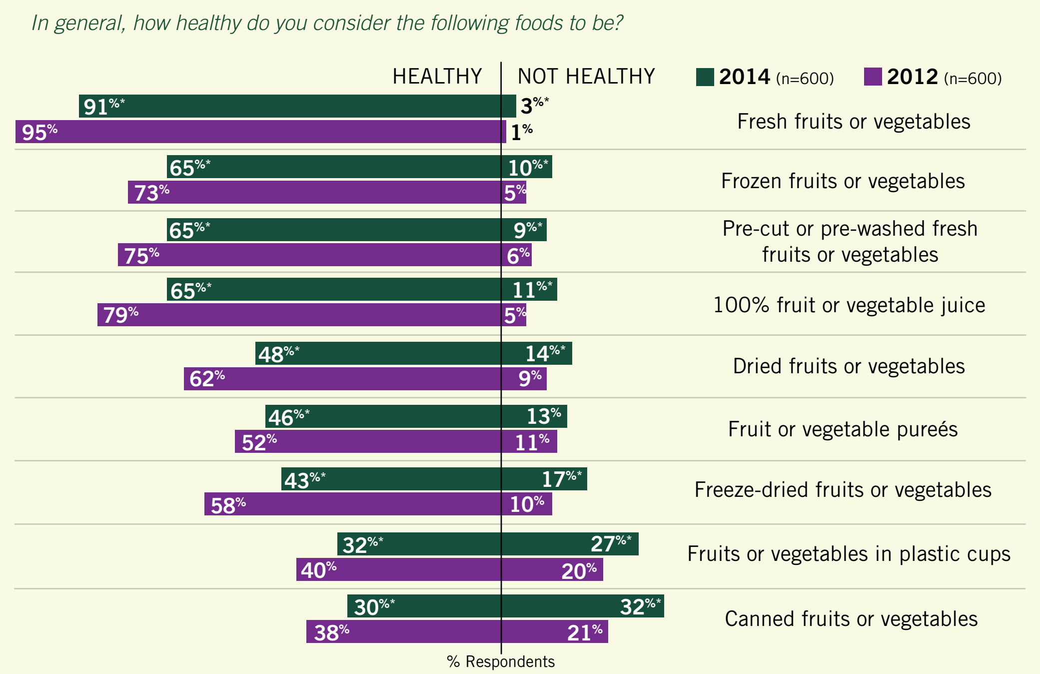
Most Americans are not consuming enough fruits and vegetables every day.[92] In light of continued low consumption, it is more important than ever to emphasize that all forms — canned, frozen, fresh, dried, 100% juice — are great ways to get fruits and vegetables into the diet. Many important nutrients are currently under-consumed in the United States, including potassium, dietary fiber, choline, magnesium, calcium, and vitamins A, D, E, and C.[93] All forms of fruits and vegetables provide many of these nutrients and also contain various phytochemicals that are thought to play an important role in disease prevention.[94-100]

Perception of Healthy

Despite the health benefits of eating more fruits and vegetables, primary shoppers viewed virtually all forms of fruits and vegetables as less healthy in 2014 than in 2012 (Chart 12). In 2016, when vegetables were asked separately from fruit, we see that nearly all forms of vegetables are considered more healthy than fruit (Chart 13). The worst forms perceptually are those that are canned or in plastic cups. What is particularly alarming is that shoppers believe fruit in cans or plastic cups are more unhealthy than healthy.

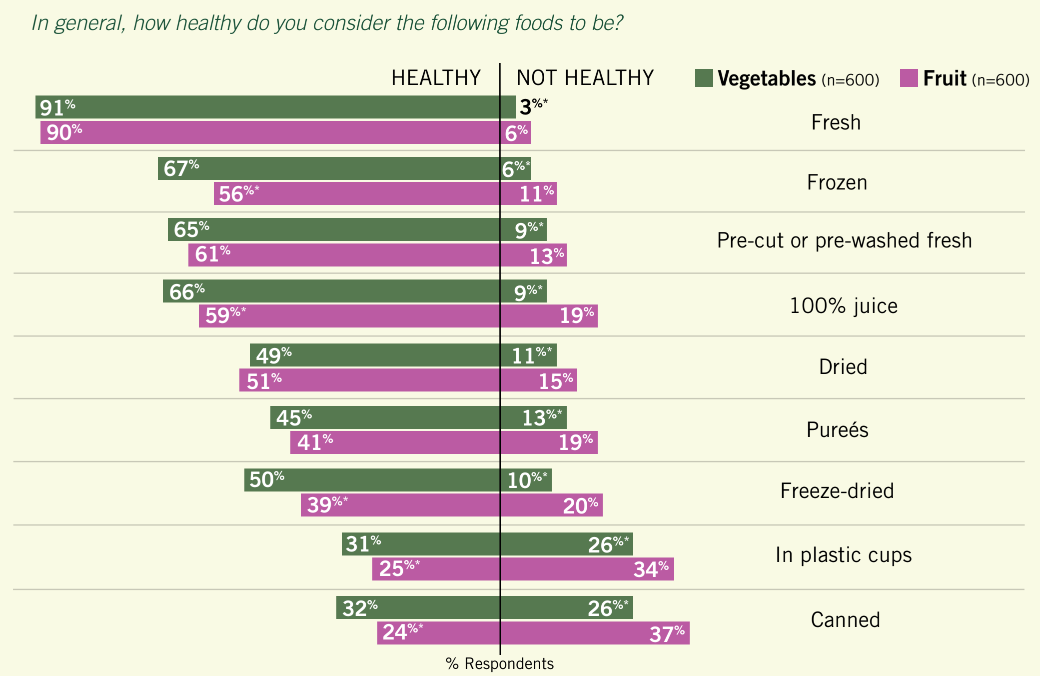
In 2016, the significant differences between lower household income shoppers

Chart 12: Primary Shoppers' Perceived Healthfulness of Different Forms of Fruits & Vegetables



*Represents statistically significant difference between years.
Responses do not equal 100% because mid-point in 5-point Likert Scale was omitted.

Chart 13: Primary Shoppers' Perceived Healthfulness of Different Forms of Fruits & Vegetables, 2016



*Represents statistically significant difference between fruit and vegetables.
Responses do not equal 100% because mid-point in 5-point Likert Scale was omitted.

and higher income shoppers is that, with the exception of frozen fruit, lower income households view all forms of fruit as more healthy; especially 100% fruit juice, fruit purees, and fruit in plastic cups. For vegetables, the main significant difference between income groups is that lower income shoppers rate 100% vegetable juice as more healthy, while higher incomes rate frozen and pre-cut vegetables as more healthy.

The negative perception of various forms of fruits and vegetables, especially canned and juiced, is that they either have too much sodium or sugar.[101] Notably, the very plant compounds that are beneficial to health — phenols, flavonoids, terpenes, glucinolates and others — are almost always bitter, acrid, or astringent. Salt or sugar helps block bitterness or astringency and are therefore important additions for acceptability of fruit and vegetables like kale, green beans, cranberries, grapefruit, and others. Furthermore, the preparation of many fresh fruit and vegetable dishes includes the addition of salt, sugar, fat or other flavorings. An emphasis to purchase fruits and vegetables with no added salt or added sugar favors fresh to the detriment of other forms and simply fuels the *perception* that canned, dried, 100% juice and frozen fruits and vegetables are not as 'healthy' as fresh,[102] when we know this not to be true.[103-105]

Ultimately the way in which health professionals communicate dietary recommendations is important in shaping consumer perceptions. For example, when 'limiting language' is used like *"Include more vegetables and beans (without added salt or fat), and fruits (without added sugars) in your diet,"* it detracts from the perceived healthfulness of packaged fruits and vegetables.[106] Furthermore, consumers are significantly more likely to say that 'limiting language' encourages a decreased intake of packaged fruits and vegetables, compared to 'inclusive language' such as *"When including more fruits and vegetables in your diet, all forms of fruits and vegetables matter –fresh, frozen, canned, dried and 100% fruit or vegetable juice."*[107] Language should encourage all forms of fruits and vegetables so consumers can feel good about the purchase they're making and find more ways to increase intake.

Charts 14: Primary Shoppers' Reasons for Purchasing Various Forms of Fruit and Vegetables, 2016

Why do you purchase fresh, frozen, canned, dried, and 100% fruit and vegetable juice? (Please select all that apply.)

Reasons for Purchasing FRUIT	Fresh (n=223)	Frozen (n=221)	Canned (n=233)	Dried (n=228)	100% Juice (n=237)	Pre-Cut, Pre-Washed (n=239)
Healthy	**74%**	30%	14%	32%	50%	39%
Tastes Good	66%	24%	30%	28%	58%	27%
Good Snack	61%	20%	38%	**51%**	22%	37%
I and/or my family likes them	55%	28%	36%	29%	**53%**	28%
Easy to Use	39%	**47%**	**63%**	37%	34%	**56%**
Quality	40%	16%	11%	16%	21%	18%
Variety	26%	16%	21%	14%	17%	21%
Quick to prepare	23%	36%	41%	21%	16%	45%
Cost	19%	22%	36%	16%	17%	19%
Use in recipes	14%	36%	12%	16%	8%	13%
Keeps well	10%	**47%**	43%	33%	19%	11%
Easy to cook	5%	11%	7%	9%	4%	15%
Nutritious	52%	22%	10%	16%	27%	19%
Other (please specify)	0%	3%	2%	2%	1%	1%

% Respondents

Reasons for Purchasing VEGETABLES	Fresh (n=230)	Frozen (n=235)	Canned (n=250)	Dried (n=201)	100% Juice (n=238)	Pre-Cut, Pre-Washed (n=225)
Healthy	**78%**	36%	16%	24%	**49%**	41%
Tastes Good	51%	26%	19%	15%	34%	26%
Good Snack	23%	6%	5%	24%	16%	26%
I and/or my family likes them	47%	26%	25%	13%	26%	27%
Easy to Use	33%	**66%**	**68%**	**29%**	29%	**65%**
Quality	46%	14%	7%	16%	18%	16%
Variety	23%	23%	20%	18%	13%	14%
Quick to prepare	21%	60%	63%	21%	16%	56%
Cost	22%	43%	49%	18%	16%	24%
Use in recipes	40%	37%	30%	20%	14%	23%
Keeps well	10%	61%	52%	22%	15%	11%
Easy to cook	25%	49%	44%	13%	5%	27%
Nutritious	57%	24%	12%	8%	15%	25%
Other (please specify)	0%	0%	1%	2%	1%	1%

% Respondents

Only asked of respondents who usually have the product available in the home.
Bolded numbers indicate the most prominent reasons for purchasing each form of fruit or vegetable.

Health professionals can give consumers 'permission' to use discretionary calories and sodium to help increase consumption of healthy fruits and vegetables in any form. Regarding meals, for example, the American Academy of Pediatrics states that "the primary objective should be to maximize nutrient density within recommended calorie ranges, which represents a balance between reducing excess calories, solid fats, added sugars, and sodium while using available discretionary calories to encourage greater consumption of *nutrient-rich foods and beverages*."[108]

Purchase Drivers

Healthy, tastes good, good snack and family preferences were the main reasons primary shoppers purchased fresh produce (Chart 14). For pre-cut, pre-washed fruit and vegetables, ease of use was the main purchase driver. Ease of use and shelf-life were the key purchase drivers of frozen and canned fruits and vegetables. Dried fruit was purchased because it is a good snack. Fruit juice was purchased because the family likes it, while vegetable juice was purchased primarily because it was considered healthy.

Uses

While not asked of respondents in 2016, Chart 15 shows shoppers' use of various forms of fruits and vegetables in 2014. Fresh and canned fruit and 100% fruit juice are primarily used as is; frozen fruit is primarily used in smoothies/beverages; and dried fruit is primarily used as a snack.

Fresh vegetables are primarily consumed as a side dish, in salads, or as is. Frozen and canned vegetables are primarily consumed as a side dish, and vegetable juice is primarily consumed as is.

Availability in the Home

Availability of fruits and vegetables in the home has been associated with higher intake.[109-113] Availability may aid consumption by making choosing fruits and vegetables easy, stimulating consumption through visual cues, and increasing preference through consistent exposure.[114, 115] Encouraging a home environment that facilitates choosing fruits and vegetables is a practical way to promote consumption.

Chart 15: Primary Shoppers' Use of Various Forms of Fruits & Vegetables, 2014

How do you use fresh, frozen, canned, dried, and 100% fruit and vegetable juice? (Please select all that apply.)

FRUIT	Fresh (n=185)	Frozen (n=177)	Canned (n=177)	Dried (n=157)	100% Juice (n=172)
Snacks	77%	27%	49%	**79%**	-
Dessert	41%	36%	48%	-	-
Smoothies/Beverages	34%	**70%**	17%	-	30%
Fruit Salads	32%	21%	39%	-	4%
As is	**86%**	29%	**65%**	-	**94%**
Baking	18%	22%	26%	41%	-
Side dish	-	7%	26%	12%	-
On cereal	47%	-	-	42%	-
Added to sauces/salsas	5%	9%	11%	9%	6%
In salads	28%	14%	19%	42%	-
Trail mix	-	-	-	37%	-
Other	2%	8%	2%	5%	2%

% Respondents

VEGETABLES	Fresh (n=185)	Frozen (n=177)	Canned (n=177)	100% Juice (n=157)
Snacks	47%	-	-	-
Dessert	2%	-	-	-
Smoothies/Beverages	14%	-	-	32%
As is	70%	-	-	**69%**
Baking	22%	-	-	-
Side dish	**77%**	**82%**	**88%**	-
In salads	**77%**	14%	14%	-
Casseroles	31%	41%	45%	-
Soups/stews	56%	55%	51%	31%
Stir-fry	56%	48%	19%	-
Add to sauces/salsas	27%	18%	17%	20%
Other	2%	2%	2%	3%

% Respondents

Empty boxes indicate that the category was not presented to the respondent.
Only asked of respondents who usually have the product available in the home.
Bolded numbers indicate the most prominent use of each form of fruit or vegetable.

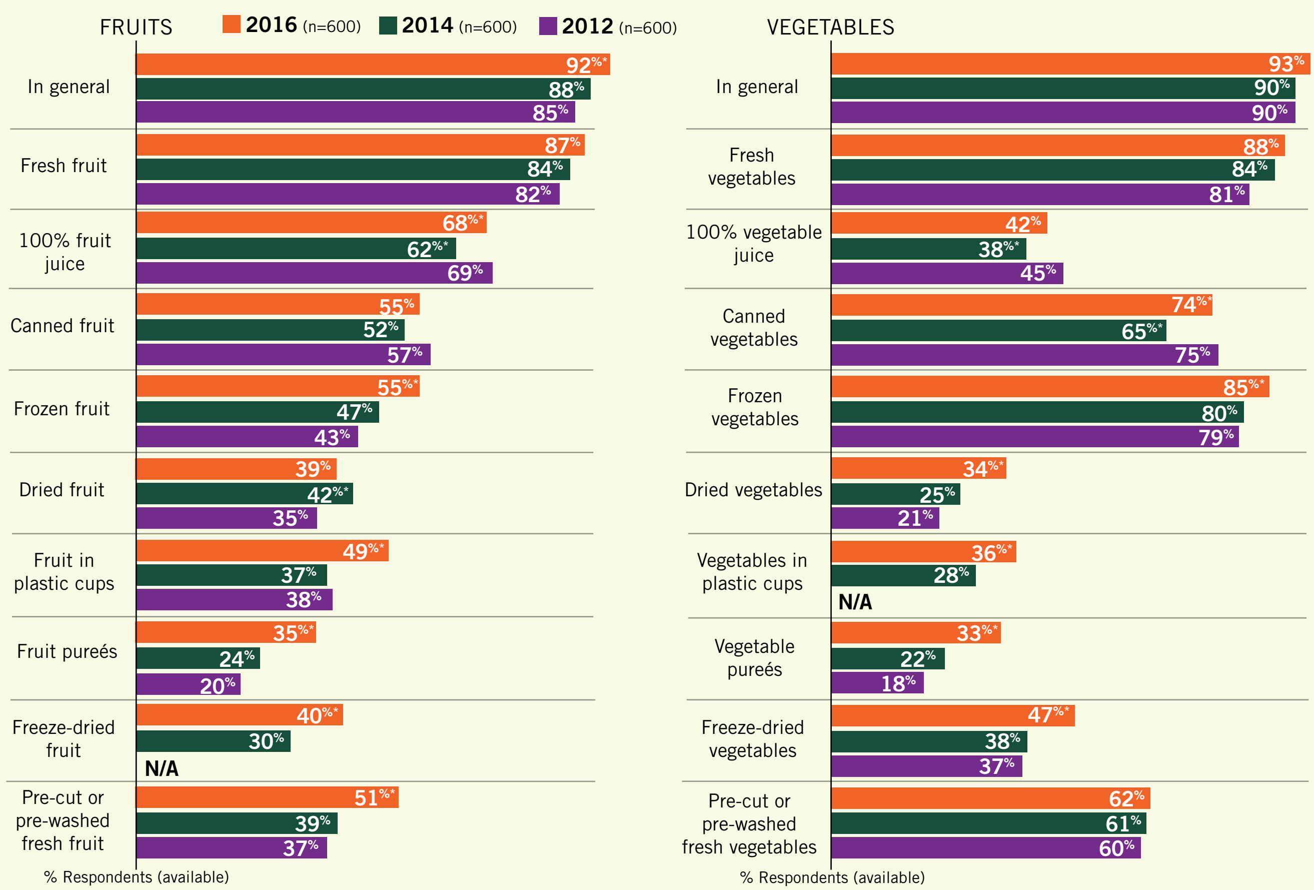
In this study, the majority of shoppers indicated that fruits and vegetables were always or almost always available in the home (Chart 16), with the availability of most forms increasingly available between 2012 and 2016. The higher availability of fruit in general, fresh fruit, and fruit in plastic cups in 2016 vs 2014 is due in part to having more children at home in the 2016 sample, with the product perhaps used in school lunches or as an easy snack. The higher availability of most forms of fruits and vegetables is consistent with the importance shoppers place on fruits and vegetables to health, even though they may not know why they are beneficial.

Similar to 2014, primary shoppers who reported higher intake of fruits and vegetables in 2016 also reported having more of all forms of fruits and vegetables available in the home, suggesting that all forms are important to help meet daily fruit and vegetable recommendations (Chart 17). This holds true when looking at income as well: lower income households report eating significantly less fruit (see Chart 5, page 8) and have significantly less fruit generally available in the home compared to higher income households (Chart 18).

Elsewhere it has been reported that of those who said they didn't have fresh or fresh-cut fruits and vegetables in the home, it was primarily because they were believed to be too expensive.[116] Similarly, if canned fruits and vegetables weren't available, it was because they were thought to be less healthy, with added preservatives or too much sodium and sugar. If frozen fruit was not in the home, it was primarily because the family didn't like them and they were simply not used. If dried fruit and vegetables were not available in the home, it was due to disliking them and because they didn't use them. For those without 100% fruit juice available in the home, it was largely because it was considered less healthy, with too much sugar and for those without 100% vegetable juice, it was because they didn't like them and don't use.

Chart 16: Primary Shoppers' Home Availability of Different Forms of Fruit & Vegetables

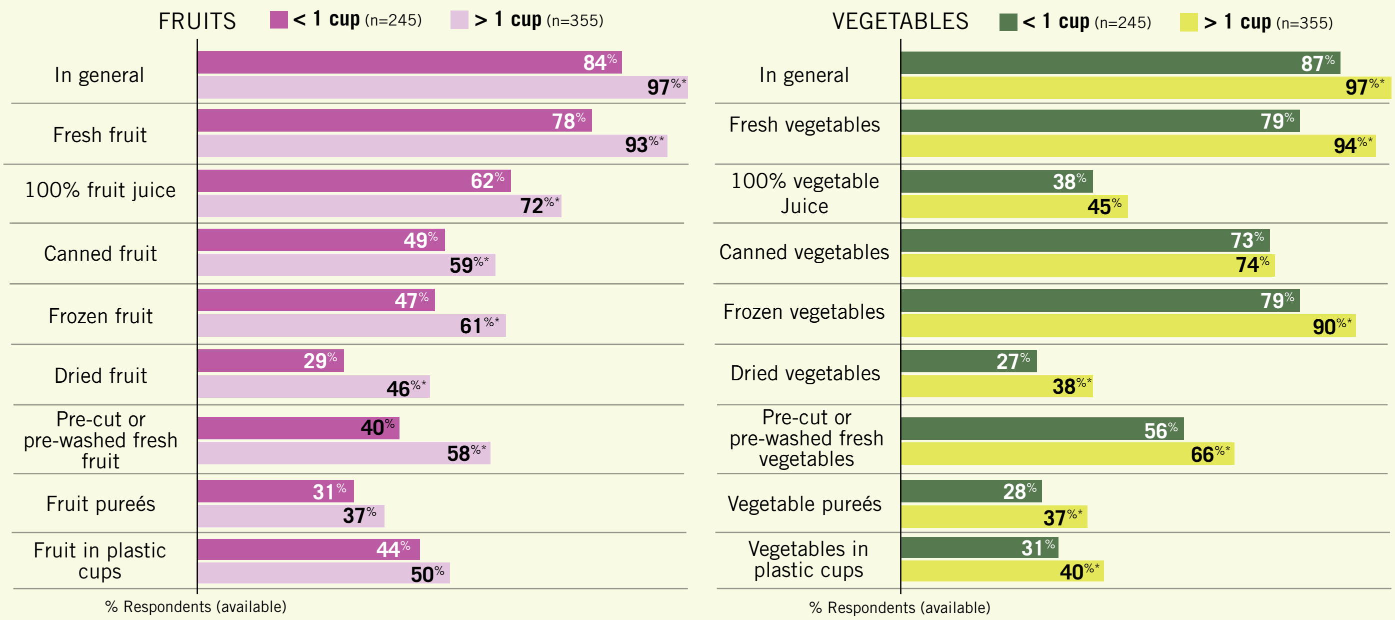
Please rate the availability of fruits and vegetables in your home.



*Represents statistically significant difference from prior year.
Scores represent top 3 box scores in 6-point Likert Scale.

Chart 17: Primary Shoppers' Home Availability of Different Forms of Fruit & Vegetables: By Consumption, 2016

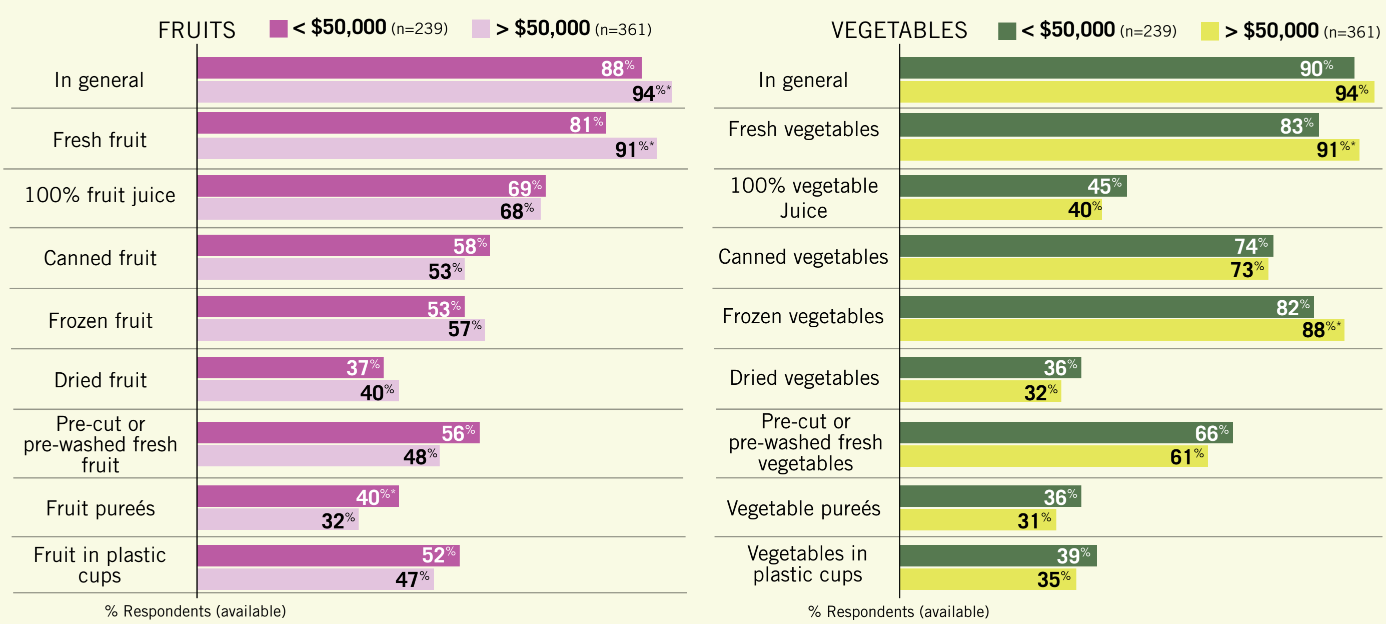
Please rate the availability of fruit and vegetables in your home.



*Represents statistically significant difference from previous year.
Scores represent top 3 box scores in 6-point Likert Scale.

Chart 18: Primary Shoppers' Home Availability of Different Forms of Fruit & Vegetables: By Income, 2016

Please rate the availability of fruit and vegetables in your home.



*Represents statistically significant difference from previous year.
Scores represent top 3 box scores in 6-point Likert Scale.

Purchase Frequency and Wastage

Fresh and fresh-cut fruit and vegetables and 100% fruit juice are the most likely forms of fruit and vegetable to be purchased weekly (Chart 19). Twenty-three percent and 22% of shoppers reported buying more fresh fruit and fresh vegetables, respectively, in the past 3 months compared to one year earlier; almost four times the number who reported purchasing less (Chart 20). Between 18%-23% of shoppers purchased more 100% fruit juice, pre-cut fruit, and pre-cut vegetables; roughly twice the number who reported purchasing less. Other forms of fruit and vegetable purchases remained relatively stable. Only canned and dried vegetables were purchased less often than more often over the past year.

There is very little reported wastage for all forms of fruits and vegetables (Chart 21), though significantly more for fresh and fresh-cut.

Promoting the healthfulness, wide variety, and convenience of different forms of fruits and vegetables, and demonstrating creative ways to include different forms in meals and snacks will help shoppers carry out their intentions to include more fruits and vegetables in their diets.

Chart 19: Primary Shoppers' Reported Frequency of Fruit & Vegetable Purchases, 2016

How frequently do you purchase fruit/vegetables?

FRUIT	Fresh (n=223)	Frozen (n=221)	Canned (n=233)	Dried (n=228)	100% Juice (n=237)	Pre-Cut, Pre-Washed (n=239)
Daily	9%	7%	3%	6%	9%	8%
Weekly	80%	36%	40%	31%	60%	59%
Monthly	9%	43%	39%	42%	24%	24%
A few times a year	2%	14%	18%	21%	6%	9%

% Respondents

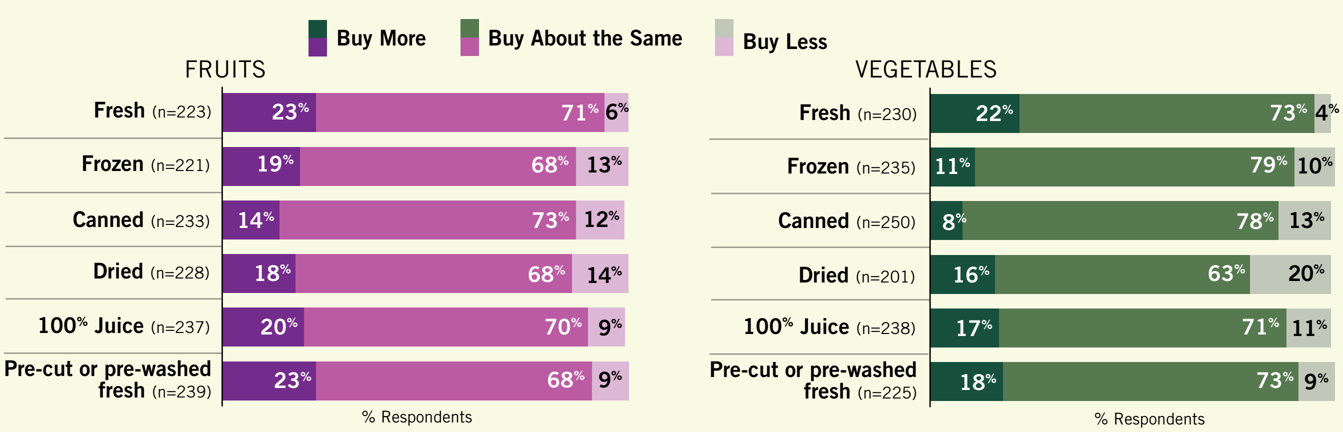
VEGETABLES	Fresh (n=230)	Frozen (n=235)	Canned (n=250)	Dried (n=201)	100% Juice (n=238)	Pre-Cut, Pre-Washed (n=225)
Daily	10%	5%	4%	7%	10%	7%
Weekly	76%	38%	44%	32%	43%	60%
Monthly	12%	51%	41%	31%	33%	23%
A few times a year	2%	6%	11%	30%	14%	11%

% Respondents

Number of respondents will vary as this question was only asked of those respondents who reported keeping the form of fruit or vegetable in question available in their homes.

Chart 20: Primary Shoppers' Perception about Fruit & Vegetable Purchases, 2016

Did you buy less, more, or about the same amount of fruit/vegetables in the past three months compared to one year earlier? (Include fresh, canned, frozen, dried, and 100% juice)



*Represents statistically significant difference from previous year.

Chart 21: Primary Shoppers' Reported Fruit & Vegetable Wastage, 2016

How much of the various forms of fruits and vegetables that you buy do you throw out?

FRUIT	Fresh (n=223)	Frozen (n=221)	Canned (n=233)	Dried (n=228)	100% Juice (n=237)	Pre-Cut, Pre-Washed (n=239)
None	25%	58%	61%	49%	73%	38%
One-tenth or less	50%	25%	23%	26%	17%	32%
One-quarter or less	18%	10%	11%	16%	7%	20%
One-third or less	7%	5%	3%	5%	3%	8%
One-half or less	0%	1%	2%	1%	1%	0%
More than half	0%	1%	0%	3%	0%	2%

% Respondents

VEGETABLES	Fresh (n=230)	Frozen (n=235)	Canned (n=250)	Dried (n=201)	100% Juice (n=238)	Pre-Cut, Pre-Washed (n=225)
None	23%	62%	65%	32%	50%	29%
One-tenth or less	46%	22%	23%	29%	24%	32%
One-quarter or less	22%	12%	8%	24%	16%	27%
One-third or less	8%	4%	3%	7%	6%	8%
One-half or less	1%	0%	1%	4%	3%	4%
More than half	0%	0%	0%	3%	0%	0%

% Respondents

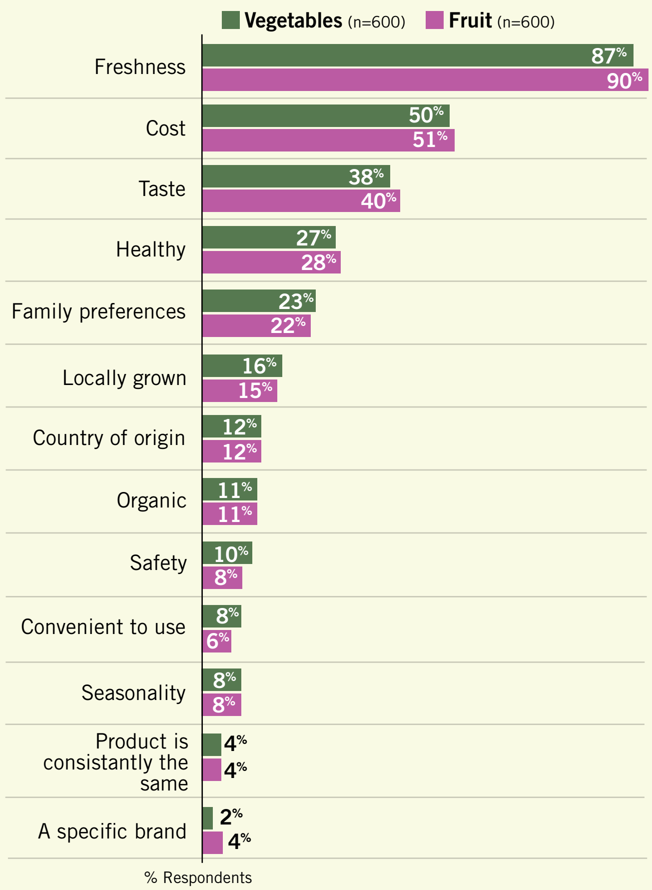
Number of respondents will vary as this question was only asked of those respondents who reported keeping the form of fruit or vegetable in question available in their home.

Purchasing Factors

In 2016, freshness was cited as the factor of most importance to primary shoppers when shopping for fruit (90%) and vegetables (87%), followed by cost (51% for fruit and 50% for vegetables) (Chart 22). Freshness significantly out-ranked cost in 2016, though in prior years cost and freshness were more closely aligned.[117] Taste and health ranked third and fourth, respectively, as most important factors for all primary shoppers. Locally grown ranked significantly higher than organic for both fruit and vegetables. Factors of importance when purchasing fruit versus vegetables were similar. All of this held true for shoppers of differing income levels as well, except that lower income shoppers ranked cost for both fruit (58%) and vegetables (55%) as significantly more important than higher income shoppers (48% for fruit and 47% for vegetables).

Chart 22: Primary Shoppers' Important Factors When Shopping for Fruits & Vegetables, 2016

When shopping for fruits and vegetables, these factors are most important to me. (Please rank your top 3 choices.)

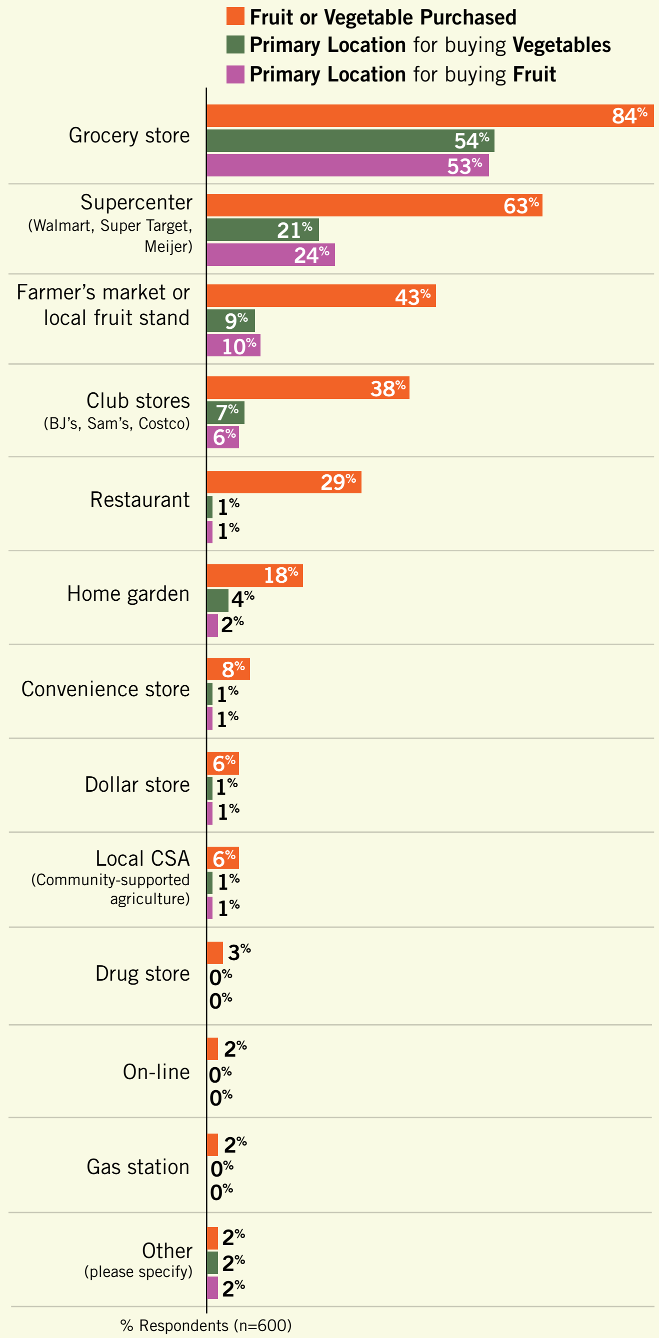


*Represents statistically significant difference between income groups.

Chart 23: Primary Shoppers' Reported Locations for Purchasing Fruits & Vegetables, 2016

Thinking of the last six months, in which of the following locations have you gotten your fruits and vegetables? (Please select all that apply.)

Of these locations, which was your primary location to buy fruits and vegetables? (Please select one for each of fruits and vegetables.)



*Represents statistically significant difference between income groups.

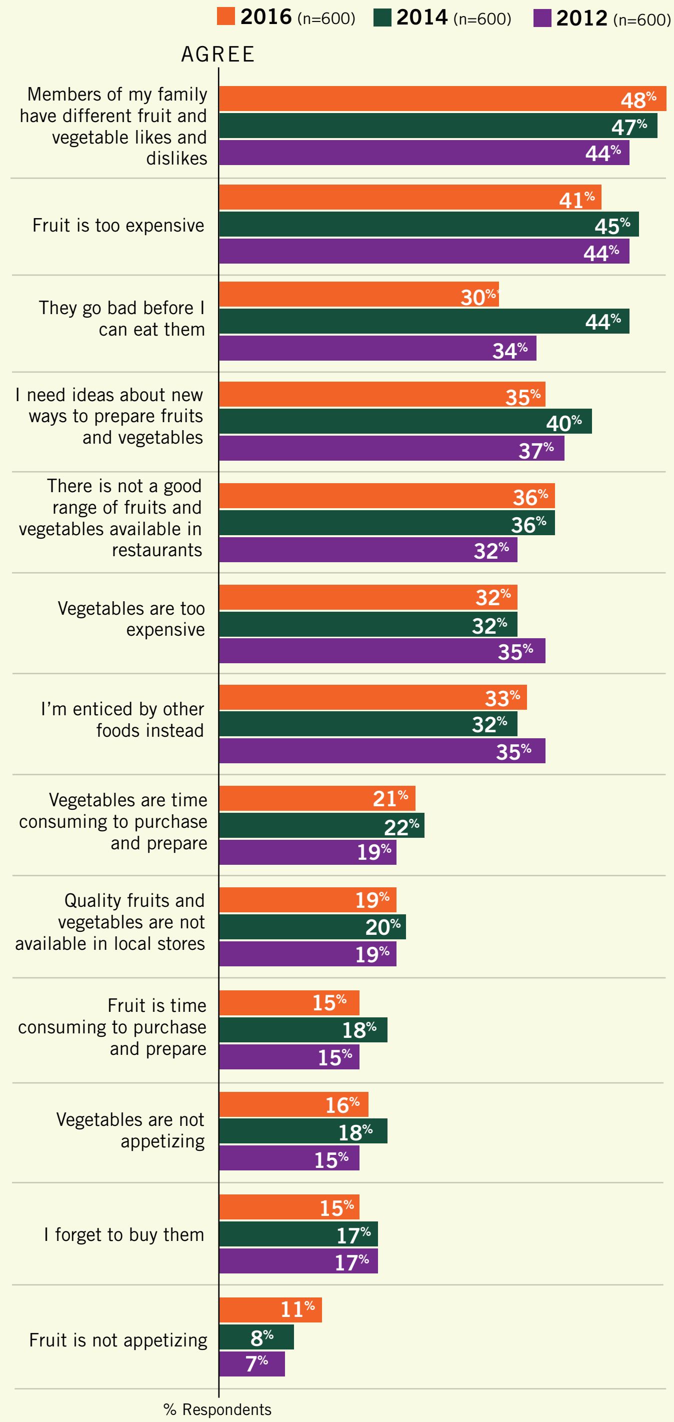
Shoppers reported sourcing their fruits and vegetables from a variety of locations, with grocery stores and supercenters at the top of the list (Chart 23). Similarly, when asked which location was their primary location, grocery stores remained at the top of the list, followed by supercenters (Chart 23). Club stores, restaurants, and home gardens also ranked strongly as a source for fruits and vegetables over the past six months, but ranked very low in terms of primary location for purchase. Other venues ranked low as a source for fruits and vegetables. There was little difference in where shoppers purchased their fruit versus their vegetables.

Barriers

When asked about how difficult it is to personally include fruits and vegetables in meals and snacks, primary shoppers indicated in 2012, 2014, and 2016 that primary barriers were different likes and dislikes of family members and concern about the cost of fruit (Chart 24). Having a good range of fruits and vegetables available in restaurants and needing ideas about new ways to prepare fruits and vegetables were the next most prominent cited barriers. Concern about spoilage significantly peaked in 2014, but returned to a lower level of concern in 2016. In fact, of all reported barriers, spoilage was the only one that changed significantly throughout the 4 years. Perhaps the global emphasis on reducing food waste[118, 119] has had an impact on consumer behavior, resulting in consumers either purchasing less or being more conscientious about eating food before it spoils.

Chart 24: Primary Shoppers' Perceived Barriers to Increased Fruit & Vegetable Consumption

Please indicate your level of agreement or disagreement in relation to how difficult each is for you personally to include fruits and vegetables in meals and snacks.

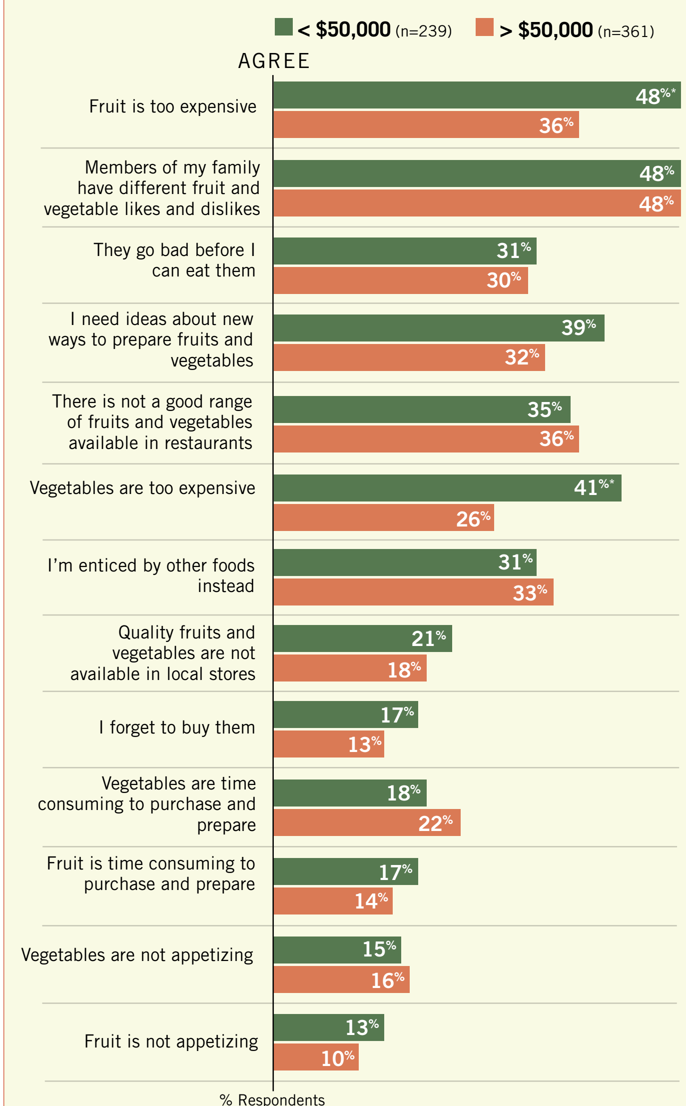


*Represents statistically significant difference from prior year.
Scores represent top 2 box scores in 5-point Likert Scale.

When comparing households with incomes above and below $50,000 in 2016 (Chart 25), we see the main barriers are similar for both income groups. The only significant differences are that lower income households believe fruits and vegetables are too expensive. This is consistent with years 2012 and 2014.[120] It is also consistent with the lower availability of several forms of fruits and vegetables in homes of lower income shoppers (Chart 18, page 17).

Chart 25: Primary Shoppers' Perceived Barriers to Increased Fruit & Vegetable Consumption: By Income, 2016

Please indicate your level of agreement or disagreement in relation to how difficult each is for you personally to include fruits and vegetables in meals and snacks.



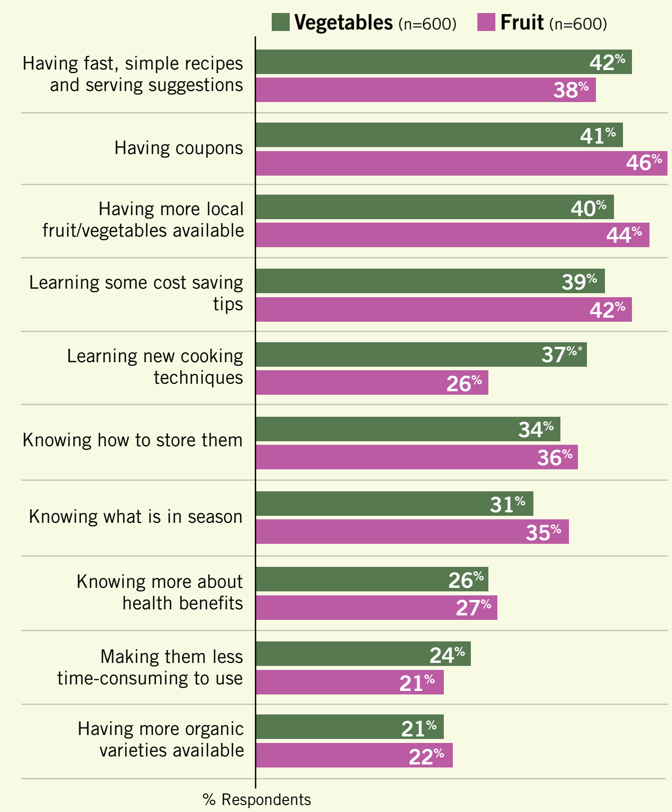
*Represents statistically significant difference between income groups.
Scores represent top 2 box scores in 5-point Likert Scale.

Helpful Aids

Tips that primary shoppers perceive to be most useful in 2016 to help them eat more fruits and vegetables are shown in Chart 26. There were many similarities when comparing fruit versus vegetables, with shoppers wanting fast, simple recipes and serving suggestions, coupons, more local availability, and cost savings tips for both vegetables and fruit. The only significant difference between vegetables and fruit was a desire to learn new cooking techniques with vegetables. This should not be a surprise since fruit is often eaten 'as is' and vegetables need preparation. The similarities held true for shoppers of differing income levels as well, except that lower income shoppers ranked the desire to have more coupons and some cost saving tips as significantly more helpful than higher income shoppers. Lower income households were also more likely than higher income households to want to learn more about the health benefits of fruit.

Chart 26: Most Useful Tips to Help Primary Shoppers Eat Fruits & Vegetables, 2016

What would be most useful to help you eat more fruits and vegetables (including salads)? (Please select all that apply.)



*Represents statistically significant difference between fruit and vegetables.
Represents top 2 box scores in 5-point Likert Scale.

Primary shoppers say they would most likely go to the Internet to find recipes, followed by cookbooks (Chart 27). That said, cookbooks are declining as a source, as are magazines. Friends and family have increased significantly as a source for recipes. Shoppers are significantly less likely to improvise and experiment, consistent with our findings that primary shoppers often don't know how to prepare vegetables and fruit. New recipe sources in 2016 were mobile apps and YouTube.

Finally, because time is a barrier to increasing fruit and vegetable consumption for some shoppers, a question to understand how much time shoppers spend making a dinner meal was included in the survey. There is a trend towards spending somewhat more time on making a dinner meal over the past four years (Chart 28), though this was more pronounced because households with children spend more time making a dinner meal and the 2016 sample respondent households had more children. There were no differences in households by income.

Chart 27: Primary Shoppers' Sources for Recipes

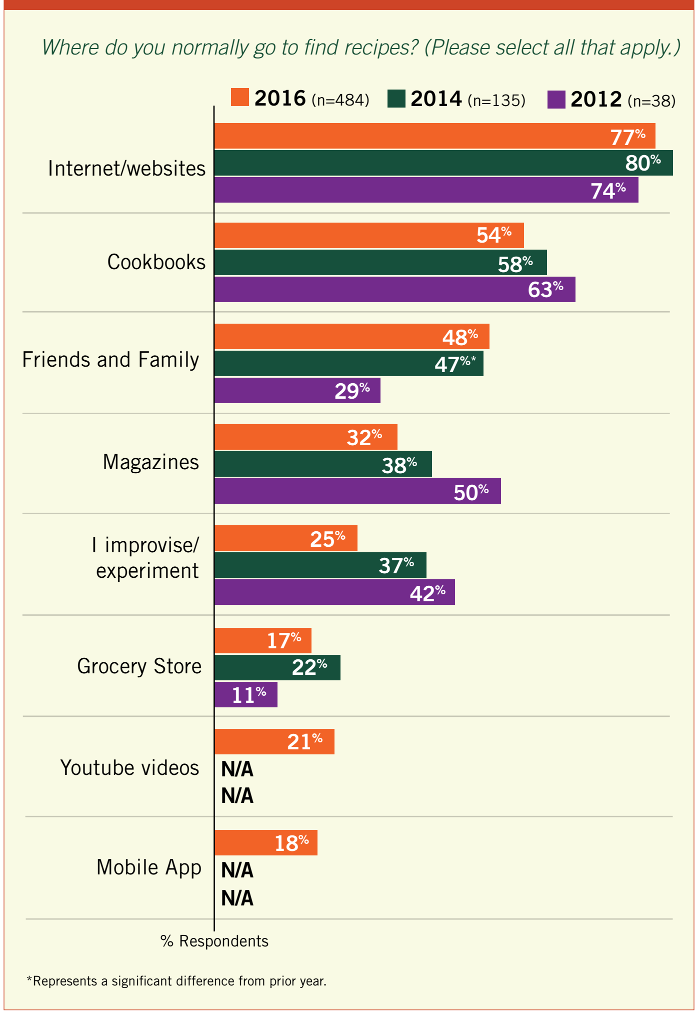


Chart 28: Primary Shoppers' Time Spent Making a Dinner Meal

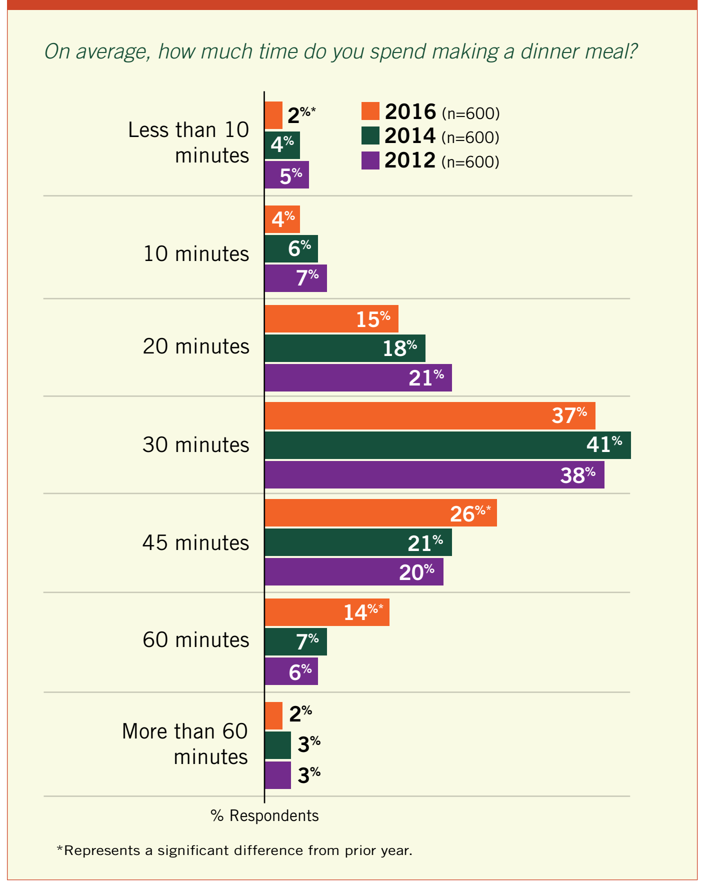
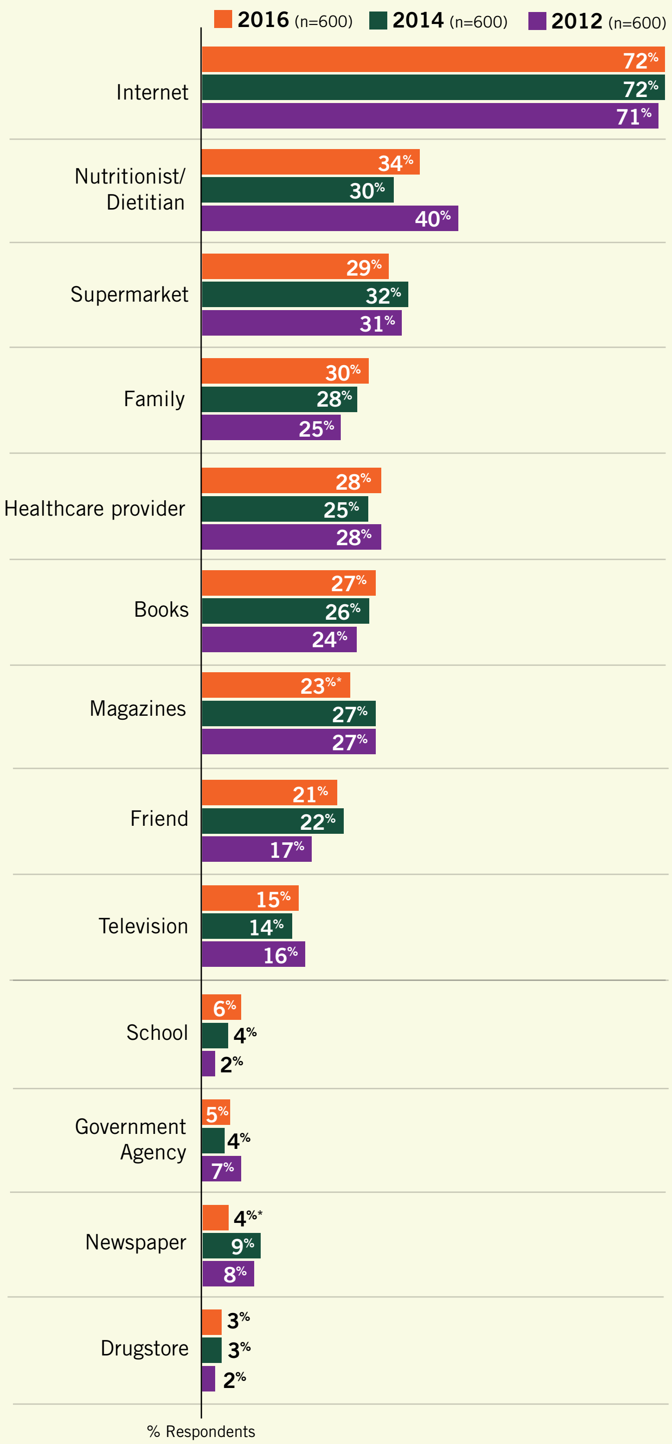


Chart 29: Primary Shoppers' Sources of Information About Eating More Fruits & Vegetables

If you wanted information about how to get yourself and/or your family to eat more fruits and vegetables, where would you go to obtain it? (Please rank your top 3 choices.)



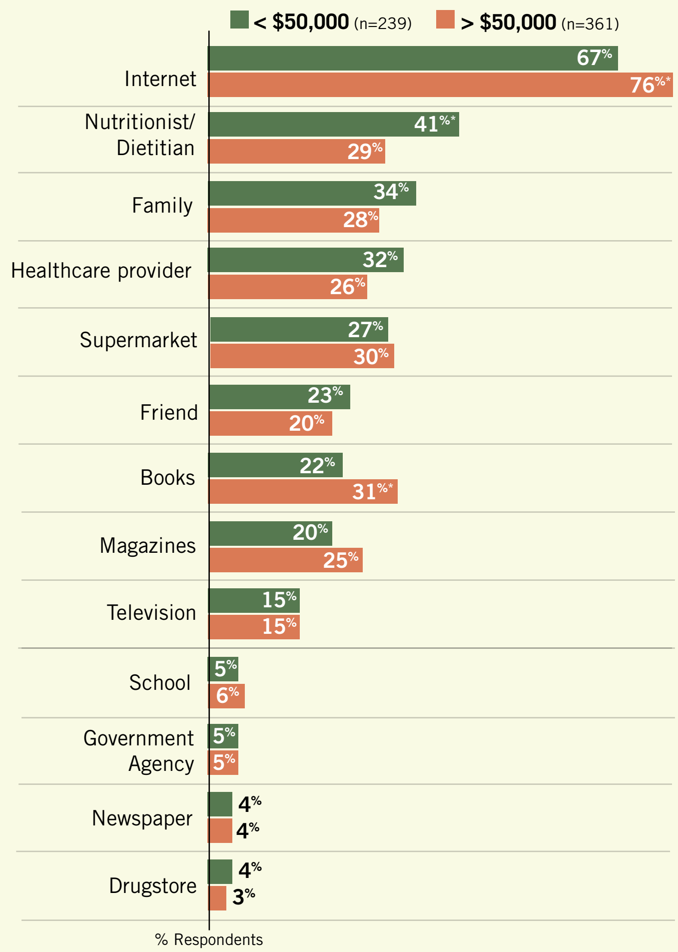
*Represents statistically significant difference from prior year.

Sources of Information

The Internet continued to be selected as the top source of information about fruits and vegetables from 2012 through 2016 (Chart 29). After the Internet, nutritionists/dietitians, and family ranked next highest in 2016 as a source of information for all primary shoppers. Family and school are trending upward over time as a source of information, while traditional print sources (magazines and newspapers) have declined significantly from two years ago. In 2016, households with incomes below $50,000 were statistically less likely to use the Internet (67%) versus households with higher incomes (76%), similar to 2014. Lower income households were also more likely to rely on a nutritionist/dietitian, but not books, compared to higher income households (Chart 30).

Chart 30: Primary Shoppers' Sources of Information About Eating More Fruits & Vegetables: By Income, 2016

If you wanted information about how to get yourself and/or your family to eat more fruits and vegetables, where would you go to obtain it? (Please rank your top 3 choices.)



*Represents statistically significant difference between income levels.

Schools significantly increased as a source of information from 2012 to 2016, likely because more primary shopper respondents had children under the age of 18 living at home in the latter years.

The active use of the Internet, family, and friends to obtain information about fruits and vegetables is why PBH continues to expand its presence in social media. Continued promotion and use of the FruitsAndVeggiesMoreMatters.org website and leveraging social media are inexpensive ways to reach consumers.

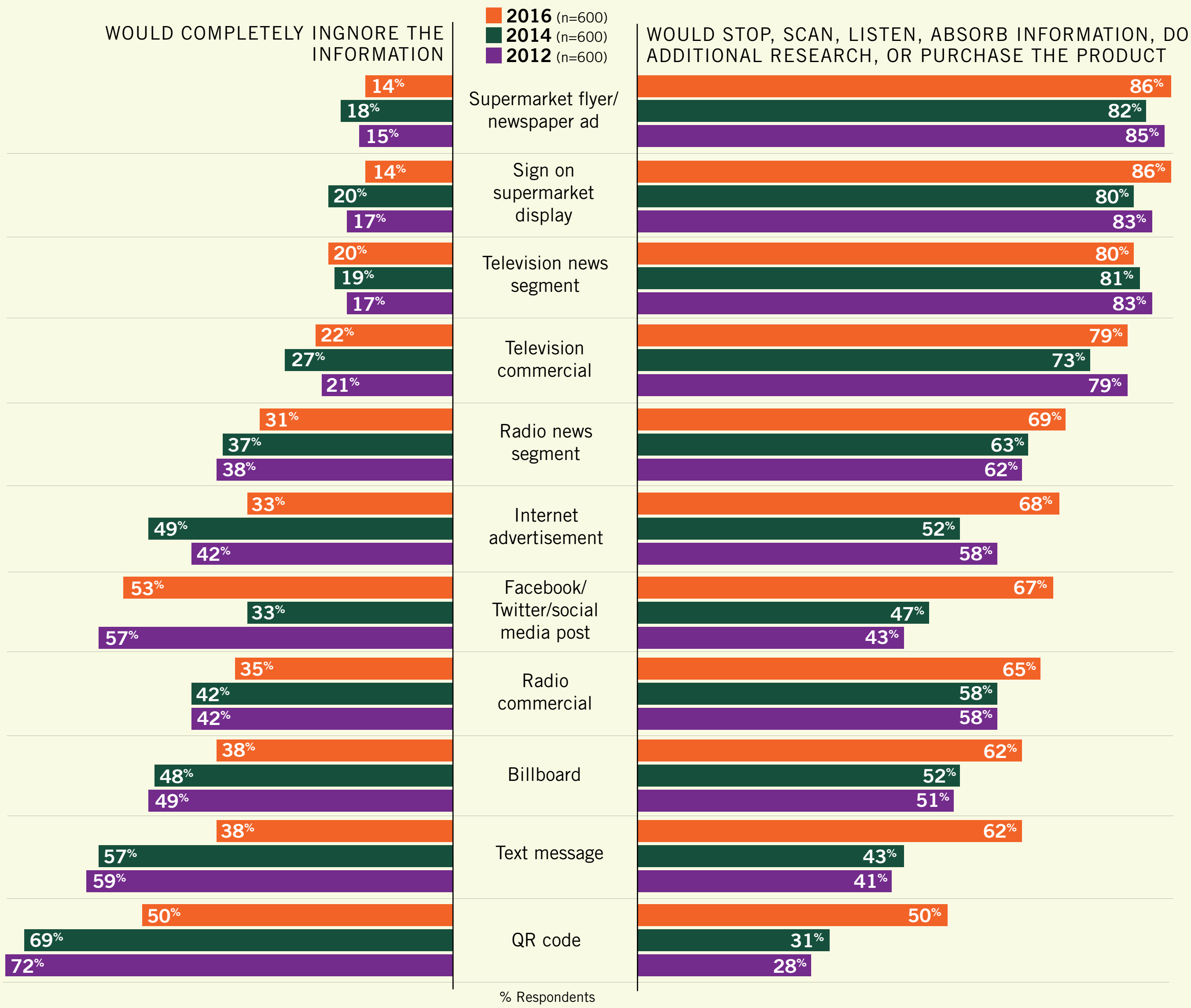
Communications Methods

Primary shoppers consistently report over time that supermarket flyers, newspaper ads, and signs on supermarket displays are the communication methods they find most effective when it comes to making a food decision (Chart 31). These, in fact, ranked highest in terms of actually purchasing the product or trying the suggestion offered by the supermarket.

Historically it had been assumed that consumers make use of available information to make optimal choices for themselves.

Chart 31: Primary Shoppers' Responses to Communication Methods Regarding Food

What would be your response to the following communication methods regarding a type of food that you or someone in your household may enjoy?



*Represents statistically significant difference from prior year.

Many economists now accept the fact that some decisions are fast, emotional, and often unconscious, while others are controlled, deductive, and involve self-awareness.[121] Because so many choices are made with minimal thought or effort, the combination of prominent in-store food displays coupled with actionable information is a very effective way to enhance sales. This, coupled with the fact that most vegetables and fruit consumed in the U.S. are sourced from home,[122] and primarily purchased through grocery stores (Chart 23, page 20), showcases the important role of grocers to increase fruit and vegetable sales and consumption.

Over time there has been a steady increase in receptivity by shoppers to Internet advertisements, social media posts, text messages, and QR codes (Chart 31, page 26). There were few differences among shoppers by income, although higher income households were more likely to ignore QR codes and text messages. The use of these as communication methods at point of sale could prove effective, but remains to be seen.

Fruits & Veggies—More Matters®

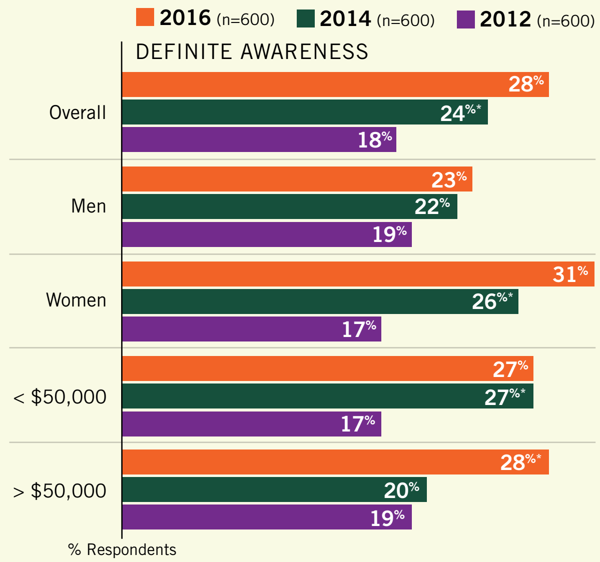
Fruits & Veggies—More Matters was launched in March of 2007 with the support of many stakeholders and targeted to moms with young children (see Appendix C). A report about moms' attitudes and behaviors between 2007 and 2015 is available separately.[123] This section describes awareness of Fruits & Veggies—More Matters, its purchasing and motivational impact, and shoppers' affinity toward the brand.

Awareness

Total "definite" familiarity with the Fruits & Veggies—More Matters campaign grew from 18% in 2012 to 28% in 2016 among all primary shoppers (Chart 32). Most gains occurred between 2012 and 2014, and there was a significant increase in familiarity for households with incomes over $50,000. While not asked of shoppers in 2014 or 2016, most shoppers in 2012 became aware of the Fruits & Veggies—More Matters campaign through a supermarket display (Chart 33). Those with household incomes below $50,000 were more likely than higher income households to have learned about it from TV or their health care provider. Brochures were more effective with higher income than lower income households.

Chart 32: Primary Shoppers' Awareness of the Fruits & Veggies—More Matters Brand Logo: By Gender & Income

Which of the following statements best describes your level of familiarity with Fruits & Veggies—More Matters®?



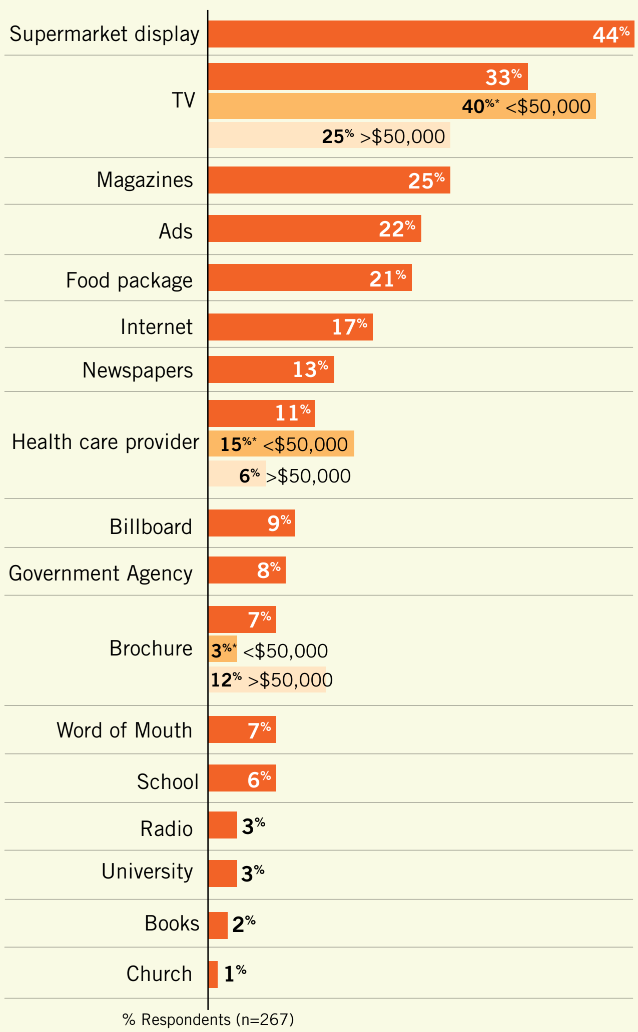
*Represents statistically significant difference from prior year.
Scores represent top 3 box scores in 5-point Likert Scale.

Motivational Impact

Of those who were aware of the Fruits & Veggies—More Matters logo, when asked how well it motivates them to help themselves or their family eat more fruits and vegetables, 43% said they find the brand logo very or extremely motivating in 2016 (Chart 34). Men and women, as well as all income levels, responded more positively to the brand since 2012. The majority of these gains were made between 2012 and 2014, but continued into 2016.

Chart 33: How Primary Shoppers Have Become Familiar with the Fruits & Veggies—More Matters Brand Logo, 2012

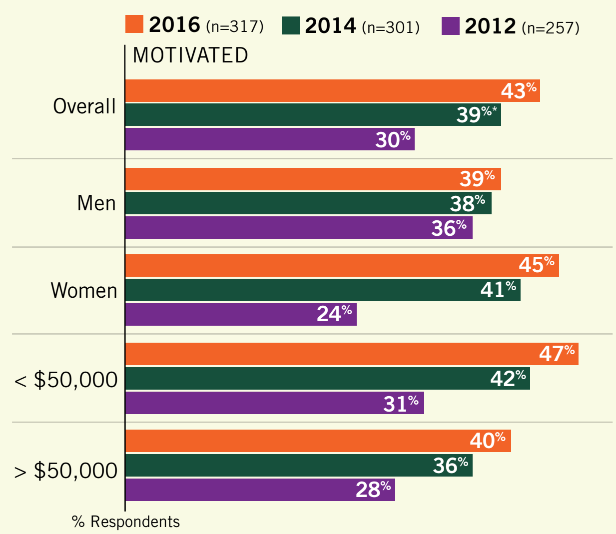
Where did you see or hear of Fruits & Veggies—More Matters®? (Please select all that apply.)



*Represents statistically significant difference between income levels.
Only asked of those aware of Fruits & Veggies--More Matters.

Chart 34: How Well Fruits & Veggies—More Matters Motivates Primary Shoppers: By Gender & Income

How well do you believe Fruits & Veggies—More Matters motivates you to help yourself and/or your family to eat more fruits and vegetables?



*Represents statistically significant difference from prior year.
Scores represent top 2 box scores on 5-point Likert Scale.
Only asked of those aware of Fruits & Veggies—More Matters.

Purchasing Impact

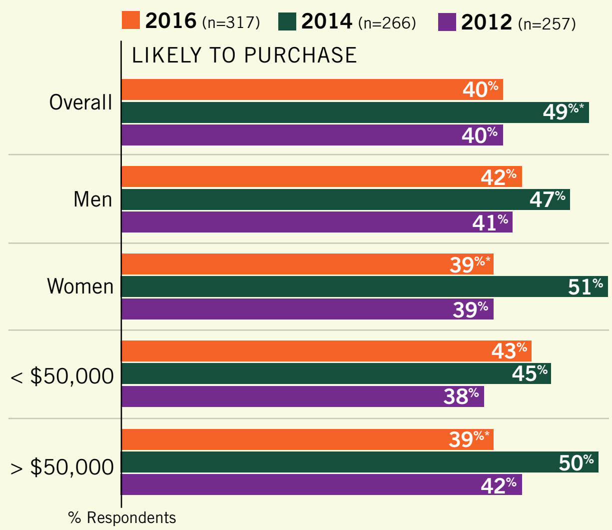
When primary shoppers were asked how seeing the Fruits & Veggies—More Matters logo affects their decision to purchase a product, 40% said they were more likely to purchase the product in 2016, significantly less than 2014, but consistent with 2012 (Chart 35). The decision to purchase the product after seeing the logo declined the most among women and higher income shoppers since 2014, but consistent with 2012.

Brand Affinity

Shoppers were asked questions about the Fruits & Veggies—More Matters brand to gauge their affinity toward it. More than two out of three shoppers appreciate the campaign as a reminder to eat more fruits and vegetables (Chart 36) and more than half are favorable toward it (Chart 37). Overall between 2014 and 2016, general affinity to the Fruits & Veggies—More Matters brand was trending positively.

Chart 35: Primary Shoppers' Likelihood of Purchasing Products Carrying the Fruits & Veggies—More Matters Brand Logo: By Gender & Income

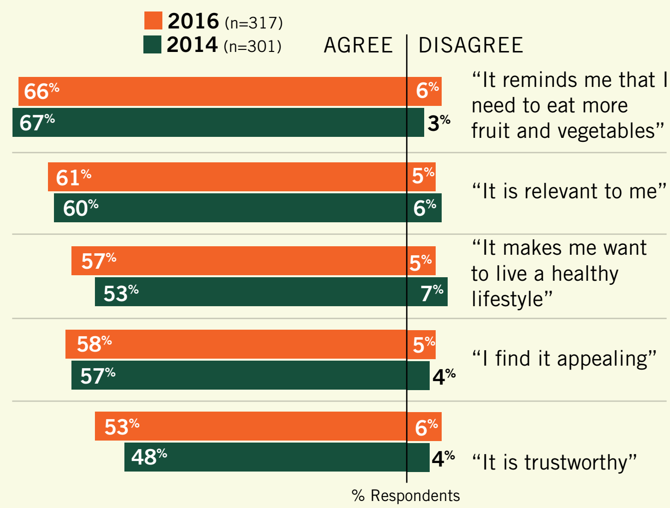
How does seeing the "More Matters" logo affect your decision to purchase the product?



*Represents statistically significant difference between years.
Scores represent top 2 box scores on 5-point Likert Scale.
Only asked of those aware of Fruits & Veggies—More Matters.

Chart 36: Primary Shoppers' Affinity Toward the Fruits & Veggies—More Matters Brand Logo

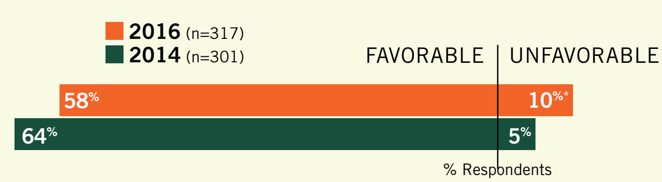
Please rate your level of agreement or disagreement with the following statements regarding Fruits & Veggies—More Matters.



*Represents statistically significant difference between years.
Only asked of those aware of Fruits & Veggies—More Matters.
Responses do not equal 100% because mid-point in 5-point Likert Scale was omitted.

Chart 37: Fruits & Veggies—More Matters Brand Favorability Among Primary Shoppers

Taking everything into account from what you may have seen, read, heard, or experienced, please rate your overall impression of Fruits & Veggies—More Matters.



*Represents statistically significant difference between years.
Only asked of those aware of Fruits & Veggies—More Matters.
Responses do not equal 100% because mid-point in 5-point Likert Scale was omitted.

Applications

Shoppers rate fruits and vegetables as very important to good health, yet there has been a decline in their perceived health benefits. Cost also continues to be a concern, yet some of the more economical canned and juiced fruits and vegetables are becoming less favored. Having all forms available in the home, however, correlates with greater consumption. Finally, use of Fruits & Veggies—More Matters as a marketing tool continues to motivate consumers to eat more fruits and vegetables, especially among women and lower income households. Things that the industry, health influencers, and policy makers should consider moving forward include:

Industry

- Continue use of the Fruits & Veggies—More Matters brand logo on packaging, promotions, and in-store signage since nearly half of shoppers say that the brand makes them more likely to purchase the product.
- Continue with supermarket flyers, newspaper ads, and signs on supermarket displays since these are most effective to making food purchasing decisions, but also continue with social media presence since this is the fastest growing way to communicate about food.
- Continue offering fruits and vegetables where budget conscious consumers eat since they are interested in eating more.
- Offer vegetable cooking skills demos, classes, and videos since shoppers are interested in learning more cooking techniques with vegetables that their family will like.

Health Influencers

- Encourage all forms of fruits and vegetables so people can feel good about the purchase they're making and find more ways to increase intake. Give consumers 'permission' to use discretionary calories and sodium to help increase consumption of healthy fruits and vegetables in any form.
- Teach the health benefits of eating fruits and vegetables, especially among lower income consumers.
- Enhance the use of Fruits & Veggies—More Matters as part of MyPlate education efforts.
- Encourage having frozen, canned, dried, and 100% fruit or vegetable juice readily on hand in the home to aid in making 'half the plate' vegetables and fruit at various eating occasions. Packaged forms of produce offer convenience without sacrificing taste in many meal occasions: frozen fruit in smoothies; canned or frozen vegetables, or 100% vegetable juice in soups; canned or dried fruit for baking, or on salads; and 100% juice as a quick serving when on the go.

- Emphasize how in-season fresh vegetables and fruit are budget-friendly, especially when they can be used within a few days of purchase, and demonstrate how to wash and store produce to extend shelf-life.

Policy Makers

- Encourage enhanced use of Fruits & Veggies—More Matters with lower income shoppers, since this group finds the message particularly motivating.
- Continue to recognize that packaged fruits and vegetables are critical to helping meet dietary goals and don't discourage consumption of canned or juiced fruit or vegetables with 'limiting language.'
- Continue to encourage that use of public funds spent on food (e.g. SNAP, WIC, and school meals) be spent on healthy foods like fruits and vegetables, in all forms.

Enhanced, collective efforts to implement any or all of these suggestions will assist shoppers in making healthy food choices within their own budget constraints. The end result will be a healthier America.

Appendix A. Methodology

Survey Design

OnResearch, Inc (Ontario, Canada), fielded and tabulated all surveys. The 2012 survey was fielded online January 23-31, 2012 and included 600 Primary Shoppers, with 300 men and 300 women. The 2014 survey was fielded online December 12, 2013 through November 16, 2014, as part of a new ongoing survey, with shoppers responding online each month of the year. The 2016 survey was fielded online January 11, 2016 through November 17, 2016. Similar to 2012, the 2014 and 2016 surveys also each include a total of 600 primary shoppers; 300 men and 300 women.

Most questions were answered using a 5-point Likert scale, with several questions that required open-ended responses. The Theory of Planned Behavior was used as a framework to ascertain psychosocial factors (social norms, perceived behavioral control, attitudes and intentions) related to consumption of fruits and vegetables.[124] Other constructs from Social Learning Theory that have been associated with fruit and vegetable intake in the scientific literature, including self-efficacy and social support were also included.[125, 126] Finally, other questions assessed perceptions about fruits and vegetables and awareness of recommendations for intake.

Sample

OnResearch uses a variety of panel vendors. For all PBH surveys, one online panel provider was used to reduce risk of duplication of responses and to ensure consistency of method. The selected panel is from a U.S. headquartered company with locations and panels around the world. The panel has been functioning for over a decade and is in compliance with ESOMAR and MRS (US) industry standards. The panel is used only for market research purposes to reduce bias responses. The U.S. consumer panel contains 3.25 million panelists who are usually on the panel from 1 to 4 years. Attrition and deliberate retirement of panelists necessitates ongoing recruitment to replenish the panelists. The panel vendor runs a multitude of recruitment campaigns, from email and online marketing channels with hundreds of diverse online affiliate partners and targeted websites. Panelists are supported by a dedicated team and have the option to unsubscribe at any time. Panel Management is compliant with market research industry standards, data protection and privacy laws. Because the sample for a survey is blended from several sources it is de-duplicated for each project. This is achieved during project set up and then Browser Fingerprinting technology is applied.

The sample selection for PBH's studies used a pre-profiled sample to minimize screen-outs and provide a better quality panelist experience. Basic demographic information (e.g. age, gender, region, household demographic) was collected at the time a panelist registered or joined the panel. A verification email and short survey were immediately sent to collect further profiling. Panelists have the option to enter profile information via their member page at any point. Profiling data is consistently updated. Panelists are prompted regularly to re-enter profiling criteria in order to ensure accuracy of segmentation and respondents.

Once the sample for the study was pulled, email invites were automatically randomized so as not to induce bias. Samples were also subject to category restrictions so that respondents who took part in surveys on fruits and vegetables over a 3 month

Methodology

All respondents were residents of the United States.
The online survey was conducted via an online panel.

Wave	2012	2014	2016
Fielding Period	January 23-31, 2012	December 12, 2013 - November 14, 2014	January 11, 2016- November 17, 2016
Sample Size	n=600	n=600	n=600
Confidence Level (within year)	4% (19/20 times)	4% (19/20 times)	4% (19/20 times)
Gender	Men=300 Women=300	Men=300 Women=300	Men=300 Women=300
Age	18 years old and older	18 years old and older	18 years old and older
Additional Criteria	Solely or normally participate in household's grocery shopping	Solely or normally participate in household's grocery shopping	Solely or normally participate in household's grocery shopping

period were excluded. Respondents were excluded from the sample if they had been invited to participate in other surveys within the prior 24 hours. In each survey invitation, panelists were informed about the survey topic in a general, non-specific, non-leading way before participation.

Panelists are rewarded for taking part in surveys with a structured incentive scheme, reflecting the length of survey and nature of the sample. The panel provider uses an incentive scale which is based on set time increments and the panelist profile. For example, a medical practitioner would generally be paid a significantly higher incentive per completed survey than the average consumer. The incentive options allow panelists to redeem from a large range of gift cards, points programs, and partner products or services. All incentives are awarded only once the survey has been completed.

OnResearch manually verified and confirmed every completed survey, rejecting any that appeared to be a dishonest respondent. The criteria used to reject any potentially "dishonest" responses are:

- Straightlining – or answering scalar questions by clicking every answer on the scale the same value.
- Speeding – people who answer the survey in a fraction of the normal or mean time that respondents normally complete the survey
- Nonsense responses – Open ended responses that are consistently filled with nonsensical answers. E.g. "qerlkljpoiu"
- Illogical responses – (also apparent in straightlining) – certain "test" questions are inserted to ensure that the respondent is reading and answering the question. For example: a statement of preference or attitude may be stated in both the positive and negative. An honest respondent will answer the two in a consistent manner i.e. if the positive statement is scored a 5 on a five point scale of agreement, then the negative version should be scored a 1 or 2 on the same scale.
- Overuse of non-response (i.e. "Don't know") or "flatlining".

Analysis

The 2016 primary shopper sample contained more children than prior years. Relevant differences between shoppers with children and those without children are noted throughout the report but no weighting by children occurred.

Seasonal variations that might have occurred with the onset of the rolling survey in 2014 were reviewed separately.[127] With so many imported fruits and vegetables readily available year-around, traditional seasonal variations appear to be muted. Since differences by season were minimal, no weighting for season occurred.

Appendix B. Demographics

Respondent Profile: Primary Shoppers

MARITAL STATUS	2012	2014	2016
Married/living with someone	57%	56%	79%
Single	23%	26%	10%
Separated/divorced	14%	13%	11%
Widowed	6%	4%	1%
SPOUSE'S EDUCATION	**2012**	**2014**	**2016**
Did not finish high school	4%	2%	4%
High school graduate	26%	19%	20%
Some college	24%	21%	24%
College graduate	25%	26%	31%
Some graduate work	2%	5%	5%
Completed graduate work	15%	24%	15%
Trade/vocational school	3%	3%	2%
WORK OUTSIDE THE HOME	**2012**	**2014**	**2016**
No	48%	39%	26%
Yes, Part-time	16%	23%	20%
Yes, Full-time	36%	38%	53%
ETHNICITY	**2012**	**2014**	**2016**
White/Caucasian	85%	75%	68%
Black/African American	7%	7%	10%
Hispanic/Latino	4%	7%	14%
Asian/Pacific Islander	3%	7%	6%
Mixed Race	0%	2%	2%
Other	0%	1%	0%
Prefer not to answer	N/A	N/A	1%
GENDER	**2012**	**2014**	**2016**
Female	50%	50%	50%
Male	50%	50%	50%
AGE	**2012**	**2014**	**2016**
18-24	17%	11%	1%
25-34	25%	15%	16%
35-44	27%	26%	57%
45-54	21%	9%	21%
55+	11%	39%	4%

HOUSEHOLD INCOME	2012	2014	2016
Less than $25,000	21%	24%	20%
$25,000 - $49,999	32%	24%	19%
$50,000 - $74,999	23%	20%	20%
$75,000 - $99,999	12%	12%	18%
$100,000 or more	12%	20%	22%
OWN EDUCATION	**2012**	**2014**	**2016**
Did not finish high school	4%	1%	4%
High school graduate	26%	14%	12%
Some college	24%	26%	30%
College graduate	25%	30%	31%
Some graduate work	2%	6%	5%
Completed graduate work	15%	22%	16%
Trade/vocational school	3%	2%	2%
NUMBER OF PEOPLE IN HOUSEHOLD	**2012**	**2014**	**2016**
1	22%	27%	0%
2	40%	32%	2%
3	18%	12%	15%
4	12%	14%	38%
5+	8%	15%	44%
CHILDREN UNDER AGE OF 18 LIVING AT HOME	**2012**	**2014**	**2016**
Yes	28%	43%	100%
No	72%	57%	0%
LIVING AREA	**2012**	**2014**	**2016**
Urban	26%	24%	23%
Suburban	52%	53%	53%
Rural	22%	23%	24%

Appendix C. About Fruits & Veggies—More Matters

Recommendations for fruit and vegetable intake have increased due to research suggesting numerous potential benefits of fruit and vegetable consumption to prevent chronic diseases. The increased importance of fruit and vegetable consumption is illustrated by the inclusion of fruits and vegetables in the Dietary Guidelines for Americans, 2010 as one of the "food groups to encourage" and in updated recommendations for fruit and vegetable intake that 'half your plate' should consist of fruit and vegetables in the new ChooseMyPlate graphic.[128, 129] This change represented an increase for most people from the previous recommendation of 5-9 servings a day.

The 5 A Day for Better Health Program ("5 A Day") was a state-wide social marketing program begun by the California Department of Health Services in 1988 to promote increased fruit and vegetable consumption. The national 5 A Day program began in 1991 as a public-private partnership between the National Cancer Institute (NCI) and Produce for Better Health Foundation (PBH). As lead health authority, NCI determined health statements and nutrient criteria for products which could carry the brand logo, and PBH coordinated private-sector activities. In 2005, NCI transferred lead health authority to the Centers for Disease Control and Prevention (CDC).
Awareness of recommendations for fruit and vegetable consumption increased over time. In 1991, 8% of individuals reported being aware that fruit and vegetable intake should be at least 5 servings a day.[130] In 2004, that percentage had increased to 40%.[131] However, this heightened awareness had not translated into behavior change. Between 1994 and 2005, the proportion of adults eating 5 or more servings of fruits and vegetables per day remained virtually unchanged (24.6% vs. 25.0%, respectively) with an estimated decrease of 0.22 servings per day among adults.[132]

In light of new dietary recommendations, PBH, CDC, and other partners recognized the need to establish a new identity for 5 A Day with the ability to sustain itself into the future, generate a brand that would provide an emotional or inspirational connection with consumers, and transfer 5 A Day equity—increased awareness of fruit and vegetable recommendations and the network for promoting consumption—to a new program identity, which is now Fruits & Veggies—More Matters®.
The Fruits & Veggies—More Matters® brand was developed based on comprehensive formative research with consumers. While specifically developed with moms as the primary target audience, the Fruits & Veggies—More Matters® message tested well with men, women and people of different ages, incomes, and ethnicities. Moms preferred a nurturing tone rather than a preaching, frightening, or bullying one. The most effective approach in motivating mothers was to be her ally, sending a message that promotes their responsibility as family caretaker. Fruits & Veggies—More Matters® brand appeals to moms' sense of responsibility to take care of her family in a strong, simple, and positive manner. Mothers feel they can help their families eat more fruits and vegetables when they know that various forms (frozen, canned, dried, 100% juice, fresh) all help meet daily fruit and vegetable requirements.[133] For time-starved mothers, providing simple serving suggestions, tips, and recipes was also identified as important.

Ultimately the Fruits & Veggies—More Matters slogan and graphic are seen as positive reminders to eat more fruits and vegetables by the broader consumer audience. It reminds them of the known health benefits of consuming fruits and vegetables and encourages them to eat more.

Effectively replacing 5 A Day, Fruits & Veggies—More Matters was launched in March 2007 with the support of many stakeholders, including growers, supermarket retailers, state departments of health, CDC, and others.

References

1. Pivonka E, Seymour J, McKenna J, et al. Development of the behaviorally focused Fruits & Veggies—More Matters public health initiative. *J Am Diet Assoc.* 2011; 111:1570-1577.

2. Stables GJ, Subar AF, Patterson BH, et al. Changes in vegetables and fruit consumption and awareness among US adults: Results of the 1991 and 1997 5 A Day for Better Health Program surveys. *J Am Diet Assoc.* 2002; 102:809-817.

3. U.S. Department of Health and Human Services. Office of Disease Prevention and Health Promotion. Healthy People 2020. Washington, DC. Available at http://healthypeople.gov/2020/topics-objectives2020/objectiveslist.aspx?topicId=29#146172. Accessed December 15, 2016.

4. U.S. Department of Health and Human Services and U.S. Department of Agriculture. *2015–2020 Dietary Guidelines for Americans*. 8th Edition. December 2015. Available at http://health.gov/dietaryguidelines/2015/guidelines/.

5. Boeing H, Bechthold A, Bub A, et al. Critical review: vegetables and fruit in the prevention of chronic diseases. *Eur J Nutr.* 2012; 51:637-663.

6. Bellavia A, Larsson SC, Bottai M, et al. Fruit and vegetable consumption and all-cause mortality: a dose-response analysis. *Am J Clin Nutr.* 2013; 98(2):454-459. doi: 10.3945/ajcn.112.056119.

7. Wang X, Ouyang Y, Liu J, et al. Fruit and vegetable consumption and mortality from all causes, cardiovascular disease, and cancer: systematic review and dose-response meta-analysis of prospective cohort studies. *BMJ.* 2014; 349:g4490. doi: 10.1136/bmj.g4490.

8. Hu D, Huang J, Wang Y, et al. Fruits and vegetables consumption and risk of stroke: a meta-analysis of prospective cohort studies. *Stroke.* 2014; 45(6):1613-1619. doi: 10.1161/STROKEAHA.114.004836.

9. Boeing H, Bechthold A, Bub A, et al. Critical review: vegetables and fruit in the prevention of chronic diseases. *Eur J Nutr.* 2012; 51:637-663.

10. Bradbury KE, Appleby PM, Key TJ. Fruit, vegetable, and fiber intake in relation to cancer risk: findings from the European Prospective Investigation into Cancer and Nutrition (EPIC). *Am J Clin Nutr.* 2014; 100 Suppl 1:394S-398S. doi: 10.3945/ajcn.113.071357.

11. Boeing H, Bechthold A, Bub A, et al. Critical review: vegetables and fruit in the prevention of chronic diseases. *Eur J Nutr.* 2012; 51:637-663.

12. Wood LG, Garg ML, Smart JM, et al. Manipulating antioxidant intake in asthma: a randomized controlled trial. *Am J Clin Nutr.* 2012; 96:534-543.

13. Williams PT. Lower risk of Alzheimer's disease mortality with exercise, statin, and fruit intake. *J Alzheimers Dis.* 2015; 44(4):1121-1129. doi: 10.3233/JAD-141929.

14. Wu Y, Zhang D, Jiang X, Jiang W. Fruit and vegetable consumption and risk of type 2 diabetes mellitus: a dose-response meta-analysis of prospective cohort studies. *Nutr Metab Cardiovasc Dis.* 2015; 25:140-147.

15. Niewiadomski O, Studd C, Wilson J, et al. Influence of food and lifestyle on the risk of developing inflammatory bowel disease. *Intern Med J.* 2016; 46(6):669-676. doi: 10.1111/img.13094.

16. Giaconi JA, Yu F, Stone KL, et al. The association of consumption of fruits/vegetables with decreased risk of glaucoma among older African-American women in the study of osteoporotic fractures. *Am J Ophthalmol.* 2012; 154(4):635-644. doi: 10.1016/j.ajo.2012.03.048.

17. Produce for Better Health Foundation. *State of the Plate: 2015 Study on America's Consumption of Fruits and Vegetables.* http://pbhfoundation.org/pdfs/about/res/pbh_res/State_of_the_Plate_2015_WEB_Bookmarked.pdf. Accessed December 13, 2016.

18. Kimmons J, Gillespie C, Seymour J, et al. Fruit and vegetable intake among adolescents and adults in the United States: Percentage meeting individualized recommendations. *Medscape J Med.* 2009; 11:26.

19. Kim SA, Moore LV, Galuska D, et al. Fruit and vegetable intake among children – United States, 2003-2010. *MMWR.* 2014; 63(31):671-676. http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6331a3.htm?s_cid=mm6331a3_w.

20. Krebs-Smith SM, Guenther PM, Subar AF, Kirkpatrick SI, Dodd KW. Americans do not meet federal dietary recommendations. *J Nutr.* 2010; 140:1832-1838.

21. Thomson CA , Ravia J. A systematic review of behavioral interventions to promote intake of fruit and vegetables. *J Am Diet Assoc.* 2011; 111: 1523-1535.

22. Pomerleau J, Lock K, Knai C, et al. Interventions designed to increase adult fruit and vegetable intake can be effective: a systematic review of the literature. *J Nutr.* 2005; 135:2486-2495.

23. Knai C, Pomerleau J, Lock K, et al. Getting children to eat more fruit and vegetables: a systematic review. *Prev Med.* 2006; 42: 85-95.

24. Delgado-Noguera M, Tort S, Martinez-Zapata MJ, et al. Primary school interventions to promote fruit and vegetable consumption: a systematic review and meta-analysis. *Prev Med.* 2011; 53: 3-9.

25. Stables GJ, Subar AF, Patterson BH, et al. Changes in vegetables and fruit consumption and awareness among US adults: Results of the 1991 and 1997 5 A Day for Better Health Program surveys. *J Am Diet Assoc.* 2002; 102:809-817.

26. Pivonka E, Seymour J, McKenna J, et al. Development of the behaviorally focused Fruits & Veggies—More Matters public health initiative. *J Am Diet Assoc.* 2011; 111:1570-1577.

27. Produce for Better Health Foundation. *State of the Plate: 2015 Study on America's Consumption of Fruits and Vegetables.* http://pbhfoundation.org/pdfs/about/res/pbh_res/State_of_the_Plate_2015_WEB_Bookmarked.pdf, pages 33-34. Accessed December 13, 2016.

28. Ibid.

29. American Psychological Association. *Stress in America, Paying With Our Health*. American Psychological Association, 2015. http://www.apa.org/news/press/releases/stress/2014/stress-report.pdf Accessed December 16, 2016.

30. Ibid.

31. U.S. Department of Health and Human Services and U.S. Department of Agriculture. *2015–2020 Dietary Guidelines for Americans*. 8th Edition. December 2015, page 21. Available at http://health.gov/dietaryguidelines/2015/guidelines/.

32. Alkerwi A, Sauvageot N, Malan L, Shivappa N, Hebert JR. Association between nutritional awareness and diet quality: evidence from observation of cardiovascular risk factors in Luxembourg (ORISCAV-LUX) study. *Nutrients.* 2015; 7:2823-2838. doi:10.3390/nu7042823.

33. Dickson-Spillman M, Siegrist M. Consumers' knowledge of healthy diets and its correlation with dietary behavior. *J Hum Nutr Diet.* 2011; 24(1):54-60. doi: 10.1111/j.1365-277X.2010.01124.x.

34. Spronk I, Kullen C, Burdon C, O'Connor H. Relationship between nutrition knowledge and dietary intake. *Brit J Nutr.* 2014; 111:1713-1726.

35. Gibson EL, Wardle J, Watts CJ. Fruit and vegetable consumption, nutritional knowledge and beliefs in mothers and children. *Appetite.* 1998; 31(2):205-8.

36. Boutelle KN, Birkeland RW, Hanna PJ, et al. Associations between maternal concern for healthful eating and maternal eating behaviors, home food availability, and adolescent eating behaviors. *J Nutr Educ Behav.* 2007; 39(5):248-56.

37. Satia JA, Kristal AR, Patterson RE, et al. Psychosocial factors and dietary habits associated with vegetable consumption. *Nutrition.* 2002; 18:247-254.

38. Wardle J, Parmenter K, Waller J. Nutrition knowledge and food intake. *Appetite*. 2000; 34(3): 269-275.

39. Fernandez DM, Larson JL, Zikmund-Fisher BJ. Associations between health literacy and preventive health behaviors among older adults: findings from the health and retirement study. *BMC Public Health.* 2016; 16:596. doi: 10.1186/s12889-016-3267-7.

40. Carbone ET, Zoellner JM. Nutrition and health literacy: a systematic review to inform nutrition research and practice. *J Acad Nutr Diet.* 2012; 112:254-265.

41. Produce for Better Health Foundation. *State of the Plate: 2015 Study on America's Consumption of Fruits and Vegetables.* http://pbhfoundation.org/pdfs/about/res/pbh_res/State_of_the_Plate_2015_WEB_Bookmarked.pdf, pages 33-34. Accessed December 13, 2016.

42. Messina M, Lampe JW, Birt DF, Appel LJ, Pivonka E, Berry B, Jacobs Jr. DR. Reductionism and the narrowing nutrition perspective: Time for reevaluation and emphasis on food synergy. *J Am Dietetic Assoc.* 2001; 101:1416-1419.

43. Produce for Better Health Foundation. *Primary Shoppers' Attitudes and Beliefs Related to Fruit & Vegetable Consumption, 2012 vs 2014*. http://pbhfoundation.org/pdfs/about/res/pbh_res/PrimaryShopperReport_WEB.pdf, page 13. Accessed December 28, 2016.

44. Larson NI, Neumark-Sztainer DR, Harnack LJ, et al. Fruit and vegetable intake correlates during the transition to young adulthood. *Am J Prev Med.* 2008; 35:33-37.

45. Pollard J, Kirk SFL, Cade JE. Factors affecting food choice in relation to fruit and vegetable intake: a review. *Nutr Res Rev*. 2002; 15:373-387.

46. Wadhera D, Capaldi-Phillips ED, Wilkie LM, Boggess MM. Perceived recollection of frequent exposure to foods in childhood is associated with adulthood liking. *Appetite.* 2015; 89:22-32.

47. Pivonka E, Seymour J, McKenna J, et al. Development of the behaviorally focused Fruits & Veggies—More Matters public health initiative. *J Am Diet Assoc.* 2011; 111:1570-1577.

48. Glasson C, Chapman , James E. Fruit and vegetables should be targeted separately in health promotion programmes: differences in consumption levels, barriers, knowledge and stages of readiness for change. *Public Health Nutr.* 2011; 14:694-701.

49. Appleton KM, Hemingway A, Saulais L, et al. Increasing vegetable intakes: rationale and systematic review of published interventions. *Eur J Nutr.* 2016; 55:869-896. Doi 10.1007/s00394-015-1130-8.

50. Boeing H, Bechthold A, Bub A, et al. Critical review: vegetables and fruit in the prevention of chronic diseases. *Eur J Nutr.* 2012; 51:637-663.

51. Appel LJ, et al. A clinical trial of the effects of dietary patterns on blood pressure. *New Engl J Med.* 1997; 336(16):1117-1124.

52. Wang X, Ouyang Y, Liu J, et al. Fruit and vegetable consumption and mortality from all causes, cardiovascular disease, and cancer: systematic review and dose-response meta-analysis of prospective cohort studies. *BMJ. 2014;* 349, g4490.

53. Ruston C, Gardner E, Walker D. Can pure fruit and vegetable juices protect against cancer and cardiovascular disease too? A review of the evidence. *Int J Food Sci Nutr*. 2006; 57(3/4): 249-272.

54. Griep L, Geleijnse J, Kromhout D, et al. Raw and processed fruit and vegetable consumption and 10-year coronary heart disease incidence in a population-based cohort study in the Netherlands. *PLoS One*. 2010; 5(10): e13609. doi:10.1371/journal.pone.0013609.

55. Khurana S, Venkataraman K, Hollingsworth A, Piche M, Tai TC. Polyphenols: benefits to the cardiovascular system in health and in aging. *Nutrients.* 2013; 5(10): 3779–3827. doi:10.3390/nu5103779.

56. Liu RH. Dietary bioactive compounds and their health implications. *J Food Sci.* 2013; 78 Suppl 1: A18-25. doi:10.1111/1750-3841.12101.

57. Liu RH. Health-promoting components of fruits and vegetables in the diet. *Adv Nutr.* 2013; 4(3): 384S-92S. doi:10.3945/an.112.003517.

58. Scalbert A, Manach C, Morand C, Remesy C. Dietary polyphenols and the prevention of diseases. *Crit Rev Food Sci Nutr.* 2005; 45: 287-306. doi:10.1080/1040869059096.

59. Skinner M, Hunter D, eds. *Bioactives in Fruit: Health Benefits and Functional Foods.* UK: Wiley-Blackwell; 2013.

60. Alasalvar C, Shahidi F, eds. *Dried Fruits: Phytochemicals and Health Effects.* UK: Wiley-Blackwell; 2013.

61. Sources of Calories from Added Sugars among the U.S. Population, 2005-06. Epidemiology and Genomics Research Program website. National Cancer Institute. http://epi.grants.cancer.gov/diet/foodsources/added_sugars/ . *Updated* April 22, 2016. *Accessed* December 9, 2016.

62. U.S. Department of Health and Human Services and U.S. Department of Agriculture. *2015–2020 Dietary Guidelines for Americans*. 8th Edition. December 2015, page 55. Available at http://health.gov/dietaryguidelines/2015/guidelines/.

63. Sources of Sodium among the U.S. Population, 2005-2006. Epidemiology and Genomics Research Program website. National Cancer Institute. https://epi.grants.cancer.gov/diet/foodsources/sodium/table1a.html . Updated April 22, 2016. Accessed December 15, 2016.

64. Note that Figure 2-14 in the *2015–2020 Dietary Guidelines for Americans*. 8th Edition, page 59 shows 11% of sodium in the U.S. population coming from vegetables. This includes fried potatoes, prepared pasta sauces, beans, legumes, and vegetable mixed dishes. Data from Scientific Report of the 2015 Dietary Guidelines Advisory Committee, https://health.gov/dietaryguidelines/2015-scientific-report/ Appendix E-2.7, https://health.gov/dietaryguidelines/2015-scientific-report/data-table-3.asp. Accessed December 15, 2016.

65. Shadix K. Reducing sodium in canned beans – easier than 1-2-3. *Today's Dietitian*. 2010; 12(1): 62. http://www.todaysdietitian.com/newarchives/011110p62.shtml. Accessed December 9, 2016.

66. O'Neil C, Nicklas TA, Zanovec M, et al. Fruit juice consumption is associated with improved nutrient adequacy in children and adolescents: the National Health and Nutrition Examination Survey (NHANES) 2003-2006. *Public Health Nutr*. 2012; 15(10):1871-1878. doi:10.1017/S1368980012000031.

67. Shenoy SF, Kazaks AG, Holt RR, et al. The use of a commercial vegetable juice as a practical means to increase vegetable intake: a randomized controlled trial. *Nutr J.* 2010: 9:38. doi:10.1186/1475-2891-9-38.

68. Drewnowski A and Rehm C. Socioeconomic gradient in consumption of whole fruit and 100% fruit juice among US children and adults. *Nutr J*. 2015; 14:3.

69. Ibid.

70. U.S. Department of Health and Human Services and U.S. Department of Agriculture. *2015–2020 Dietary Guidelines for Americans*. 8th Edition. December 2015, page 21. Available at http://health.gov/dietaryguidelines/2015/guidelines/.

71. Produce for Better Health Foundation. *Moms' Attitudes and Beliefs Related to Fruit & Vegetable Consumption, 2007-2015.* http://pbhfoundation.org/about/res/pbh_res/ page 27. Accessed December 28, 2016.

72. Rehm CD, Drewnowski A. Dietary and economic effects of eliminating shortfall in fruit intake on nutrient intakes and diet cost. *BMC Pediatr.* 2016; 16:83. doi:10.1186/s12887-016-0620-z.

73. O'Neil CE, Nicklas TA, Zanovec M, Fulgoni VL. Diet quality is positively associated with 100% fruit juice consumption in children and adults in the United States: NHANES 2003-2006. *Nutr J.* 2011; 10:17. doi:10.1186/1475-2891-10-17.

74. Ibid.

75. Ibid.

76. Fox MK, Reidy K, Novak T, Ziegler P. Sources of energy and nutrients in the diets of infants and toddlers. *J Am Diet Assoc*. 2006; 106:S28-42.

77. Keast DR, Fulgoni VL, Nicklas TA, O'Neil CE. Food sources of energy and nutrients among children in the United States: National Health and Nutrition Examination Survey 2003-2006. *Nutrients*. 2013; 5:283-301. doi:10.3390/nu5010283.

78. Murphy MM, Barraj LM, Herman D, Be X, Cheatham R, Randolph, RK. Phytonutrient intake by adults in the United States in relation to fruit and vegetable consumption. *J Acad Nutr Diet.* 2012; 112:222-229.

79. Crowe-White K, O'Neil CE, Parrott JS, et al. Impact of 100% fruit juice consumption on diet and weight status of children: an evidence-based review. *Crit Rev Food Sci Nutri*. 2015; June 19 (epub).

80. O'Neil C, Nicklas TA. A review of the relationship between 100% fruit juice consumption and weight in children and adolescents. *Am J Lifestyle Med*. 2008; 2(4):315-354.

81. Pereira M, Fulgoni V. Consumption of 100% fruit juice and risk of obesity and metabolic syndrome: findings from the National Health and Nutrition Examination Survey 1999-2004. *J Am Coll Nutr.* 2010; 29:625-629.

82. Nicklas T, O'Neil C, Kleinman R. Association between 100% juice consumption and nutrient intake and weight of children aged 2 to 11 years. *Arch Pediatr Adolesc Med*. 2008; 162(6):557-565.

83. Nicklas T, O'Neil C, Kleinman R. The relationship among 100% juice consumption, nutrient intake, and weight of adolescents 12 to 18 years. *Am J Health Prom*. 2010; 24(4):231-237.

84. Pivonka E, Seymour J, McKenna J, Baxter SD, Williams S. Development of the behaviorally focused Fruits & Veggies—More Matters public health initiative. *J Am Diet Assoc.* 2011; 111:1570-1577.

85. Ibid.

86. Canned Produce Plays Important Role in Increasing Consumption of Fruits & Vegetables– Mom's "Fruit and Vegetable Challenges" Survey, Can Manufacturers Institute, December 2014.

87. Research was conducted using Toluna's On-line Omnibus; interviews were completed on July 25-27, 2012. The total sample of 1,017 respondents is representative of U.S. adults and is balanced on three key demographics: age, sex and region of the U.S. Additionally, respondents on SNAP/WIC food assistance and/or have limited access to fresh food were identified for comparative analysis of consumption behaviors and attitudes towards canned and fresh foods.

88. Produce for Better Health Foundation. *Primary Shoppers' Attitudes and Beliefs Related to Fruit & Vegetable Consumption, 2012 vs 2014*. Produce for Better Health Foundation, 2014. http://pbhfoundation.org/pdfs/about/res/pbh_res/PrimaryShopperReport_WEB.pdf, page 18.

89. Freedman MR, Fulgoni V. Consumption of canned fruits and vegetables is associated with greater total vegetable and fruit consumption, better diet quality and increased nutrient intake in children: National Health and Nutrition Examination Survey (NHANES) 2001-2010. Department of Nutrition, Science & Pkg, San Jose State University, San Jose, CA and Nutrition Impact, LLC, Battle Creek, MI [ABSTRACT].

90. Canned Food Alliance. Canned Produce Helps American Adults Achieve A Better Diet Year-Round. Canned Food Alliance. http://www.mealtime.org/media-center/cfa-press-releases/press-release-documents/canned-produce-helps-american-adults.aspx?siteLocation=c0c56229-2323-4d59-919f-ead481f4960f. Published March 30, 2015. Accessed December 9, 2016.

91. Freedman MR, Fulgoni, VL. Canned vegetable and fruit consumption is associated with changes in nutrient intake and higher diet quality in children and adults: National Health and Nutrition Examination Survey 2001-2010. *J Acad Nutr Diet*. 2016; 116(6):940-948. doi:10.1016/j.jand.2015.10.013.

92. U.S. Department of Health and Human Services and U.S. Department of Agriculture. *2015–2020 Dietary Guidelines for Americans*. 8th Edition. December 2015. Available at http://health.gov/dietaryguidelines/2015/guidelines/.

93. Ibid.

94. Khurana S, Venkataraman K, Hollingsworth A, Piche M, Tai TC. Polyphenols: benefits to the cardiovascular system in health and in aging. *Nutrients.* 2013; 5(10): 3779–3827. doi: 10.3390/nu5103779.

95. Liu RH. Dietary bioactive compounds and their health implications. *J Food Sci.* 2013; 78 Suppl 1: A18-25. doi:10.1111/1750-3841.12101.

96. Liu RH. Health-promoting components of fruits and vegetables in the diet. *Adv Nutr.* 2013; 4(3): 384S-92S. doi: 10.3945/an.112.003517.

97. Scalbert A, Manach C, Morand C, Remesy C. Dietary polyphenols and the prevention of diseases. *Crit Rev Food Sci Nutr.* 2005; 45: 287-306. doi: 10.1080/1040869059096.

98. Skinner M, Hunter D, eds. *Bioactives in Fruit: Health Benefits and Functional Foods.* UK: Wiley-Blackwell; 2013.

99. Alasalvar C, Shahidi F, eds. *Dried Fruits: Phytochemicals and Health Effects.* UK: Wiley-Blackwell; 2013.

100. Higdon J, Drake V, eds. *An Evidence-based Approach to Phytochemicals and Other Dietary Factors, 2nd edition.* New York, NY: Thieme Stuttgart; 2013.

101. Produce for Better Health Foundation. *Moms' Attitudes and Beliefs Related to Fruit & Vegetable Consumption, 2007-2015.* Web. http://pbhfoundation.org/about/res/pbh_res/, page 27. Accessed December 28, 2016.

102. Produce for Better Health Foundation. *Moms' Attitudes and Beliefs Related to Fruit & Vegetable Consumption, 2007-2014.* http://pbhfoundation.org/pdfs/about/res/pbh_res/MomReport2014_WEB.pdf, page 14. Accessed December 28, 2016.

103. PBH. *Fresh, Frozen, Canned, Dried, 100% Juice It All Matters*. http://pbhfoundation.org/pdfs/pri_sec/retail/mar_tools/all_forms_health_influence/All_Forms_Health_Influencer_Brochure.pdf. Published April 2012. Accessed December 28, 2016.

104. Rickman J, Barrett D, Bruhn C. Nutritional comparison of fresh, frozen and canned fruits and vegetables. Part I. Vitamins C and B and phenolic compounds. *J Sci Food Agric.* 2007; 87(6):930-940.

105. Rickman J, Barrett D, Bruhn C. Nutritional comparison of fresh, frozen and canned fruits and vegetables: Part II. Vitamin A and carotenoids, vitamin E, minerals and fiber. *J Sci Food Agric.* 2007; 87(7): 1185-1196.

106. Produce for Better Health Foundation. *The Impact of Policy Recommendation with Limiting and Inclusive Language on Consumers Perceptions and Intent to Purchase Fresh and Packaged Forms of Fruits and Vegetables. Consumer Message Testing Research.* http://pbhfoundation.org/sites/default/files/pdf/Limiting_Inclusive_Language_Consumer_Research_10.21.15_1449586538.pdf Published October 2015. Accessed December 9, 2016.

107. Ibid.

108. Policy Statement: Snacks, sweetened beverages, added sugars, and schools. American Academy of Pediatrics, Council on School Health, Committee on Nutrition. *Pediatrics.* 2015; 135(3): 575-583. doi: 10.1542/peds.2014-3902.

109. Jago R, Baranowski T, Baranowski JC. Fruit and vegetable availability: a micro environmental mediating variable? Public Health Nutr. 2007; 10(7):681-9.

110. Gallaway MS, Jago R, Baranowski T, et al. Psychosocial and demographic predictors of fruit, juice and vegetable consumption among 11-14-year old Boy Scouts. *Public Health Nutr.* 2007; 10(12):1508-14.

111. Young EM, Fors SW, Hayes DM. Associations between perceived parent behaviors and middle school student fruit and vegetable consumption. *J Nutr Educ Behav.* 2004; 37(1):2-8.

112. Pearson N, Biddle SJ, Gorely T. Family correlates of fruit and vegetable consumption in children and adolescents: a systematic review. *Public Health Nutr.* 2009; 12(2): 267-83.

113. Larson N, Laska MN, Story M, Neumark-Sztainer D. Predictors of fruit and vegetable intake in young adulthood. *J Acad Nutr Diet.* 2012; 112(8): 1216-22. doi: 10.1016/j.jand.2012.03.035.

114. Jago R, Baranowski T, Baranowski JC. Fruit and vegetable availability: a micro environmental mediating variable? *Public Health Nutr.* 2007; 10(7):681-9.

115. Wadhera D, Capaldi-Phillips ED. A review of visual cues associated with food on food acceptance and consumption. *Eat Behav.* 2014; 15(1):132-143.

116. Produce for Better Health Foundation. *Moms' Attitudes and Beliefs Related to Fruit & Vegetable Consumption, 2007-2015.* http://pbhfoundation.org/about/res/pbh_res/. Accessed December 28, 2016.

117. Produce for Better Health Foundation. *Primary Shoppers' Attitudes and Beliefs Related to Fruit & Vegetable Consumption, 2012 vs 2014.* http://pbhfoundation.org/pdfs/about/res/pbh_res/PrimaryShopperReport_WEB.pdf, page 20. Accessed December 28, 2016.

118. USDA Office of the Chief Economist. How much food waste is there in the United States and why does it matter? USDA Office of the Chief Economist. http://www.usda.gov/oce/foodwaste/faqs.htm. Accessed December 19, 2016.

119. The Guardian. Danish supermarket selling expired food opens second branch. The Guardian. https://www.theguardian.com/environment/2016/nov/27/food-waste-denmark-buy-expired-produce-copenhagen-wefood. Published November 27, 2016. Accessed December 19, 2016.

120. Produce for Better Health Foundation. *Primary Shoppers' Attitudes and Beliefs Related to Fruit & Vegetable Consumption, 2012 vs 2014.* http://pbhfoundation.org/pdfs/about/res/pbh_res/PrimaryShopperReport_WEB.pdf, page 21. Accessed December 28, 2016.

121. Price J, Riis J. Behavioral economics and the psychology of fruit and vegetable consumption. *J Food Studies*; 2012; 1(1). doi: 10.5296/jfs.v1i1.2014.

122. Produce for Better Health Foundation. *State of the Plate: 2015 Study on America's Consumption of Fruits and Vegetables.* Page 13, Chart 5. http://pbhfoundation.org/pdfs/about/res/pbh_res/State_of_the_Plate_2015_WEB_Bookmarked.pdf. Accessed December 13, 2016.

123. Produce for Better Health Foundation. *Moms' Attitudes and Beliefs Related to Fruit & Vegetable Consumption, 2007-2015.* http://pbhfoundation.org/about/res/pbh_res/. Accessed December 28, 2016.

124. Francis JJ, Eccles MP, Johnston M, et al. Constructing questionnaires based on the theory of planned behavior: a manual for health services researchers, 2004 http://www-unix.oit.umass.edu/~aizen/tpb.html. Accessed July 6, 2006.

125. Van Duyn MA, Kristal AR, Dodd K, et al. Association of awareness, intrapersonal and interpersonal factors, and stage of dietary change with fruit and vegetable consumption: a national survey. *Am J Health Promot.* 2001; 16(2):69-78.

126. Fuemmeler BF, Masse LC, Yaroch AL, et al. Psychosocial mediation of fruit and vegetable consumption in the body and soul effectiveness trial. *Health Psychol.* 2006; 25(4):474-83.

127. Produce for Better Health Foundation. *Moms' Attitudes and Beliefs Related to Fruit & Vegetable Consumption, 2007-2015.* http://pbhfoundation.org/about/res/pbh_res/. Accessed December 28, 2016.

128. U.S. Department of Agriculture and U.S. Department of Health and Human Services. *Dietary Guidelines for Americans, 2010.* 7th Edition, Washington, DC: U.S. Government Printing Office; 2010; 35.

129. http://www.choosemyplate.gov/downloads/mini_poster_English_final.pdf

130. Stables GJ, Subar AF, Patterson BH, et al. Changes in vegetables and fruit consumption and awareness among US adults: Results of the 1991 and 1997 5 A Day for Better Health Program surveys. *J Am Diet Assoc.* 2002; 102:809-817.

131. NCI 5 A Day Attitude and Behavioral Tracking, National Omnibus Survey Results: November 2004. Unpublished data, reported by Porter Novelli for the National Cancer Institute.

132. Blanck H, Gillespie C, Kimmons JE, et al. Trends in fruit and vegetable consumption among U.S. men and women, 1994-2005. *Prev Chronic Dis.* 2008; 5(2). http://www.cdc.gov/pcd/issues/2008/apr/07_0049.htm. Accessed December 9, 2016.

133. Pivonka E, Seymour J, McKenna J, et al. Development of the behaviorally focused Fruits & Veggies—More Matters public health initiative. *J Am Diet Assoc.* 2011; 111:1570-1577.

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