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Public Perspectives on Food Risks

Americans are closely divided over health risk from food additives and genetically modified foods

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Public Perspectives on Food Risks

Americans are closely divided over health risk from food additives and genetically modified foods

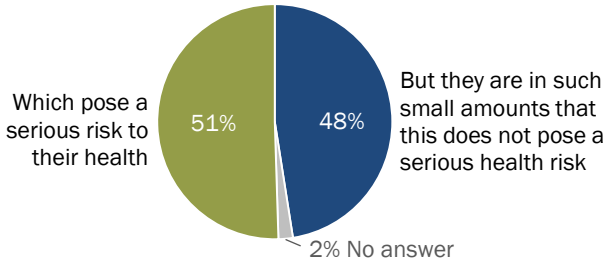
The American public is closely divided over the degree of health risk posed by additives present in the foods we regularly eat. Majorities see at least some risk from eating food produced with common agricultural and processing practices, including meat from animals given hormones or antibiotics, produce grown with pesticides and foods with artificial ingredients. And about half of the public says that foods with genetically modified (GM) ingredients are worse for one's health than foods without, according to a new nationally representative survey from Pew Research Center.

Today's food landscape requires consumers to navigate shifting terrain given the flow of new food technologies and ongoing debates among food scientists, industry groups and health care professionals over which foods are safe and how what we eat can have a lasting impact on one's health.

For instance, the American Academy of Pediatrics recently called for regulatory changes due to potential adverse effects on child development from food additives. And major food purveyors have been at odds over how to respond to consumer demand for healthier foods with more transparent labeling amid a changing regulatory environment.

U.S. public is closely divided about overall health risk from food additives

% of U.S. adults who say the average person is exposed to additives in the food they eat every day …



Source: Survey conducted April 23-May 6, 2018.
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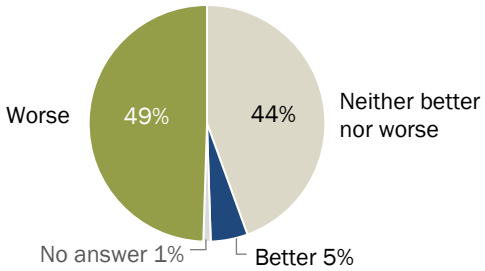
About half of U.S. public says GM foods are worse for one's health

% of U.S. adults who say genetically modified foods are ____ for one's health than foods with no genetically modified ingredients



Note: Beliefs about the health effects of genetically modified (GM) foods include those who lean toward each response.
Source: Survey conducted April 23-May 6, 2018.
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The Pew Research Center survey finds the U.S. public of two minds about food additives. Roughly half say the average person faces a serious health risk from food additives over their lifetime (51%) while the other half believes the average person is exposed to potentially threatening additives in such small amounts that there is no serious risk (48%). It's important to keep in mind that the survey asks respondents for their views about food additives as a whole. There are more than 10,000 additives used to enhance the shelf life, appearance, taste or nutritional value of foods, including over 3,000 that are "generally recognized as safe" – a term defined by the Food and Drug Administration, the main federal agency charged with regulating food safety.[1]

Seven-in-ten Americans (70%) believe that science has had a mostly positive effect on the quality of food in the United States. But when asked about one area where new developments in biotechnology are changing the possibilities for how we grow and consume foods, the public is closely divided. Roughly half of Americans (49%) believe that foods with GM ingredients are worse for one's health than non-GM foods, while 44% say such foods are neither better nor worse and 5% say they are better for one's health.

In a 2016 Pew Research Center survey, 39% of Americans said GM foods were worse for health compared with non-GM foods. The uptick in concern about GM foods in 2018 is primarily among those with low levels of science knowledge; 52% of those with low science knowledge on a nine-item index say GM foods are worse for health than non-GM foods, up 23 percentage points from 29% in 2016. But there is no shift in beliefs among those with high science knowledge; 38% in this group say GM foods are worse for health, as did 37% in 2016.

The meaning of terms such as "genetically modified" is evolving in the regulatory world. The U.S. Department of Agriculture has ruled that some uses of gene editing techniques can be indistinguishable from traditional breeding methods; those plants will not be considered genetically modified and therefore won't be subject to regulation. The European Court of Justice took a broader approach to classification, ruling that gene-edited crops should be classified as genetically modified and, as such, subject to regulation. The Pew Research Center survey referenced only foods with "genetically modified ingredients" in order to capture common usage.

[1] There are a number of agencies involved in food safety issues in the U.S., including the Food and Drug Administration for foods such as dairy, seafood, produce and packaged goods; the Department of Agriculture for most meat, poultry and some egg products as well as GM crops or foods labeled organic; and the Environmental Protection Agency for standards related to pesticide chemicals or residues in food. For background on the U.S. regulations related to food additives see Neltner, Thomas G., Neesha R. Kulkarni, Heather M. Alger, Maricel V. Maffini, Erin D. Bongard, Neal D. Fortin and Erik D. Olson. 2011. "Navigating the U.S. Food Additive Regulatory Program." Comprehensive Reviews in Food Science and Food Safety.

The new survey finds several patterns in people's beliefs about food additives as well as GM foods. First, there are consistent gender differences in public views about these food issues. On average, more women than men are concerned about potential health risk from food additives and from genetically modified foods. Second, there is an inverse relationship between how much people know about science generally, based on a nine-item index of factual knowledge, and their beliefs about the health risk of foods with additives as well as GM foods. People with low science knowledge tend to express more concern about the health risk from these food groups compared with those high in science knowledge.

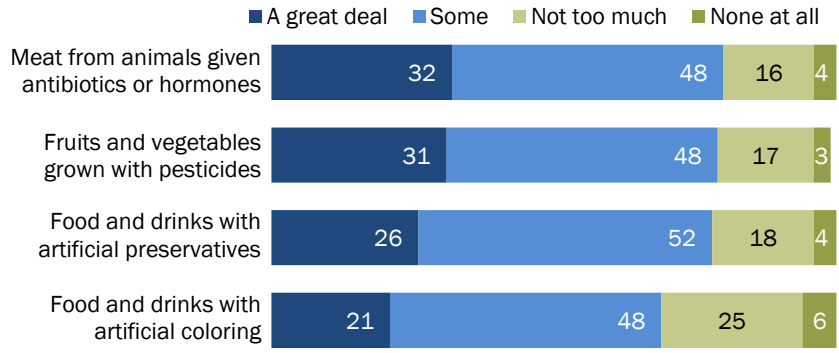
Third, public divisions over these food issues appear to reflect personal philosophies about the relationship between food and well-being. One indicator of such "food ideologies" is the amount of concern people have about the issue of GM foods. Those who care a great deal about the GM foods issue are much more likely to think GM foods are worse for one's health, as might be expected, and they see a higher risk to health from four types of food additives: artificial coloring, artificial preservatives, pesticides used on crops and meat produced from animals given antibiotics or hormones. But while there are deep political divides over some issues connected with science – notably climate and energy issues – Democrats and Republicans hold broadly similar beliefs about potential health effects from food additives and GM foods, a finding consistent with previous Center studies on food issues.

Americans hold mixed assessments of potential risk from specific types of food additives

When asked to rate the degree of long-term health risk to the average person from eating four types of foods – each with a different kind of additive introduced at some stage during food production – most Americans report at least "some" risk from meat from animals given hormones or antibiotics, or produce grown with pesticides, as well as food and beverages with artificial preservatives or coloring. Public concern is highest for meat from animals given antibiotics or hormones and produce grown with pesticides (32% and 31%, respectively, consider each to pose "a great deal" of health risk to the average person) followed by food and beverages with artificial preservatives (26%) or artificial coloring (21%).

About one-third of Americans believe antibiotics in meat, pesticides in produce pose a great health risk

% of U.S. adults who say ___ has the following health risk for the average person over the course of their lifetime



Note: Respondents who did not give an answer are not shown.
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Consumer preference for "natural" foods, a common label with no standard meaning from a U.S. regulatory perspective, raises concerns among some in the scientific community that the public has an aversion to additives and anything that might be seen as "unnatural" in the foods people eat, sometimes called chemophobia.[2] The survey finds half of Americans (50%) believe at least one of these four types of foods poses a great deal of health risk over time, although only a minority of 11% believe all four do.

Still, some groups of people have more concern about what is in the food they eat. For instance, among the roughly half of Americans (51%) who believe additives, in general, pose a serious health

[2] Experimental studies suggest that adding something to food tends to be seen as diminishing the sense that a food is "natural." See Scott, Sydney E. and Paul Rozin. 2017. "Are Additives Unnatural? Generality and Mechanisms of Additivity Dominance." Judgment and Decision Making.

risk overall, 71% say at least one of these four types of foods with additives poses a great deal of health risk over time, compared with 27% of those who don't think additives pose a serious health risk who say the same. And 19% of those who believe additives pose a serious health risk overall say that all four additives pose a risk over time, compared with 2% of those who don't think additives pose a serious health risk.

Assessments of food risk from additives vary by gender, degree of concern about the issue of GM foods and levels of science knowledge

There are consistent patterns in public beliefs about food additives. For instance, women are more likely to see a health risk in consuming foods with additives such as produce grown with pesticides. But while there are wide political differences across many social and political issues today, divides over food additives do not strongly tie to political parties (see Appendix for details).

In addition, the degree of concern people have about the issue of GM foods is a consistent indicator of their personal philosophies toward consuming additives – with those who care a great deal about GM food topics tending to be the most likely to say that additives pose a serious risk to health. Similarly, people who report eating a larger share of organic foods are more concerned about health risk from foods with additives.

Food science is complex and in flux, which creates an ongoing need for the public to stay abreast of the latest recommendations. It is perhaps fitting, then, that a person's level of science knowledge is another factor in their views about food. Those with high science knowledge are the least concerned about potential risk from foods with additives; those with low science knowledge are more inclined to see additives overall as posing a health risk.

Women are more inclined than men to view food additives as a serious health risk

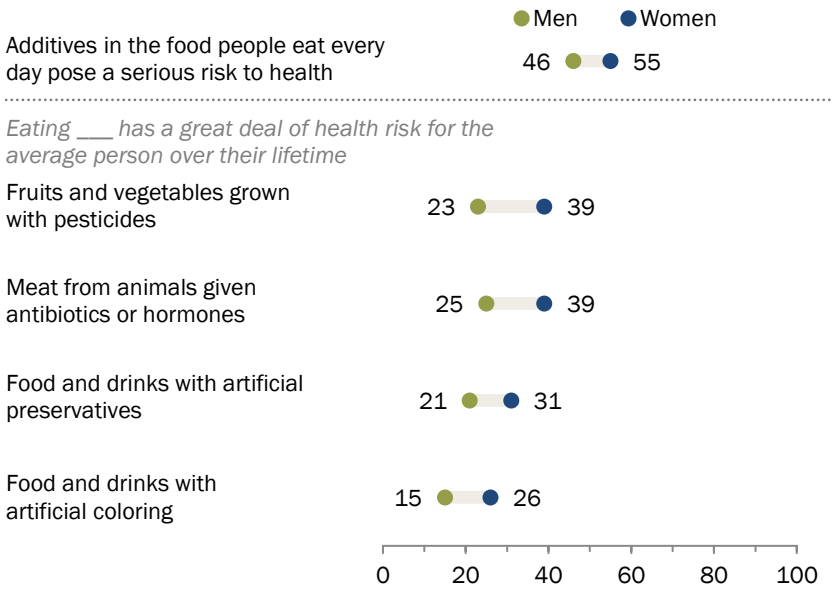
Women are consistently more wary than men of food additives. More women (55%) than men (46%) say that the average person is exposed to additives in the food they eat every day, which pose a serious risk to their health.

Women are also more likely to evaluate eating each of four foods with additives as having a great deal of health risk for the average person over the course of their lifetime. About four-in-ten women say fruits and vegetables grown with pesticides (39%) or meat from animals given antibiotics or hormones (39%) poses a great deal of health risk, compared with 23% and 25% of men who say the same, respectively.

And more women than men say food and drinks with artificial preservatives (31% vs. 21%) or with artificial coloring (26% vs. 15%) pose a great deal of health risk for the average person.

Men are less likely to see health risk from foods produced with pesticides, antibiotics

% of U.S. adults who say the following



Note: Respondents who gave other responses or who did not give an answer are not shown.
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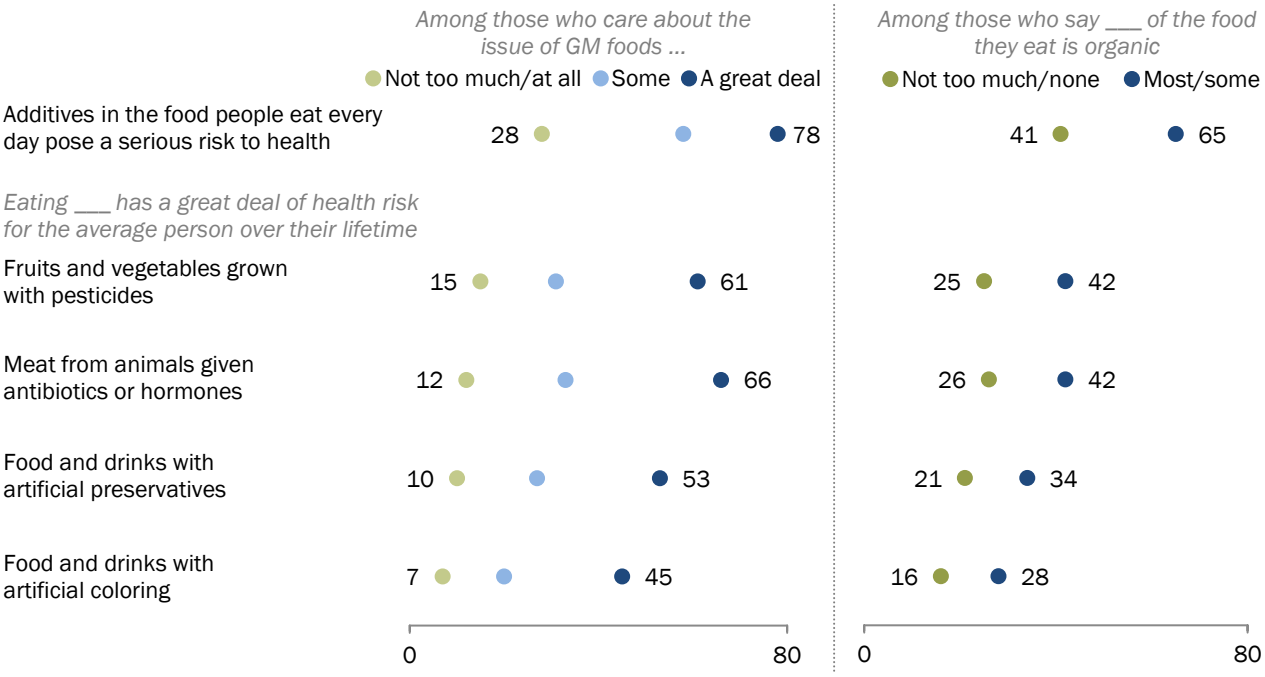
Americans' beliefs about food additive risk align with their degree of concern about genetically modified foods and their organic consumption habits

There are intense debates about the health risks and benefits of foods in American society; people appear to hew to their own "food ideologies." While these ideologies inform key attitudes and behaviors around life's staples, such beliefs don't align closely with political divides. (See Appendix for details.)

One marker of these divides is the extent to which people care about the issue of genetically modified foods. People who care deeply about the issue of GM foods are particularly likely to consider food additives a serious health risk and to rate produce grown with pesticides, foods with artificial preservatives or coloring or meat from animals given antibiotics or hormones as posing a great deal of threat to health. For example, roughly eight-in-ten of those who care a great deal about the issue of GM foods (78%) believe that additives pose a serious risk to people's health, compared with 28% of those who care not too much or not at all about the issue who say the same (a 50-percentage-point difference). And 66% of those who care deeply about the issue of GM foods

Perceptions of health risk from these kinds of food additives are connected with people's concern about the GM foods issue and their organic food consumption

% of U.S. adults who say the following



Note: Respondents who gave other responses or who did not give an answer are not shown.
Source: Survey conducted April 23-May 6, 2018.
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say meat from animals given antibiotics or hormones poses a great deal of health risk, compared with just 12% of those who do not care about the GM foods issue at all or not too much (a 54-point difference).

Demographically, those who care a great deal about the GM foods issue are diverse. Women are somewhat more likely than men to say they care a great deal about this issue (26% vs. 17%), and blacks (30%) and Hispanics (28%) are somewhat more inclined than whites (18%) to report this level of concern. But there are no more than modest differences in reported care about the issue of GM foods among other demographic, income and educational groups. (See Appendix for details.)

There are also consistent differences in beliefs about additives between those who report consuming more organics in their diet and those who don't. Specifically, 65% of people who report that most or some of what they eat is organic say that, in general, food additives pose a serious health risk. By contrast, 41% of those who report eating a smaller share of organic food say this. Other gaps between these groups include the risk from eating produce grown with pesticides – 42% of those who report eating a larger share of organics say this poses a great deal of risk, versus 25% of those who eat a smaller share – as well as meat from animals given antibiotics or hormones (42% vs. 26%).

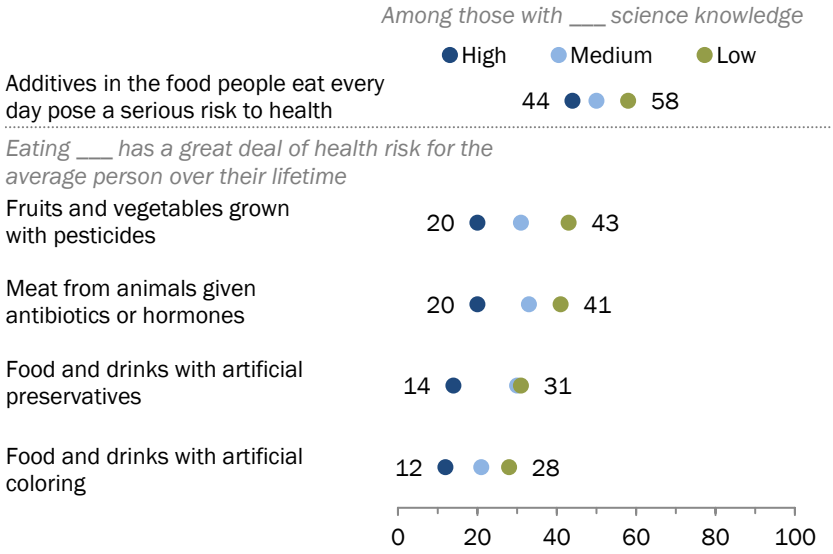
Americans' views about the health risk of food additives tend to correspond with their levels of science knowledge

There are also differences by level of science knowledge in beliefs about the health risk posed by food additives.

The Pew Research Center survey included a set of nine questions to tap public knowledge of science across a range of principles and topics. Roughly one-in-four Americans have low (26%) or high (24%) levels of science knowledge, while 49% have a medium level of science knowledge.

Americans with low science knowledge are more inclined than those with high science knowledge to view additives as posing a serious risk to health

% of U.S. adults who say the following



Note: See Methodology for details on science knowledge index. Respondents who gave other responses or who did not give an answer are not shown.
Source: Survey conducted April 23-May 6, 2018.
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The survey reveals an inverse relationship between a person's level of science knowledge and their beliefs concerning the health risk posed by additives. For example, 43% of those with low science knowledge say eating fruits and vegetables grown with pesticides poses a great deal of health risk to the average person over their lifetime, while 20% of those with high science knowledge say the same.

Similarly, there are differences by education level in these beliefs.

Most Americans say they watch their intake of at least one of 10 food ingredients

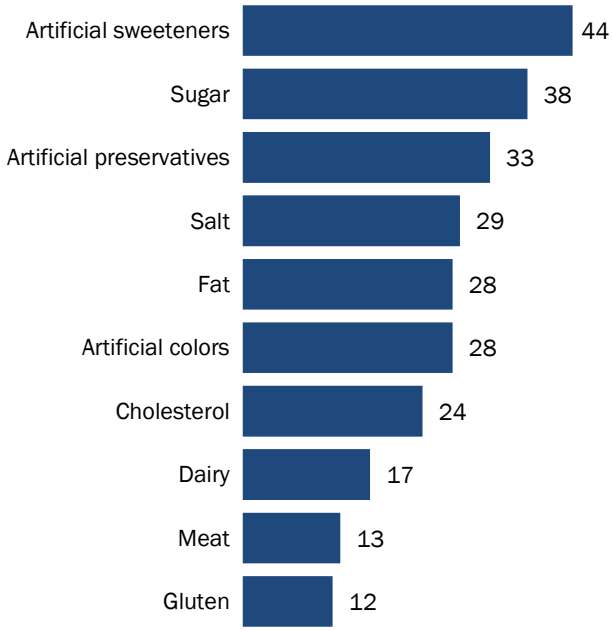
Public beliefs about food health risk tend to track with reported eating behaviors. The survey asked people about their eating habits regarding 10 broad types of food ingredients. Some 44% of U.S. adults say they restrict or limit consumption of artificial sweeteners. A third (33%) say they limit artificial preservatives and 28% limit foods with artificial coloring.

People who believe there is a serious risk for the average person today from food additives are more likely to report that they limit foods with artificial ingredients in their own diets. For example, 52% in this group say they restrict or limit artificial sweeteners, compared with 36% of those who believe food additives do not pose a serious risk to the average person because potentially harmful additives are consumed in such small amounts.

But artificial additives are far from the only ingredient that people restrict in their diet. About four-in-ten Americans (38%) report limiting sugar intake and about three-in-ten limit salt (29%) or fat (28%).

44% of Americans say they limit their consumption of artificial sweeteners

% of U.S. adults who say they restrict or limit eating each of the following on a regular basis



Source: Survey conducted April 23-May 6, 2018.
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Roughly three-quarters of U.S. adults (76%) say they limit at least one of these 10 ingredients on a regular basis; on average, U.S. adults say they limit 2.7 items out of 10.

On average, women limit somewhat more of these ingredients than do men (2.8 items out of 10 compared with 2.5 for men). Americans ages 65 and older limit, on average, more of these food ingredients than do Americans ages 18 to 29 (3.4 vs. 2.0).

About half of U.S. adults see genetically modified foods as worse for health

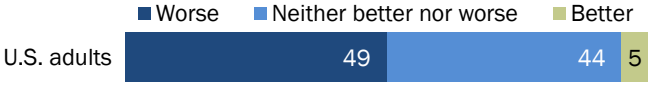
The survey finds about half of Americans (49%) believe foods with GM ingredients are worse for one's health, while 44% say such foods are neither better nor worse than non-GM foods and 5% say they are better for one's health.

The share of Americans who say foods with GM ingredients are worse for one's health is up 10 percentage points, from 39% in 2016.

Still, when contemplating the effects of GM foods on society at large, Americans anticipate some positive consequences. About three-quarters (76%) of Americans say it is very (31%) or fairly likely (45%) GM foods will increase the food supply. A somewhat smaller share, though still a 63% majority, thinks it is very (25%) or fairly likely (38%) that GM foods will result in more affordably priced food.

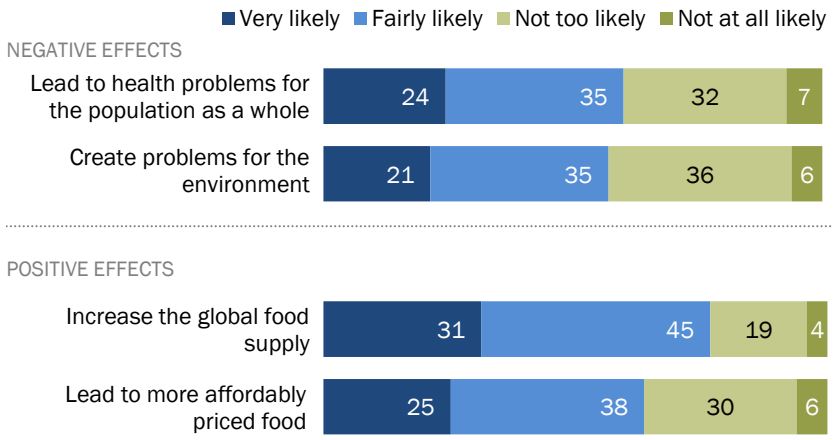
About half of Americans think GM foods are worse for one's health

% of U.S. adults who say that genetically modified foods are ____ for one's health than foods with no genetically modified ingredients



The public holds mixed views about the likely effects of GM foods for society

% of U.S. adults who say it is ____ that genetically modified foods will ...



Notes: Beliefs about the health effects of genetically modified (GM) foods include those who lean toward each response. Respondents who did not give an answer are not shown.
Source: Survey conducted April 23-May 6, 2018.
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On the other hand, majorities think GM foods are at least fairly likely to lead to health problems for the population as a whole (24% say this is very likely, 35% say it is fairly likely) or create problems for the environment (21% very likely, 35% fairly likely).

In the survey, Pew Research Center used the term "genetically modified ingredients" to reflect common usage for a genetically engineered or modified food ingredient. Such terms encompass a range of techniques, most commonly adding genetic material from another species to change, for example, a plant's characteristics.

But what is and isn't considered genetically modified can be murky, even among regulatory agencies. A March 2018 U.S. Department of Agriculture (USDA) statement determined that some "genome editing" techniques are akin to traditional forms of selective breeding and therefore will not be subject to USDA regulation as a genetically modified crop, while uses that add genetic material from other "non-compatible" species such as bacteria or insects will continue to be monitored. By contrast, three months later a European court ruled that gene-edited crops should be classified as genetically modified, leading to an ongoing discussion of which technological distinctions are germane for food safety regulations.[3]

These distinctions may fly under the radar for many Americans. Roughly three-in-ten adults (29%) say they have heard or read a lot about GM foods, while about seven-in-ten say they heard or read a little (58%) or nothing at all (13%).

Some experts suggest that – due to limited public understanding of the term genetic modification or genetic engineering – public attitudes about genetic engineering are "soft" and more likely to fluctuate over time or in response to different question wording.[4]

Overall, there is a 10-percentage-point increase in the share of Americans who say that foods with GM ingredients are worse for health in the new survey compared with a 2016 Pew Research Center survey.

[3] See Zimmer, Carl. July 27, 2018. "What Is a Genetically Modified Crop? A European Ruling Sows Confusion." The New York Times. For an explainer see King, Anthony. July 25, 2018. "What the ECJ ruling means for gene editing." Chemistry World.
[4] For a review of survey findings and factors in predicting public views related to genetically modified foods see Scott, Sydney E., Yoel Invar, Christopher D. Wirz, Dominque Brossard and Paul Rozin, 2018. "An Overview of Attitudes Toward Genetically Engineered Food." Annual Review of Nutrition; and Runge, Kristin K., Dominique Brossard, Dietram A. Scheufele, Kathleen M. Rose and Brita J. Larson. 2017. "Attitudes about Food and Food-Related Biotechnology." Public Opinion Quarterly.

Further analysis shows that the shift in opinion occurs primarily among people with low science knowledge. Among this group, 52% say that GM foods are worse for health, up 23 percentage points from 29% in 2016. In contrast, there is no significant change over time in beliefs about GM foods among those with high science knowledge. This finding is consistent with the idea that those with less information about genetic engineering tend to hold "soft" attitudes, more likely to shift over time. [5]

These two Center surveys, while using the same wording for beliefs about GM foods, differ in the range of other questions asked. Thus, survey context differences could also be a factor in people's responses to the two surveys.[6]

Those with low science knowledge are more inclined to say GM foods are worse for health today

% of U.S. adults who say that genetically modified foods are ____ for one's health than foods with no genetically modified ingredients

	Worse	Neither better nor worse	Better	No answer
U.S. adults 2018	49	44	5	1
U.S. adults 2016	39	48	10	3
Difference	+10	-4	-5	-2
Among those with high science knowledge				
2018	38	57	5	0
2016	37	56	6	1
Difference	+1	+1	-1	-1
Among those with medium science knowledge				
2018	54	41	4	1
2016	47	44	8	1
Difference	+7	-3	-4	0
Among those with low science knowledge				
2018	52	38	7	2
2016	29	50	15	6
Difference	+23	-12	-8	-4

Note: Beliefs about the health effects of genetically modified (GM) foods include those who lean toward each response. See Methodology for details on science knowledge index.
Source: Surveys conducted April 23-May 6, 2018, and May 10-June 6, 2016.
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[5] We also looked at the views of the 630 people who completed both the 2016 and the 2018 survey and found a 10-percentage-point increase in the share saying that GM foods are worse for health among this group. There was no difference in beliefs about GM foods in 2018 between those who had completed both surveys and those who completed only the 2018 survey; thus, sample composition differences do not explain the change over time.

[6] Note that the introduction to the set of questions about GM foods varied across the two years. In 2018, the set of questions started with an introduction worded to reflect the USDA ruling distinguishing genetic modification from genome editing. It read: "Genetically modified foods, sometimes called GMOs, come from a technique that adds genes from other organisms to change that food's genetic characteristics." In 2016, the introduction to the set of questions was simpler, stating: "Thinking about genetically modified foods, sometimes called GMOs…."

Americans who think GM foods are worse for health tend to expect negative consequences for society

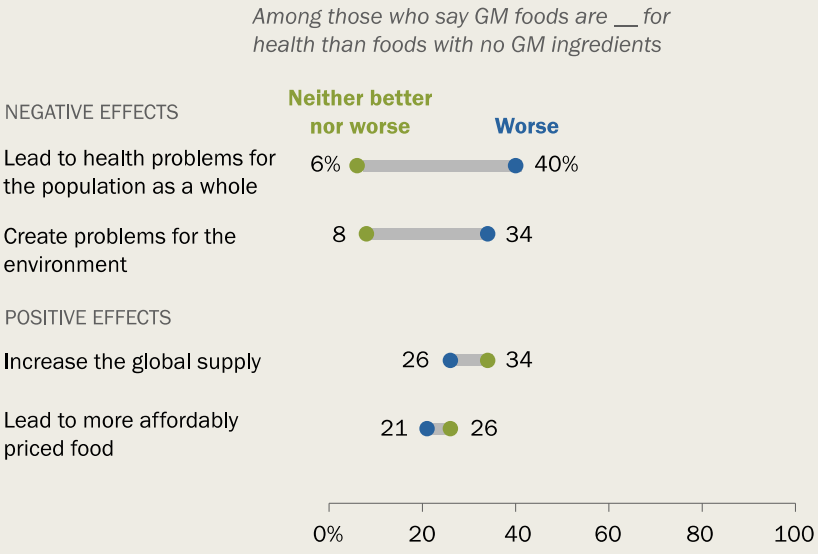
People who believe genetically modified (GM) foods are worse for health than foods with non-GM ingredients are more likely to have negative expectations for the effects of GM foods on public health and the environment.

Some 40% of those who say GM foods are worse for health believe that those foods are very likely to lead to health problems for the population as a whole, compared with just 6% who say the same among those who believe GM foods are neither better nor worse for health.

Similarly, some 34% of those who believe GM foods are worse for health anticipate that GM foods will very likely create problems for the environment, while just 8% say this among those who believe GM foods are neither better nor worse.

Americans who think GM foods are worse for health are more inclined to see negative effects as very likely

% of U.S. adults who say it is very likely that genetically modified foods will lead to these effects



Notes: Beliefs about the health effects of genetically modified (GM) foods include those who lean toward each response. Those who say GM foods are better for health are not shown. Respondents who gave other responses or who did not give an answer are not shown.
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There is a weaker relationship between one's beliefs about GM foods and expectations that such foods will increase the global food supply. And there is no relationship between beliefs and an expectation that GM foods will lead to more affordably priced food.

Americans' views about GM foods tend to vary by gender, degree of concern about the GM foods issue and level of science knowledge

The public's views and expectations about the effects of GM foods adhere to some consistent patterns, similar to those observed in the survey findings about how people feel about various types of food additives.

For instance, gender again is a factor, with women more likely than men to see negative effects of GM foods. And, overall, people's degree of concern about the GM foods issue is strongly related to their beliefs about GM foods and the potential effects of these foods on public health and the environment. There is also a relationship between science knowledge and beliefs about GM foods. Americans with a high level of science knowledge are more likely to be optimistic that GM foods will help increase the global food supply and this group is less likely to believe that GM foods are worse for one's health than non-GM. But consistent with previous Center surveys, there are no more than modest differences in beliefs about GM foods by politics. (See Appendix for details.)

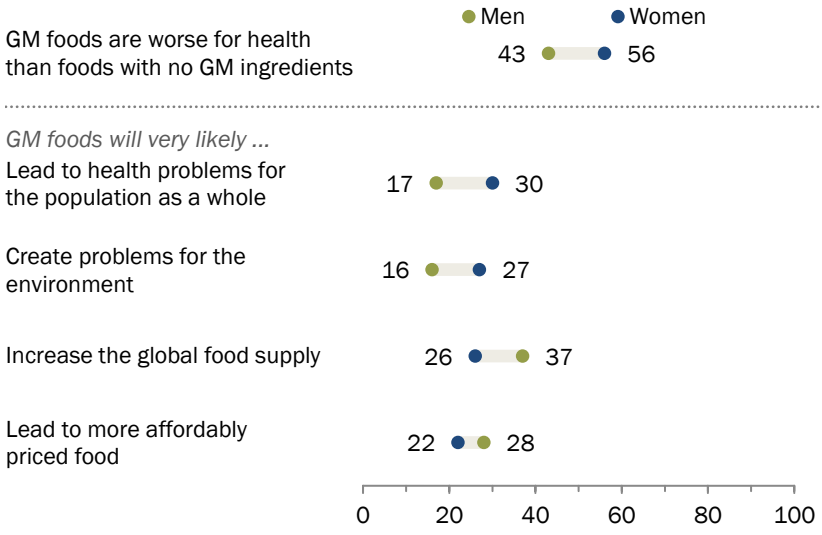
Women are more inclined than men to view GM foods as a health risk

Men and women have somewhat different expectations for GM foods. Men are more optimistic about the likely impact of GM foods on society, while women are more pessimistic.

Some 56% of women compared with 43% of men believe that GM foods are worse for health than foods without GM ingredients. And women are more inclined than men to expect problems ahead from GM foods for public health (30% vs. 17%) or the environment (27% vs. 16%). Conversely, men, more than

Women are more inclined than men to see problems stemming from GM foods

% of U.S. adults who say the following



Notes: Beliefs about the health effects of genetically modified (GM) foods include those who lean toward each response. Respondents who gave other responses or who did not give an answer are not shown.
Source: Survey conducted April 23-May 6, 2018.
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women, think it very likely that GM foods will increase the global food supply (37% vs. 26%) or lead to more affordably priced food (28% vs. 22%).

Personal concern about the issue of GM foods is closely tied with beliefs about the effects of GM foods

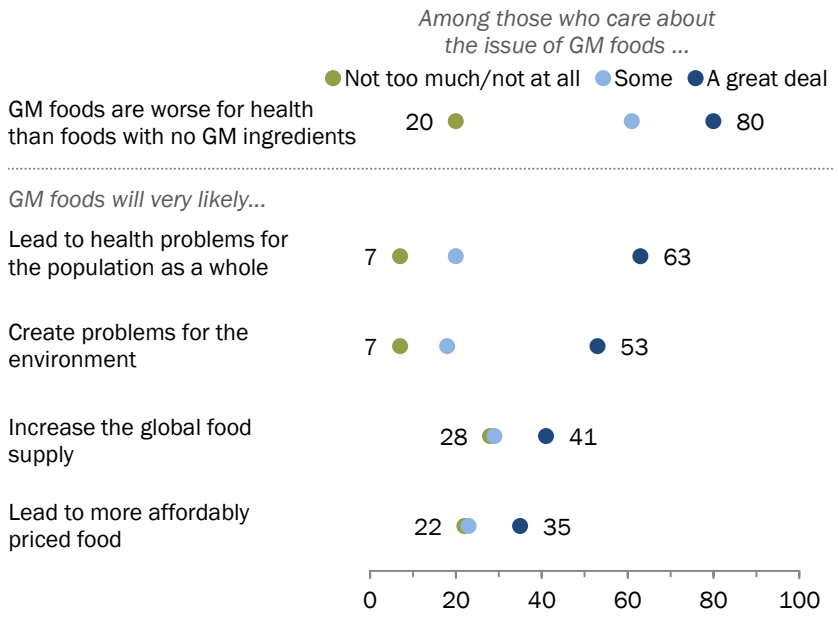
Overall, a minority of about one-in-five Americans (22%) say they care a great deal about the issue of GM foods, while an additional roughly four-in-ten (39%) say they care some. About four-in-ten say they care either not too much (28%) or not at all (10%) about this issue.

But the 22% of the public that cares deeply about the issue of GM foods holds views that are distinct from those of other Americans.

For instance, a large majority of Americans who care a great deal about the GM foods issue (80%) say foods with GM ingredients are worse for their health than foods with no GM ingredients. In contrast, among those who care not too much or not at all about the issue of GM foods, two-in-ten (20%) say foods with GM ingredients are worse for their health, while most of this group (73%) says GM foods are neither better nor worse than foods with no GM ingredients.

Those most concerned about the issue of GM foods expect GM to bring health, environmental downsides

% of U.S. adults who say the following



Notes: Beliefs about the health effects of genetically modified (GM) foods include those who lean toward each response. Respondents who gave other responses or who did not give an answer are not shown.
Source: Survey conducted April 23-May 6, 2018.
"Public Perspectives on Food Risks"

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Similarly, people who care deeply about the issue of GM foods are also more likely to think that negative health and environmental effects will accrue as a result of GM foods. A majority of those who care a great deal about the issue of GM foods (63%) say GM foods will very likely lead to health problems for the population as a whole, compared with just 7% of those who care not too

much or not at all about the issue who say the same. At the same time, those who care a great deal are more likely than other Americans to think GM foods will increase the food supply and lead to affordably priced foods, although no more than half of any of these groups consider this very likely.

About half of those with high science knowledge expect GM foods to increase the food supply

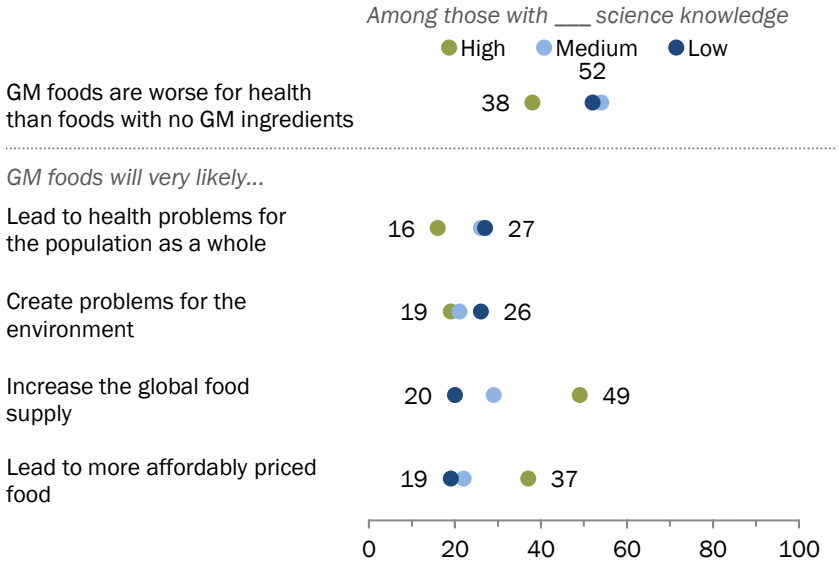
At a time when biotechnology continues to push the boundaries of crop development, the survey finds a relationship between how much people know about science and their beliefs about GM foods. People with high science knowledge, based on a nine-item index, are the most positive in their assessments of GM foods, while those with less understanding of science register more concern about GM foods.

For instance, people with high science knowledge are less inclined than those with less science knowledge to believe that GM foods are worse for one's health than foods with no GM ingredients (38% of those with high science knowledge say this, vs. 54% of those with medium and 52% of those with low science knowledge).

At the same time, about half (49%) of those with high science knowledge say it is very likely that GM foods will increase the global food supply and 37% in this group say it is very likely that GM foods will lead to affordably priced foods. By comparison, about one-in-five of those

Americans with high science knowledge are more inclined to anticipate positive effects from GM foods

% of U.S. adults who say the following



Notes: Beliefs about the health effects of genetically modified (GM) foods include those who lean toward each response. See Methodology for details on science knowledge index. Respondents who gave other responses or who did not give an answer are not shown.
Source: Survey conducted April 23-May 6, 2018.
"Public Perspectives on Food Risks"

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with low science knowledge say each of these is very likely to happen (20% for increasing the global food supply and 19% for leading to more affordably priced food).

45% of Americans believe organic produce provides net benefits for health; 51% see no health advantage for organics over conventionally grown options

Americans are closely divided over whether organic fruits and vegetables are better for one's health than conventionally grown foods: 45% say they are, while 51% say that organic produce is neither better nor worse for health than conventionally grown produce.

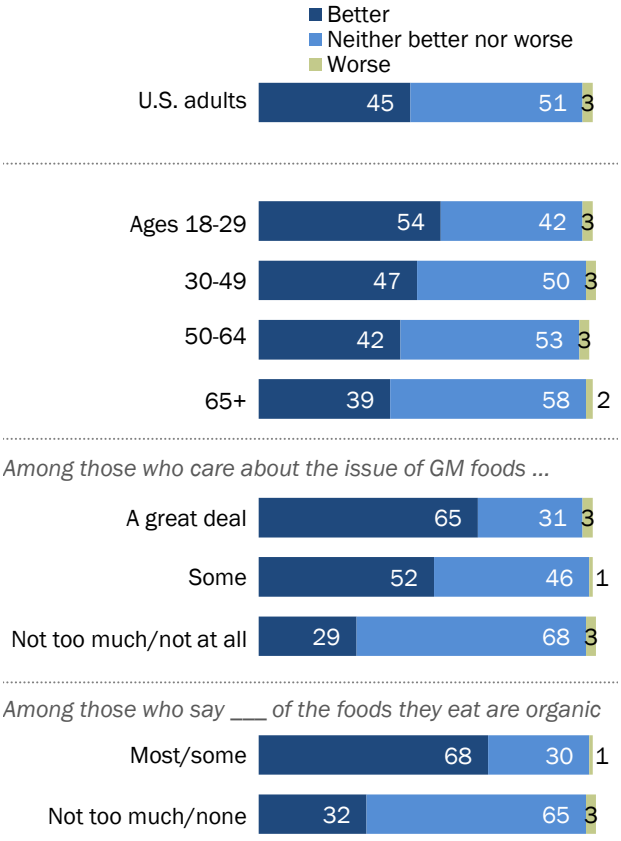
Younger Americans are more likely than their older counterparts to believe that organics are better for one's health than conventionally grown produce. Some 54% of those ages 18 to 29 and 47% of those 30 to 49 say organic foods are better for one's health. By comparison, 39% of those ages 65 and older believe organic foods are better for one's health than conventionally grown foods.

People who care deeply about the issue of GM foods are more than twice as likely as those with less concern about this issue to say organic foods are better for one's health than conventionally grown foods (65% of those who care a great deal about the issue of GM foods say this vs. 29% of those who care not too much or not at all).

About four-in-ten Americans (39%) estimate that most (7%) or some (32%) of what they eat is organic. A majority of this group (68%) believes that organic produce is better for one's health than conventionally grown

Younger adults are more inclined to say organic produce is better for health

% of U.S. adults who say organic fruits and vegetables are generally ____ for one's health than conventionally grown foods



Notes: Respondents who did not give an answer are not shown.
Source: Survey conducted April 23-May 6, 2018.
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options. By comparison, 32% of those who report eating no or not too much organic food believe that organic produce is better for one's health.

While women are more inclined than men to see health risk from GM foods and food additives, there are no differences between men and women when it comes to beliefs about the comparative health benefits of organic produce. Similarly, there were no significant differences between men and women on beliefs about the health effects of organic produce in the Center's 2016 survey.

The share of U.S. adults who say organic produce is better for one's health declined from 55% in 2016 to 45% this year. While people of all levels of science knowledge are about equally likely in the new survey to say organic produce is better for health, the shifts from 2016 in beliefs about organic produce occurred among those with high and medium science knowledge. People with low science knowledge held similar beliefs in both years.

Dip in belief that organic produce is better for health among those with high, medium science knowledge

% of U.S. adults who say organic fruits and vegetables are generally ____ for one's health than conventionally grown produce

	Better	Neither better nor worse	Worse	No answer
U.S. adults 2018	45	51	3	1
U.S. adults 2016	55	41	3	1
Difference	-10	+10	0	0
Among those with high science knowledge				
2018	48	50	2	<1
2016	62	37	1	0
Difference	-14	+13	+1	
Among those with medium science knowledge				
2018	46	52	1	1
2016	60	38	1	1
Difference	-14	+14	0	0
Among those with low science knowledge				
2018	43	50	6	2
2016	40	49	8	3
Difference	+3	+1	-2	-1

Note: See Methodology for details on science knowledge index. Respondents who gave other responses or who did not give an answer rare not shown.
Source: Surveys conducted April 23-May 6, 2018 and May 10-June 6, 2016.
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Methodology

This report is drawn from a survey conducted as part of the American Trends Panel (ATP), a nationally representative panel of randomly selected U.S. adults recruited from landline and cellphone random-digit-dial (RDD) surveys. Panelists participate via monthly self-administered web surveys. Panelists who do not have internet access are provided with a tablet and wireless internet connection. The panel, which was created by Pew Research Center, is being managed by GfK.

Data in this report are drawn from the panel wave conducted April 23-May 6, 2018, among 2,537 respondents. The margin of sampling error for the full sample of 2,537 respondents is plus or minus 2.8 percentage points.

Members of the ATP were recruited from several large, national landline and cellphone RDD surveys conducted in English and Spanish. At the end of each survey, respondents were invited to join the panel. The first group of panelists was recruited from the 2014 Political Polarization and Typology Survey, conducted Jan. 23-March 16, 2014. Of the 10,013 adults interviewed, 9,809 were invited to take part in the panel and a total of 5,338 agreed to participate.[7]

Margins of error

	Sample size	Margin of error in percentage points
U.S. adults	2,537	+/- 2.8
Men	1,272	+/- 4.0
Women	1,265	+/- 3.8
Age		
18-29	367	+/- 7.3
30-49	759	+/- 4.9
50-64	804	+/- 4.9
65+	605	+/- 5.3
Among those with ___ science knowledge		
High	679	+/- 5.2
Medium	1,274	+/- 3.9
Low	584	+/- 5.7
Among those who care about the issue of GM foods ...		
A great deal	610	+/- 5.5
Some	1,002	+/- 4.4
Not too much/not at all	918	+/- 4.6
Among those who say ___ of the food they eat is organic		
Most/some	1,087	+/- 4.2
Not too much/none	1,438	+/- 3.6
Among those who say GM foods are ___ for health than foods with no GM ingredients		
Neither better nor worse	1,141	+/- 4.1
Worse	1,261	+/- 3.9

Note: The margins of error are reported at the 95% level of confidence and are calculated by taking into account the average design effect for each subgroup.
Source: Survey conducted April 23-May 6, 2018.
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[7] When data collection for the 2014 Political Polarization and Typology Survey began, non-internet users were subsampled at a rate of 25%, but a decision was made shortly thereafter to invite all non-internet users to join. In total, 83% of non-internet users were invited to join the panel.

The second group of panelists was recruited from the 2015 Pew Research Center Survey on Government, conducted Aug. 27-Oct. 4, 2015. Of the 6,004 adults interviewed, all were invited to join the panel, and 2,976 agreed to participate.[8] The third group of panelists was recruited from a survey conducted April 25 to June 4, 2017. Of the 5,012 adults interviewed in the survey or pretest, 3,905 were invited to take part in the panel and a total of 1,628 agreed to participate.[9]

The overall target population for Wave 34 was non-institutionalized persons ages 18 and older, living in the United States, including Alaska and Hawaii. The sample for Wave 34 consisted of 3,099 ATP members that were invited to Wave 33 and were still active. This subsample was selected using the following approach:

1. Panelists were grouped into three strata based on how underrepresented they are demographically. Then we analyzed response rates to the last five panel survey waves (W28-32) to project the number of panelists in each stratum who would respond to the W33 survey.

2. We then determined how many panelists we wanted to sample from each stratum in W33 in order to finish with around 2,500 completed interviews and have a responding sample that is as representative as possible.

    - Stratum A consists of panelists who are non-internet users, are black non-Hispanic, are Hispanic, or have high school or less education. There were 1,819 total panelists in this stratum and they are sampled at a rate of 100% for W33. 1,806 were active panelists.

    - Stratum B consists of panelists who are ages 18 to 34 or are non-volunteers. The 1,684 total panelists in this stratum are subsampled at a rate of 63%, yielding 1,061 sampled for W33 (1,057 were active).

[8] Respondents to the 2014 Political Polarization and Typology Survey who indicated that they are internet users but refused to provide an email address were initially permitted to participate in the American Trends Panel by mail but were no longer permitted to join the panel after Feb. 6, 2014. Internet users from the 2015 Pew Research Center Survey on Government who refused to provide an email address were not permitted to join the panel.
[9] White, non-Hispanic college graduates were subsampled at a rate of 50%.

- Stratum C consists of the remaining 2,009 panelists not in stratum A or B. This group is subsampled at a rate of 12%, yielding 241 panelists sampled for W33 (239 were active).

The ATP data were weighted in a multistep process that begins with a base weight incorporating the respondents' original survey selection probability and the fact that in 2014 some panelists were subsampled for invitation to the panel. Next, an adjustment was made for the fact that the propensity to join the panel and remain an active panelist varied across different groups in the sample.

The final step in the weighting uses an iterative technique that aligns the sample to population benchmarks on a number of dimensions. Gender, age, education, race, Hispanic origin and region parameters come from the U.S. Census Bureau's 2016 American Community Survey. The county-level population density parameter (deciles) comes from the 2010 U.S. decennial census. The telephone service benchmark comes from the July-December 2016 National Health Interview Survey and is projected to 2017. The volunteerism benchmark comes from the 2015 Current Population Survey Volunteer Supplement. The party affiliation benchmark is the average of the three most recent Pew Research Center general public telephone surveys. The internet access benchmark comes from the 2017 ATP Panel Refresh Survey. Respondents who did not previously have internet access are treated as not having internet access for weighting purposes.

Sampling errors and statistical tests of significance take into account the effect of weighting. Interviews are conducted in both English and Spanish, but the Hispanic sample in the ATP is predominantly U.S. born and English speaking.

Margins of error tables shown here provide the unweighted sample sizes and the error attributable to sampling that would be expected at the 95% level of confidence for different groups in the survey, taking into account the average design effect for each subgroup. Sample sizes and sampling errors for other subgroups are available upon request.

In addition to sampling error, one should bear in mind that question wording and practical difficulties in conducting surveys can introduce error or bias into the findings of opinion polls.

The April 2018 wave had a response rate of 82% (2,537 responses among 3,099 individuals in the panel). Taking account of the combined, weighted response rate for the recruitment surveys

(10.1%) and attrition from panel members who were removed at their request or for inactivity, the cumulative response rate for the wave is 2.3%.[10]

Science knowledge index

The Pew Research Center survey included a set of nine questions to tap public knowledge of science across a range of principles and topics. Most respondents (n=1,901) completed these questions as part of a previous wave of the American Trends Panel, conducted May 10-June 6, 2016. Respondents who did not participate in the previous wave answered these questions in this survey (n=636). The following shows the measurement properties of the index for the combined set of 2,537 respondents.[11]

As shown in the accompanying table, the internal reliability or consistency of the scale as measured by Cronbach's alpha is 0.75. Each of the items in the scale is at least moderately correlated with the other items.

An exploratory factor analysis finds one common factor explaining 76% of the common

Scale reliability and factor analysis

Knowledge index 9-items		Alpha for scale 0.75	Common variance explained by first factor 76%
	Item-rest correlation	Alpha if item is dropped	Factor loadings
KNOSCT22. Use of a control group to determine whether a new drug is effective	0.39	0.74	0.46
KNOSCT23. Carbon dioxide is made as a consequence of burning fossil fuels	0.47	0.73	0.55
KNOSCT27. The probability of an old bridge collapsing after a period of time	0.50	0.72	0.59
KNOSCT28. Only bacterial infections can be treated effectively by antibiotic medications	0.31	0.75	0.35
KNOSCT29. The use of a control "sugar pill" in a new drug trial is to rule out a possible placebo effect	0.43	0.73	0.50
KNOSCT31. The health benefits occurring when most people in a population get a vaccine is called herd immunity	0.45	0.73	0.52
KNOSCT32. An apple, salmon, corn and a mosquito can all be genetically modified.	0.47	0.73	0.55
KNOSCT33. Humans and mice share 50% or more of the same genetic make-up	0.43	0.73	0.50
KNOSCT34. Nitrogen makes up most of the Earth's atmosphere.	0.44	0.73	0.52

Source: Surveys conducted May 10-June 6, 2016 and April 23-May 6, 2018.
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[10] Approximately once per year, panelists who have not participated in multiple consecutive waves are removed from the panel. These cases are counted in the denominator of cumulative response rates. Note that for the March 2018 survey, we calculated the response rates by computing the mean rates for the subsampled respondents (based on the rates from the recruitment survey they joined the panel on).
[11] In statistical models controlling for demographics and education, there were no significant differences between respondents who completed the science knowledge items in 2016 (W17) and those who completed them in 2018 (W34) on either the overall index measure or the individual questions.

variance in the items. The factor loadings show that each of the nine questions is moderately correlated with the common factor. These indicators suggest a set of items is measuring a single underlying dimension.

Note that each of the science knowledge questions are coded as binary variables (correct/incorrect). Both Cronbach's alpha reliability analysis and the factor analysis are based on a Pearson's correlation matrix. Pearson correlations with binary variables are restricted to a limited range, underestimating the association between two variables when compared with tetrachoric correlations. We do not anticipate that the use of a Pearson's correlation matrix affects the unidimensional factor solution for the scale, however.

Two-parameter item response theory analysis

	% Correct	Discrimination	Difficulty
KNOSCT22. Use of a control group to determine whether a new drug is effective	68	1.36	-0.73
KNOSCT23. Carbon dioxide is made as a consequence of burning fossil fuels	72	1.74	-0.82
KNOSCT27. The probability of an old bridge collapsing after a period of time	62	2.14	-0.38
KNOSCT28. Only bacterial infections can be treated effectively by antibiotic medications	46	0.81	0.25
KNOSCT29. The use of a control "sugar pill" in a new drug trial is to rule out a possible placebo effect	59	1.60	-0.33
KNOSCT31. The health benefits occurring when most people in a population get a vaccine is called herd immunity	34	1.39	0.65
KNOSCT32. An apple, salmon, corn and a mosquito can all be genetically modified.	39	1.66	0.38
KNOSCT33. Humans and mice share 50% or more of the same genetic make-up	34	1.37	0.66
KNOSCT34. Nitrogen makes up most of the Earth's atmosphere.	31	1.55	0.74

Source: Surveys conducted May 10-June 6, 2016 and April 23-May 6, 2018. "Public Perspectives on Food Risks"

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We also ran an item-response theory analysis (IRT) to check how well each question distinguishes between those who know relatively more or less on the scale. This analysis fits a two-parameter logistic model, allowing discrimination and difficulty to vary across the items. Discrimination shows the ability of the question to distinguish between those with higher and lower science knowledge. Difficulty shows how easy or hard each question is for the average respondent. We did not include a guessing parameter in the model; the questionnaire offered respondents an explicit option of not sure on the survey.

The results show variation in difficulty across the items. The easiest item required respondents to identify that carbon dioxide as the gas that is made as a consequence of burning fossil fuels, while

the most difficult item required respondents to identify nitrogen as the gas that makes up most of the Earth's atmosphere.

Most of the questions also discriminate between those with higher and lower science knowledge. The item with strongest ability to discriminate was the question asking respondents to calculate the conditional probability of an old bridge over time. The question with the weakest ability to discriminate is that effectiveness of antibiotics to treat bacterial, but not other kinds of infections.

The test information curve mirrors a normal curve centered around zero, suggesting that the science knowledge index provides the most information about Americans near the mean level of knowledge.

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Appendix: Detailed tables

Political groups have similar views on many of these food issues

% of U.S. adults who say the following

	Rep/ lean Rep	Dem/ lean Dem	Rep-Dem Diff
Additives in the food people eat every day pose a serious risk to health	43	56	-13
Eating ___ has a great deal of health risk for the average person over their lifetime			
Fruits and vegetables grown with pesticides	28	34	-6
Meat from animals given antibiotics or hormones	28	34	-6
Food and drinks with artificial preservatives	24	27	-3
Food and drinks with artificial coloring	19	21	-2
Organic fruits and vegetables are better for health than conventionally grown foods	42	48	-6
GM foods are worse for health than foods with no GM ingredients	52	47	+5
GM foods will very likely ...			
Lead to health problems for the population as a whole	21	25	-4
Create problems for the environment	18	24	-6
Increase the global food supply	28	34	-6
Lead to more affordably priced food	22	28	-6

Notes: Respondents who gave other responses or who did not give an answer are not shown.
Source: Survey conducted April 23-May 6, 2018.
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Those who care a great deal about the GM foods issue hail from a mix of demographic groups

% of U.S. adults who say they care _____ about the issue of genetically modified foods

	A great deal	Some	Not too much/ Not at all
U.S. adults	22	39	39
Men	17	39	43
Women	26	39	35
White	18	40	41
Black	30	38	31
Hispanic	28	42	29
Ages 18-29	16	42	41
30-49	22	38	40
50-64	24	40	36
65+	23	38	38
Republican/lean Rep	19	38	42
Democrat/lean Dem	24	39	36
Among those with ___ science knowledge			
High	21	39	41
Medium	21	41	37
Low	24	37	39

Notes: Whites and blacks include non-Hispanics; Hispanics are of any race. Respondents who did not give an answer are not shown.
Source: Survey conducted April 23-May 6, 2018.
"Public Perspectives on Food Risks"

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Americans who care about the GM foods issue are closely divided over science's effect on food quality

% of U.S. adults who say science has had a ____ effect on the quality of food in the U.S.

	Mostly positive	Mostly negative
U.S. adults	70	29
Men	77	23
Women	64	35
Ages 18-29	66	34
30-49	68	31
50-64	71	27
65+	77	22
College grad or more	75	23
Some college	69	31
High school or less	68	32
Republican/lean Rep	70	29
Democrat/lean Dem	71	28
Among those with ___ science knowledge		
High	80	19
Medium	69	31
Low	64	34
Among those who care about the issue of GM foods ...		
A great deal	51	48
Some	69	30
Not too much/not at all	83	17

Notes: Respondents who did not give an answer are not shown.
Source: Survey conducted April 23-May 6, 2018.
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Half of Americans say at least one of four types of food additives pose a long-term health risk

% of U.S. adults who say at least one of four food additives poses a great deal of health risk to the average person over their lifetime

	One or more poses a great deal of risk	None pose a great deal of risk
U.S. adults	50	50
Men	41	59
Women	58	42
White	42	57
Black	62	36
Hispanic	67	33
Ages 18-29	48	50
30-49	45	55
50-64	54	46
65+	53	47
Republican/lean Rep	45	55
Democrat/lean Dem	52	47
Among those with ___ science knowledge		
High	34	66
Medium	51	49
Low	62	37
Among those who care about the issue of GM foods …		
A great deal	82	18
Some	54	45
Not too much/not at all	27	72
Among those who say ___ of the food they eat is organic		
Most/some	61	38
Not too much/none	42	58

Notes: Whites and blacks include non-Hispanics; Hispanics are of any race. Based on combined responses about the degree of health risk from four types of food additives.
Source: Survey conducted April 23-May 6, 2018.
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Survey questionnaire and topline

2018 PEW RESEARCH CENTER'S AMERICAN TRENDS PANEL
APRIL 23-MAY 6, 2018
TOTAL N=2,537

ADDITIONAL QUESTIONS PREVIOUSLY RELEASED OR HELD FOR FUTURE RELEASE

ASK ALL:
SCI2 Do you think science has had a mostly positive or mostly negative effect on the quality of the following in the U.S.? **[RANDOMIZE ITEMS]**

	Mostly positive	Mostly negative	No answer
a. Food			
Apr 23-May 6, 2018	70	29	1
b. Health care			
Apr 23-May 6, 2018	90	9	1
c. The environment			
Apr 23-May 6, 2018	76	23	1

TREND FOR COMPARISON
*Pew Research Center surveys conducted by telephone: Has science had a mostly positive or mostly negative effect on the quality of **[INSERT ITEM; RANDOMIZE]** in the U.S.? What about **[NEXT ITEM]**? **[IF NECESSARY**: Has science had a mostly positive or mostly negative effect on the quality of **[ITEM]** in the U.S.?**]***

	Mostly positive	*Mostly negative*	*Not had much of an effect* ***(VOL.)***	*DK/Ref* ***(VOL.)***
a. Food				
Aug 15-25, 2014	*62*	*34*	*1*	*3*
Apr 28-May 12, 2009[12]	*66*	*24*	*2*	*8*
b. Health care				
Aug 15-25, 2014	*79*	*18*	*1*	*3*
Apr 28-May 12, 2009	*85*	*10*	*1*	*4*
c. The environment				
Aug 15-25, 2014	*62*	*31*	*2*	*5*
Apr 28-May 12, 2009	*66*	*23*	*2*	*8*

[12] In 2009, the question stem did not explicitly mention "in the U.S.". The question wording was: "Has science had a mostly positive or mostly negative effect on the quality of [INSERT ITEM; RANDOMIZE]? What about [NEXT ITEM]? [IF NECESSARY: Has science had a mostly positive or mostly negative effect on the quality of [ITEM]?

RANDOMIZE EAT1 AND EAT2
ASK ALL:
Thinking about yourself…

EAT1 How often do you choose foods to eat because they are HEALTHY AND NUTRITIOUS?

Apr 23-May 6 2018	
12	All of the time
37	More than half of the time
32	About half of the time
16	Less than half of the time
3	Never
<1	No answer

ASK ALL:
EAT2 How often do you choose foods to eat because they are EASY AND MOST CONVENIENT?

Apr 23-May 6 2018	
11	All of the time
29	More than half of the time
30	About half of the time
26	Less than half of the time
3	Never
1	No answer

ASK ALL:
FUD30 Do you currently have any kind of food intolerance or food allergy?

[Check all that apply]

		Selected	Not selected /No answer
a.	I have a severe allergic reaction to some foods		
	Apr 23-May 6, 2018	5	95
	May 10-Jun 6, 2016	5	95
b.	I have a mild or moderate allergic reaction to some foods		
	Apr 23-May 6, 2018	10	90
	May 10-Jun 6, 2016	11	89
c.	I have an intolerance to some foods		
	Apr 23-May 6, 2018	16	84
	May 10-Jun 6, 2016	17	83
d.	No, None of these **[EXCLUSIVE PUNCH]**		
	Apr 23-May 6, 2018	71	29
	May 10-Jun 6, 2016	69	31

ASK ALL:
EAT3 Which of the following, if any, do you restrict or limit eating on a regular basis?

[Check all that apply] **[RANDOMIZE ITEMS WITH ITEM K ALWAYS LAST]**

	Selected	Not selected /No answer
a. Fat		
Apr 23-May 6, 2018	28	72
b. Meat		
Apr 23-May 6, 2018	13	87
c. Dairy		
Apr 23-May 6, 2018	17	83
d. Salt		
Apr 23-May 6, 2018	29	71
e. Cholesterol		
Apr 23-May 6, 2018	24	76
f. Sugar		
Apr 23-May 6, 2018	38	62
g. Artificial preservatives		
Apr 23-May 6, 2018	33	67
h. Artificial colors		
Apr 23-May 6, 2018	28	72
i. Artificial sweeteners		
Apr 23-May 6, 2018	44	56
j. Gluten		
Apr 23-May 6, 2018	12	88
k. None of these **[EXCLUSIVE PUNCH]**		
Apr 23-May 6, 2018	24	76

ASK ALL:
FUD22 How much of the food you eat is organic?

Apr 23-May 6 2018		May 10-June 6 2016
7	Most of it	6
32	Some of it	34
43	Not too much	44
18	None at all	15
1	No answer	1

ASK ALL:
FUD24 Do you think organic fruits and vegetables are generally…

Apr 23-May 6 2018		May 10-June 6 2016
45	Better for one's health than conventionally grown foods	55
3	Worse for one's health than conventionally grown foods	3
51	Neither better nor worse for one's health than conventionally grown foods	41
1	No answer	1

ASK ALL:
EAT5 How much health risk, if any, does eating each of the following have for the average person over the course of their lifetime? **[RANDOMIZE ITEMS]**

		A great deal of health risk	Some health risk	Not too much health risk	No health risk at all	No Answer
a.	Fruits and vegetables grown with pesticides					
	Apr 23-May 6, 2018	31	48	17	3	<1
b.	Meat from animals that have been given antibiotics or hormones					
	Apr 23-May 6, 2018	32	48	16	4	<1
c.	Food and drinks with artificial coloring					
	Apr 23-May 6, 2018	21	48	25	6	<1
d.	Food and drinks with artificial preservatives					
	Apr 23-May 6, 2018	26	52	18	4	<1

ASK ALL:
EAT6 Which of these statements comes closer to your view, even if neither is exactly right? **[RANDOMIZE RESPONSE OPTIONS]**

Apr 23-May 6 2018	
51	The average person is exposed to additives in the food they eat every day, which pose a serious risk to their health
48	The average person is exposed to additives in the food they eat every day but they eat such a small amount that this does not pose a serious health risk
2	No answer

ASK ALL:

FUD32 Genetically modified foods, sometimes called GMOs, come from a technique that adds genes from other organisms to change that food's genetic characteristics.

How much, if anything, have you heard or read about foods with genetically modified ingredients?

Apr 23-May 6 2018		May 10-June 6 2016
29	A lot	29
58	A little	52
13	Nothing at all	19
<1	No answer	<1

ASK ALL:

FUD33A Do you think foods with genetically modified ingredients are generally…

Apr 23-May 6 2018		May 10-June 6 2016
4	Better for your health than foods with no genetically modified ingredients	7
40	Worse for your health than foods with no genetically modified ingredients	33
29	Neither better nor worse for your health than foods with no genetically modified ingredients	32
26	Not sure	26
1	No answer	1

ASK IF NO ANSWER OR NOT SURE (FUD33A=8,99) [N=656]:

FUD33B Even if you are not sure, which is closer to your views? Do you think foods with genetically modified ingredients are generally…

Apr 23-May 6 2018		May 10-June 6 2016
4	Better for your health than foods with no genetically modified ingredients	11
34	Worse for your health than foods with no genetically modified ingredients	22
57	Neither better nor worse for your health than foods with no genetically modified ingredients	58
4	No answer	10

COMBINED RESPONSES FUD33A AND FUD33B:

Apr 23-May 6 2018		May 10-June 6 2016
5	Better for your health than foods with no genetically modified ingredients	10
49	Worse for your health than foods with no genetically modified ingredients	39
44	Neither better nor worse for your health than foods with no genetically modified ingredients	48
1	No answer	3

ASK ALL:
FUD35 How much do you, personally, care about the issue of genetically modified foods?

Apr 23-May 6 2018		May 10-June 6 2016
22	A great deal	16
39	Some	37
28	Not too much	31
10	Not at all	15
<1	No answer	<1

ASK ALL:
FUD37 How likely is it that genetically modified foods will… **[RANDOMIZE ITEMS]**

		Very likely	Fairly likely	Not too likely	Not at all likely	No Answer
a.	Lead to more affordably-priced food					
	Apr 23-May 6, 2018	25	38	30	6	1
	May 10-June 6, 2016	20	36	31	11	2
b.	Lead to health problems for the population as a whole					
	Apr 23-May 6, 2018	24	35	32	7	1
	May 10-June 6, 2016	16	33	39	10	2
c.	Create problems for the environment					
	Apr 23-May 6, 2018	21	35	36	6	1
	May 10-June 6, 2016	18	31	39	9	2
d.	Increase the global food supply					
	Apr 23-May 6, 2018	31	45	19	4	1
	May 10-June 6, 2016	25	44	23	6	3

ADDITIONAL QUESTIONS PREVIOUSLY RELEASED OR HELD FOR FUTURE RELEASE

NOTE: RESULTS SHOWN FOR KNOSCT22-KNOSCT34 INCLUDE 636 RESPONDENTS WHO ANSWERED THESE QUESTIONS APR 23-MAY 6, 2018 COMBINED WITH 1,901 RESPONDENTS WHO ANSWERED THESE QUESTIONS IN A PREVIOUS WAVE FIELDED MAY 10-JUNE 6, 2016.

ASK ALL:
Here's a different kind of question. (If you don't know the answer, select "Not sure." As far as you know…

KNOSCT22 Here's a different kind of question. (If you don't know the answer, select "Not sure.") As far as you know...

Which is the better way to determine whether a new drug is effective in treating a disease? If a scientist has a group of 1,000 volunteers with the disease to study, should she… **[RANDOMIZE OPTIONS 1 AND 2]**

Apr 23-May 6 2018	
68	Give the drug to half of them but not to the other half, and compare how many in each group get better *(Correct)*
32	NET Incorrect/Not sure/No answer
14	Give the drug to all of them and see how many get better
18	Not sure
<1	No answer

[RANDOMIZE ITEMS KNOSCT23 TO KNOSCT34; KNOSCT22 ALWAYS FIRST]

ASK ALL:

KNOSCT23 Which gas is made as a consequence of burning fossil fuels? Is it… **[RANDOMIZE OPTIONS 1-4]**[13]

Apr 23-May 6 2018	
72	Carbon dioxide *(Correct)*
28	NET Incorrect/Not sure/No answer
4	Hydrogen
1	Helium
3	Radon
20	Not sure
<1	No answer

NO QUESTION KNOSCT24, KNOSCT25 AND KNOSCT26

ASK ALL:

KNOSCT27 If the chances that an old bridge will collapse starts at 1% in week 1 and doubles each week (as shown below), what is the chance that the old bridge will collapse during week 7?

Chances the bridge will collapse is…
- 1% at Week 1
- 2% at Week 2
- 4% at Week 3
- 8% at Week 4

Enter the % chance that the bridge will collapse at Week 7 (if the bridge is still standing after Week 6)[14]

Apr 23-May 6 2018	
62	64% *(Correct)*
38	NET Incorrect/Not sure/No answer
20	All other numeric responses
17	Not sure
1	No answer

[13] In the Wave 17 May 2016 survey, the question had a minor wording difference: "What gas is made as a consequence of burning fossil fuels? Is it…"

[14] The phrase "(if the bridge is still standing after Week 6)" was added for clarity in the Apr 23-May 6, 2018 wave.

ASK ALL:
KNOSCT28 Which of the following conditions can be treated effectively by antibiotic medications?

[Check all that apply] **[RANDOMIZE ITEMS WITH ITEMS e AND f ALWAYS LAST]**

Apr 23-May 6 2018	
46	Bacterial infection only *(Correct)*
54	NET Incorrect/Not sure/No answer

KNOSCT28 INDIVIDUAL ITEM RESPONSES

	Selected	Not selected /No answer
a. Viral infections (such as a cold)	23	77
b. Fungal infections (such as athlete's foot)	28	72
c. Bacterial infections (such as strep throat infections)	83	17
d. Allergic reactions to insect bites	17	83
e. None of these **[EXCLUSIVE PUNCH]**	2	98
f. Not sure **[EXCLUSIVE PUNCH]**	9	91

ASK ALL:
KNOSCT29 If a scientist wants to determine if a new drug is effective at treating high blood pressure by giving half of a group of 1,000 volunteers a new medication and the other half a "sugar pill" she wants to rule out… **[RANDOMIZE OPTIONS 1-3]**

Apr 23-May 6 2018	
59	A placebo effect *(Correct)*
41	NET Incorrect/Not sure/No answer
4	A third person effect
16	A false consensus effect
20	Not sure
1	No answer

NO QUESTION KNOSCT30

ASK ALL:
KNOSCT31 Which of these terms refers to health benefits occurring when most people in a population get a vaccine? **[RANDOMIZE OPTIONS 1-3]**

Apr 23-May 6 2018	
34	Herd immunity *(Correct)*
66	NET Incorrect/Not sure/No answer
8	Population control
35	Vaccination rate
23	Not sure
1	No answer

ASK ALL:
KNOSCT32 Which of the following can be genetically modified?

[Check all that apply] **[RANDOMIZE ITEMS WITH ITEMS e AND f ALWAYS LAST]**

Apr 23-May 6 2018	
39	Selected all *(Correct)*
61	NET Incorrect/Not sure/No answer

KNOSCT32 INDIVIDUAL ITEM RESPONSES

	Selected	Not selected /No answer
a. An apple	61	39
b. Salmon	53	47
c. A mosquito	46	54
d. Corn	70	30
e. None of these **[EXCLUSIVE PUNCH]**	2	98
f. Not sure **[EXCLUSIVE PUNCH]**	20	80

ASK ALL:
KNOSCT33 Humans and mice share the same genetic make-up by… **[RANDOMIZE ORDER LOW TO HIGH; HIGH TO LOW with NOT SURE ALWAYS LAST]**

Apr 23-May 6 2018	
34	About 50% or more *(Correct)*
66	NET Incorrect/Not sure/No answer
8	Less than 10%
14	Between 11% and 49%
44	Not sure
1	No answer

ASK ALL:
KNOSCT34 Which gas makes up most of the Earth's atmosphere? **[RANDOMIZE OPTIONS 1-4]**

Apr 23-May 6 2018	
31	Nitrogen *(Correct)*
69	NET Incorrect/Not sure/No answer
9	Hydrogen
9	Carbon dioxide
35	Oxygen
15	Not sure
1	No answer

TOTAL NUMBER CORRECT KNOSCT22 THROUGH KNOSCT34:

Apr 23-May 6 2018	
4	9 out of 9
10	8 out of 9
10	7 out of 9
13	6 out of 9
12	5 out of 9
13	4 out of 9
11	3 out of 9
12	2 out of 9
9	1 out of 9
6	0 out of 9
24	High science knowledge (7-9 correct)
49	Medium science knowledge (3-6 correct)
26	Low science knowledge (0-2 correct)