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60% of Americans Would Be Uncomfortable With Provider Relying on AI in Their Own Health Care

Yet many see promise for artificial intelligence to help issues of bias in medical care

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How we did this

Pew Research Center conducted this study to understand Americans' views of artificial intelligence (AI) and its uses in health and medicine. For this analysis, we surveyed 11,004 U.S. adults from Dec. 12-18, 2022.

Everyone who took part in the survey is a member of the Center's American Trends Panel (ATP), an online survey panel that is recruited through national, random sampling of residential addresses. This way, nearly all U.S. adults have a chance of selection. The survey is weighted to be representative of the U.S. adult population by gender, race, ethnicity, partisan affiliation, education and other categories. Read more about the [ATP's methodology](#).

Here are the [questions used](#) for this report, along with responses, and [its methodology](#).

This is part of a series of surveys and reports that look at the increasing [role of AI](#) in shaping American life. For more, read "[Public Awareness of Artificial Intelligence in Everyday Activities](#)" and "[How Americans view emerging uses of artificial intelligence, including programs to generate text or art.](#)"

60% of Americans Would Be Uncomfortable With Provider Relying on AI in Their Own Health Care

Yet many see promise for artificial intelligence to help issues of bias in medical care

A new Pew Research Center survey explores public views on artificial intelligence (AI) in [health and medicine](#) – an area where Americans may [increasingly encounter](#) technologies that do things like screen for skin cancer and even monitor a patient’s vital signs.

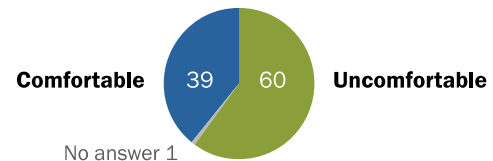
The survey finds that on a personal level, there’s significant discomfort among Americans with the idea of AI being used in their own health care. Six-in-ten U.S. adults say they would feel *uncomfortable* if their own health care provider relied on artificial intelligence to do things like diagnose disease and recommend treatments; a significantly smaller share (39%) say they would feel comfortable with this.

One factor in these views: A majority of the public is unconvinced that the use of AI in health and medicine would improve health outcomes. The Pew Research Center survey, conducted Dec. 12-18, 2022, of 11,004 U.S. adults finds only 38% say AI being used to do things like diagnose disease and recommend treatments would lead to better health outcomes for patients generally, while 33% say it would lead to worse outcomes and 27% say it wouldn’t make much difference.

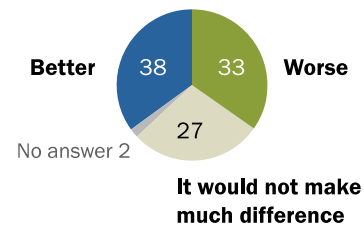
Fewer than half in U.S. expect artificial intelligence in health and medicine to improve patient outcomes

% of U.S. adults who say that thinking about the use of artificial intelligence in health and medicine to do things like diagnose disease and recommend treatments ...

They would feel __ if their health care provider relied on it for their medical care



It would lead to __ health outcomes for patients



Source: Survey conducted Dec. 12-18, 2022.

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These findings come as public attitudes toward AI continue to take shape, amid the ongoing adoption of AI technologies across industries and the accompanying national conversation about the benefits and risks that AI applications present for society. Read recent Center analyses for more on public awareness of [AI in daily life](#) and perceptions of how much advancement [emerging AI applications represent for their fields](#).

Asked in more detail about how the use of artificial intelligence would impact health and medicine, Americans identify a mix of both positives and negatives.

On the positive side, a larger share of Americans think the use of AI in health and medicine would reduce rather than increase the number of mistakes made by health care providers (40% vs. 27%).

And among the majority of Americans who see a problem with racial and ethnic bias in health care, a much larger share say the problem of bias and unfair treatment would get better (51%) than worse (15%) if AI was used more to do things like diagnose disease and recommend treatments for patients.

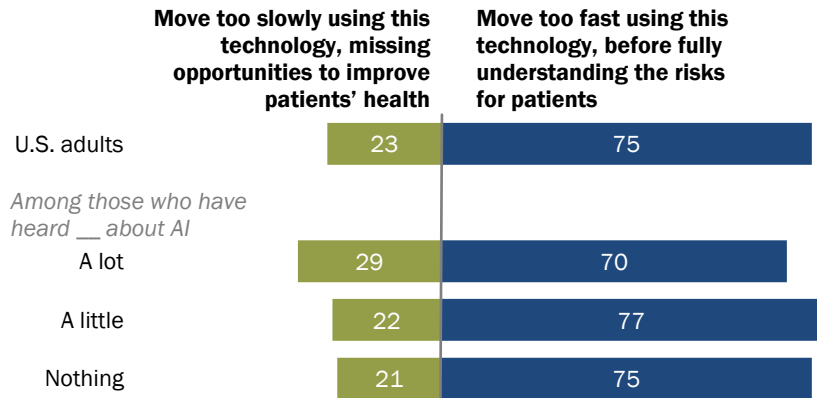
But there is wide concern about AI's potential impact on the personal connection between a patient and health care provider: 57% say the use of artificial intelligence to do things like diagnose disease and recommend treatments would make the patient-provider relationship worse. Only 13% say it would be better.

The security of health records is also a source of some concern for Americans: 37% think using AI in health and medicine would make the security of patients' records worse, compared with 22% who think it would improve security.

Though Americans can identify a mix of pros and cons regarding the use of AI in health and medicine, caution remains a dominant theme in public views. When it comes to the pace of technological adoption, three-quarters of Americans say their greater concern is that health care providers will move too fast implementing AI in health and medicine before fully understanding the risks for patients; far fewer (23%) say they are more concerned that providers will move too slowly, missing opportunities to improve patients' health.

Americans more concerned that health care providers will adopt AI technologies too fast than too slowly

% of U.S. adults who say that, thinking about the use of artificial intelligence in health and medicine to do things like diagnose disease and recommend treatments, they are more concerned that health care providers will ...



Note: Respondents who did not give an answer are not shown.

Source: Survey conducted Dec. 12-18, 2022.

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Concern over the pace of AI adoption in health care is widely shared across groups in the public, including those who are the most familiar with artificial intelligence technologies.

Younger adults, men, those with higher levels of education are more open to the use of AI in their own health care

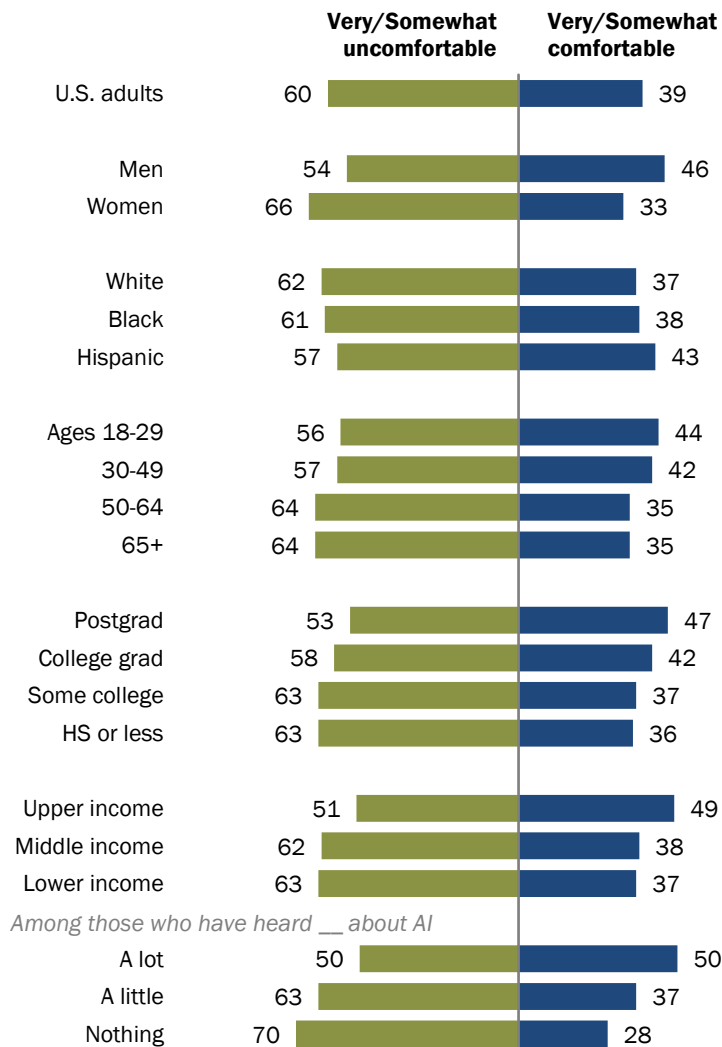
There is more openness to the use of AI in a person's own health care among some demographic groups, but discomfort remains the predominant sentiment.

Among men, 46% say they would be comfortable with the use of AI in their own health care to do things like diagnose disease and recommend treatments, while 54% say they would be uncomfortable with this. Women express even more negative views: 66% say they would be uncomfortable with their provider relying on AI in their own care.

Those with higher levels of education and income, as well as younger adults, are more open to AI in their own health care than other groups. Still, in all cases, about half or more express discomfort with their own health care provider relying on AI.

Majority of U.S. adults would be uncomfortable if their health care provider relied on artificial intelligence

% of U.S. adults who say that they would feel ___ if their health care provider relied on artificial intelligence to do things like diagnose disease and recommend treatments



Note: Respondents who did not give an answer are not shown. White and Black adults include those who report being only one race and are not Hispanic. Hispanics are of any race. Family income tiers are based on adjusted 2021 earnings.

Source: Survey conducted Dec. 12-18, 2022.

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Among those who say they have heard a lot about artificial intelligence, 50% are comfortable with the use of AI in their own health care; an equal share say they are uncomfortable with this. By comparison, majorities of those who have heard a little (63%) or nothing at all (70%) about AI say they would be uncomfortable with their own health care provider using AI.

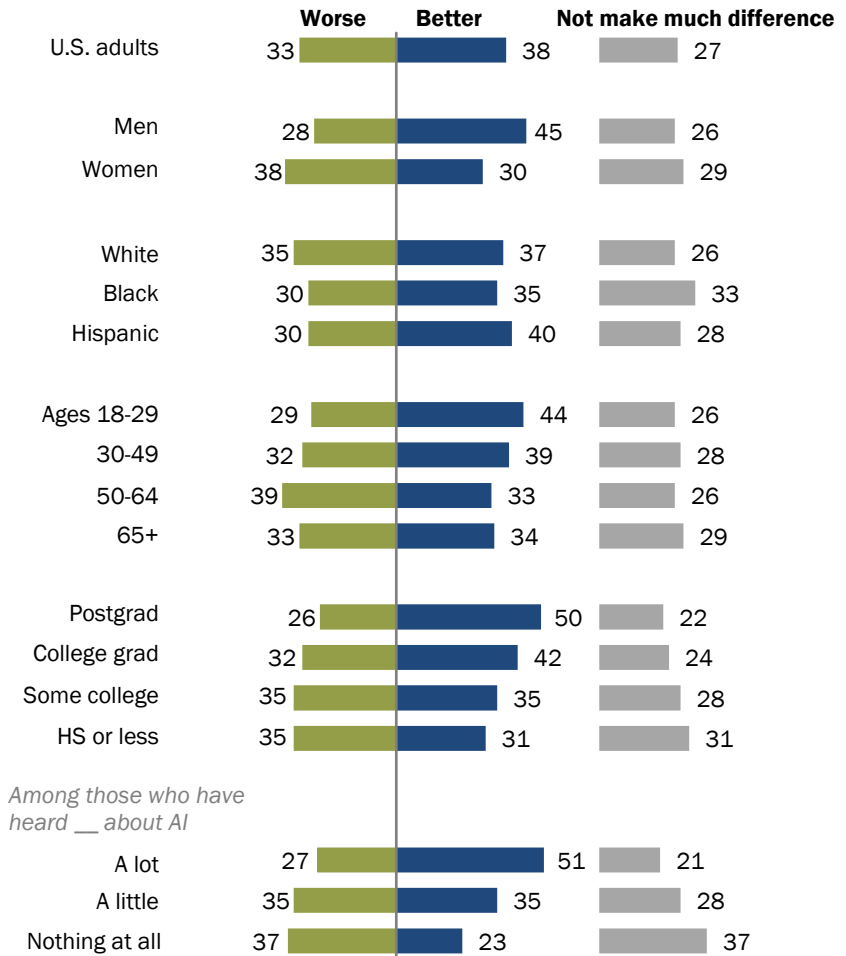
At this stage of development, a modest share of Americans see AI delivering improvements for patient outcomes. Overall, 38% think that AI in health and medicine would lead to better overall outcomes for patients. Slightly fewer (33%) think it would lead to worse outcomes and 27% think it would not have much effect.

Men, younger adults, and those with higher levels of education are more positive about the impact of AI on patient outcomes than other groups, consistent with the patterns seen in personal comfort with AI in health care. For instance, 50% of those with a postgraduate degree think the use of AI to do things like diagnose disease and recommend treatments would lead to better health outcomes for patients; significantly fewer (26%) think it would lead to worse outcomes.

Americans who have heard a lot about AI are also more optimistic about the impact of AI in health and medicine for patient outcomes than those who are less familiar with artificial intelligence technology.

38% of Americans think that the use of AI in health care would improve patient outcomes

% of U.S. adults who say that the use of artificial intelligence in health and medicine to do things like diagnose disease and recommend treatments would lead to ___ health outcomes for patients



Note: Respondents who did not give an answer are not shown. White and Black adults include those who report being only one race and are not Hispanic. Hispanics are of any race. Family income tiers are based on adjusted 2021 earnings.

Source: Survey conducted Dec. 12-18, 2022.

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Four-in-ten Americans think AI in health and medicine would reduce the number of mistakes, though a majority say patient-provider relationships would suffer

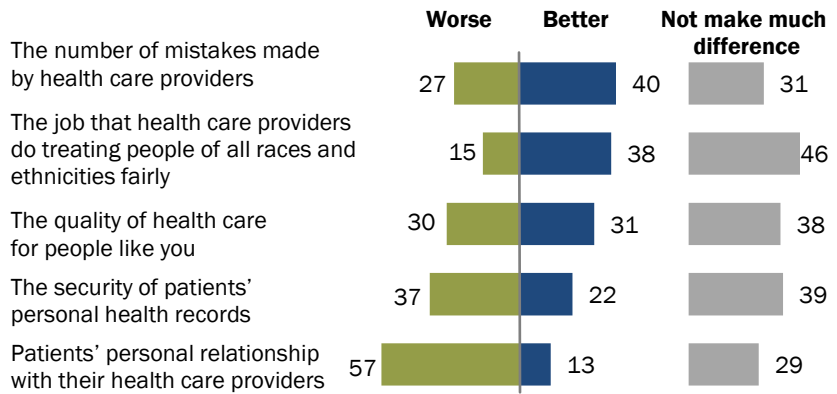
Americans anticipate a range of positive and negative effects from the use of AI in health and medicine.

The public is generally optimistic about the potential impact of AI on medical errors. Four-in-ten Americans say AI would reduce the number of mistakes made by health care providers, while 27% think the use of AI would lead to more mistakes and 31% say there would not be much difference.

Many also see potential downsides from the use of AI in health and medicine. A greater share of Americans say that the use of AI would make the security of patients' health records worse (37%) than better (22%). And 57% of Americans expect a patient's personal relationship with their health care provider to deteriorate with the use of AI in health care settings.

Americans tilt positive on AI's ability to reduce medical errors; greater concern around data security, patient-provider relationships

% of U.S. adults who say the use of artificial intelligence in health and medicine to do things like diagnose diseases and recommend treatments would make each of the following ...



Note: Respondents who did not give an answer are not shown.

Source: Survey conducted Dec. 12-18, 2022.

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The public is divided on the question of how it would impact the quality of care: 31% think using AI in health and medicine would make care for people like themselves better, while about as many (30%) say it would make care worse and 38% say it wouldn't make much difference.

Americans who are concerned about bias based on race and ethnicity in health and medicine are more optimistic than pessimistic about AI's potential impact on the issue

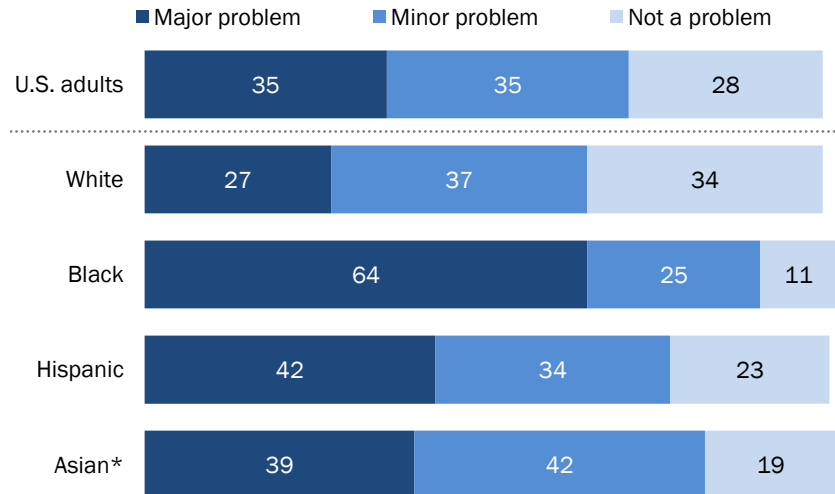
When it comes to bias and unfair treatment in health and medicine based on a patient's race or ethnicity, a majority of Americans say this is a major (35%) or minor (35%) problem; 28% say racial and ethnic bias is not a problem in health and medicine.

There are longstanding efforts by the [federal government](#) and across the [health and medical care sectors](#) to address racial and ethnic inequities in access to care and in health outcomes.

Black adults are especially likely to say that bias based on a patient's race or ethnicity is a *major* problem in health and medicine (64%). About four-in-ten Hispanic (42%) and English-speaking Asian adults (39%) also say this. A smaller share of White adults (27%) describe bias and unfair treatment related to a patient's race or ethnicity as a major problem in health and medicine.

64% of Black adults say bias based on patients' race or ethnicity is a major problem in health and medicine

% of U.S. adults who say that bias and unfair treatment based on patients' race or ethnicity is a ___ in health and medicine



* Estimates for Asian adults are representative of English speakers only.

Note: Respondents who did not give an answer are not shown. White, Black and Asian adults include those who report being only one race and are not Hispanic. Hispanics are of any race.

Source: Survey conducted Dec. 12-18, 2022.

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On balance, those who see bias based on race or ethnicity as a problem in health and medicine think AI has potential to improve the situation. About half (51%) of those who see a problem think the increased use of AI in health care would help reduce bias and unfair treatment, compared with 15% who say the use of AI would make bias and unfair treatment worse. A third say the problem would stay about the same.

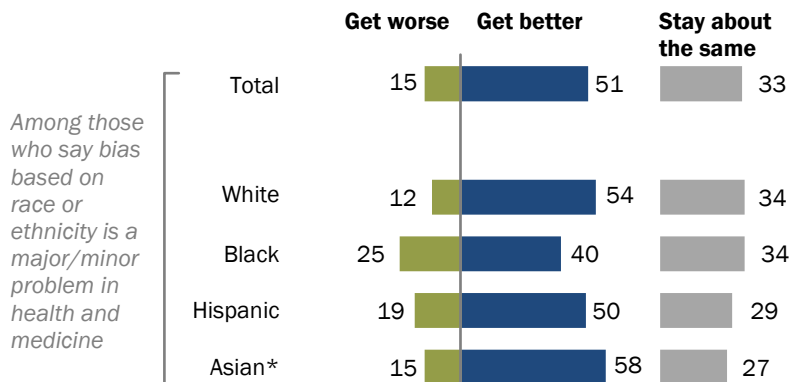
Among those who see a problem with bias in health and medicine, larger shares think the use of AI would make this issue better than worse among White (54% vs. 12%, respectively), Hispanic (50% vs. 19%) and English-speaking Asian (58% vs. 15%) adults.

Views among Black adults also lean in a more positive than negative direction, but by a smaller margin (40% vs. 25%).

Note that for Asian adults, the Center estimates are representative of English speakers only. Asian adults with higher levels of English language proficiency tend to have higher levels of [education](#) and [family income](#) than Asian adults in the U.S. with lower levels of English language proficiency.

Among those who see a problem with bias based on race or ethnicity in medicine, 51% think relying more on AI would make the issue better

*% who say that if artificial intelligence is used more in health and medicine to do things like diagnose disease and recommend treatments, the **issue of bias and unfair treatment** based on a patient's race or ethnicity would ...*



* Estimates for Asian adults are representative of English speakers only.

Note: Based on those who say bias based on race or ethnicity is a major or minor problem in health and medicine. Respondents who did not give an answer are not shown. White, Black and Asian adults include those who report being only one race and are not Hispanic. Hispanics are of any race.

Source: Survey conducted Dec. 12-18, 2022.

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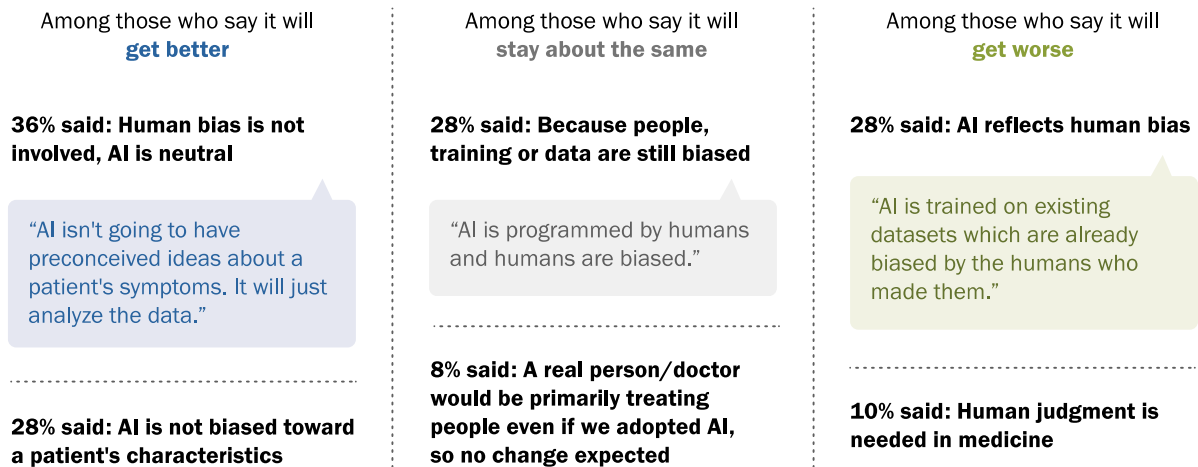
About half of those who see racial or ethnic bias in health and medicine think the use of artificial intelligence would help address the issue

Among those who say racial or ethnic bias is a **major/minor problem** in health and medicine, % who say that if artificial intelligence is used more, the issue of bias and unfair treatment based on a patient's race or ethnicity would ...



Here are the main reasons they gave

% who give the following as a reason for their response above



Note: Based on those who say bias based on race or ethnicity is a major or minor problem in health and medicine. Verbatim responses have been coded into categories. Respondents who gave other responses or did not give an answer are not shown.

Source: Survey conducted Dec. 12-18, 2022.

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Asked for more details on their views about the impact of AI on bias in health and medicine, those who think it would improve the situation often explain their view by describing AI as more objective or dispassionate than humans. For instance, 36% say AI would improve racial and ethnic bias in medicine because it is more neutral and consistent than people and human prejudice is not involved. Another 28% explain their view by expressing the sense that AI is not biased toward a patient's characteristics. Examples of this sentiment include respondents who say AI would be blind to a patient's race or ethnicity and would not be biased toward their overall appearance.

Among those who think that the problem of bias in health and medicine would stay about the same with the use of AI, 28% say the main reason for this is because the people who design and train AI, or the data AI uses, are still biased. About one-in-ten (8%) in this group say that AI would not change the issue of bias because a human care provider would be primarily treating people even if AI was adopted, so no change would be expected.

Among those who believe AI will make bias and unfair treatment based on a patient's race or ethnicity worse, 28% explain their viewpoint by saying things like AI reflects human bias or that the data AI is trained on can reflect bias. Another reason given by 10% of this group is that AI would make the problem worse because human judgment is needed in medicine. These responses emphasized the importance of personalized care offered by providers and expressed the view that AI would not be able to replace this aspect of health care.

Americans' views on AI applications used in cancer screening, surgery and mental health support

The Center survey explores views on four specific applications of AI in health and medical care that are in use today or being developed for widespread use: AI-based tools for skin cancer screening; AI-driven robots that can perform parts of surgery; AI-based recommendations for pain management following surgery; and AI chatbots designed to support a person's mental health.

Public awareness of AI in health and medicine is still in the process of developing, yet even at this early stage, Americans make distinctions between the types of applications they are more and less open to. For instance, majorities say they would want AI-based skin cancer detection used in their own care and think this technology would improve the accuracy of diagnoses. By contrast, large shares of Americans say they would not want any of the three other AI-driven applications used in their own care.

For more on how Americans view the impact of these four developments read, "[How Americans view emerging uses of artificial intelligence, including programs to generate text or art.](#)"

AI-based skin cancer screening

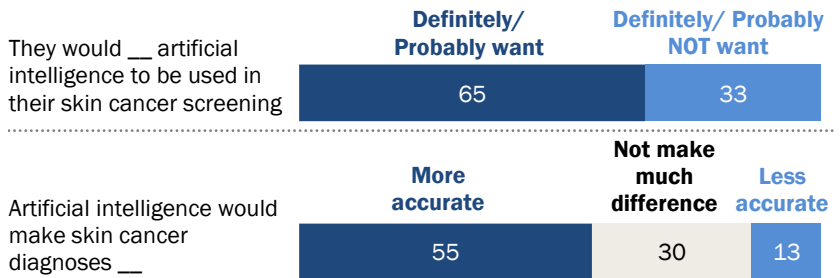
AI used for skin cancer detection can scan images of people’s skin and flag areas that may be skin cancer for testing.

Nearly two-thirds of U.S. adults (65%) say that they would definitely or probably want AI to be used for their own skin cancer screening. Consistent with this view, about half (55%) believe that AI would make skin cancer diagnoses more accurate. Only 13% believe it would lead to less accurate diagnoses, while 30% think it wouldn’t make much difference.

On the whole, Americans who are aware of this AI application view it as an advance for medical care: 52% describe it as a major advance while 27% call it a minor advance. Very few (7%) say it is not an advance for medical care.

Majority of Americans say they would want AI to be used in their own skin cancer screening

% of U.S. adults who say ...



Note: Respondents who did not give an answer are not shown.
 Source: Survey conducted Dec. 12-18, 2022.
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Majorities of most major demographic groups say they would want AI to be used in their own screening for skin cancer, with men, younger adults, and those with higher education levels particularly enthused.

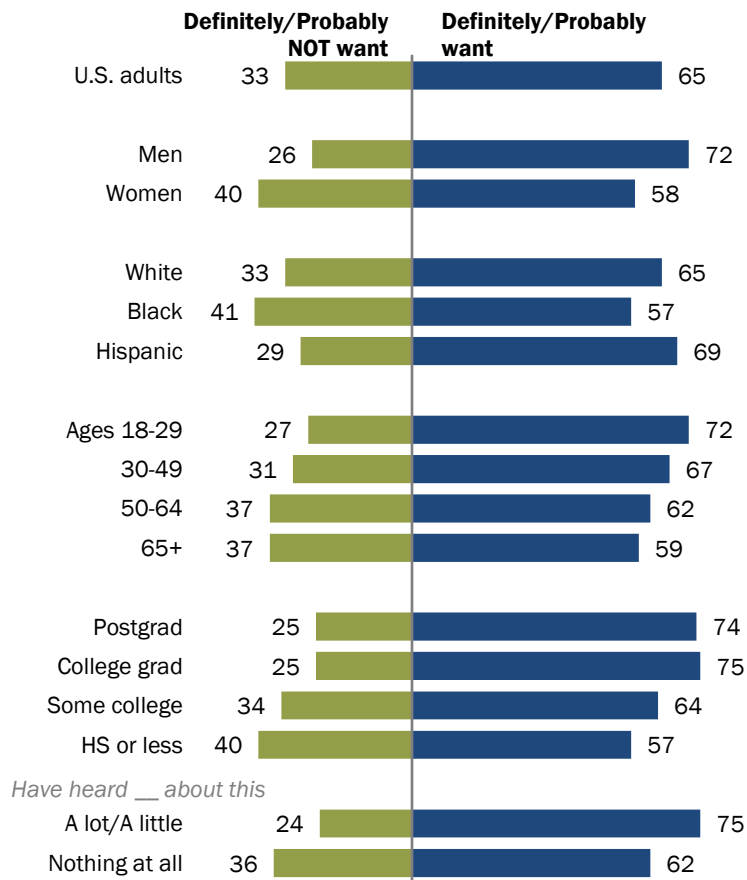
A larger majority of men (72%) than women (58%) say they would want AI to be used in their screening for skin cancer.

Black adults (57%) are somewhat less likely than White (65%) and Hispanic (69%) adults to say they would want AI used for skin cancer screening. Experts have raised [questions about the accuracy](#) of AI-based skin cancer systems for darker skin tones.

Younger adults are more open to using this form of AI than older adults, and those with a college degree are more likely to say they would want this than those without a college degree.

65% of U.S. adults say they would want AI to be used in their own skin cancer screening

% of U.S. adults who say they would ___ artificial intelligence to be used in their screening for skin cancer



Note: Respondents who did not give an answer are not shown. White and Black adults include those who report being only one race and are not Hispanic. Hispanics are of any race.

Source: Survey conducted Dec. 12-18, 2022.

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In addition, those who have heard at least a little about the use of AI in skin cancer screening are more likely than those who have heard nothing at all to say they would want this tool used in their own care (75% vs. 62%).

AI for pain management recommendations

AI is being used to help physicians [prescribe pain medication](#). AI-based pain management systems are designed to minimize the chances of patients becoming addicted to or abusing medications; they use machine learning models to predict things like which patients are at high risk for severe pain and which patients could benefit from pain management techniques that do not involve opioids.

Asked to consider their own preferences for treatment of pain following surgery, 31% of Americans say they would want this kind of AI guiding their pain management treatment while two-thirds (67%) say they would not.

This reluctance is in line with people's beliefs about the effect of AI-based pain management recommendations. About a quarter (26%) of U.S. adults say that pain treatment would get better with AI, while a majority say either that this would make little difference (40%) or lead to worse pain care (32%).

Two-thirds of U.S. adults say they would not want AI to help determine amount of pain medication they get

% of U.S. adults who say ...

They would __ artificial intelligence to help decide the amount of pain medication they would get after a surgery



Artificial intelligence would make patients' treatment for pain __



Note: Respondents who did not give an answer are not shown.

Source: Survey conducted Dec. 12-18, 2022.

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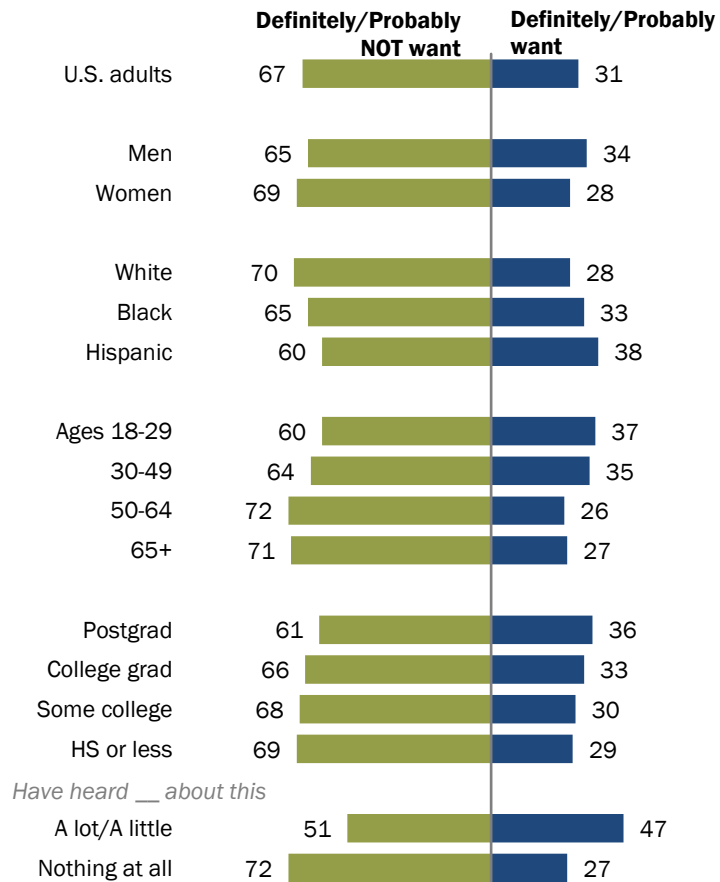
Among those who say they've heard at least a little about this use of AI, fewer than half (30%) see it as a major advance for medical care, while another 37% call it a minor advance. By comparison, larger shares of those aware of AI-based skin cancer detection and AI-driven robots in surgery view these applications as major advances for medical care.

Those with some familiarity with AI-based pain management systems are more open to using AI in their own care plan. Of those who say they have heard at least a little about this, 47% say they would want AI-based recommendations used in their post-op pain treatment, compared with 51% who say they would not want this. By comparison, a large majority (72%) of those not familiar with this technology prior to the survey say they would not want this.

Demographic differences on this question are generally modest, with majorities of most groups saying they would *not* want AI to help decide their pain treatment program following a surgery.

U.S. adults aware of AI use in pain management more likely to want this in their own care than those unfamiliar with this technology

% of U.S. adults who say they would __ artificial intelligence to help decide the amount of pain medication they would get after a surgery



Note: Respondents who did not give an answer are not shown. White and Black adults include those who report being only one race and are not Hispanic. Hispanics are of any race.

Source: Survey conducted Dec. 12-18, 2022.

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Performing surgery with AI-driven robots

AI-driven robots are in development that could complete surgical procedures on their own, with full autonomy from human surgeons. These AI-based surgical robots are being tested to perform [parts of complex surgical procedures](#) and are expected to increase the precision and consistency of the surgical operation.

Americans are cautious toward the idea of surgical robots used in their own care: Four-in-ten say they would want AI-based robotics for their own surgery, compared with 59% who say they would not want this.

Still, Americans with at least some awareness of these AI-based surgical robots are, by and large, convinced they represent an advance for medical science: 56% of this group says it is a major advance and another 22% calls it a minor advance. (For more on how Americans view advances in artificial intelligence, read [“How Americans view emerging uses of artificial intelligence, including programs to generate text or art.”](#) Public familiarity with the idea of AI-based surgical robots is higher than for the three other health and medical applications included on the survey; 59% say they have heard at least a little about this development.

59% of Americans say they would not want AI-powered robots to be used in their own surgery

% of U.S. adults who say they would ___ surgical robots with artificial intelligence to be used if they were getting surgery



Note: Respondents who did not give an answer are not shown.

Source: Survey conducted Dec. 12-18, 2022.

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As with other AI applications included in the survey, those unfamiliar with AI-driven robots in surgery are especially likely to say they would not want them used in their own care (74% say this). Those who have heard of this use of AI before are evenly divided: 50% say they would want AI-driven robots to be used in their surgery, while 49% say they wouldn't want this.

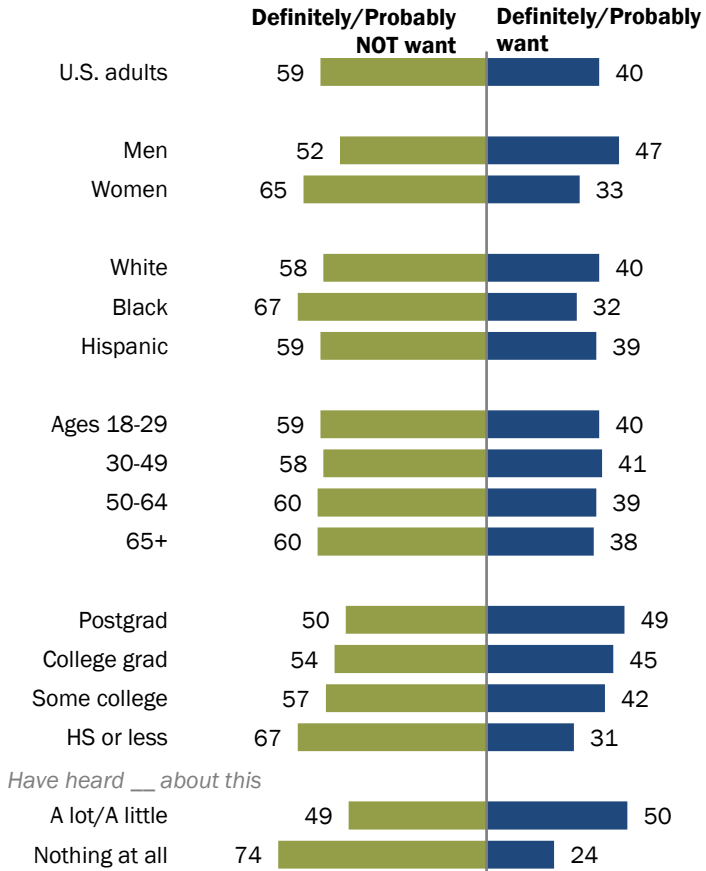
Across demographic groups, men are more inclined than women to say they would want an AI-based robot for their own surgery (47% vs. 33%). And those with higher levels of education are more open to this technology than those with lower levels of education.

There is little difference between the views of older and younger adults on this: Majorities across age groups say they would *not* want an AI-based robot for their own surgery. This contrasts with preferences about other uses

of AI in medical care in which younger adults are more likely than older adults to say they would want AI applications for skin cancer screening or pain management.

Men more likely than women to say they would want surgical robots with AI to be used in their own care

% of U.S. adults who say they would ___ surgical robots with artificial intelligence to be used if they were getting surgery



Note: Respondents who did not give an answer are not shown. White and Black adults include those who report being only one race and are not Hispanic. Hispanics are of any race.

Source: Survey conducted Dec. 12-18, 2022.

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AI chatbots designed to support mental health

Chatbots aimed at [supporting mental health](#) use AI to offer mindfulness check-ins and “automated conversations” that may supplement or potentially provide an alternative to counseling or therapy offered by licensed health care professionals. Several chatbot platforms are available today. Some are touted as ways to support mental health wellness that are available on-demand and may appeal to those reluctant to seek in-person support or to those looking for more affordable options.

Public reactions to the idea of using an AI chatbot for mental health support are decidedly negative. About eight-in-ten U.S. adults (79%) say they would not want to use an AI chatbot if they were seeking mental health support; far fewer (20%) say they would want this.

In a further sign of caution toward AI chatbots for mental health support, 46% of U.S. adults say these AI chatbots should only be used by people who are also seeing a therapist; another 28% say they should not be available to people at all. Just 23% of Americans say that such chatbots should be available to people regardless of whether they are also seeing a therapist.

Large majority of Americans do not want to use an AI chatbot to support their mental health

% of U.S. adults who say they would ___ to use an artificial intelligence chatbot if they were seeking mental health support

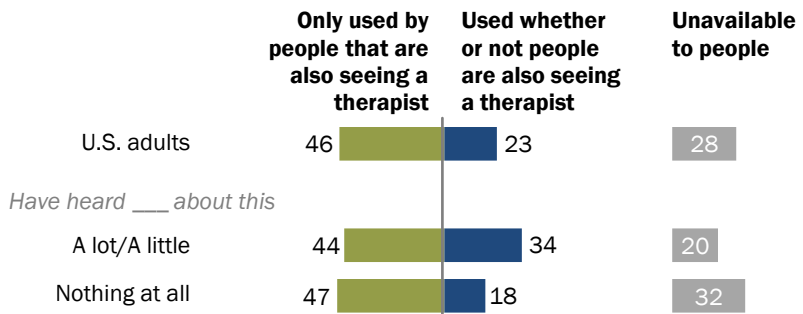


Note: Respondents who did not give an answer are not shown.
 Source: Survey conducted Dec. 12-18, 2022.
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Many in U.S. support limits on the availability or use of AI chatbots for mental health wellness

% of U.S. adults who say artificial intelligence chatbots for mental health support should be ...



Note: Respondents who did not give an answer are not shown.
 Source: Survey conducted Dec. 12-18, 2022.
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Large majorities of U.S. adults across demographic and educational groups lean away from using an AI chatbot for their own mental health support. Read the [Appendix](#) for details.

Even among Americans who say they have heard about these chatbots prior to the survey, 71% say they would not want to use one for their own mental health support.

And among those who have heard about these AI chatbots, relatively few (19%) consider these to be a major advance for mental health support; 36% call them a minor advance, while 25% say they are not an advance at all. Public opinion on this use of AI, as with many others, is still developing: 19% of those familiar with mental health chatbots say they're not sure if this application of AI represents an advance for mental health support.

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pewresearch.org/science.

Primary research team

Cary Funk, *Director, Science and Society Research*
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Methodology

The American Trends Panel survey methodology

Overview

The American Trends Panel (ATP), created by Pew Research Center, is a nationally representative panel of randomly selected U.S. adults. Panelists participate via self-administered web surveys. Panelists who do not have internet access at home are provided with a tablet and wireless internet connection. Interviews are conducted in both English and Spanish. The panel is being managed by Ipsos.

Data in this report is drawn from the panel wave conducted from Dec. 12-18, 2022. A total of 11,004 panelists responded out of 12,448 who were sampled, for a response rate of 88%. The cumulative response rate accounting for nonresponse to the recruitment surveys and attrition is 4%. The break-off rate among panelists who logged on to the survey and completed at least one item is 2%. The margin of sampling error for the full sample of 11,004 respondents is plus or minus 1.4 percentage points.

Panel recruitment

The ATP was created in 2014, with the first cohort of panelists invited to join the panel at the end of a large, national, landline and cellphone random-digit-dial survey that was conducted in both English and Spanish. Two additional recruitments were conducted using the same method in 2015 and 2017, respectively. Across these three surveys, a total of 19,718 adults were invited to join the ATP, of whom 9,942 (50%) agreed to participate.

In August 2018, the ATP switched from telephone to

American Trends Panel recruitment surveys

Recruitment dates	Mode	Invited	Joined	Active panelists remaining
Jan. 23 to March 16, 2014	Landline/ cell RDD	9,809	5,338	1,504
Aug. 27 to Oct. 4, 2015	Landline/ cell RDD	6,004	2,976	881
April 25 to June 4, 2017	Landline/ cell RDD	3,905	1,628	434
Aug. 8 to Oct. 31, 2018	ABS	9,396	8,778	4,119
Aug. 19 to Nov. 30, 2019	ABS	5,900	4,720	1,476
June 1 to July 19, 2020; Feb. 10 to March 31, 2021	ABS	3,197	2,812	1,542
May 29 to July 7				
Sept. 16 to Nov. 1, 2021	ABS	1,329	1,162	790
May 24 to Sept. 29, 2022	ABS	3,354	2,869	1,702
	Total	42,894	30,283	12,448

Note: RDD is random-digit dial; ABS is address-based sampling. Approximately once per year, panelists who have not participated in multiple consecutive waves or who did not complete an annual profiling survey are removed from the panel. Panelists also become inactive if they ask to be removed from the panel.

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address-based recruitment. Invitations were sent to a stratified, random sample of households selected from the U.S. Postal Service’s Delivery Sequence File. Sampled households receive mailings asking a randomly selected adult to complete a survey online. A question at the end of the survey asks if the respondent is willing to join the ATP. In 2020 and 2021 another stage was added to the recruitment. Households that did not respond to the online survey were sent a paper version of the questionnaire, \$5 and a postage-paid return envelope. A subset of the adults who returned the paper version of the survey were invited to join the ATP. This subset of adults received a follow-up mailing with a \$10 pre-incentive and invitation to join the ATP.

Across the five address-based recruitments, a total of 23,176 adults were invited to join the ATP, of whom 20,341 agreed to join the panel and completed an initial profile survey. In each household, one adult was selected and asked to go online to complete a survey, at the end of which they were invited to join the panel. Of the 30,283 individuals who have ever joined the ATP, 12,448 remained active panelists and continued to receive survey invitations at the time this survey was conducted.

The U.S. Postal Service’s Delivery Sequence File has been estimated to cover as much as 98% of the population, although some studies suggest that the coverage could be in the low 90% range.¹ The American Trends Panel never uses breakout routers or chains that direct respondents to additional surveys.

Sample design

The overall target population for this survey was non-institutionalized persons ages 18 and older, living in the U.S., including Alaska and Hawaii. All active panel members were invited to participate in this wave.

Questionnaire development and testing

The questionnaire was developed by Pew Research Center in consultation with Ipsos. The web program was rigorously tested on both PC and mobile devices by the Ipsos project management team and Pew Research Center researchers. The Ipsos project management team also populated test data that was analyzed in SPSS to ensure the logic and randomizations were working as intended before launching the survey.

¹ AAPOR Task Force on Address-based Sampling. 2016. “[AAPOR Report: Address-based Sampling.](#)”

Incentives

All respondents were offered a post-paid incentive for their participation. Respondents could choose to receive the post-paid incentive in the form of a check or a gift code to Amazon.com or could choose to decline the incentive. Incentive amounts ranged from \$5 to \$20 depending on whether the respondent belongs to a part of the population that is harder or easier to reach. Differential incentive amounts were designed to increase panel survey participation among groups that traditionally have low survey response propensities.

Data collection protocol

The data collection field period for this survey was Dec. 12-18, 2022. This survey included a postcard experiment in which postcard notifications were mailed to half of ATP non-tablet household panelists with a known residential address on Dec. 12, 2022. The other half of ATP panelists did not receive any postcard mailings. The survey-level response rate was 89% among those mailed the postcard and 88% among those who were not mailed the postcard.

Invitations were sent out in two separate launches: Soft Launch and Full Launch. Sixty panelists were included in the Soft Launch, which began with an initial invitation sent on Dec. 12, 2022. The ATP panelists chosen for the initial Soft Launch were known responders who had completed previous ATP surveys within one day of receiving their invitation. All remaining English- and Spanish-speaking panelists were included in the Full Launch and were sent an invitation on Dec. 13, 2022.

All panelists with an email address received an email invitation and up to two email reminders if they did not respond to the survey. All ATP panelists that consented to SMS messages received an SMS invitation and up to two SMS reminders.

Invitation and reminder dates, ATP Wave 119

	Soft launch	Full launch
Initial invitation	Dec. 12, 2022	Dec. 13, 2022
First reminder	Dec. 15, 2022	Dec. 15, 2022
Final reminder	Dec. 17, 2022	Dec. 17, 2022

Data quality checks

To ensure high-quality data, the Center’s researchers performed data quality checks to identify any respondents showing clear patterns of satisficing. This includes checking for very high rates of leaving questions blank, as well as always selecting the first or last answer presented. As a result of this checking, eight ATP respondents were removed from the survey dataset prior to weighting and analysis.

Weighting

The ATP data is weighted in a multistep process that accounts for multiple stages of sampling and nonresponse that occur at different points in the survey process. First, each panelist begins with a base weight that reflects their probability of selection for their initial recruitment survey. These weights are then rescaled and adjusted to account for changes in the design of ATP recruitment surveys from year to year. Finally, the weights are calibrated to align with the population benchmarks in the accompanying table to correct for nonresponse to recruitment surveys and panel attrition. If only a subsample of panelists was invited to participate in the wave, this weight is adjusted to account for any differential probabilities of selection.

American Trends Panel weighting dimensions

Variable	Benchmark source
Age (detailed)	2021 American Community Survey (ACS)
Age x Gender	
Education x Gender	
Education x Age	
Race/Ethnicity x Education	
Born inside vs. outside the U.S. among Hispanics and Asian Americans	
Years lived in the U.S.	
Census region x Metro/Non-metro	2021 CPS March Supplement
Volunteerism	2022 American Trends Panel Annual Profile Survey/2019 CPS Volunteering & Civic Life Supplement
Voter registration	2018 CPS Voting and Registration Supplement
Party affiliation	2022 National Public Opinion Reference Survey (NPORS)
Frequency of internet use	
Religious affiliation	
<i>Additional weighting dimensions applied within Black adults</i>	
Age	2021 American Community Survey (ACS)
Gender	
Education	
Hispanic ethnicity	
Voter registration	2018 CPS Voting and Registration Supplement
Party affiliation	2022 National Public Opinion Reference Survey (NPORS)
Religious affiliation	

Note: Estimates from the ACS are based on non-institutionalized adults. Voter registration is calculated using procedures from Hur, Achen (2013) and rescaled to include the total U.S. adult population. Volunteerism is estimated using a model to account for potential changes in volunteering behavior due to the coronavirus outbreak that began in February, 2020.

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Among the panelists who completed the survey, this weight is then calibrated again to align with the population benchmarks identified in the accompanying table and trimmed at the 1st and 99th percentiles to reduce the loss in precision stemming from variance in the weights. Sampling errors and tests of statistical significance take into account the effect of weighting.

The following table shows 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.

Sample sizes and margins of error, ATP Wave 119

	Unweighted sample size	Margins of error in percentage points
U.S. adults	11,004	+/- 1.4
Men	4,884	+/- 2.2
Women	5,993	+/- 1.8
Ages 18-29	930	+/- 4.3
30-49	3,514	+/- 2.4
50-64	3,157	+/- 2.5
65+	3,367	+/- 2.5
Postgraduate	2,503	+/- 2.6
College grad	2,918	+/- 2.4
Some college	3,523	+/- 2.4
HS or less	2,029	+/- 3.0
Upper income	2,625	+/- 2.6
Middle income	5,233	+/- 2.0
Lower income	2,283	+/- 3.2

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. Family income tiers are based on adjusted 2021 earnings.

Source: Survey conducted Dec. 12-18, 2022.

"60% of Americans Would Be Uncomfortable with Provider Relying on AI in Their Own Health Care"

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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.

Dispositions and response rates

Final dispositions, ATP Wave 119

	AAPOR code	Total
Completed interview	1.1	11,004
Logged on to survey; broke off	2.12	237
Logged on to survey; did not complete any items	2.1121	61
Never logged on (implicit refusal)	2.11	1,134
Survey completed after close of the field period	2.27	4
Completed interview but was removed for data quality		8
Screened out		0
Total panelists in the survey		12,448
Completed interviews	I	11,004
Partial interviews	P	0
Refusals	R	1,440
Non-contact	NC	4
Other	O	0
Unknown household	UH	0
Unknown other	UO	0
Not eligible	NE	0
Total		12,448
AAPOR RR1 = $I / (I+P+R+NC+O+UH+UO)$		88%

Cumulative response rate as of ATP Wave 119

	Total
Weighted response rate to recruitment surveys	12%
% of recruitment survey respondents who agreed to join the panel, among those invited	71%
% of those agreeing to join who were active panelists at start of Wave 119	49%
Response rate to Wave 119 survey	88%
Cumulative response rate	4%

Adjusting income and defining income tiers

To create upper-, middle- and lower-income tiers, respondents' 2021 family incomes were adjusted for differences in purchasing power by geographic region and household size. "Middle-income" adults live in families with annual incomes that are two-thirds to double the median family income in the panel (after incomes have been adjusted for the local cost of living and household size). The middle-income range for the American Trends Panel is about \$43,800 to \$131,500 annually for an average family of three. Lower-income families have incomes less than roughly \$43,800, and upper-income families have incomes greater than roughly \$131,500 (all figures expressed in 2021 dollars).

Based on these adjustments, 28% of respondents in Wave 119 are lower income, 46% are middle income and 18% fall into the upper-income tier. An additional 6% either didn't offer a response to the income question or the household size question.

Here is [more information about how the income tiers were determined](#).

A note about the Asian adult sample

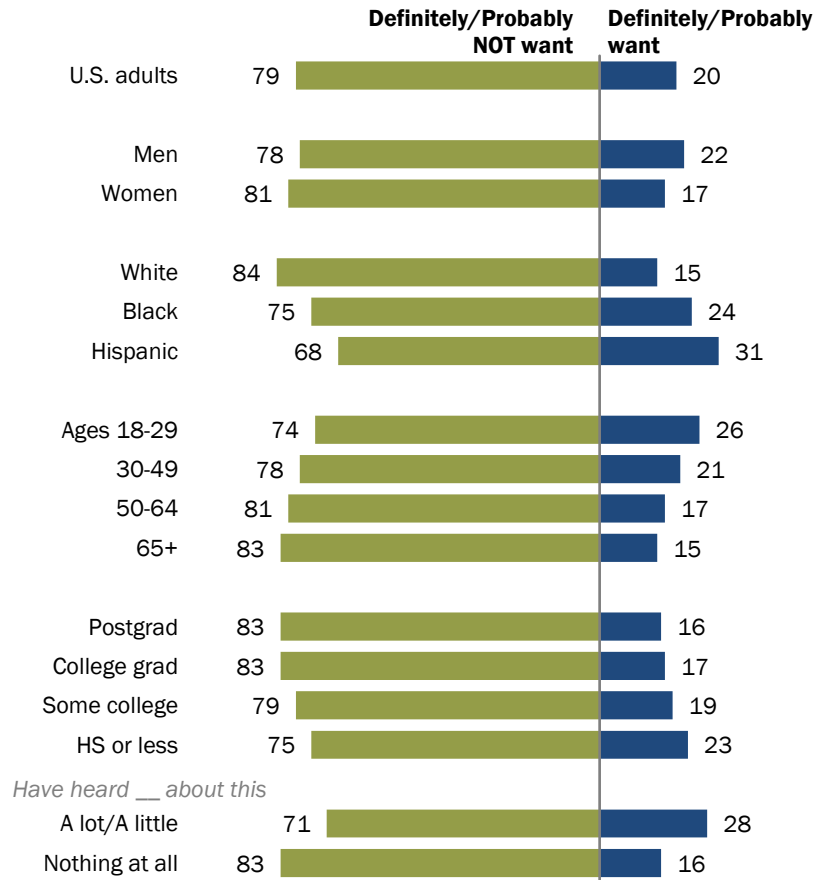
This survey includes a total sample size of 371 Asian adults. The sample primarily includes English-speaking Asian adults and, therefore, may not be representative of the overall Asian adult population. Despite this limitation, it is important to report the views of Asian adults on the topics in this study. As always, Asian adults' responses are incorporated into the general population figures throughout this report.

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Appendix: Additional charts and tables

Majorities across groups say they would not want to use an AI chatbot for mental health support

% of U.S. adults who say they would ___ to use an artificial intelligence chatbot if they were seeking mental health support



Note: Respondents who did not give an answer are not shown. White and Black adults include those who report being only one race and are not Hispanic. Hispanics are of any race.

Source: Survey conducted Dec. 12-18, 2022.

"60% of Americans Would Be Uncomfortable With Provider Relying on AI in Their Own Health Care"

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Survey question wording and topline

**2022 PEW RESEARCH CENTER'S AMERICAN TRENDS PANEL
WAVE 119 – SCIENCE TOPLINE
December 12-18, 2022
N=11,004**

ASK ALL:

DESRRISK

How well do each of the following phrases describe you? **[RANDOMIZE ITEMS]**

		Extremely <u>well</u>	Very <u>well</u>	Somewhat <u>well</u>	Not too <u>well</u>	Not at all <u>well</u>	<u>No answer</u>
COMF.	Comfortable taking risks Dec 12-18, 2022	8	20	45	24	4	<1
CREAT.	Creative thinker Dec 12-18, 2022	20	34	36	8	1	<1
NTECH.	Enjoy using new technology Dec 12-18, 2022	21	28	36	13	2	<1

ASK ALL:

RISK2

Thinking about the decisions you make as you go through life, which better describes how you feel? **[RANDOMIZE RESPONSE OPTIONS]**Dec 12-18,
2022

55	Taking risks usually pays off in the end
44	Taking risks too often leads to problems
1	No answer

OTHER QUESTIONS PREVIOUSLY RELEASED**ASK ALL:**

AIHCCOMF

Thinking about the use of artificial intelligence (AI) in health and medicine to do things like diagnose disease and recommend treatments...

How would you feel if your health care provider relied on AI to do things like diagnose disease and recommend treatments for your medical care? **[RANDOMLY DISPLAY OPTIONS 1-4 OR 4-1]**Dec 12-18,
2022

7	Very comfortable
32	Somewhat comfortable
37	Somewhat uncomfortable
23	Very uncomfortable
1	No answer

ASK ALL:
AIHCTRT1

Do you think the use of artificial intelligence (AI) in health and medicine to do things like diagnose disease and recommend treatments would lead to... **[RANDOMIZE RESPONSE OPTIONS 1 AND 2, WITH OPTION 3 ALWAYS LAST]**

Dec 12-18,
2022

38	Better health outcomes for patients
33	Worse health outcomes for patients
27	Not make much difference
2	No answer

ASK ALL:
AIHCTRT2

Thinking about the use of artificial intelligence (AI) in health and medicine to do things like diagnose disease and recommend treatments, which of the following concerns you more?

Health care providers will... **[RANDOMIZE RESPONSE OPTIONS]**

Dec 12-18,
2022

75	Move too fast using this technology, before fully understanding the risks for patients
23	Move too slowly using this technology, missing opportunities to improve patients' health
2	No answer

ASK ALL:
MEDBIAS

In health and medicine, how much of a problem is bias and unfair treatment based on patients' race or ethnicity?

Dec 12-18,
2022

35	A major problem
35	A minor problem
28	Not a problem
2	No answer

ASK ALL:
AIHCCHG

Do you think the use of artificial intelligence (AI) in health and medicine to do things like diagnose diseases and recommend treatments would make each of the following better, worse, or not make much difference? **[RANDOMIZE ITEMS]**

		<u>Better</u>	<u>Worse</u>	<u>Not make much difference</u>	<u>No answer</u>
QUAL.	The quality of health care for people like you Dec 12-18, 2022	31	30	38	1
MIST.	The number of mistakes made by health care providers Dec 12-18, 2022	40	27	31	1
REL.	Patients' personal relationship with their health care providers Dec 12-18, 2022	13	57	29	1
RACETHN.	The job that health care providers do treating people of all races and ethnicities fairly Dec 12-18, 2022	38	15	46	1
SECUR.	The security of patients' personal health records Dec 12-18, 2022	22	37	39	1

ASK ALL:

HCMEDBIAS

Thinking about the potential for bias and unfair treatment in health and medicine based on a patient's race or ethnicity...

If artificial intelligence (AI) is used more in health and medicine to do things like diagnose disease and recommend treatments, do you think the issue of bias and unfair treatment based on a patient's race or ethnicity would... **[RANDOMLY DISPLAY OPTIONS 1-5 OR 5-1]**

Dec 12-18,
2022

9	Definitely get better
35	Probably get better
40	Stay about the same
10	Probably get worse
3	Definitely get worse
2	No answer

ASK IF BETTER AND FORM 2 (HCMEDBIAS=1,2 AND XFORM=2)] [N=2,531]:

BIASBETR What's a reason you think the issue of bias and unfair treatment based on a patient's race or ethnicity would get better with the use of artificial intelligence (AI) in health and medicine?

Dec 12-18,
2022

34	Human bias/prejudice not involved; AI is neutral/consistent
28	AI is not biased towards a patient's characteristics
9	Programmers or datasets could input bias into the AI
4	AI can make more accurate decisions, including based on a person's race
1	AI will still have some bias, but can help
6	Other
3	Unclear
2	Don't know
24	No answer

ASK IF WORSE AND FORM 2 (HCMEDBIAS=4,5 AND XFORM=2)] [N=683]:

BIASWORS What's a reason you think the issue of bias and unfair treatment based on a patient's race or ethnicity would get worse with the use of artificial intelligence (AI) in health and medicine?

Dec 12-18,
2022

26	AI reflects human biases
9	Human judgement is needed in medicine
4	AI would take into account race/ethnicity, making it biased
3	Don't like AI/Don't want it involved in health care
2	More use of AI would increase inequality, only available for the rich
1	Medical providers would use AI to reinforce their own biases/might not be aware of biases
1	Data privacy and security concerns
1	Data entry, medical record errors
1	Programming will determine whether it is biased or not
1	AI does not take into account race/ethnicity
1	No racism or bias exists in healthcare
8	Other
3	Unclear
3	Don't know
40	No answer

ASK IF STAY ABOUT THE SAME AND FORM 2 (HCMEDBIAS=3 AND XFORM=2)] [N=2,195]:

BIASSAME What's a reason you think the issue of bias and unfair treatment based on a patient's race or ethnicity would stay about the same with the use of artificial intelligence (AI) in health and medicine?

Dec 12-18,
2022

18	Because people, training or data are still biased
16	Racial and ethnic bias is not a problem, doesn't exist or race and ethnicity isn't relevant to healthcare
6	A real person/doctor would be primarily treating people even if we adopted AI, so no change expected
4	Individual bias is possible, but good doctors are not biased
3	It would stay the same/AI wouldn't make a difference/there will always be a problem
2	Negative toward implementation of AI, general
2	AI can't even detect race or doesn't take into account race
1	AI is unbiased, will affect everyone equally
1	AI will only be accessible to the privileged, so it will not change things much
1	Negative toward healthcare system, general
1	Bias is caused by factors that AI cannot solve
4	Other
1	Unclear
4	Don't know
38	No answer

[RANDOMIZE ORDER OF BLOCK 1 AND BLOCK 2]**BLOCK 1****DISPLAY TO FORM 1:**

Artificial intelligence (AI) can be used to review large numbers of images of people's skin with and without skin cancer and learn to identify patterns; it is designed to detect skin cancer in patients.

ASK FORM 1 ONLY (XFORM=1) [N=5,511]:

SCDETECT1 How much have you heard or read about AI designed to detect skin cancer?

Dec 12-18,

2022

3	A lot
19	A little
77	Nothing at all
<1	No answer

ASK FORM 1 ONLY (XFORM=1) [N=5,511]:

SCDETECT2 How much of an advance for medical care is artificial intelligence (AI) that can detect skin cancer?

Dec 12-18,

2022

45	A major advance
17	A minor advance
3	Not an advance
34	Not sure
<1	No answer

ASK FORM 1 ONLY (XFORM=1) [N=5,511]:

SCDETECT3 Would you personally want artificial intelligence (AI) to be used in your screening for skin cancer, if you were getting screened? **[RANDOMLY DISPLAY OPTIONS 1-4 OR 4-1]**

Dec 12-18,

2022

17	Definitely want
48	Probably want
24	Probably NOT want
10	Definitely NOT want
2	No answer

ASK FORM 1 ONLY (XFORM=1) [N=5,511]:

SCDETECT4 Do you think artificial intelligence (AI) would make skin cancer diagnoses...
[RANDOMIZE RESPONSE OPTIONS 1 AND 2, WITH OPTION 3 ALWAYS LAST]

Dec 12-18,

2022

55	More accurate
13	Less accurate
30	Not make much difference
3	No answer

BLOCK 2**DISPLAY FOR FORM 1:**

There are artificial intelligence (AI) chatbots in which people text AI programs about their feelings or concerns and the chatbot responds, without the involvement of a human. These chatbots are designed to support a person's mental health.

ASK FORM 1 ONLY (XFORM=1) [N=5,511]:

AIMH1 How much have you heard or read about AI chatbots designed to support mental health?

Dec 12-18,

2022

6	A lot
25	A little
68	Nothing at all
<1	No answer

ASK FORM 1 ONLY (XFORM=1) [N=5,511]:

AIMH2 How much of an advance for mental health support are artificial intelligence (AI) chatbots?

Dec 12-18,

2022

11	A major advance
21	A minor advance
20	Not an advance
47	Not sure
<1	No answer

ASK FORM 1 ONLY (XFORM=1) [N=5,511]:

AIMH3 Would you personally want to use an artificial intelligence (AI) chatbot, if you were seeking mental health support? **[RANDOMLY DISPLAY OPTIONS 1-4 OR 4-1]**

Dec 12-18,

2022

4	Definitely want
16	Probably want
41	Probably NOT want
38	Definitely NOT want
1	No answer

ASK FORM 1 ONLY (XFORM=1) [N=5,511]:

AIMH5 Do you think artificial intelligence (AI) chatbots that can provide mental health support should be... **[RANDOMIZE RESPONSE OPTIONS 1-2 WITH OPTION 3 ALWAYS LAST]**

Dec 12-18,

2022

46	Only used by people that are also seeing a human therapist
	Used by people regardless of whether they are also seeing a human
23	therapist
28	These should not be available to people at all
3	No answer

[RANDOMIZE ORDER OF BLOCK 3 AND BLOCK 4]**BLOCK 3****DISPLAY TO FORM 2:**

Artificial intelligence (AI) can be used to help decide the amount of pain medication patients get following a major surgery. These programs are designed to limit the abuse of pain medications.

ASK FORM 2 ONLY (XFORM=2) [N=5,493]:

AIPAIN1 How much have you heard or read about using AI to help decide the amount of pain medication patients get?

Dec 12-18,

2022

3	A lot
19	A little
77	Nothing at all
1	No answer

ASK FORM 2 ONLY (XFORM=2) [N=5,493]:

AIPAIN2 How much of an advance for medical care is artificial intelligence (AI) that can help decide the amount of pain medication patients get?

Dec 12-18,

2022

19	A major advance
24	A minor advance
16	Not an advance
40	Not sure
1	No answer

ASK FORM 2 ONLY (XFORM=2) [N=5,493]:

AIPAIN3 Would you personally want artificial intelligence (AI) to help decide the amount of pain medication you get, if you were getting surgery? **[RANDOMLY REVERSE SCALE FOR HALF]**

Dec 12-18,

2022

5	Definitely want
26	Probably want
39	Probably NOT want
27	Definitely NOT want
2	No answer

ASK FORM 2 ONLY (XFORM=2) [N=5,493]:

AIPAIN4 Do you think artificial intelligence (AI) would make patients' treatment for pain... **[RANDOMIZE RESPONSE OPTIONS 1 AND 2, WITH OPTION 3 ALWAYS LAST]**

Dec 12-18,

2022

26	Better
32	Worse
40	Not make much difference
3	No answer

BLOCK 4**DISPLAY TO FORM 2:**

Robots with artificial intelligence (AI) are being developed that can be used to perform parts of surgery on their own. These robots are designed to make precise and steady movements during surgery.

ASK FORM 2 ONLY (XFORM=2) [N=5,493]:

SROBOT1 How much have you heard or read about surgical robots with AI?

Dec 12-18,

2022

9	A lot
50	A little
40	Nothing at all
1	No answer

ASK FORM 2 ONLY (XFORM=2) [N=5,493]:

SROBOT2 How much of an advance for medical care are surgical robots with artificial intelligence (AI) that can perform parts of surgery on their own?

Dec 12-18,

2022

45	A major advance
18	A minor advance
7	Not an advance
30	Not sure
1	No answer

ASK FORM 2 ONLY (XFORM=2) [N=5,493]:

SROBOT3 Would you personally want surgical robots with artificial intelligence (AI) to be used, if you were getting surgery? **[RANDOMLY REVERSE SCALE FOR HALF]**

Dec 12-18,

2022

6	Definitely want
33	Probably want
37	Probably NOT want
22	Definitely NOT want
2	No answer

RANDOMIZE BLOCKS 5-7 (FORM 2 ONLY RECEIVES BLOCK 7)**BLOCK 5****DISPLAY TO FORM 1 (XFORM=1):**

Artificial intelligence (AI) can be used in biology to predict protein structures in cells. This can help develop new medical treatments.

ASK FORM 1 (XFORM=1) [N=5,511]:

AIPROT1 How much have you heard or read about using AI to predict protein structures in people's cells?

Dec 12-18,

2022

3	A lot
18	A little
79	Nothing at all
1	No answer

ASK FORM 1 (XFORM=1) [N=5,511]:

AIPROT2 How much of an advance for medical research is using artificial intelligence (AI) to predict protein structures in people's cells?

Dec 12-18,

2022

33	A major advance
16	A minor advance
3	Not an advance
47	Not sure
<1	No answer

BLOCK 6**DISPLAY TO FORM 1 (XFORM=1):**

Artificial intelligence (AI) can be used to recommend which varieties of plants to breed in order to produce crops that can withstand drought and heat.

ASK FORM 1 (XFORM=1) [N=5,511]:

AICROP1 How much have you heard or read about using AI to produce drought and heat-resistant crops?

Dec 12-18,

2022

3	A lot
22	A little
74	Nothing at all
1	No answer

ASK FORM 1 (XFORM=1) [N=5,511]

AICROP2 How much of an advance for agriculture is using artificial intelligence (AI) to produce drought and heat-resistant crops?

Dec 12-18,

2022

37	A major advance
19	A minor advance
6	Not an advance
37	Not sure
<1	No answer

BLOCK 7**DISPLAY TO FORM 2 (XFORM=2):**

Artificial intelligence (AI) can be used to predict when and where extreme weather like heavy rainfall or storms is likely to occur.

ASK FORM 2 (XFORM=2) [N=5,493]:

AIEXT1 How much have you heard or read about using AI to predict when and where extreme weather is likely to occur?

Dec 12-18,

2022

8	A lot
39	A little
53	Nothing at all
1	No answer

ASK FORM 2 (XFORM=2) [N=5,493]:

AIEXT2 How much of an advance for weather forecasting is using artificial intelligence (AI) to predict when and where extreme weather is likely to occur?

Dec 12-18,

2022

38	A major advance
28	A minor advance
6	Not an advance
28	Not sure
1	No answer

END BLOCK 7

DISPLAY TO FORM 1 (XFORM=1):

Artificial intelligence (AI) can be used to write articles that report on news events and information.

ASK FORM 1 (XFORM=1) [N=5,511]:

AINEWS1 How much have you heard or read about using AI to write news articles?

Dec 12-18,

2022

8	A lot
25	A little
66	Nothing at all
1	No answer

ASK FORM 1 (XFORM=1) [N=5,511]:

AINEWS2 How much of an advance for the news media is using artificial intelligence (AI) to write news articles?

Dec 12-18,

2022

10	A major advance
19	A minor advance
34	Not an advance
36	Not sure
1	No answer

DISPLAY TO FORM 2 (XFORM=2):

Artificial intelligence (AI) can be used to produce visual images from keywords a person types into the system. It can be used to produce complex, artistic images.

ASK FORM 2 (XFORM=2) [N=5,493]:

AIIMAG1 How much have you heard or read about using AI to produce visual images from keywords?

Dec 12-18,

2022

15	A lot
29	A little
55	Nothing at all
1	No answer

ASK FORM 2 (XFORM=2) [N=5,493]:

AIIMAG2 How much of an advance for the visual arts is using artificial intelligence (AI) to produce visual images from keywords?

Dec 12-18,

2022

20	A major advance
26	A minor advance
14	Not an advance
39	Not sure
1	No answer

OTHER QUESTIONS HELD FOR FUTURE RELEASE