

Insights 2024: Attitudes toward AI



Insights 2024: Attitudes toward AI

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Insights 2024: Attitudes toward AI

Foreword

Advances in science, technology and healthcare shape human progress. Artificial intelligence (AI) has emerged as a formidable force in recent years, helping to reshape how we work, consume information, innovate and many other aspects of our lives. In particular, recent advances in generative AI have the potential to be transformative.

At Elsevier, we bring together trusted content, human expertise and responsibly applied AI technologies to help researchers, educators and healthcare professionals worldwide advance discovery, innovation and patient care. In doing so, we continually explore emerging trends and what they mean for the communities that we serve. Our reports, including *Research Futures*, *Clinician of the Future*, *View from the Top* and *Confidence in Research*, delve into the ever-evolving landscape of knowledge creation, dissemination, application and medical practice. We are pleased to share our latest report, *Insights 2024: Attitudes toward AI*. Based on the insights from nearly 3,000 researchers and clinicians worldwide, this report explores AI's current state and future prospects. Their feedback indicates that researchers and clinicians worldwide have an appetite for adopting AI tools in their work, but not at the cost of ethics, transparency and accuracy. The findings point to high quality, verified information, responsible development and transparency being paramount to building trust in AI tools, and alleviating concerns over misinformation and inaccuracy.

Our goal is to provide decision makers with evidence-based insights into how researchers and clinicians feel about AI's immense potential as well as its challenges. Working together with the communities we serve, we strive to shape the future in which AI tools serves all — ethically, faster and better. We hope you enjoy reading this report and we welcome your feedback.

Sincerely,

Kieran West

EVP Strategy, Elsevier

Insights 2024: Attitudes toward AI

Executive summary

Generative artificial intelligence (GenAI) has entered the market at an unprecedented pace, with most researchers and clinicians aware of its biggest applications, following their emergence in late 2022.

What is GenAI?

GenAI, short for generative artificial intelligence, refers to a category of artificial intelligence systems and models that have the ability to generate data, content, or other outputs that are similar to those created by humans. These AI systems are designed to produce new and original content rather than simply process or analyze existing data.

The artificial intelligence (AI) landscape is changing rapidly, and in order to ensure the technology has a positive impact on research and healthcare, it's important to monitor the views of those who could be using it.

The *Insights 2024: Attitudes toward AI* research aimed to do this, by surveying nearly 3,000 people working in research (including leaders and corporate researchers) and in health (clinicians) from around the world.

The research examines the attitudes of researchers and clinicians towards artificial intelligence, including generative AI, covering its attractiveness, perceived impact, the benefits to them and wider society, the degree of transparency to be comfortable using tools that capitalize on the technology, and the challenges they see with AI. It also looks at the current usage, and what respondents think would help them trust AI tools.



Online survey

December 2023 to February 2024

n = 2,999 researchers and clinicians from 123 countries

Some main themes emerge from the results of the research:

- **Awareness of AI is high, but regular usage is low generally**, with expectations that this will grow. Institutions have not yet clearly conveyed their AI usage restrictions, or their preparations for increased use of AI, to researchers and clinicians.
- **Attitudes are mixed**, but sentiment is more positive than negative among researchers and clinicians.
- **Specific actions can help increase trust**, and by taking and communicating them, providers of AI tools can increase users' comfort.

Chapter 1: The current AI landscape

Explore the awareness, perceptions and usage of AI (including GenAI) among researchers and clinicians around the world – page 9

- 96% have heard of AI (including GenAI) subsequent statistics exclude the 4% not familiar with AI
- 54% of those aware of AI have used it; 31% have used it for work purposes, this is higher in China (39%) than in the USA (30%) and India (22%)
- 11% are very familiar with AI, i.e. they've used it a lot
- ChatGPT is by far the most well-known AI product (89%)
- 25% have used ChatGPT for work purposes
- 49% of those who have not used AI cite a lack of time as the reason
- 72% believe AI (including GenAI) will have a transformative or significant impact on their area of work

Researchers and clinicians are on a journey from awareness to usage to benefit when it comes to AI. Awareness of AI in general is high among both researchers and clinicians, but relatively few say they are currently very familiar with the technology, having used AI a lot. Over half of both groups who are aware of AI have used it, and almost one-third have used it for a specific work-related purpose; this is highest in China (39%). A lack of time to investigate such tools is the main reason for not using AI.

Chapter 2: A future lens on AI

Discover researchers' and clinicians' expectations, including the potential benefits and drawbacks of the technology – page 18

- 95% think AI will help accelerate knowledge discovery
- 94% think AI will help rapidly increase the volume of scholarly and medical research
- 92% expect to see cost savings for institutions and businesses
- 67% of those not using AI expect to use it in the next 2-5 years
- 42% of those who have ethical concerns about AI cite as a top disadvantage that it is unable to replace human creativity, judgement and/or empathy
- 71% expect generative AI dependent tools' results be based on high quality trusted sources only

Researchers and clinicians who are aware of AI recognize the growing potential of AI tools, and if they're not already using them, most expect to do so in the coming two to five years. Almost all respondents expect AI (including GenAI) to have an impact by accelerating knowledge discovery and rapidly increasing the volume of research. While they identify numerous benefits, respondents also think that AI will not replace inherently human capabilities like creativity and empathy. Transparency and quality will be important in the future as AI use increases.

Recommendations

Based on the survey findings and secondary research, recommended actions for technology developers and institutions – page 35.

GenAI technology developers can:

- Enhance accuracy and reliability
- Increase transparency
- Strengthen safety and security

Institutions employing researchers and clinicians can:

- Establish policies and plans and communicate them clearly
- Build governance and expertise
- Provide training and capacity
- Ensure access

Chapter 3: Shaping an AI-driven future

Look at researchers' and clinicians' concerns in the context of building trust and comfort in AI tools, and read recommendations for developers and institutions – page 29

- 94% believe AI could be used for misinformation
- 86% are concerned AI will cause critical errors or mishaps
- 81% think AI will to some extent erode critical thinking with 82% of doctors expressing concern physicians will become over reliant on AI to make clinical decisions
- 58% say training the model to be factually accurate, moral, and not harmful (safety) would strongly increase their trust in that tool
- Knowing the information the model uses is up to date was ranked highest by respondents for increasing their comfort in using an AI tool

Understanding not only their concerns but also the factors that build researchers' and clinicians' trust in AI tools and their comfort using them can help technology developers create better tools and institutions maximize their benefit. Almost all respondents are concerned that AI will be used for misinformation and could cause critical errors or mishaps. Factual accuracy and up-to-date information would help increase trust among users.

For more about the AI views and usage of clinicians, see the report *Insights: Clinician of the Future Attitudes Toward AI – Key Findings*

<https://tinyurl.com/ai-cotf>

For more on AI usage and perceptions among researchers, see the report *Insights: Researchers Attitudes to AI – Key Findings*.

<https://tinyurl.com/ai-researchers>

<https://tinyurl.com/ai-attitudes>

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Insights 2024: Attitudes toward AI

Introduction

“The development of AI is as fundamental as the creation of the microprocessor, the personal computer, the Internet, and the mobile phone. It will change the way people work, learn, travel, get health care, and communicate with each other.”

Bill Gates ²

Generative artificial intelligence (GenAI) has entered the market at an unprecedented pace, with the majority of researchers and clinicians aware of its biggest applications, including ChatGPT, within a short period of launch.

What is GenAI?

GenAI, short for generative artificial intelligence, refers to a category of artificial intelligence systems and models that have the ability to generate data, content, or other outputs that are similar to those created by humans. These AI systems are designed to produce new and original content rather than simply process or analyze existing data.¹

ChatGPT, Open.ai’s generative AI platform, reached 100 million users within two months of its launch in November 2022, making it the fastest growing consumer application ever at the time.³

Artificial Intelligence (AI) had been prevalent in our lives for many years before GenAI, helping us search, buy and navigate, among many other things. But the development of GenAI is boosting the impact of the technology overall: estimates suggest it will generate trillions of dollars every year.⁴ This is reflected in the acceleration of investment in GenAI, leaping from \$4.3 billion in 2022 to \$22.4 bn in 2023.⁵

The future of GenAI

The expectation is that the return on investment will be worthwhile. According to consulting firm EY, investment in AI could add 1% to global GDP by 2033 – the equivalent of \$1 tn.⁶ EY expects the US to lead this investment, though they note that China and Europe are not far behind. Even more optimistically, the McKinsey Global Institute estimates GenAI will add \$4.4 tn in value to the global economy annually.⁴ Goldman Sachs goes even further, predicting an increase of 7% in global GDP – almost \$7 tn.⁷

Where are these benefits coming from? GenAI is transforming the very nature of work – and it’s happening much faster than we thought. McKinsey projects AI will automate half of today’s work activities between 2040 and 2060, more than a decade earlier than previous estimates, thanks to acceleration of the technology’s development and usage. The results from our survey also indicate that the impact of AI on research and healthcare will be transformative over the next few years.

Likely impact on research and healthcare

McKinsey indicates that of the four areas likely to account for three-quarters of the added value of GenAI is research and development, where GenAI could “deliver productivity with a value ranging from 10 to 15 percent of overall R&D costs.”⁴ This is notable in the pharmaceuticals and medical products industry, where GenAI is expected to have a relatively high impact in terms of R&D productivity. In comparison, they think healthcare is likely to see a greater impact in supply chain and logistics productivity.

As noted in Elsevier’s *Clinician of the Future Report 2023*, AI has gained attention in healthcare for its potential to automate certain tasks, such as filling in forms or summarizing notes, thereby increasing efficiency and saving clinicians’ time.⁸

But the potential of AI goes far beyond boosting productivity. An MIT Technology Review Insights report describes health and medicine as “a productive testing ground for AI,” with applications including tracking disease spread and supporting drug discovery, as well as summarizing medical notes and even communicating with patients.⁹

There are just as many opportunities for AI in research. As Bill Gates noted on his blog Gates Notes, “AIs will dramatically accelerate the rate of medical breakthroughs.”² In particular, he mentions the large amount of biological data resulting from complex systems, which AI applications are already helping researchers untangle and understand.

AI is already being used in clinical trials. Given that pharma companies spend about 20% of their revenue on research and development, the McKinsey Global Institute estimates that GenAI could contribute \$60 bn to \$110 bn a year to the industry.⁴ Specifically, applications include identifying lead molecules, where GenAI could cut down research time from months to weeks. GenAI also has a role to play in identifying findings during clinical trials, especially with the increase in digital technologies used in clinical research.

Companies are embracing GenAI

Organizations around the world are already embracing new AI-powered technologies to improve efficiency and boost innovation. A 2022 MIT Technology Review Insights report showed that 94% of organizations were using AI, though only 14% aimed to achieve “enterprise-wide” AI by 2025.⁹ Developments since this report clearly show the potential application of AI, GenAI is changing the picture rapidly across every function, including the more creative tasks previously considered inherently human.

“I can’t think of anything that’s been more powerful since the desktop computer.”

Michael Carbin, Associate Professor, MIT, and Founding Advisor, MosaicML⁹

Indeed, in a global EY survey of corporate CEOs, 62% acknowledged the urgency of acting on GenAI, in this case to prevent their competitors from “gaining a strategic edge.”⁶ But the survey also uncovered a dilemma: 61% of business leaders shared reservations around GenAI because of “the uncertainties surrounding the formulation and execution of an AI strategy.”

Before organizations can benefit from the potential of GenAI, these reservations, and risks such as bias and privacy that are inherent in the technology, will need to be addressed. According to EY, organizations will need to invest in infrastructure as well as technology and skills in their workforce.⁶ Almost 70% of respondents to an MIT Technology Review Insights survey said a unified data platform for analytics and AI is crucial. This includes ‘data lakehouses’ – a hybrid of data lakes, where data is stored in its original form, and data warehouses, systems for analyzing and reporting data from multiple sources.¹⁰

Getting the workforce on board

In order to unlock its full potential, it’s not just the companies and institutions that will need to be on board, but also the people who will be using it. As noted by MIT Technology Review Insights, “Risk aversion and cultural factors, like fear of failure, also need to be addressed to drive AI adoption in the workforce.”

Unlike the kind of automation that has changed the way we work in the past, for example with the advent of machinery to take on manual tasks, emergent GenAI technology will likely have the biggest impact on knowledge work, tasks involving creativity, collaboration and decision making.

According to McKinsey, GenAI has only shifted the potential to automate physical work by 0.5%.¹¹ In comparison, the potential to technically automate the application of expertise increased from 24.5% in 2017 to 58.5% in 2023, thanks to GenAI.

The report also suggests that GenAI is likely to have a major impact on STEM professionals: the estimated technical automation potential of activities performed by this group was 28% in 2017; with GenAI, this doubled to 57% in 2023. Numbers are similar by education level, with GenAI doubling the automation potential for those in roles with a master’s, PhD or higher.⁴

Today’s STEM professionals are already using AI or are expecting to use it. Elsevier’s *Research Futures 2.0* report released in early 2022 showed that 8% of researchers were already using AI extensively in their research, principally to help with analysis and processing large data sets.¹² In the *Clinician of the Future Report 2022*, over half (56%) of clinicians surveyed expected to be making most of their decisions using clinical decision support tools that use AI in 10 years’ time.¹³

“Clinical information is only one element of the clinical decision-making process, from assessment to diagnosis and treatment. Heuristic knowledge drives decision making, and this can be supported by artificial intelligence (AI) and machine learning prediction models.”

Clinician of the Future Report 2022

Concern about GenAI

The picture is not simple, though: clinicians and the general public report being excited but also concerned about GenAI.¹⁵ In *Clinician of the Future 2023*, a sizable minority, 28%, of clinicians said they find it undesirable for AI to be used in clinical decision-making tools in the future.¹⁶

There are several commonly reported concerns among various groups, primarily including accuracy and the risk of misinformation, bias, privacy and security, and to a lesser extent, ethical issues.¹⁵ Many of these concerns are not unique to GenAI, but the technology is amplifying them.

Understanding researchers' and clinicians' views

The GenAI landscape is changing rapidly, and in order to ensure the technology has a positive impact on research and healthcare, it's important to monitor the views of those in these areas.

The *Insights 2024: Attitudes toward AI* research aimed to do this, by surveying nearly 3,000 people working in research (including leaders and corporate researchers) and in health (clinicians) from around the world.

The research examines the attitudes of researchers and clinicians towards artificial intelligence (AI), including generative AI (GenAI), including its attractiveness, perceived impact, the benefits to them and wider society, the degree of transparency required around AI to be comfortable using tools that capitalize on the technology, and the challenges they see with AI. It also looks at the current usage, and what respondents think would help them trust AI tools.

Insights 2024: Attitudes toward AI



When: December 2023 to February 2024
What: 15-minute online quantitative survey
Who: 2,999 respondents from across 123 countries
- 2,284 researchers
- 1,007 clinicians
(of whom 292 are also included as researchers)

Results: To improve representativeness we weighted responses by region, and to equally represent researchers and clinicians in totals. Clinicians are weighted equally by doctors and nurses.

[See appendices for more detail on methodology and sample.](#)

You can explore these themes across three chapters in this report:

- **Chapter 1: The current AI landscape**
Explore the awareness, perceptions and usage of AI (including GenAI) among researchers and clinicians around the world.
- **Chapter 2: A future lens on AI**
Discover researchers' and clinicians' expectations, including the potential benefits and drawbacks of the technology.
- **Chapter 3: Shaping an AI-driven future**
Look at researchers' and clinicians' concerns in the context of building trust and comfort in AI (including GenAI) tools, and read recommendations for developers and institutions.

Insights 2024: Attitudes toward AI

The current AI landscape



Chapter 1

The current AI landscape

“AI is here, and it works. We need to think how to use it properly.”

Survey respondent, researcher, Kazakhstan

- 96% have heard of AI (including GenAI) – subsequent statistics exclude the 4% not familiar with AI
- 54% have used AI (including GenAI) and 31% have used it for work purposes; this is higher in China (39%) than in the USA (30%) and India (22%)
- 11% are very familiar with AI (including GenAI), i.e. they’ve used it a lot
- ChatGPT is by far the most well-known AI product (89%)
- 25% have used ChatGPT for work purposes
- 49% of those who have not used AI cite a lack of time as the reason
- 72% believe AI (including GenAI) will have a transformative or significant impact on their area of work

Researchers and clinicians are on a journey from awareness to usage to benefit when it comes to AI. Awareness of AI in general is high among both researchers and clinicians, but relatively few say they are currently very familiar with the technology, having used AI a lot. Over half of both groups who are aware of AI have used it, and almost one-third have used it for a specific work-related purpose; this is highest in China (39%). A lack of time to investigate such tools is the main reason for not using AI.

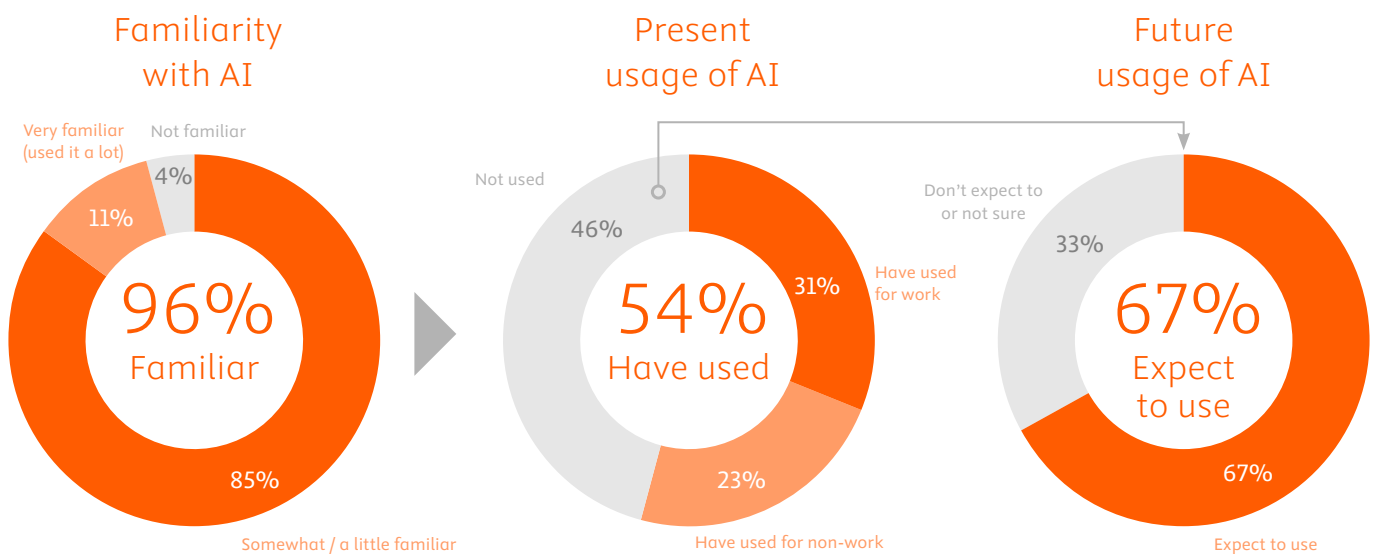


Fig 1. Question: To what extent are you familiar with AI (including GenAI)? n=3,118
 Question: Have you used an AI (including GenAI) product or an AI feature on a product you use regularly? n=2,999
 Question: Do you expect you will choose to use AI (including GenAI) in the near future? n=1,330

Awareness of GenAI tools

Given the rapid rise of GenAI tools, particularly ChatGPT, it is perhaps unsurprising that most people are at least aware of its existence. Global Counsel surveys show that about 90% of people in the UK, US and Germany have heard of GenAI.¹⁷ Similarly, a 2023 survey by Pew Research Center showed that 90% of Americans say they “have heard at least a little about artificial intelligence.”¹⁸ However, drilling down reveals only about one-third have heard a lot about it.

The current survey reflects these findings: almost all (96%) have heard of AI. Awareness is highest in China at 99% (see accompanying databook for full details). Globally, only 11% are very familiar with AI, having used it a lot, this is higher among researchers (14%) than it is clinicians (8%).

Demographics seem to have an impact when it comes to familiarity with AI. We see that in APAC those very familiar and using AI a lot is highest 13%, compared to 8% in Europe (see accompanying databook for full details). Please note: all subsequent statistics in this report exclude the 4% not familiar with AI.

ChatGPT is the most familiar GenAI tool

ChatGPT is by far the most well-known AI product, with 89% of survey respondents globally being familiar with it. Researchers (94%) are more likely than clinicians (84%) to have heard of it.

Levels of familiarity with AI (including GenAI)

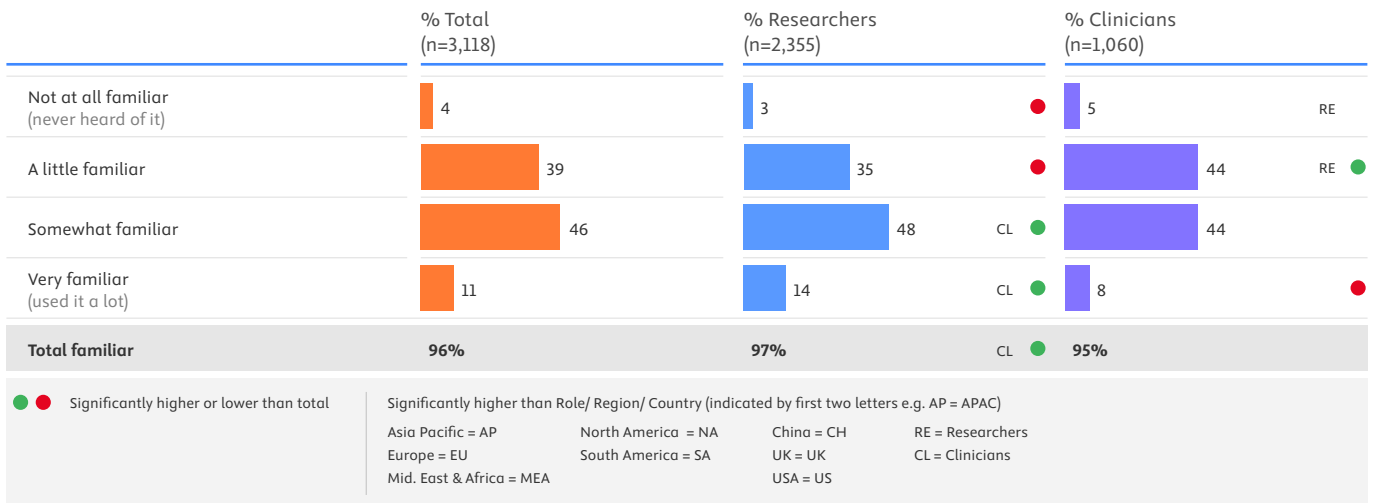


Fig 2. Question: To what extent are you familiar with AI (including GenAI)?

AI products familiarity and usage

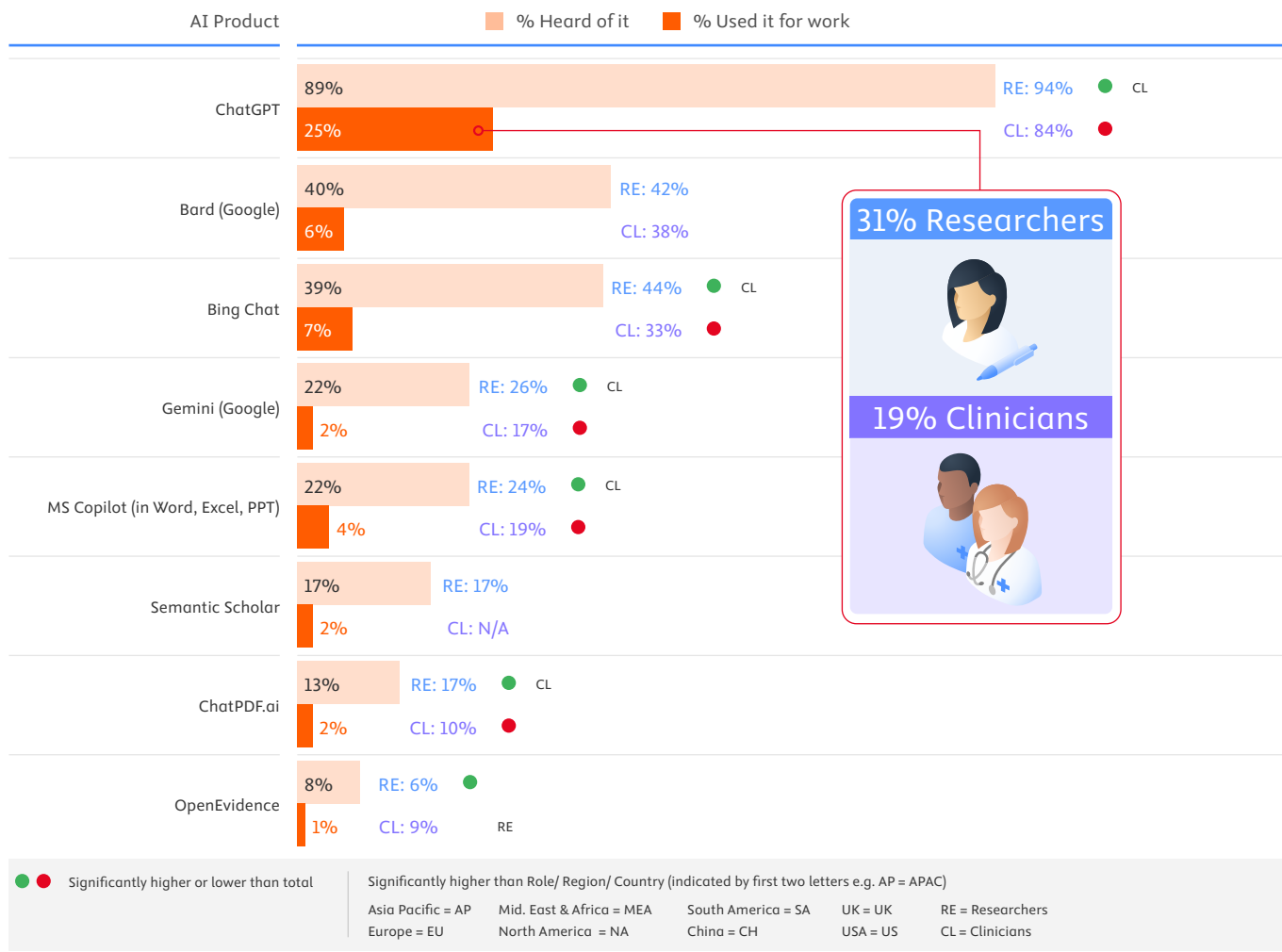


Fig 3. Question: Which of these AI products, if any, have you heard of before today? n=2,999
Question: Which, if any, AI products or AI features have you used for work purposes? Shown to only those aware of tool base variable n=81 to 2,713: % shown is proportion of 2,999.

This reflects the rapidly increasing awareness and use of ChatGPT. In March 2023, just under a year before the current survey, Pew Research found that 58% of US adults had heard of ChatGPT.¹⁹ In a consumer survey by Capgemini Research Institute the same year, 51% of respondents were aware of the latest trends in GenAI and had explored tools like ChatGPT and DALL-E.²⁰ A further 35% were aware but had not yet tried the tools.

In the current survey, we found that across most geographical regions, ChatGPT was the most well-known tool. Familiarity was high across all regions but notably lower in South America at 75% (see accompanying databook for full details).

The next most familiar GenAI tool is Bard (40% overall), followed by Bing Chat (39%), Gemini (22%) and MS Copilot (22%). Lesser-known tools are Semantic Scholar (17%), ChatPDF.ai (13%) and OpenEvidence (8%). In most cases, researchers are more likely than clinicians to be familiar with the tools.

The most well-known GenAI tools we asked participants about

ChatGPT – a chatbot developed by OpenAI

Gemini – formerly known as Bard, a chatbot developed by Google

Copilot – formerly Bing Chat, an AI-powered feature by Microsoft, built into the browser, and Microsoft 365 Copilot, built into Microsoft 365 apps including Word, Excel, PowerPoint, Outlook and Teams

Semantic Scholar – an AI-powered research tool for scientific literature, developed at the Allen Institute for AI

ChatPDF.ai – AI-powered text recognition, table extraction and data analysis for PDFs

OpenEvidence – an AI system to aggregate, synthesize and visualize clinically relevant evidence

Perceptions of AI

While awareness of certain GenAI tools is high among both researchers and clinicians, attitudes to the technology are more variable, with 49% of respondents globally saying they feel mixed about AI, able to see both potential and drawbacks.

“All emerging technologies, including AI, have both advantages and disadvantages. It is essential to further develop and regulate these technologies, aiming to extract maximum benefits.”

Survey respondent, researcher, Canada

However, sentiment is generally more positive about the impact of AI than negative: 36% of respondents say AI is a welcome advancement, compared to just 1% who see mostly drawbacks. Researchers (41%) are more positive about the technology than clinicians are (32%). Clinicians are also more unsure, with 17% saying they need to see how AI develops, compared to 10% of researchers.

“Although there would be many benefits, it would also wreak havoc if false information is spread.”

Survey respondent, nurse, Mexico

A report by Stanford University highlighted major differences in sentiment about AI, with that of people in Asia more positive than those in the West.²¹ In this survey, we see that those in North America are more skeptical, 28% are positive about AI, this compares to 40% in APAC and 46% in China (see accompanying databook for full details). A similar pattern is evident in Pew Research Center Survey in the US, 52% of adults reported being more concerned than excited about the use of AI in daily life.¹⁸ Previous research conducted by the UK’s Office for National Statistics also reveals a mixed picture when it comes to perceptions.²² In a 2023 survey of adults, 28% said they think “AI brings greater risks than benefits,” compared to just 14% thinking the opposite.

Men have also been shown to be more positive than women about AI, and this is corroborated in the current survey; men are much likely to be positive about the impact of AI (45%) than women (27%) (see detailed findings in databook).

There is little evidence of differences in sentiment by age group, however, there may be differences by sector and role. In a survey by Gaggemini, executives have a more positive outlook: 74% “believe the benefits that generative AI brings outweigh the associated risks,” rising to 80% of executives in pharma and healthcare companies.²³

Overall feelings towards AI (including GenAI)

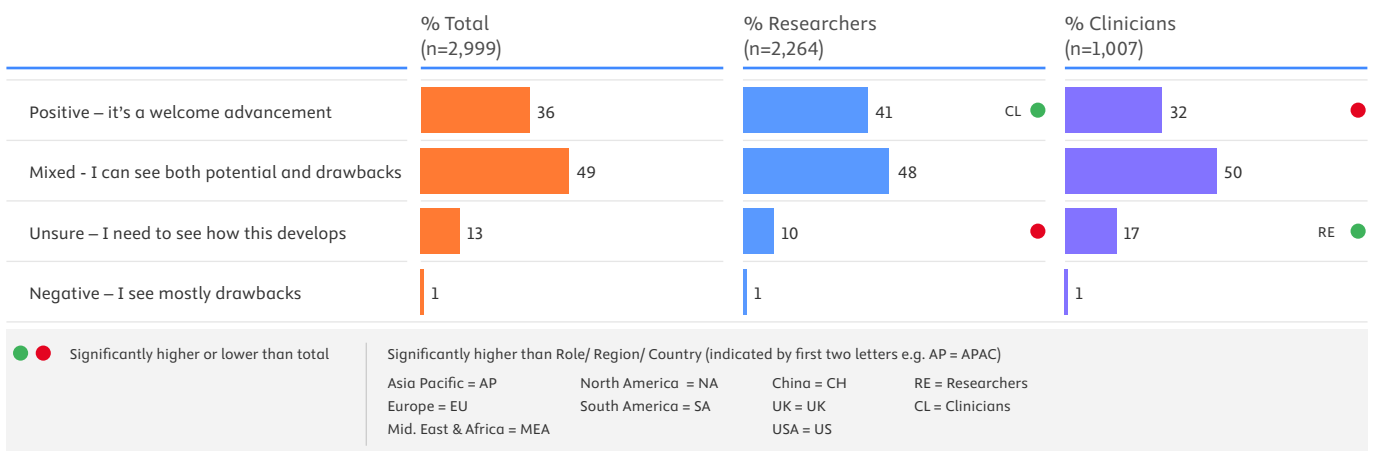


Fig 4. Question: What are your overall feelings about the impact of AI on your area of work?

AI will have a major impact

The vast majority (95%) of respondents who are aware of AI believe it will have an impact on their work (1% think it won't, 4% don't know), with 72% believing the level of impact will be either transformative or significant. There is some variation in the expected extent of that impact, with a higher proportion of researchers (28%) than clinicians (22%) expecting the impact to be transformative.

These results are echoed in other research. In *View from the Top: Academic Leaders' and Funders' Insights on the Challenges Ahead*, AI was identified as “a transformative force that will affect all aspects of university functions, from teaching and research to administration,” with some respondents expecting AI to have a “profound impact” across disciplines.²⁴

Capgemini research also reveals the sentiment that GenAI could transform work.²³ In their survey, 70% of consumers said they believe GenAI will make them more efficient at work and free up time to be more strategic, while 70% of executives agree GenAI will allow organizations to

widen knowledge workers' roles. And 60% say GenAI will completely revolutionize the way they work.

Like much of the other research, the Network Readiness Index (NRI), which looks at countries' digital readiness, highlighted a mixed perception of GenAI among the public.²⁵ The NRI shows a geographical split, which shows the USA ranks highest in terms of digital readiness, largely due to their pioneering position in technology, followed by Switzerland and Hong Kong.²⁵ However, it's the Republic of Korea, Israel and Japan that lead the 'people' pillar of digital readiness, which comprises individuals, businesses and governments.

The current study somewhat reflects this distribution with more in APAC believing the impact of AI will be transformative or significant (76%) versus North America (66%) and Europe (65%) (see accompanying databook for full details). This regional pattern was also evident in *Clinician of the Future 2023*, in which clinicians in China were least likely to find the future use of AI undesirable (17%), compared to 33% in Europe and 31% in North America.²⁶

Expected level of impact of AI in area of work

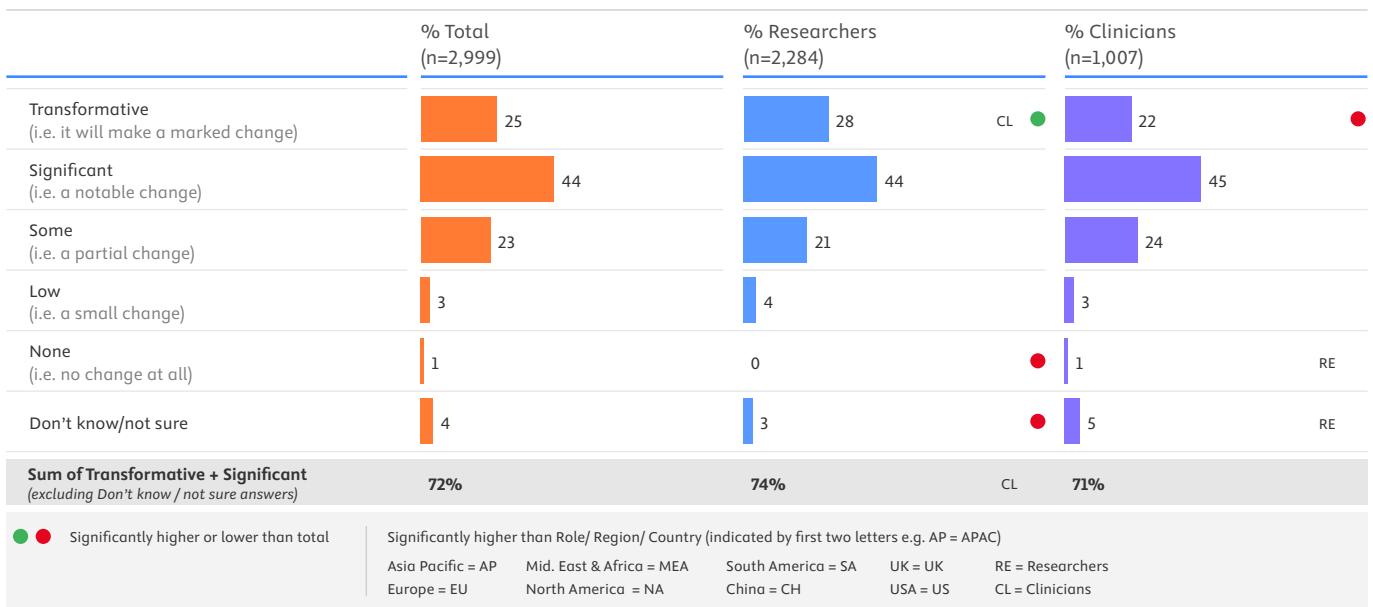


Fig 5. Question: What do you think will be the level of impact of AI (including GenAI) in your area of work in the near future?

Men and women differ in AI views

Men are significantly more likely than women to feel positive about AI, at 45% and 27% respectively. Women are more likely than men to feel mixed (54% versus 44%) and unsure (17% versus 10%).

This difference is reflected in their expectations: men are more likely than women to think AI will be transformative, at 29% and 21% respectively. Overall, more women (26%) than men (20%) expect the change resulting from AI to be only partial.

Conversely, women are more concerned about the ethical implications of AI on their area of work, with 30% of women reporting significant concerns, compared to 24% of men.

Women also appear to be more aware of their institutions' actions related to AI, with women less likely than men to be unsure how their institution is preparing for AI usage, and more women than men likely to be aware of new AI leadership at their institutions.

AI in practice

Of those familiar with AI, more than half (54%) of respondents in the current research have actively used AI, with researchers (59%) more likely than clinicians (50%) to have used it.

Proportionally more researchers (37%) than clinicians (26%) have used AI tools for a work-related purpose.

While this survey is setting a baseline, there are indications of an upward trend. In the *Research Futures 2.0* report published in 2022, 8% of respondents reported using AI extensively in their research.²⁷ The researchers who used AI reported using it to analyze research results (66%), process large data sets to spot defects (49%), help conduct research (36%), enhance images (26%) and generate hypotheses (17%).

Elsevier’s *Clinician of the Future 2023* report noted that AI technology is already helping clinicians learn and make decisions – not displacing or replacing them, but supplementing and supporting them.³ Clinicians surveyed were open to the potential of AI to improve patient care, though in practice this was limited at the time:

respondents shared that 11% of their clinical decisions were assisted by GenAI, with nurses (16% of clinical decision) using it more than doctors (7% of clinical decisions).

When we look at the results at a more granular level, regional differences emerge, APAC is more likely to have used AI for work related purposes (34%) versus North America (30%), and it is notably higher in China (39%). There are difference by years of experience in work and gender too. Those active 6-10 years have used AI for a work-related purpose most, while those most experienced are less likely to have used AI than average, while men (35%) are more likely than women 27% to have used AI for work purposes (see detailed findings in databook).

Elsevier’s *Research Futures 2.0* report in 2022 revealed similar differences in the extensive use of AI in research.

Usage of AI and context for usage

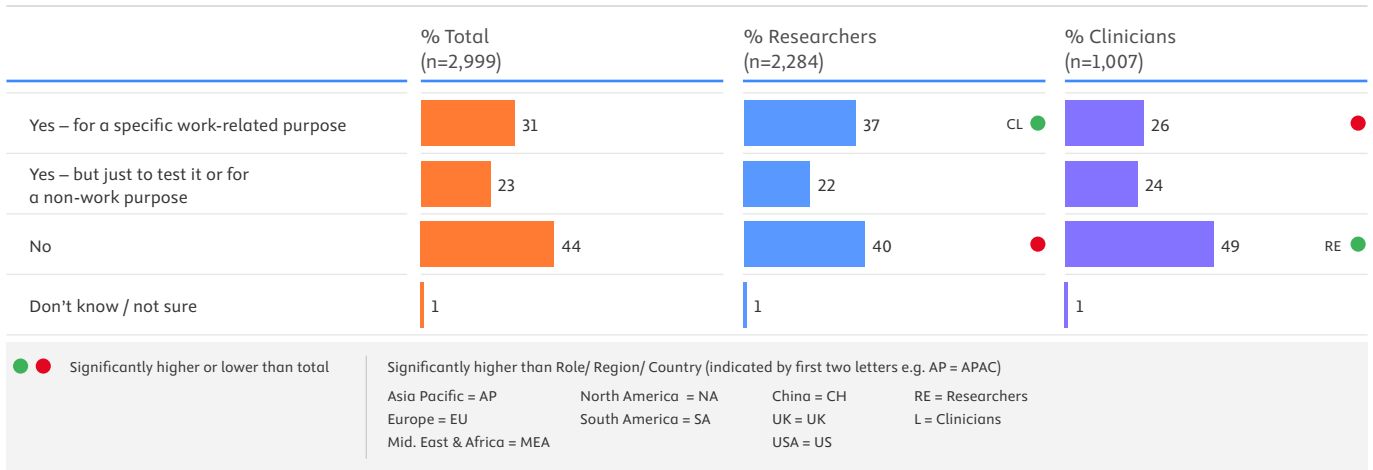


Fig 6. Question: Have you used an AI (including generative AI) product or an AI feature on a product you use regularly?

Years’ experience and perceptions of AI

Years of experience in work have an impact on people’s perception of AI and knowledge of their institutions’ AI-related actions. As years active in their area of work increases, so too does the proportion who feel unsure about AI. Those newest to their roles tend to be more positive about AI, and they believe it will free up time

for higher value work and increase work consistency (see detailed findings in databook). Those with over 35 years’ experience in their area of work are least likely to think AI will be transformative, at 19%, and most likely to expect only a partial change, at 28%. This group is also more likely to be unsure how their institution is preparing for AI usage.

In terms of tools being used, it is not surprising given its high awareness levels that ChatGPT is the AI tool used most for work (see figure 3). Specifically, one-quarter (25%) of respondents in the current study have used ChatGPT for work, with usage significantly higher among researchers than clinicians (31% vs 19% respectively). Comparatively few (4%) report using MS Copilot (in Word, Excel and PowerPoint).



Reasons for not using AI products or AI features

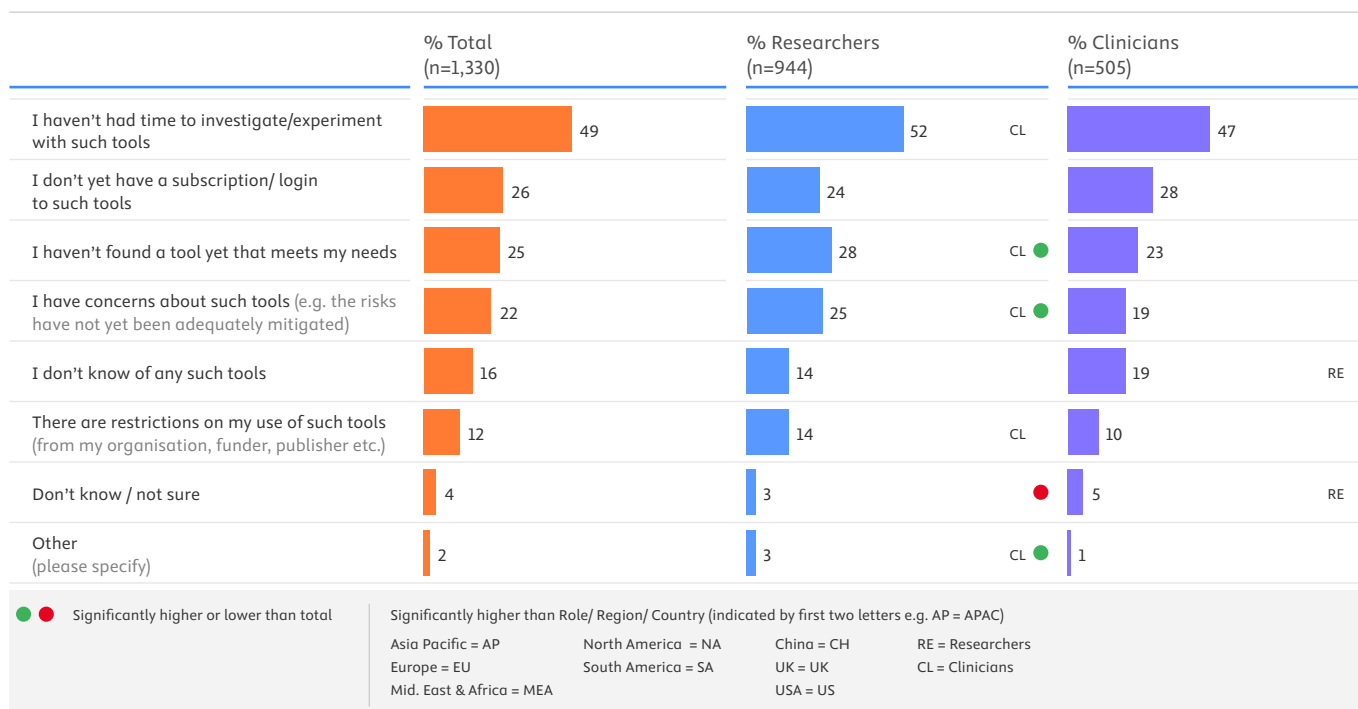


Fig 7. Question: Which of the following describes why you haven't used an AI product or AI feature?

Why not use AI?

The most common reason for researchers and clinicians not having used AI is lacking the time to investigate or experiment with the tools – 49% of respondents globally cite this as the reason, including 52% of researchers and 47% of clinicians.

Other reasons given for not having used AI tools include lack of access (26%), not having the right tools (25%) and having concerns about AI tools (22%).

More than one in ten (12%) overall say they haven't used AI due to restrictions, for example, from their employer, funder or publisher.

There are some differences by region: we see that more respondents in South America have not used AI tools due to a lack of subscriptions to such tools (29% vs 20% in North America) and restrictions are highest in North America (15%) which is higher than Europe (9%) (see detailed findings in databook).

Although only 2% of respondents are prohibited from using AI in any way (see figure 8), 27% report being prohibited from uploading confidential information to public GenAI platforms, 18% are prohibited from using it for certain purposes and 10% are prohibited from using certain tools. More than one-quarter (26%) say they are prohibited from using AI tools due to lack of budget to pay for them. A lack of budget is the most commonly cited restriction, at 35% in South America and Middle East and Africa. One-third (33%) of respondents are unaware of restrictions on AI usage at their institution.

Many respondents are also unaware of their institutions' plans when it comes to AI, with 44% of respondents not knowing how their institutions are preparing for AI usage (see chapter 2, page 29).

Institutional restrictions on the use of AI



Fig 8. Question: Which restrictions, if any, does your institution currently have with regards to AI usage?

Insights 2024: Attitudes toward AI

A future lens on AI



Chapter 2

A future lens on AI

“AI is the future, but it is also very worrying.”

Survey respondent, doctor, Peru

- 95% think AI will help accelerate knowledge discovery
- 94% think AI will help rapidly increase the volume of scholarly and medical research
- 92% foresee cost savings for institutions and businesses
- 67% of those not using AI expect to use it in the next two to five years
- 42% of those who have ethical concerns about AI cite as a top disadvantage that it is unable to replace human creativity, judgement and/or empathy
- 71% expect generative AI dependent tools' results be based on high quality trusted sources only

Researchers and clinicians recognize the growing potential of AI tools, and if they're not already using them, most expect to do so in the coming two to five years. Almost all respondents expect AI (including GenAI) to have an impact by helping accelerate knowledge discovery and rapidly increasing the volume of research. While they identify numerous benefits, they also note that AI will not replace inherently human capabilities like creativity and empathy. Transparency and quality will be important in the future as AI use increases.



Perceived impact and benefits

The sentiment around AI is influenced by the impact people expect the technology to bring in the future, some of it positive and some negative. In the current study, almost all (96%) respondents think AI will change the way education is delivered and 95% believe it will accelerate knowledge discovery at least to some extent in the next two to five years.

Similarly, 94% of respondents think AI will rapidly increase the volume of scholarly and medical research, with clinicians (96%) more likely than researchers (92%) to think this. Although those in North America (and the USA specifically) and Europe generally believe AI will

impact positively, they are consistently less likely to do so compared to other regions and indeed, for North America, more likely to think AI will cause mishaps and disruption than average globally (see Chapter 3 on page 32 and detailed findings in databook). Specifically, 95% of respondents see benefit in using AI for research-related activities (see figure 10).

Positive impact of AI in various areas over the next two to five years

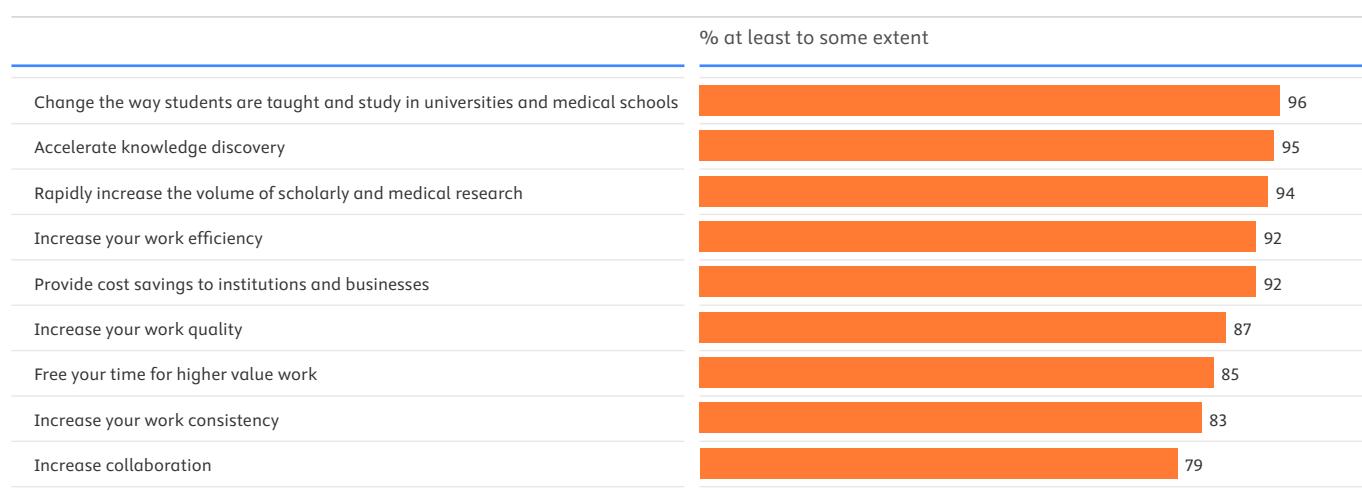


Fig 9. Question: Thinking about the impact AI will have on society and your work, to what extent do you think over the next 2 to 5 years it will...? A great extent, some extent, not at all. n=2,887

As noted in Elsevier’s 2022 *Research Futures 2.0* report, “Artificial intelligence (AI) and machine learning tools are changing the shape of science.”²⁸ Researchers today can use GenAI-powered tools across a multitude of tasks, including to:

- Collect, generate, sort and analyze data
- Identify errors, inconsistencies and biases in data
- Visualize data
- Identify plagiarism
- Discover relevant published research
- Support peer review
- Refine written work through translation and editing
- Summarize and simplify academic papers
- Brainstorm ideas for structuring presentations and articles

Drilling down into the detail of where AI may deliver benefits across different areas, 95% of respondents believe it will help with using scientific content (e.g., keeping up-to-date). The benefit of AI is also expected to extend to human interaction, with 79% of respondents (84% of clinicians and 74% of researchers) saying they think AI will increase collaboration (see detailed findings in databook for more detail).

“The single biggest topic must be AI. It is developing so fast and has so many breakthroughs. I have to study this topic myself. Artificial Intelligence will promote unlimited possibilities for cross-disciplinary collaboration.”

Academic Leader, APAC²⁹

Perceived benefits of AI in different areas



Fig 10. Question: Thinking about the general areas of activity you need to complete, how much benefit, if any, do you believe the assistance of AI would bring? Scale: A lot of benefit, some benefit, no benefit, don't know/not applicable (bottom box and top two boxes, excl. don't know)

Buying time for high-value work

As we have seen, GenAI is likely to have a bigger impact on knowledge work than manual work. GenAI can play a role by automating structured tasks, reducing cognitive load and supporting unstructured tasks like critical thinking and creativity.³⁰

According to the Office of National Statistics, about one-third (32%) of UK adults believe that AI will benefit them, rising to 49% of those with higher education qualifications.²² This perception is largely down to the potential GenAI has to improve work: 41% of professional workers thought AI could make their job easier.

The expansion beyond purely data-related and repetitive tasks is reflected in public surveys.³¹ For example, consumers are using GenAI for creative purposes, like generating content (52%) and brainstorming (28%).

This is reflected in the current study: 85% of respondents believe AI tools will free their time for higher value work, though 15% don't expect any impact in this area (see figure 9 on page 20).

For researchers and clinicians, it takes a lot of time and effort to keep up to date with the influx of new knowledge being published every day. The resulting 'digital debt' builds up a backlog that can hide useful information and even impact mental health. According to Microsoft's *2023 Work Trend Index: Annual Report*, 68% of people

“say they don't have enough uninterrupted focus time during the workday,” and 62% “struggle with too much time spent searching for information in their workday.”³²

In the current survey, 95% of respondents see benefit in AI using scientific content – in other words, keeping up to date with new information and reducing their digital debt. Clinicians (97%) see more benefit than researchers (93%).

“Spend less time on papers doing the bureaucratic part and can have a better reading about the patient's conditions.”

Survey respondent, nurse, Brazil³³

In addition, 92% expect AI to increase their work efficiency to some extent, and 92% expect the technology to provide cost savings. This is echoed in research by Capgemini, in which executives predicted operational improvements of 7-9% within three years.²³

About nine in ten (87%) respondents expect AI to improve their work quality to some extent, while 13% predict there will be no impact in this area. Similarly, 83% think the technology will increase their work consistency, compared to 17% who expect no benefit.

Powering education

GenAI already plays a role in education, and as such, many universities have set out policies and guidance for students and educators. GenAI tools can support learning by acting as “advisor, tutor, coach, and simulator,” providing instructions, feedback and different perspectives, for example.³¹

Almost all (96%) respondents to the current survey expect AI to change the way students are taught to some extent, and a nearly all (96%) see at least some benefit in AI for teaching and lecturing activities.

This is in line with findings from *Clinician of the Future 2023*, in which 51% of clinicians considered the use of AI desirable for training medical students and 50% for training nurses.³⁴ And students reported similar sentiments, with 43% of respondents in the *Clinician of the Future Education Edition* saying their instructors welcome GenAI.³⁵

The way today’s researchers and clinicians perceive and approach using GenAI in teaching will affect not only its impact on education but also on the views and behaviors of the next generation of researchers and clinicians.

Supporting clinical activities

The potential applications of GenAI technology in the clinic are growing rapidly. The *Research Futures 2.0* report highlights the use of AI in predicting the progress of Alzheimer’s disease, monitoring the progression of Parkinson’s disease, examining CT scans and x-rays, diagnosing and developing personalized medication plans for cancer patients, and improving the effectiveness of mental healthcare.³⁶

In the current study, 95% of respondents of those involved in clinical practice see a benefit in AI for clinical activities such as diagnoses and patient summaries. This is in line with the views clinicians shared in 2023.³⁷

“AI can empower a trained physician to consider wider differential diagnosis and management plan”.

Doctor, UK³⁸

Despite clinicians having reservations about the impact of GenAI on the patient–clinician relationship (see page 31), blinded research reveals a more positive picture. The study, by US researchers, asked the question: “Can an artificial intelligence chatbot assistant, provide responses to patient questions that are of comparable quality and empathy to those written by physicians?”

The results were striking, with a panel of licensed healthcare professionals preferring ChatGPT’s responses to physicians’ responses 79% of the time, rating them higher quality and more empathetic.³⁹

AI in publishing and funding

The publishing process – including authoring, reviewing and editing – can be time-consuming for researchers and clinicians, and AI is already being employed in several systems.

Applications mentioned in *Research Futures 2.0* include StatReviewer, which has been integrated into Editorial Manager, UNSILO’s AI-supported tools Evaluate Technical Checks, integrated into ScholarOne, and AIRA, used by Frontiers.⁴⁰

There have been suggestions that the application of GenAI could go even further, potentially even replacing human review, at least in part, in the future. In *Research Futures 2.0*, presented with this hypothetical scenario, 21% of researchers said they would be willing to read an article reviewed by AI.⁴¹ Respondents shared reasons including lower subjectivity and greater consistency across reviews.

“Some reviewers take a long time to respond. An intelligent system would be much faster.”

Chemical Engineering researcher, Egypt⁴⁰

However, the majority in the study – 59% – disagreed or strongly disagreed that they would be willing to read an article reviewed by AI, many saying they “valued human understanding and believed AI incapable of quality peer review.”

In the current study, 93% of respondents believe AI will bring benefit in publication and monitoring the impact of research, for example in authoring and reviewing.

When it comes to funding, though, respondents were not as optimistic, with 84% expecting AI to provide some benefit for funding-related activities.

Perceived drawbacks

Respondents were not solely positive about AI – they also identified a number of potential disadvantages of AI. The majority (85%) had at least some concerns about the ethical implications of AI in their area of work.

People see its inability to replace human creativity, judgement and/or empathy as the main disadvantage, with 42% of those who have concerns about AI ranking this as a top-three disadvantage of the technology.

Clinicians (45%) are more likely to say this than researchers (39%). And women (46%) are more likely to say this than men (38%).

“AI tools can help provide information and effective management and nursing work, but it cannot replace practical experience, interaction and communication with patients.”

Survey respondent, nurse, China³⁷

Perceived top-three disadvantages of AI (of those who have concerns)

	% Total (n=2,561)		% Researchers (n=1,963)		% Clinicians (n=861)
Unable to replace human creativity, judgment and/or empathy	42		39	RE ●	45
Does not have enough regulation or governance	40		39		41
Lack of accountability over the use of generative AI outputs	30		32	CL	29
Outputs can be discriminatory or biased	24		25		23
Too dependent on outdated data and/or information	19		21	CL	17
Outputs are factually incorrect and/or non-sensical (hallucinations)	18		25	CL ●	11
Lack of relevant expertise within organisation	19		15	RE ●	23
Risks homogenizing culture via its use of global models	18		17		18
The logic behind an output is not well described	17		20	CL ●	14
Lack of permission to use data or information AI tools are trained on	14		14		15
Generative AI inputs/prompts are not confidential	13		12		14
Generative AI outputs are not confidential	11		10		11
Requires a lot of computer processing power	9		8		10
Generative AI discriminates against non-native English speakers	7		7		7
Other	2		2	CL	1
Don't know/not sure	1		1		1
None of the above	0		0		0

● ● Significantly higher or lower than total

Significantly higher than Role/ Region/ Country (indicated by first two letters e.g. AP = APAC)

Asia Pacific = AP

North America = NA

China = CH

RE = Researchers

Europe = EU

South America = SA

UK = UK

CL = Clinicians

Mid. East & Africa = MEA

USA = US

Fig 10. Question: What do you think are the top 3 disadvantages of AI? Select up to three?

Regulation and accountability

Two-fifths (40%) of respondents with concerns cite the lack of regulation and governance as a top three disadvantage of AI. Those in South America (45%) and Europe (45%) are most concerned. Indeed, there is currently a dearth of regulation for GenAI, largely due to the speed at which the technology has developed – faster than policymakers can update laws.⁴²

This concern about a lack of regulation is widespread, even among the corporate leaders driving the GenAI movement, with the CEOs of OpenAI and Google and the President of Microsoft among those taking steps to encourage regulation.⁴³ Senate Judiciary Committee Chairman Richard Durbin said it is “historic” for “people representing large corporations [to] come before us and plead with us to regulate them.”⁴⁴

One of the benefits of regulation is highlighting the potentially negative effects of GenAI, and as Joshua Gans, co-author of *Power and Prediction: The Disruptive Economics of Artificial Intelligence*, shared in an interview with the International Monetary Fund (IMF), “it behooves us to monitor for those consequences, identify their causes, and consider experimentation with policy interventions that can mitigate them.”⁴⁵

The need for better guidance and oversight is reflected in two other top three disadvantages. About one-third (30%) of respondents with concerns ranked lack of accountability over the use of AI outputs in their top three; this is highest in North America (34%), and researchers (32%) are more likely than clinicians (29%) to cite this as a top concern. Conversely, clinicians (23%) were more likely than researchers (15%) to cite ‘lack of relevant expertise within organizations’ as a top disadvantage of AI.

Early days of regulation: The EU’s AI Act⁴⁶

Agreed in December 2023, the AI Act aims to address the risks certain AI systems can create in order to avoid “undesirable outcomes.”

The Regulatory Framework defines four levels of risk for AI systems. An AI system will be banned if it is “considered a clear threat to the safety, livelihoods and rights of people.” This includes, for example, social scoring by governments and toys encouraging dangerous behavior.

The European AI Office oversees the enforcement and implementation of the AI Act.

Discrimination and bias

Following its inability to replace humans and the lack of regulation and accountability around AI, the next most commonly cited disadvantage is that outputs can be discriminatory or biased, with 24% of respondents with concerns ranking this in their top three.

For almost one-fifth (18%) of respondents, the risk of AI homogenizing culture via its use of global models is a top three disadvantage, and 7% of respondents cite the technology’s discrimination against non-native English speakers.

The concern about bias and discrimination in AI is not new. As noted by the UK’s communications regulator Ofcom, if the voices and perspectives of marginalized groups are underrepresented in training data, GenAI models can underrepresent them in outputs, leading to exclusion and inaccurate information about those groups.⁴⁷ Tech leaders have acknowledged the problem and recognize the need for improvement.⁴⁸ To overcome this, Ofcom suggests that the datasets used to train GenAI models should be “diverse and representative,” which will require human quality control.

Capgemini research revealed that 45% of organizations lack confidence that GenAI programs are fair (inclusive of all population groups) and 36% say the potential for bias to lead to embarrassing (i.e. undesirable or socially unacceptable) results is a challenge for implementing the technology.²³

“I suspect that AI will be easier to reprogram to be less discriminatory than people are.”

Joshua Gans⁴⁵

Conversely, there are some indications that GenAI has the potential to make a positive impact on existing biases and discrimination. According to the Pew Research Center, 51% of US adults who see a problem with racial and ethnic bias in health and medicine think AI would improve the issue, and 53% believe the same for bias in hiring.¹⁸

Lack of accuracy

More insight into the datasets used to train GenAI models would not only help mitigate against the potential for bias but also give transparency around how an output was generated. A number of respondents to the current survey (17%) consider 'the logic behind an output is not well described' as a top-three disadvantage. Researchers (20%) are more likely than clinicians (14%) to rank this issue in their top three.

Accuracy was more important to respondents than transparency. For 19% overall, being too dependent on outdated data and/or information is a top three disadvantage of AI. Researchers (21%) are more likely than clinicians (17%) to rank this highly.

Similarly, 18% of respondents with concerns consider hallucinations (i.e. when AI generates incorrect and/or nonsensical outputs) to be a major disadvantage, with researchers (25%) significantly more likely than clinicians (11%) to rank this in their top three.

Hallucinations are incorrect and sometimes nonsensical outputs generated based on patterns in training data, and they occur in an estimated 3% to 30% of answers.⁴⁹ Hallucinations are a topic of discussion among tech leaders as well as users. According to Sundar Pichai, CEO of Alphabet, "No one in the field has yet solved the hallucination problems. All models do have this as an issue."⁵⁰ Given their ubiquity, hallucinations are of particular concern for areas like law and medicine, according to some researchers.³¹



Privacy and ethical issues

Some of the less commonly ranked disadvantages are related to privacy and ethical issues. For example, 13% of respondents with concerns consider the lack of confidentiality of AI inputs or prompts as a top-three disadvantage, and 11% rank the lack of confidentiality of outputs as such.

Privacy is one of the main concerns of consumers, with 72% of the UK public surveyed by the Office of National Statistics considering the use of personal data without consent a negative impact, and 60% mentioning the increased chances of experiencing cybercrime.²²

Looking at the data ownership issue from the other side, 14% of respondents in the current study say the lack of permission to use data or information AI tools are trained on is a top three disadvantage. And almost one in ten (9%) respondents consider AI's need for a lot of computer processing power to be a top-three disadvantage.

Expectations

As noted in chapter 1, more than half of respondents in the current study have used AI, either for a work or non-work purpose (see page 10). This is likely to change soon: 67% of those who have yet to use AI (including GenAI) tools expect to do so in the next two to five years.

The proportion of those in North America (and in the USA specifically), who have yet to use AI, is notably lower - only 51% expect to do so in the near future, significantly lower than the global average and highest in APAC and Middle East and Africa.

While respondents were optimistic about their future use of AI, they also shared a number of expectations around how they believe AI should develop.

The top expectation overall is that generative AI will always be paired with human expertise, with 83% of respondents globally agreeing with this. Clinicians (86%) are more likely than researchers (81%) to agree.



Expected future use for those that currently don't use AI

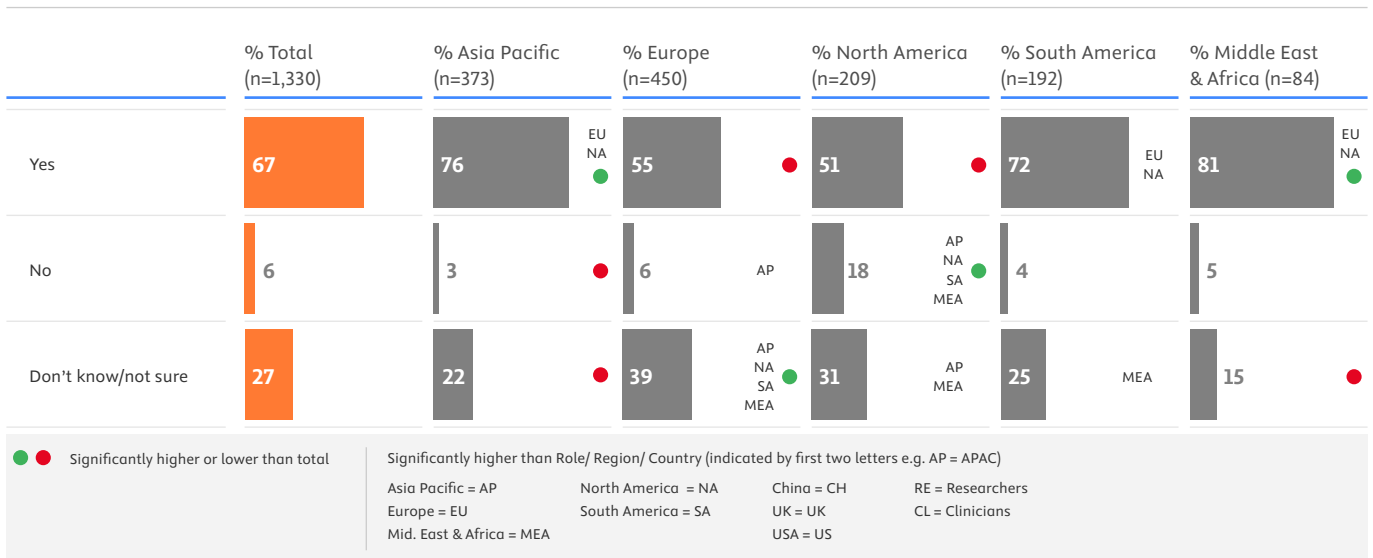


Fig 12. Question: Do you expect you will choose to use AI in the near future?

Expectations of AI

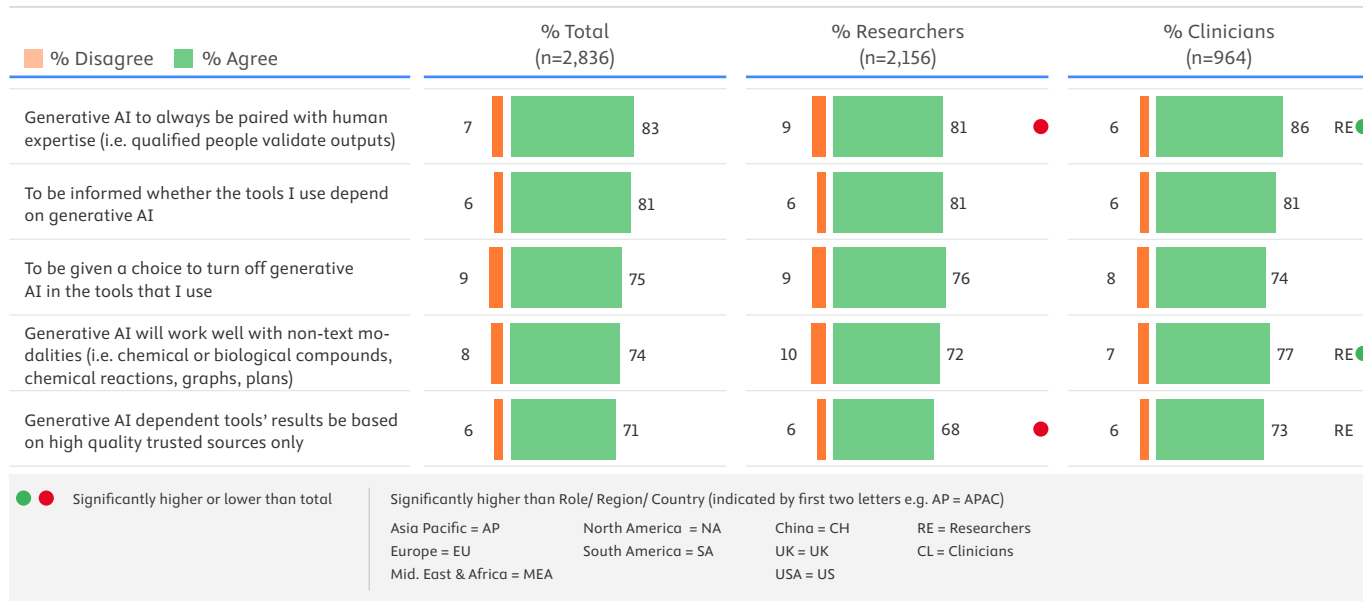


Fig 13. Question: Thinking about the use of generative AI in your area of work, how much do you agree or disagree with the following either presently or in the near future? By near future, we mean in the next 2-5 years.

Information and consent are critical: 81% of respondents expect to be informed whether the tools they use depend on generative AI, and 71% expect AI tools' results to be based on high quality trusted sources

Three-quarters (75%) of respondents expect to be given a choice to turn off generative AI in the tools that they use.

Respondents expect generative AI will work well with non-text modalities (i.e. chemical or biological compounds, chemical reactions, graphs, plans) (74%); agreement is higher among clinicians (77%) than researchers (72%).

Quality is important too: about seven in ten (71%) respondents expect generative AI dependent tools' results to be based on high quality trusted sources only, with agreement higher among clinicians (73%) than researchers (68%). This aligns with the findings shared earlier in this chapter, with researchers more likely to consider outdated source information a top disadvantage (see page 23).

Likelihood of using a reliable AI assistant by those who see benefit of AI in research

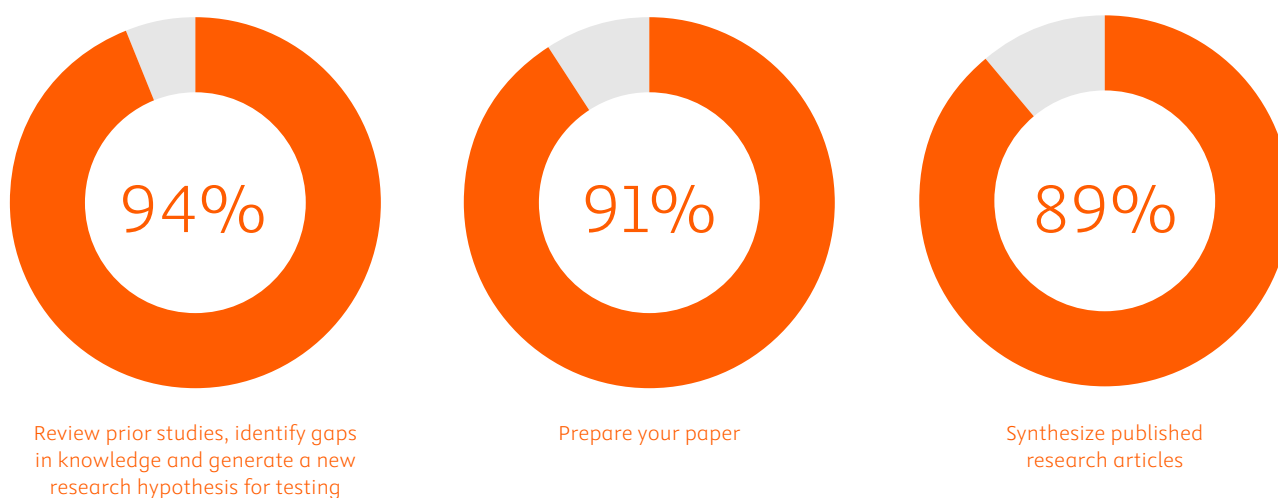


Fig 14. Question: If you had a reliable and secure AI assistant to help you in your research, how likely would you be to use it to... Scale: Very likely, Likely, Somewhat likely, Unlikely, Not at all likely, Don't know, Not applicable (top 3 box excluding 'don't know' and 'not applicable' answers). n=1008, 568 and 936



Researchers believe AI can bring benefit across a range of activities, including developing new ideas, preparing articles and summarizing information. Of those who think AI would benefit research activities or using scientific content, 94% are likely to use a reliable AI assistant to review prior studies, identify gaps in knowledge and generate a new research hypothesis for testing, 91% to proof their paper and 89% to generate a synthesis of research articles in an area.

Likelihood of using a reliable AI assistant to help assess symptoms

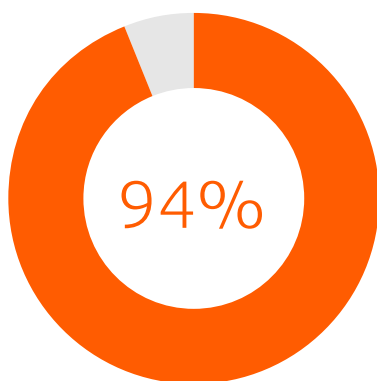


Fig 15. Question: If you had a reliable and secure AI assistant to help you in clinical activities, how likely would you be to... Assess symptoms and identify possibility of a disease/condition (provides confidence levels for diagnosis and recommends any confirmatory tests). Scale: Very likely, Likely, Somewhat likely, Unlikely, Not at all likely, Don't know, Not applicable (top 3 box excluding 'don't know' and 'not applicable' answers). n=687 shown to clinicians who believe AI can bring benefit when completing clinical activities

For clinicians, who believe AI could bring benefit across clinical activities such as diagnoses and clinical imaging, 94% are likely to use a reliable and secure AI assistant to assess symptoms and identify a disease or condition.

Institutions are preparing for an AI-powered future

Looking to the future, institutions are also expecting the use of GenAI to increase – and they're preparing for it. Elsevier's report *View from the Top: Academic Leaders' and Funders' Insights on the Challenges Ahead* highlights that many universities have GenAI guidelines in place, or are working on them, both for research and education.⁵¹ In particular, 64% of academic leaders are prioritizing the challenge of AI governance, though only 23% consider their institutions well prepared to tackle the challenge.⁵²

"AI is going to change everything about how we work at universities, particularly in the teaching but also, in the research. I don't think we have begun to scratch the surface of what that looks like."

Academic leader, EMEA⁵³

Businesses more broadly are taking the subject seriously. Capgemini reports that GenAI is on the boardroom agenda for 96% of organizations, with one-fifth of executives expecting the technology to "significantly disrupt their industries."²³ Support is even stronger among pharma and healthcare companies: 98% of executives in this industry say GenAI is on the board's agenda, and 58% say company leaders are strong advocates of GenAI.

As such according to Capgemini 97% of organizations had plans for GenAI and by July 2023, 40% of organizations had set up teams and allocated budget to GenAI (42% for the pharma and healthcare sector). A further 49% planned to do so within a year.²³ More than two-thirds (68%) reported establishing guidelines and policies on employees' use of GenAI, and 10% had banned, or were considering banning, GenAI tools.

In the current study, actions institutions are taking include building a plan or protocol to evaluate the purchase of tools that include AI (reported by 16% of respondents), setting up a community of practice around it (14%) and providing ethics courses (14%). Overall, 12% plan to acquire tools that include AI in 2024 or beyond.

It is less common for institutions to be appointing new AI leadership (6%) or operational functions such as GenAI Librarian (10%).

Ways in which institutions are preparing for AI usage

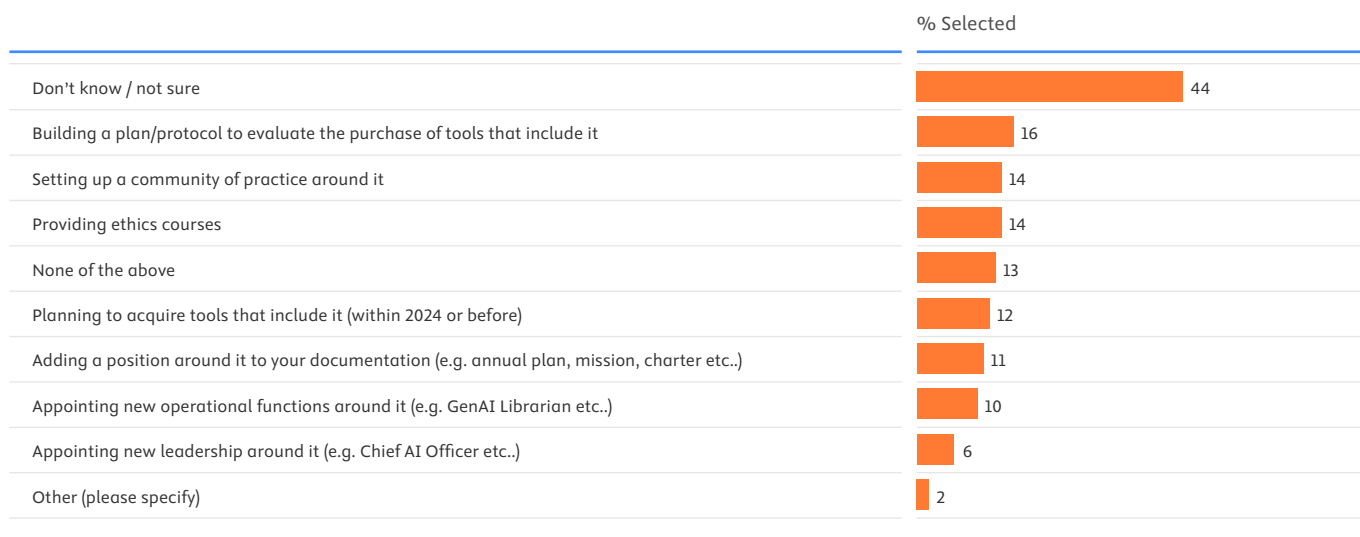


Fig 16. Question: In which ways, if any, is your institution preparing for AI usage? n=2,999



Insights 2024: Attitudes toward AI

Shaping an AI-driven future



Chapter 3

Shaping an AI-driven future

“We’re only at the beginning of what AI can accomplish. Whatever limitations it has today will be gone before we know it.”

– Bill Gates²

- 94% believe AI could be used for misinformation
- 86% are concerned AI could cause critical errors or mishaps
- 81% think AI will to some extent erode critical thinking with 82% of doctors expressing concern physicians will become over reliant on AI to make clinical decisions
- 58% say training the model to be factually accurate, moral, and not harmful (safety) would strongly increase their trust in that tool
- Knowing the information the model uses is up to date was ranked highest by respondents for increasing their comfort in using an AI tool

Understanding not only their concerns but also the factors that build researchers’ and clinicians’ trust in AI tools and their comfort using them can help technology developers create better tools and institutions maximize their benefit. Almost all respondents are concerned that AI will be used for misinformation, a concern that was identified in Elsevier’s *Confidence in Research* global survey,⁵⁶ as well as cause critical errors or mishaps.



Factual accuracy and up-to-date models and information would help increase trust among users.

Exploring users’ concerns

The potential of GenAI is becoming clearer as the technology develops, as are the potential pitfalls. GenAI tools can be powerful, not only for automating structured tasks and accelerating data analysis and visualization but also developing hypotheses and supporting clinical decisions.

When the stakes are high, as they are in the treatment of patients, it is vital that technology is responsible, ethical and transparent. Concern about the loss of the human element is particularly high around the use of AI in healthcare, and most Americans think it could harm the patient–clinician relationship.¹⁸

In a Pew Research survey, 60% of adults said they would feel uncomfortable if their healthcare provider relied on

AI for their medical care, and opinion was split about the health outcomes, with 38% expecting them to be better and 33% worse.¹⁸

This provides a dilemma for tech companies developing the technology as well as those using it: they need to move fast to keep up with the changing landscape and harness the potential for innovation, but they also need to be cautious about the risks, many of which are still unknown.¹⁰

Understanding users’ (and potential users’) concerns around GenAI is an important step in developing tools with minimized risks. Some of the biggest concerns are around misinformation and errors.

Researchers' and clinicians' concerns

Overall, 94% of respondents (95% of researchers and 93% of clinicians) believe to some extent that AI will be used for misinformation over the next two to five years.

“These tools are not yet based on scientific evidence, do not provide references, and are not yet reliable.”

Survey respondent, doctor, Brazil



GenAI technology can be used to produce misinformation, and if trained with this data, it can use misinformation as a basis for outputs it considers true. As Ofcom notes, “generative AI models are not capable of determining the truth or accuracy of information on their own.”¹⁴⁷ Users are not always aware of the misinformation they collect, such as in the case of a lawyer cited for using fictitious case law in a legal brief that he used GenAI to write.³⁰

This makes the governance and regulation of GenAI even more vital, and institutions have a role to play in mitigating the intentional use of GenAI to produce misinformation. As noted in *View from the Top: Academic Leaders' and Funders' Insights on the Challenges Ahead*, academic leaders are concerned about how to mitigate risks like the falsification of research results.⁵⁴

Most researchers and clinicians (86%) are also worried about critical errors or mishaps (accidents) occurring, with 14% not expecting this not to happen at all.

However, previous research suggests particular concern about mistakes in healthcare resulting from AI use, with over three-quarters of US clinicians considering it important for tech companies and governments to carefully manage AI applications in disease diagnosis.²⁶

“I am very worried about generative AI leading to clinical mistakes that could harm patients. These machines don't think, they recognize patterns to make confident but nonsensical answers. That is dangerous when making decisions. Lawyers are already in deep legal trouble for trying to pass off generative AI documents as their work.”

Survey respondent, doctor, USA

Negative impact of AI in various areas over the next two to five years

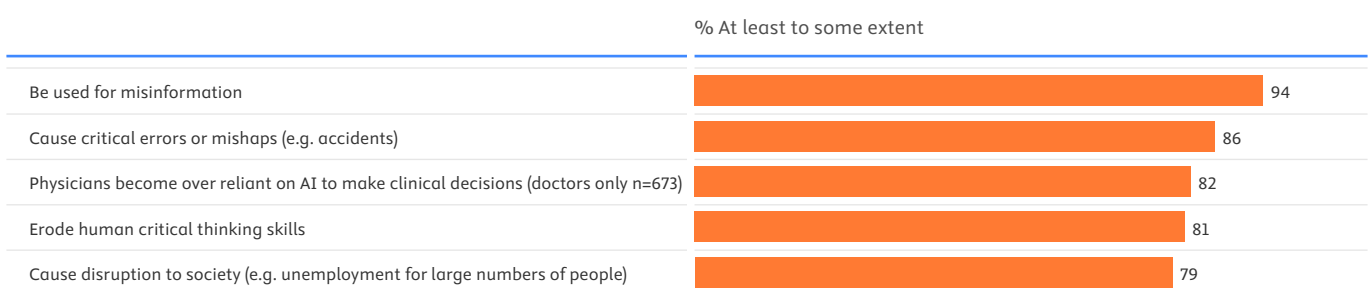


Fig 17. Question: Thinking about the impact AI will have on society and your work, to what extent do you think over the next 2 to 5 years it will...? A great extent, some extent, not at all. n=2,829

When technology meets humanity

Several other concerns relate to the impact GenAI could have on people and the way they think and behave. In the current study, 81% of respondents think AI will erode human critical thinking skills. Indeed, there is suggestion of a risk that AI will affect the way students think, which any changes in curriculum should consider.⁵⁵

Over four in five (82%) doctors think use of AI may mean physicians become over reliant on the technology to make clinical decisions. This concern was echoed in the *Clinician of the Future Education Edition*, in which more than half (56%) of students feared the negative effects AI can have on the medical community.³⁵

Social disruption is a concern for 79% of respondents, for example with AI causing the unemployment of large numbers of people.

Ethical concerns are also important: in the current survey, most respondents (85%) have at least some concerns, with only 11% reporting no concerns about the ethical implications of AI on their area of work and 11% reporting fundamental concerns. This is higher in Europe (17%) and North America (14%) (see detailed findings in databook).

Level of concerns about the ethical implications of AI

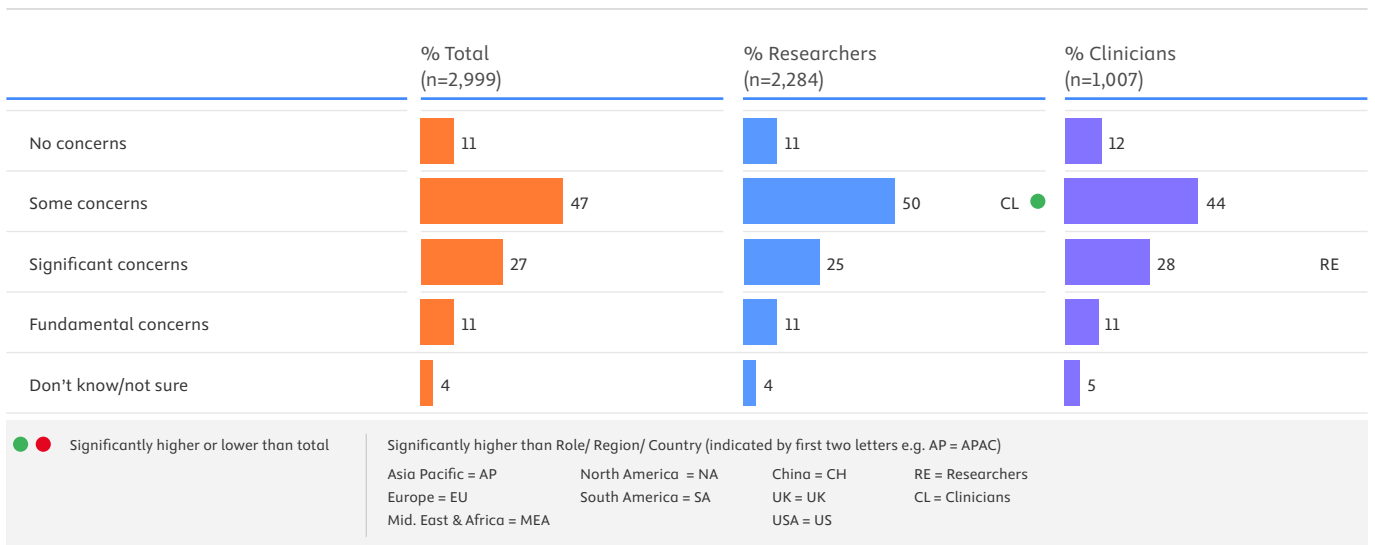


Fig 18. Question: To what extent, if at all, do you have concerns about the ethical implications of AI (including generative AI) in your area of work?

Factors impacting trust in AI tools

“I’m distrustful of all AI tools at present. It would take a lot of transparency along with concrete examples of the tool in action to convince me it is trustworthy. My career and my scientific integrity are too valuable to hand over to anyone or anything else. I am also not protected by tenure so any slip-ups and I will lose my career.”

Survey respondent, researcher, Canada

When combined, the potential GenAI has for misinformation, hallucinations, disruption to society and impact on job security paints a picture for many of a technology that is difficult to trust.²⁵ Yet surveys show that most people do trust the technology.

The Capgemini Research Institute found that 73% of consumers trust content created by GenAI.²⁰ Specifically, 67% believed they could benefit from GenAI used for diagnosis and medical advice, and 63% were excited by the prospect of GenAI bolstering drug discovery.

What makes researchers and clinicians trust AI?

There is room for improvement when it comes to trust. Respondents to the current survey share their views about how to build trust in AI tools, and views are similar for researchers and clinicians across all factors.

More than half (58%) of respondents say training the model to be factually accurate, moral and not harmful would strongly increase their trust in that tool.

Some of the other factors respondents say would increase their trust in AI tools relate to quality and reliability. For example, 57% say only using high-quality peer-reviewed content to train the model would strongly increase their trust, while just over half (52%) say training the model for high coherency outputs (quality model output) would strongly increase their trust.

Transparency and security are also important factors. For 56% of respondents, citing references by default (transparency) will strongly increase trust in AI tools. Keeping the information input confidential is a trust-boosting factor for 55%, as is abidance by any laws governing development and implementation (legality) for 53%.

Statement: Factors that strongly increase trust in AI tools



Fig 19. Question: To what extent, if at all, would the following factors increase your trust in tools that utilize generative AI? Scale: Strongly increase my trust, Slightly increase my trust, No impact on my level of trust

The importance of access

Regional differences across many survey questions highlight the importance of access in the implementation of AI globally.

Respondents in lower-middle-income countries are significantly more likely than those in high income countries to think AI will increase collaboration, at 90% and 65% respectively. They are also more likely to think AI will be transformative, at 32% compared to the global average of 25%.

However, respondents are less likely to have used AI for work purposes (at 21% versus the average of 31%), perhaps owing to access issues. While 26% of respondents globally cite a lack of budget as a restriction to using AI, this increases to 42% in lower- middle-income countries.

Actions for an AI-powered future

“All emerging technologies, including AI, have both advantages and disadvantages. It is essential to further develop and regulate these technologies, aiming to extract maximum benefits.”

Survey respondent, researcher, Canada

Respondents to the current survey clearly share the view that the AI tools they use now and in the future to support research and clinical work should be responsible, ethical and transparent. With this in mind, information, consent and quality are critical factors to consider from different angles.

GenAI technology providers

Enhance accuracy and reliability

As we saw in Chapter 2 (see figure 13 on page 27), researchers and clinicians expect tools powered by GenAI to be based on high-quality, trusted sources only (71%). To support this, developers should work to ensure the datasets used to train GenAI tools are reliable, accurate and unbiased. To minimize bias, advanced NLP techniques could be applied to understand the intent of users for more relevant outputs.²⁰ Efforts to minimize the risk of hallucination should continue.

Increase transparency

Respondents expect to be informed whether the tools they are using depend on GenAI (81%) and would want the option to turn off the functionality (75%). In line with their expectation that it should be possible to choose whether to activate AI functionality, 42% of respondents would prefer AI to be provided as a separate module, while 37% would want it integrated into a product.

Solution providers should be clear about the datasets used, and ensure intellectual property and copyright is protected. GenAI functionality should be clearly labelled or otherwise indicated, ideally with the ability for users to switch it off and on.

Strengthen safety and security

As regulation and policy develops, tech companies have a role to play in ensuring the safety of their GenAI tools, including robust governance and human oversight.

Given the importance of privacy and data security, developers could go beyond regulation to ensure their tools are safe and secure for users, thereby increasing trust.

Access preference for AI tools

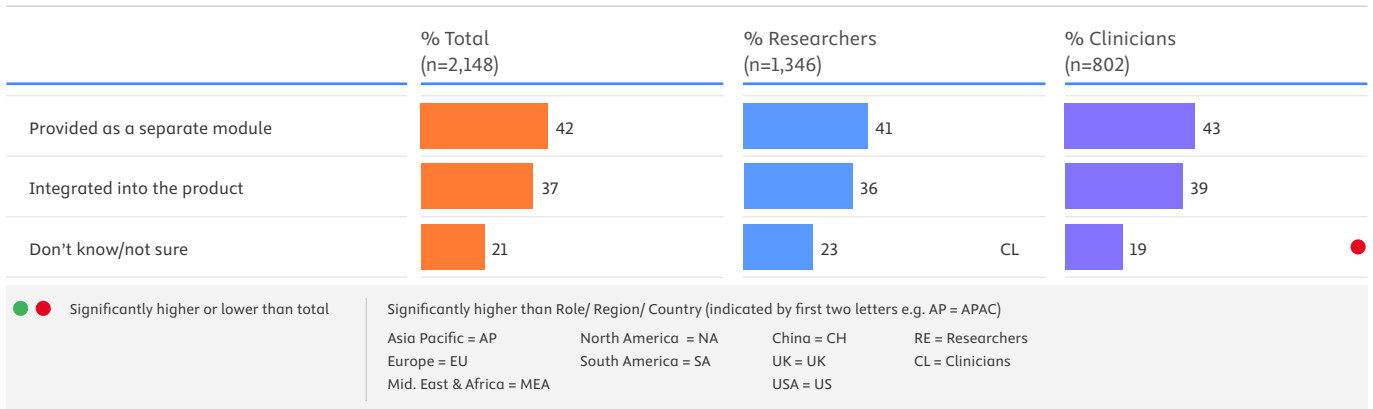


Fig 20. Question: Would you prefer any generative AI functionality included in a product you use already to be...?



Institutions employing researchers and clinicians

Establish policies and plans and communicate them clearly

As we have seen, numerous organizations are working on policies, guidance and plans to integrate GenAI into their operations. However, as respondents shared in the survey, many are unaware of their institutions' plans, including restrictions on using GenAI.

In addition to establishing guidelines on GenAI and taking steps towards a strategy for the organization, communicating those actions and plans to researchers and clinicians would help mitigate risk and maximize benefit.

Build governance and expertise

Institutions can help increase the comfort and trust of researchers and clinicians in GenAI by ensuring the tools they choose are overseen in a way that identifies and reduces biases and risks.

Any GenAI strategy should include a robust governance structure, including people with expertise in the technology and its area of application.

Provide training and capacity

Despite its rapid increase in awareness and usage, GenAI remains a relatively young technology.

As the use of GenAI increases, researchers and clinicians will need to spend time learning how to maximize its benefit. Previous research with clinicians has highlighted the potential burden of AI due to the required time to learn.³⁴

To ensure the technology is part of the solution rather than the problem, institutions could identify ways to give researchers and clinicians the time and a safe space to explore GenAI.

Ensure access

AI perception is markedly more positive in lower-middle-income countries, yet its use among researchers and clinicians is limited due to budgetary restrictions.

Institutions are increasingly aware of the importance of inclusion, and the role accessibility plays in that. As use of AI becomes increasingly widespread globally, there will be a growing need to address gaps in access to the technology, especially in international collaboration. To help ensure improved access to AI technology globally, institutions could consider AI as part of their wider strategy, to help foster partnership and ensure greater diversity at the institutional and project level.

Insights 2024: Attitudes toward AI

Conclusion

Building on previous research published in the *Research Futures* and *Clinician of the Future* series, this report sets a baseline for researchers' and clinicians' awareness, perspectives, use, concerns and expectations of AI (including GenAI).

In *Research Futures 2.0*, we outlined the 'Tech titans' scenario, in which "significant advances in AI products drive innovation, enabling technology companies to support the research ecosystem and become knowledge creators and curators."

Since then, we have seen the potential of AI jump forward considerably with the arrival of generative AI into public consciousness through the launch of ChatGPT3 in late 2022. This was a watershed moment, as it gave most of the public, as well as researchers and clinicians, a glimpse into its potential.

Whilst the majority of researchers and clinicians are aware of AI and over half (54%) of those surveyed have actively used it, and just under one-third (31%) for a specific work-related purpose, few are actively using AI tools often.

Many see its great potential to accelerate knowledge discovery, increase work quality and save costs. But they are worried about AI's potential for misinformation, to cause critical errors and to erode critical human thinking.

The implicit expectation from respondents to our survey is that providers of AI tools take appropriate measures to mitigate the potential negative impacts of AI and for the majority transparency and AI tools being based on high-quality trusted resources are critical.

Elsevier's role

Elsevier provides information-based analytics and decision tools for researchers and health professionals worldwide, helping them advance science and improve healthcare outcomes, for the benefit of society.

For more than a decade, Elsevier has been using AI and machine learning technologies responsibly in our products combined with our unparalleled peer-reviewed content, extensive data sets, and sophisticated analytics to help researchers, clinicians and educators discover, advance and apply trusted knowledge.

Our responsible AI principles

- ▶ We consider the real-world impact of our solutions on people.
- ▶ We take action to prevent the creation or reinforcement of unfair bias.
- ▶ We can explain how our solutions work.
- ▶ We create accountability through human oversight.
- ▶ We respect privacy and champion robust data governance.

Whatever future we head towards, it is clear that GenAI will play a role. The aim of this study was to understand the AI landscape from the point of view of researchers and clinicians, including their awareness, perception and use of GenAI tools. With these insights into their concerns and expectations, we at Elsevier together with institutions we support are better prepared to utilize AI to help advance knowledge and health care.

As familiarity with GenAI grows, parallel with developments in the technology, areas of opportunity and concern are likely to evolve. We will continue to monitor researchers' and clinicians' views and behavior to meet their needs with responsible AI tools that support research and clinical decisions.

For further information go to:

<https://tinyurl.com/ai-attitudes>

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Insights 2024: Attitudes toward AI

Methodology

This study aimed to uncover awareness, usage and perceptions of AI, including generative AI.

In late December 2023 to February 2024, Elsevier sent a survey to a sample of people working in research (including leaders and corporate researchers) and in health (clinicians) from a variety of sources, including:

- ▶ Those who had published recently – these individuals were randomly selected from a database of published authors across journals and books from various publishers
- ▶ A third-party panel provided by Dynata (voluntary sign up)
- ▶ Users of Elsevier solutions as well as from Elsevier's marketing databases

Participants were recruited using an email invitation containing a link to the online survey. A total of 2,999 people from 123 countries and a range of disciplines completed the survey. Clinicians undertaking research as part of their role count as both clinicians and researchers. Base sizes shown in the report are unweighted.

Results are weighted based on OECD/Pharma Factbook population figures for Researchers and Clinicians by region, and to equally represent Research and Health sectors in the totals. Health is weighted 50:50 medicine and nursing.

Despite the weighting, the study is not without limitations due to self-selection, non-response biases and the lower response rate than what is typical for online surveys of this nature. Therefore, there will be some non-sampling error associated with this study, as we cannot be sure responses accurately represent the views of the population for a given country. Statistical differences shown in this report should be interpreted within this context, and while showing notable difference between groups, results are not necessarily generalizable to a whole country. Given the non-probability sampling methods, these tests are indicative.

Insights 2024: Attitudes toward AI



When: December 2023 to February 2024
When: 15-min online quantitative survey
Who: Global study with 2,999 responses from 123 countries.
= 2,284 researchers
= 1,007 clinicians
(of whom 292 are also included as researchers)

Results: To increase representativeness responses were weighted based on OECD and Pharma Factbook population figures by region, and to equally represent researchers and clinicians in totals. Clinicians are weighted equally by doctors and nurses. Base sizes included in the report are unweighted.

Insights 2024: Attitudes toward AI

Appendices

Sample bases by region/country

NB. Clinicians undertaking research as part of their role count as both clinicians and researchers.

ASIA-PACIFIC	Researchers	Clinicians	Total
Afghanistan	1	0	1
Australia	26	16	37
Bangladesh	3	2	4
Cambodia	1	0	1
China	311	103	358
Fiji	1	1	2
French Polynesia	0	1	1
Hong Kong	3	0	3
India	101	42	134
Indonesia	13	6	18
Japan	112	27	120
Malaysia	17	4	21
Mongolia	1	0	1
Myanmar	1	0	1
Nepal	1	1	2
New Zealand	1	3	4
Pakistan	14	5	16
Philippines	10	14	23
Singapore	3	3	5
Solomon Islands	1	0	1
South Korea	68	9	73
Sri Lanka	4	3	6
Taiwan	37	20	45
Thailand	14	0	14
Vietnam	1	2	3
Total	745	262	894

EUROPE	Researchers	Clinicians	Total
Albania	2	0	2
Armenia	1	0	1
Austria	6	4	8
Azerbaijan	2	0	2
Belgium	8	0	8
Bulgaria	4	1	5
Croatia	3	1	4
Cyprus	1	1	2
Czech Republic	7	1	8
Denmark	8	2	8
Finland	11	1	11
France	100	42	126
Georgia	4	0	4
Germany	63	27	82
Greece	4	2	6
Hungary	6	0	6
Iceland	1	0	1
Ireland	2	0	2
Italy	39	12	44
Kazakhstan	5	0	5
Kyrgyzstan	1	1	1
Latvia	2	0	2
Lebanon	2	0	2
Lithuania	1	0	1
Malta	1	0	1
Netherlands	22	13	32
Norway	10	1	11
Poland	36	3	38
Portugal	13	4	16
Romania	7	1	8
Russia	131	8	135
Serbia	9	3	10
Slovenia	4	0	4
Spain	106	138	219
Sweden	7	4	9
Switzerland	13	5	16
Turkey	55	6	61
Ukraine	10	0	10
United Kingdom	47	13	53
Uzbekistan	4	0	4
Total	758	294	968

Insights 2024: Attitudes toward AI

Appendices

MID. EAST & AFRICA	Researchers	Clinicians	Total
Algeria	2	0	2
Bahrain	1	0	1
Botswana	1	0	1
Burkina Faso	2	0	2
Cameroon	3	1	3
Côte d'Ivoire	2	2	3
Egypt	15	2	16
Ethiopia	4	1	4
Gambia	1	0	1
Ghana	3	5	6
Iran	45	7	49
Iraq	5	0	5
Israel	6	1	6
Jordan	11	0	11
Kenya	4	3	7
Kuwait	0	2	2
Morocco	4	1	5
Mozambique	1	0	1
Nigeria	16	4	20
Oman	2	1	3
Palestinian Authority	2	0	2
Réunion	1	1	1
Rwanda	2	2	2
Saudi Arabia	7	3	9
Senegal	2	0	2
South Africa	3	3	6
Sudan	0	1	1
Syria	2	0	2
Togo	1	1	1
Tunisia	3	2	3
Uganda	5	0	5
United Arab Emirates	6	2	8
Zambia	2	0	2
Zimbabwe	1	0	1
Total	165	45	193

NORTH AMERICA	Researchers	Clinicians	Total
Canada	49	14	57
United States of America	298	127	393
Total	347	141	450

SOUTH AMERICA	Researchers	Clinicians	Total
Argentina	17	32	48
Bolivia	1	2	3
Brazil	81	19	96
Chile	18	12	25
Colombia	19	21	38
Costa Rica	1	4	5
Cuba	2	1	3
Curaçao	0	1	1
Dominican Republic	0	1	1
Ecuador	13	21	30
El Salvador	1	2	3
Guatemala	2	3	4
Haiti	0	1	1
Honduras	1	2	2
Mexico	57	85	134
Nicaragua	1	7	8
Panama	1	3	3
Paraguay	0	1	1
Peru	9	20	27
Puerto Rico	1	0	1
Uruguay	4	8	9
Venezuela	5	5	8
Total	234	251	451

PREFER NOT TO SAY COUNTRY	Researchers	Clinicians	Total
Total	35	14	43

GRAND TOTAL	Researchers	Clinicians	Total
Total	2,284	1,007	2,999

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