



Global Perception of Antimicrobial Resistance (AMR)

March 2021



Background on Antimicrobial Resistance (AMR)

Overview of the Global AMR Crisis



What is Antimicrobial Resistance (AMR)?

Antimicrobial resistance (AMR) is the ability of germs to fight off the drugs designed to kill them and is currently a serious global health threat. Through overuse and misuse of antimicrobial drugs, the bacteria, viruses, fungi, and parasites that cause infection and sepsis in humans can more quickly evolve to become resistant to drugs.¹

Antimicrobial resistance poses a threat to people across the world. As medications to treat infection become less effective, all people are at increased risk of contracting infections that are difficult to treat or that can not be treated with available drugs.

Antimicrobial resistance leads to an estimated 700,000 deaths per year around the world, and this number is projected to reach ten million annually by the year 2050.²

Any infection can cause sepsis, the body's overwhelming response to infection that can lead to tissue damage, organ failure and death. Fighting antimicrobial resistance means working to keep drugs safe and effective against infection and sepsis.

Overview of the Global AMR Crisis



What kind of infectious organisms (germs) develop AMR?

The development of antimicrobial resistance has been observed in all types of infectious organisms. Resistant bacteria may receive the most attention, but viruses, fungi, and even infectious parasites have developed resistance to available antimicrobial medications.

- Drug-resistant bacteria are currently of highest concern to human health. Every antibiotic drug introduced on the market to treat bacterial infection has been met with some level of resistance from bacteria (antibiotic resistance).³
- Resistance has also developed against most antivirals, posing a particular threat to immunocompromised patients who rely on these antiviral treatments.¹
- Diseases caused by parasites called protozoa affect one-sixth of the world's population, and parasitic drug resistance is increasing.⁴
- Drug-resistant fungi are also becoming a concern. For example, *Candida auris*, a species that is strongly associated with drug resistance and causes invasive infections in humans, has been found on six continents.⁵

Overview of the Global AMR Crisis



Who is impacted by AMR?

The responsible use of antimicrobials is important for all sectors of society, from healthcare prescribing and patient use to agriculture and veterinary applications.

- Globally, 73% of all antimicrobials sold are intended for use in animal agriculture.⁶ The EU has now banned the use of antimicrobials as growth promoters in animal agriculture,⁷ and plans to terminate the agricultural use of all antimicrobials used for human health.⁸
- Drug-resistant microbes (germs) can pass between animals, humans, and the environment. Research suggests that antimicrobial usage in animal agriculture leads to resistant infections in humans. In several studies in which antimicrobial usage in animal agriculture was decreased, lower levels of antibiotic-resistant infections in humans were observed.⁹

Overview of the Global AMR Crisis



Why did Sepsis Alliance conduct this survey?

Any infection, if left untreated, can lead to sepsis. Antimicrobial resistance threatens our ability to treat many infections and therefore increases the risk of sepsis to all.

Sepsis Alliance conducted this survey to assess international understanding of antimicrobial resistance. Tackling the global problem of antimicrobial resistance requires that people around the world understand what the problem is and what is causing it. Sepsis Alliance plans to use these survey results to target public education efforts toward raising awareness of this serious threat to the health of all people.



Methodology

Sepsis.org

Methodology



The survey was conducted online by Radius Global Market Research on behalf of Sepsis Alliance from January 28 - February 3, 2021, among 6,330 adults, ages 18 and older, in the following countries:

Brazil (n = 1,102)
China (n=1,063)
India (n = 1,055)
Spain (n = 1,103)
United States (U.S.) (n = 2,007)

The samples from the U.S. and Spain are representative of age and gender based on general census data. The samples from Brazil, China, and India are representative of age and gender based on online census data. The U.S. sample is also representative of household income, race and ethnicity, and region. The survey was translated into the appropriate language for each country.

For awareness questions (Q1 and Q2), no definitions were provided to survey respondents (unaided awareness testing). For subsequent questions, term definitions were provided (aided testing). Term definitions used in the study are listed in Appendix.

Funding

Research funding for this survey was provided by an independent medical education grant from Pfizer.

About Radius Global Market Research

Radius Global Market Research (www.radius-global.com) is one of the largest independent market-research companies. For more than 50 years, the business has partnered with global marketers to develop insight-based strategies that drive brand performance. A superior level of senior team involvement is the hallmark of Radius GMR's approach. Radius GMR is based in New York. Global operations include London-based Radius Europe, Radius MEA in Dubai, and Radius Asia in Beijing.



SEPSIS
ALLIANCE

Global Findings

Sepsis.org

Summary



- Globally, half of adults surveyed (52%) are aware of the term antimicrobial resistance (AMR), but fewer have knowledge of the effects of AMR, with nearly one-third (32%) stating they do not know what AMR is.
- There is significantly greater awareness of the term antibiotic resistance (70%) compared to awareness of the term antimicrobial resistance (52%), suggesting that the relationship between the two is not well understood.
- Globally, many adults are unable to identify potential complications of an infection and only 45% know that sepsis is a potential complication.
- When provided with definitions of the terms used, most adults indicate that they are worried about antimicrobial resistance (85%) and also consider it to be a major problem (68%).
- Adults are most likely to think medical providers, drug and pharmaceutical companies, and government are responsible for solving the issue of antimicrobial resistance. However, nearly three-quarters believe they themselves are also responsible.
- Low awareness of antimicrobial resistance (AMR) and its effects suggests there is a great need for public education on the impacts of AMR and what can be done to prevent it, including when it is appropriate to take antibiotics.



Unaided Awareness Testing

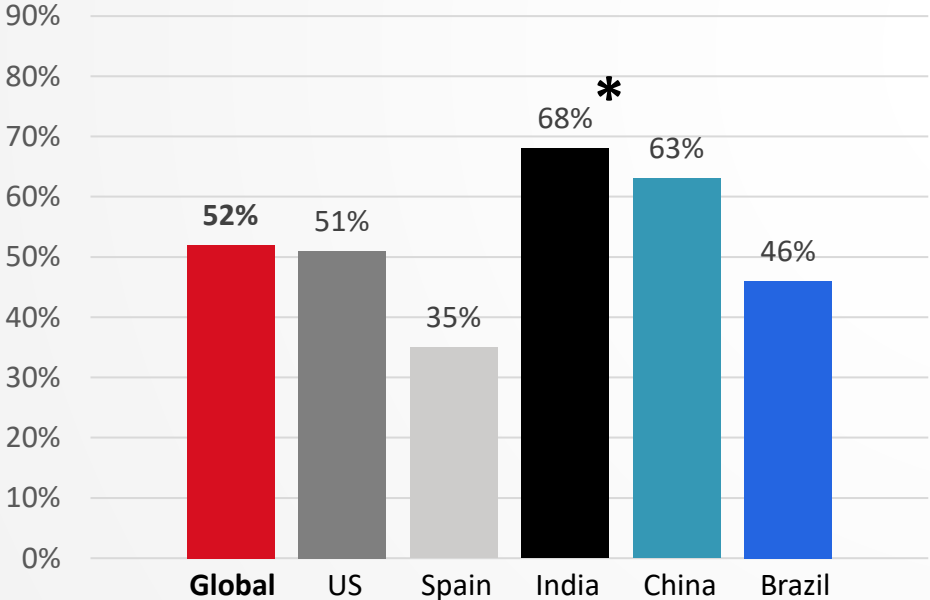
Sepsis.org

Antimicrobial resistance (AMR) is a global crisis according to the World Health Organization, yet only about half of adults (52%) globally are aware of the term.

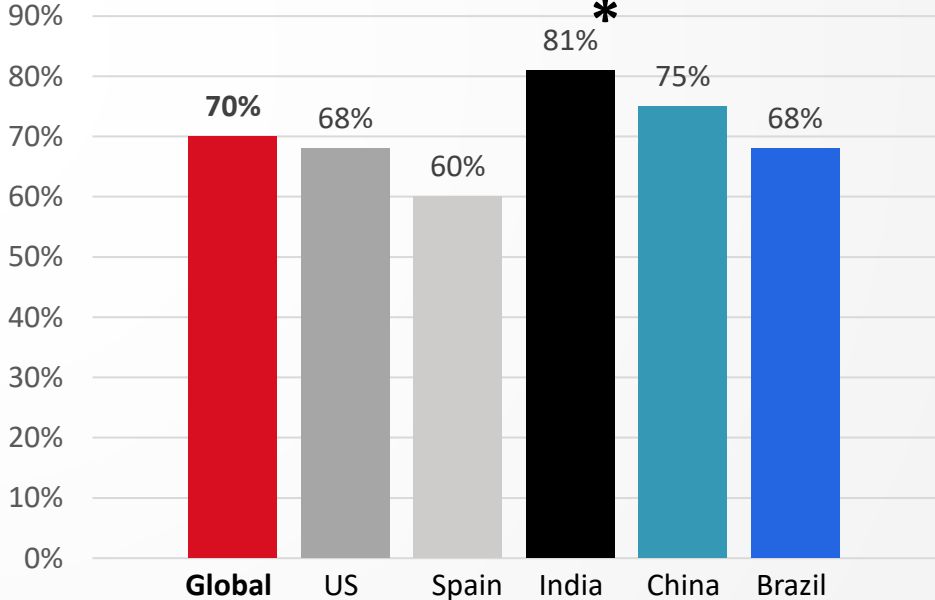


- More adults are aware of the term **antibiotic resistance**.

Antimicrobial Resistance Awareness



Antibiotic Resistance Awareness



Q1 How aware are you, if at all, of the following terms?
Base: Total Sample (n=6330), US (n=2007), Spain (n=1103), India (n=1055), China (n=1063), Brazil (n=1102)

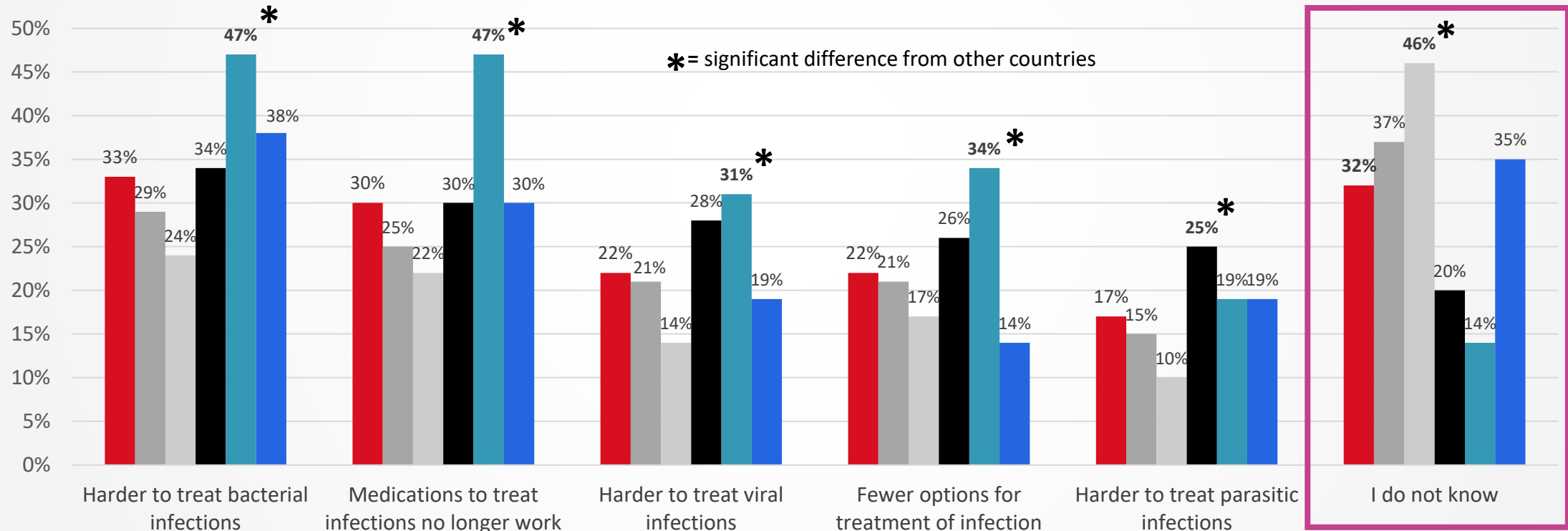
*= significant difference from other countries

Globally, there is low knowledge about antimicrobial resistance (AMR).



- Nearly one-third say they do not know what antimicrobial resistance is and less than half can accurately identify a description of AMR or its effects.

Antimicrobial Resistance Description and Effects



Q2 Which of the following, if any, describes antimicrobial resistance (AMR) or its effects?

Base: Total Sample (n=6330), US (n=2007), Spain (n=1103), India (n=1055), China (n=1063), Brazil (n=1102)

■ Global ■ US ■ Spain ■ India ■ China ■ Brazil



SEPSIS
ALLIANCE

Aided Testing

Sepsis.org

Globally, many adults are unable to identify potential complications of an infection.



- Only 45% know that sepsis is a potential complication of an infection.

Potential Complications	Global	US	Spain	India	China	Brazil
Weakened immune system	65%	65%	63%	61%	60%	75%*
Organ failure	59%	61%	49%	55%	61%	66%*
Death	58%	65%	66%	41%	39%	70%*
Loss of limbs	45%	50%	43%	32%	40%	55%*
Sepsis	45%	56%	43%	29%*	55%	33%
Long term health problems	42%	50%	34%	48%	33%	36%
Type 1 diabetes	17%	15%	15%	24%*	16%	19%
Down syndrome	13%	11%	9%	26%*	19%	5%
Do not know	8%	10%	3%	10%	10%	4%

Globally, 8% state they do not know the complications of an infection.

More education is needed to promote understanding of the many potential complications of an infection, including sepsis.

Indicates selection of incorrect responses

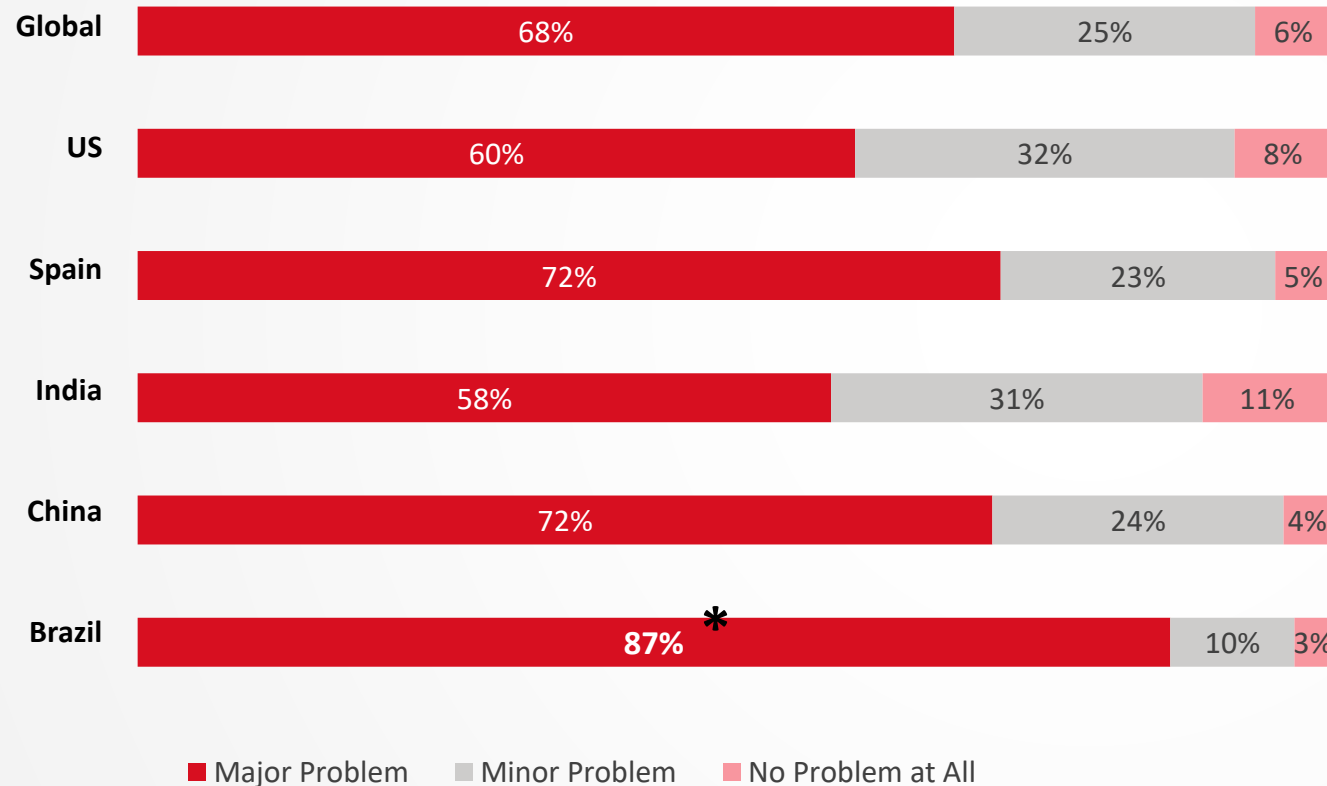
*= significant difference from other countries

Q5 Which of the following, if any, can be complications of an infection? Please select all that apply.
 Base: Total Sample (n=6330), US (n=2007), Spain (n=1103), India (n=1055), China (n=1063), Brazil (n=1102)

When provided with the definition of AMR, more than two-thirds of adults believe it is a major problem.



- Those in Brazil are generally more worried about AMR than those in other countries.



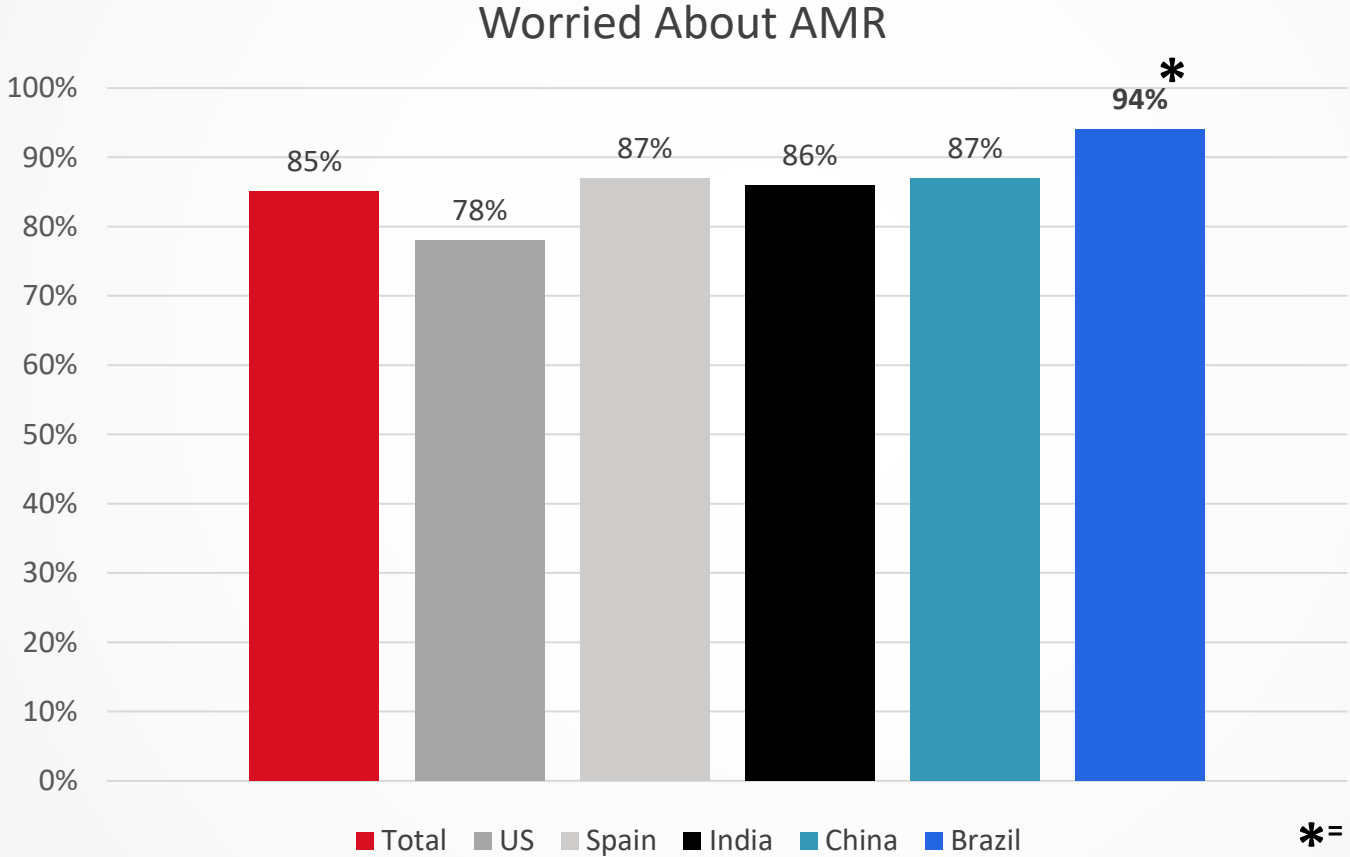
- Adults globally are also likely to think the following are major problems:
- Overuse of antibiotics (73%)
 - Antibiotic resistance (70%)
 - People not getting vaccinated (66%)
 - People not finishing their complete course of antibiotics (61%)
 - Ability to develop new drugs to treat infections (51%)

*= significant difference from other countries

Q3 Do you think any of the following are a minor problem, major problem, or no problem at all? (Definition of AMR provided; see Appendix.)

Base: Total Sample (n=6330), US (n=2007), Spain (n=1103), India (n=1055), China (n=1063), Brazil (n=1102)

Similarly, there are high levels of worry about antimicrobial resistance (AMR) across countries.



Worry about AMR is highest in Brazil and lowest in the U.S.

Worry is significantly higher in Brazil than in all other countries surveyed.

Q4 How worried, if at all, are you about the following? (Definition of AMR provided; see Appendix.)
Base: Total Sample (n=6330), US (n=2007), Spain (n=1103), India (n=1055), China (n=1063), Brazil (n=1102)

*= significant difference from other countries

Medical providers, pharmaceutical companies, and government are perceived as most responsible for solving antimicrobial resistance (AMR).



Responsible	Global	US	Spain	India	China	Brazil
Doctors/Healthcare Providers	89%	89%	85%	90%	90%	95%*
Drug/Pharma Companies	87%	86%	88%	86%	82%	94%*
Government	82%	76%	77%	86%	89%	89%
Myself	73%	64%*	68%	85%	86%	68%
NGOs	65%	65%	57%	74%*	69%	62%
Agriculture Industry	65%	63%	70%	73%	64%	54%

Nearly three-quarters (73%) believe they themselves are responsible for solving AMR.

Adults in the U.S. feel they are less personally responsible to solve AMR than adults in any other country.

*= significant difference from other countries

Q6 How responsible are the following, if at all, for solving antimicrobial resistance (AMR)? (Definition of AMR provided; see Appendix.)
 Base: Total Sample (n=6330), US (n=2007), Spain (n=1103), India (n=1055), China (n=1063), Brazil (n=1102)

Globally, 75% know that it is appropriate to take antibiotics when a healthcare professional has written a prescription.



Appropriate Time for Antibiotics

	Global	US	Spain	India	China	Brazil
Prescribed by a healthcare professional due to a bacterial infection	75%	73%	84%	64%	66%	89%*
My doctor says I have a virus or flu	37%	34%	23%	51%*	45%	36%
I have a fever & don't have time to see a healthcare professional	18%	14%	9%	34%*	24%	12%
As a preventative measure when travelling	16%	14%	7%	30%*	22%	9%
A family member or friend lets me use theirs	12%	11%	4%	23%*	17%	7%
Other	3%	3%	2%	5%*	3%	2%
I do not know	6%	7%	3%	6%	11%*	2%

Just 41% of adults selected the only correct option exclusively: that it is appropriate to use an antibiotic when prescribed by a healthcare provider due to a bacterial infection.

* = significant difference from other countries

Q7 When is it appropriate to use an antibiotic? Please select all that apply.

Base: Total Sample (n=6330), US (n=2007), Spain (n=1103), India (n=1055), China (n=1063), Brazil (n=1102)

Appendix – Term Definitions



The following definitions were provided for survey questions 3, 4, and 6:

Antimicrobial Resistance (AMR) – the ability of microorganisms (bacteria, virus, fungi, parasite) to resist the effects of a drug.

Antibiotic Resistance (ABR) – The ability of bacteria to resist the effects of a drug.

Appendix - Demographics by Country



Brazil

Gender

- Female - 573
- Male - 529

Age

- 18-34 - 477
- 35-54 - 451
- 55+ - 174

China

Gender

- Female - 566
- Male - 494

Age

- 18-34 - 470
- 35-54 - 491
- 55+ - 101

India

Gender

- Female - 488
- Male - 566

Age

- 18-34 - 522
- 35-54 - 405
- 55+ - 128

Spain

Gender

- Female - 577
- Male - 526

Age

- 18-34 - 283
- 35-54 - 462
- 55+ - 358

US

Gender

- Female - 1047
- Male - 960

Age

- 18-34 - 669
- 35-54 - 774
- 55+ - 564

References



1. World Health Organization. 2020. Antimicrobial resistance, 10.13.2020. Accessed 11.02.2020. <https://www.who.int/news-room/fact-sheets/detail/antimicrobial-resistance>
2. Review on Antimicrobial Resistance. 2016. Antimicrobial resistance: tackling a crisis for the health and wealth of nations. https://amr-review.org/sites/default/files/AMR%20Review%20Paper%20-%20Tackling%20a%20crisis%20for%20the%20health%20and%20wealth%20of%20nations_1.pdf
3. Prestinaci, F., Pezzotti, P. and Pantosti, A. 2015. Antimicrobial resistance: a global multifaceted phenomenon. *Pathogens and global health*, 109(7), pp.309-318.
4. Capela, R., Moreira, R. and Lopes, F. 2019. An overview of drug resistance in protozoal diseases. *International journal of molecular sciences*, 20(22), pp.5748.
5. Kordalewska, M. and Perlin, S. 2019. Identification of drug resistant *Candida auris*. *Frontiers in microbiology*, 10, p.1918.
6. Van Boeckel, T.P., Pires, J., Silverster, R., Zhao, C., Song, J., Criscuolo, N.G., Gilbert, M., Bonhoeffer, S. and Laxminarayan, R. 2019. Global trends in antimicrobial resistance in animals in low- and middle-income countries. *Science*, 365(6459).
7. European Parliament and European Council. 2003. Regulation (EC) No 1831/2003. *Official Journal of the European Union*.
8. European Medicines Agency. 2018. Implementation of the new Veterinary Medicines Regulation. Accessed 2.24.2021. <https://www.ema.europa.eu/en/veterinary-regulatory/overview/implementation-new-veterinary-medicines-regulation>
9. Innes, G.K., Randad, P.R., Korinek, A., Davis, M.F., Price, L.B., So, A.D. and Heaney, C.D. 2020. External societal costs of antimicrobial resistance in humans attributable to antimicrobial use in livestock. *Annual review of public health*, 41, pp.141-57.



SEPSIS
ALLIANCE

Sepsis.org