# United States Perception of Antimicrobial Resistance (AMR)

March 2021

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# Overview of the 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 national and 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 in the United States and 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 cannot 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] In the U.S. alone, at least 2.8 million people are infected by antibiotic-resistant bacteria annually, resulting in over 35,000 deaths.[3]

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 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).[4]

- Resistance has also developed against most antivirals, posing a particular threat to immunocompromised patients who rely on these antiviral treatments.[1]

- Drug-resistant fungi are also becoming a problem. Drug-resistant *Candida* species alone caused 1,700 deaths in the U.S. in 2017.[3] Drug-resistance in parasites like protozoa is also rising,[5] and are of particular concern in U.S. livestock.[6]

# Overview of the 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.

- Of all antibiotics sold in the U.S., 80% are sold for use in animal agriculture. Looking only at sales of the important antibiotics used to treat human diseases, 70% are sold for use in animal agriculture.[7,8]

- The U.S. is the largest purchaser of antimicrobial agents for use in animal agriculture except, perhaps, for China. U.S. sales of antimicrobials for animal agriculture exceed that of the entire European Union by 40%. About 50% of those U.S. sales are for non-medically important applications such as growth promotion.[9]

- 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 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 understanding of antimicrobial resistance in the U.S. Tackling the problem of antimicrobial resistance requires that people in the U.S. and 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 to raise awareness of this serious threat to the health of all people.

# Methodology

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# Methodology

The online survey was conducted by Radius Global Market Research on behalf of Sepsis Alliance from January 28 - February 3, 2021, among more than 2,007 adults, ages 18 and older, in the United States. Surveys were conducted in English.

The sample is representative of age, gender, household income, race and ethnicity, and region, as measured by the U.S. Census.

This study was part of a larger global survey effort by Sepsis Alliance.

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 and respondent demographics are listed in the 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.

# United States Findings

# Summary

- Among adults in the United States (U.S.), only half (51%) are aware of the term antimicrobial resistance (AMR).

- There is significantly higher awareness of the term <u>antibiotic resistance</u> (68%) compared to awareness of the term <u>antimicrobial resistance</u> (51%), suggesting that the relationship between the two is not well understood.

- Many adults can identify some of the descriptors and effects of antimicrobial resistance, yet more than one-third state they do not know what antimicrobial resistance is.

- Many U.S. adults are unable to identify potential complications of an infection and only 56% know that sepsis is a potential complication.

- When provided with a definition of the terms used, most survey respondents indicate that they are worried about antimicrobial resistance (78%) and also consider it to be a major problem (60%).

- 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 two-thirds believe they themselves are also responsible.

- There are notable disparities in awareness and understanding of antimicrobial resistance (AMR) between racial/ethnic groups and income levels. For example, Black adults are significantly less likely to be aware of AMR than white adults, Hispanic adults, and those who selected "Other" race. Likewise, adults with incomes below $50,0000 are less likely to be aware of AMR than those with higher incomes.

- 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.  Racial/ethnic and income disparities in awareness suggest that education targeted to some groups may be beneficial.
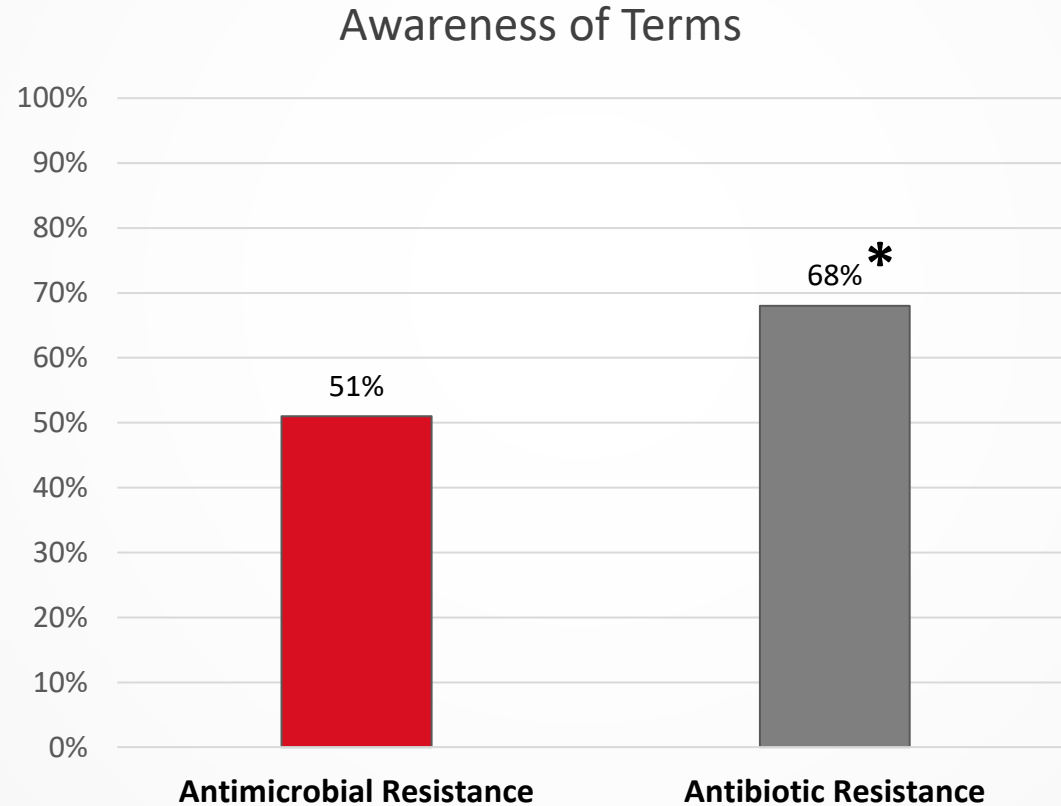
# Unaided Awareness Testing

# Only half of U.S. adults are aware of the of the term **antimicrobial resistance** (AMR).

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

## Awareness of Terms



* = significant difference

# More than one-third of U.S. adults state that they do not know how to describe antimicrobial resistance (AMR).

- The majority are not able to accurately identify a description of AMR or its effects.

### Antimicrobial Resistance Description and Effects
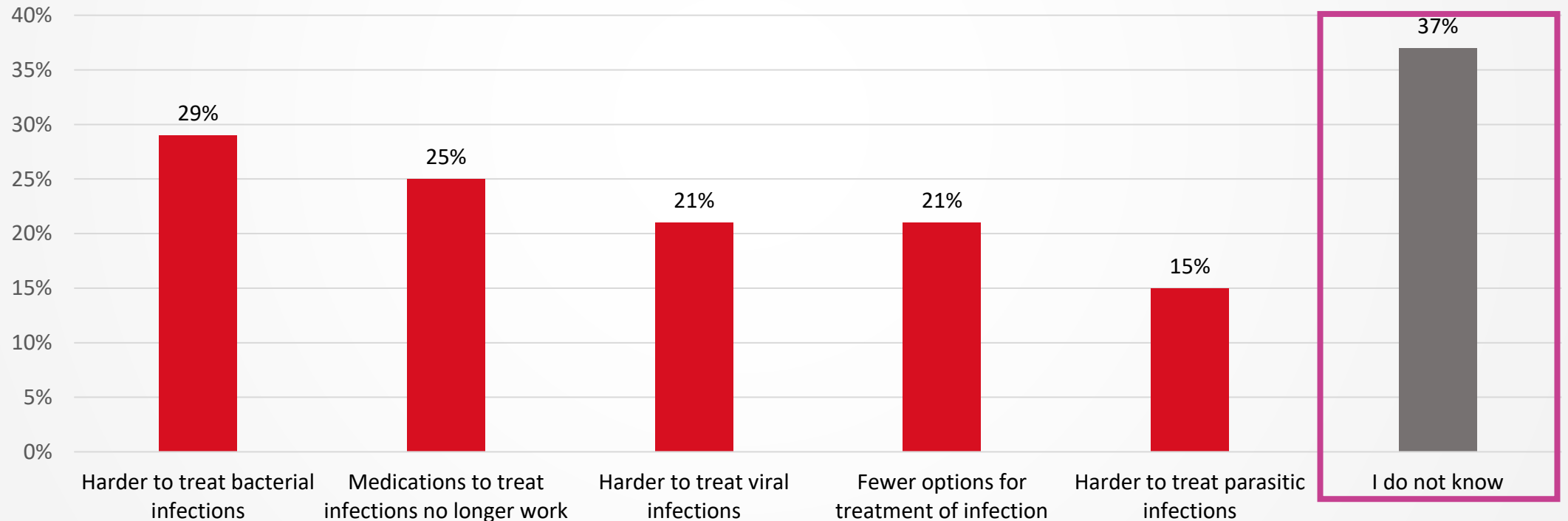


**Q2** Which of the following, if any, describes antimicrobial resistance (AMR) or its effects?
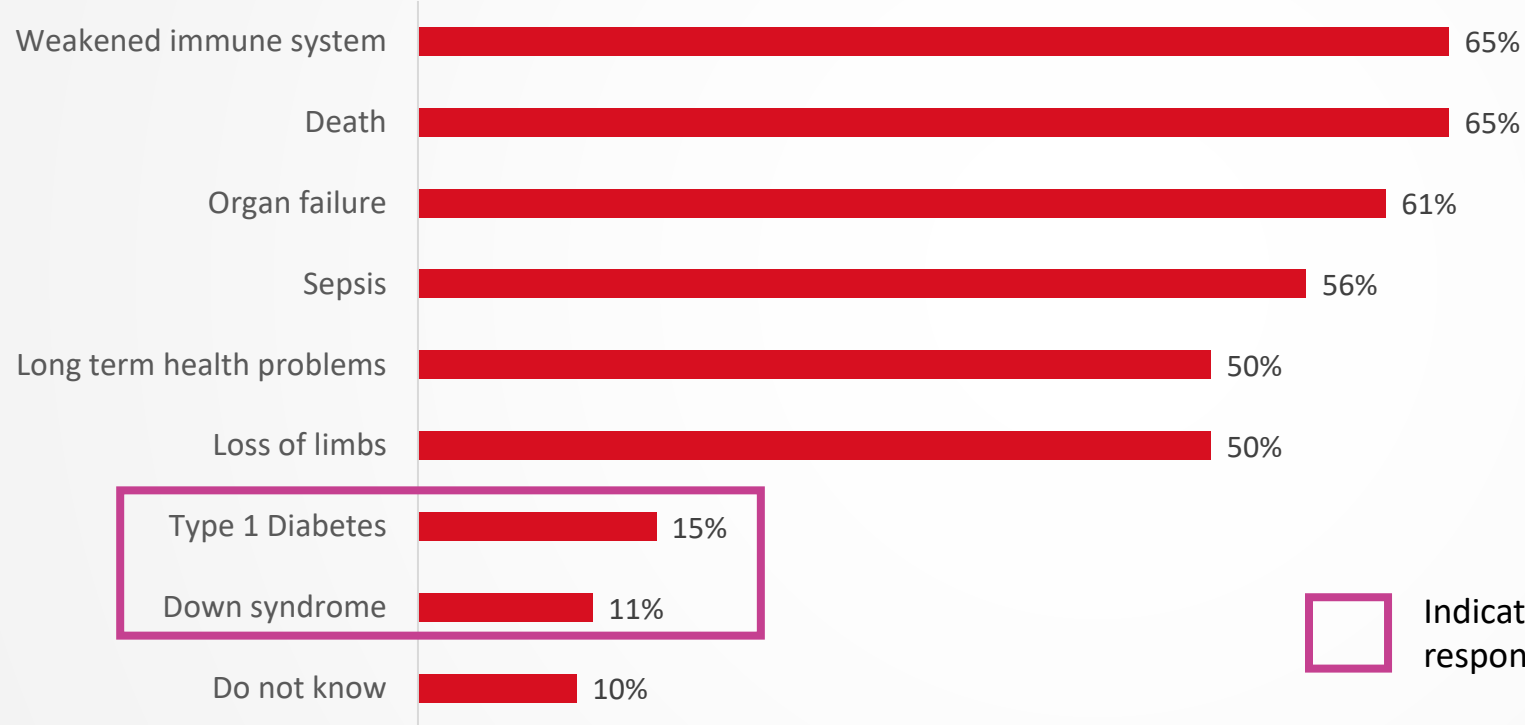Base: Total Sample  US (n=2007)

# Aided Testing

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# Many U.S. adults are unable to identify potential complications of an infection.

- Only 56% know that sepsis is a potential complication of an infection.

**Complications of an Infection**

| Complication | Percentage |
|---|---|
| Weakened immune system | 65% |
| Death | 65% |
| Organ failure | 61% |
| Sepsis | 56% |
| Long term health problems | 50% |
| Loss of limbs | 50% |
| Type 1 Diabetes | 15% |
| Down syndrome | 11% |
| Do not know | 10% |

One in ten state they do not know the complications of an infection.

☐ Indicates selection of incorrect responses

**Q5** Which of the following, if any, can be complications of an infection? Please select all that apply.
Base: Total Sample  US (n=2007)

# Six in ten U.S. adults believe that antimicrobial resistance is a major problem.
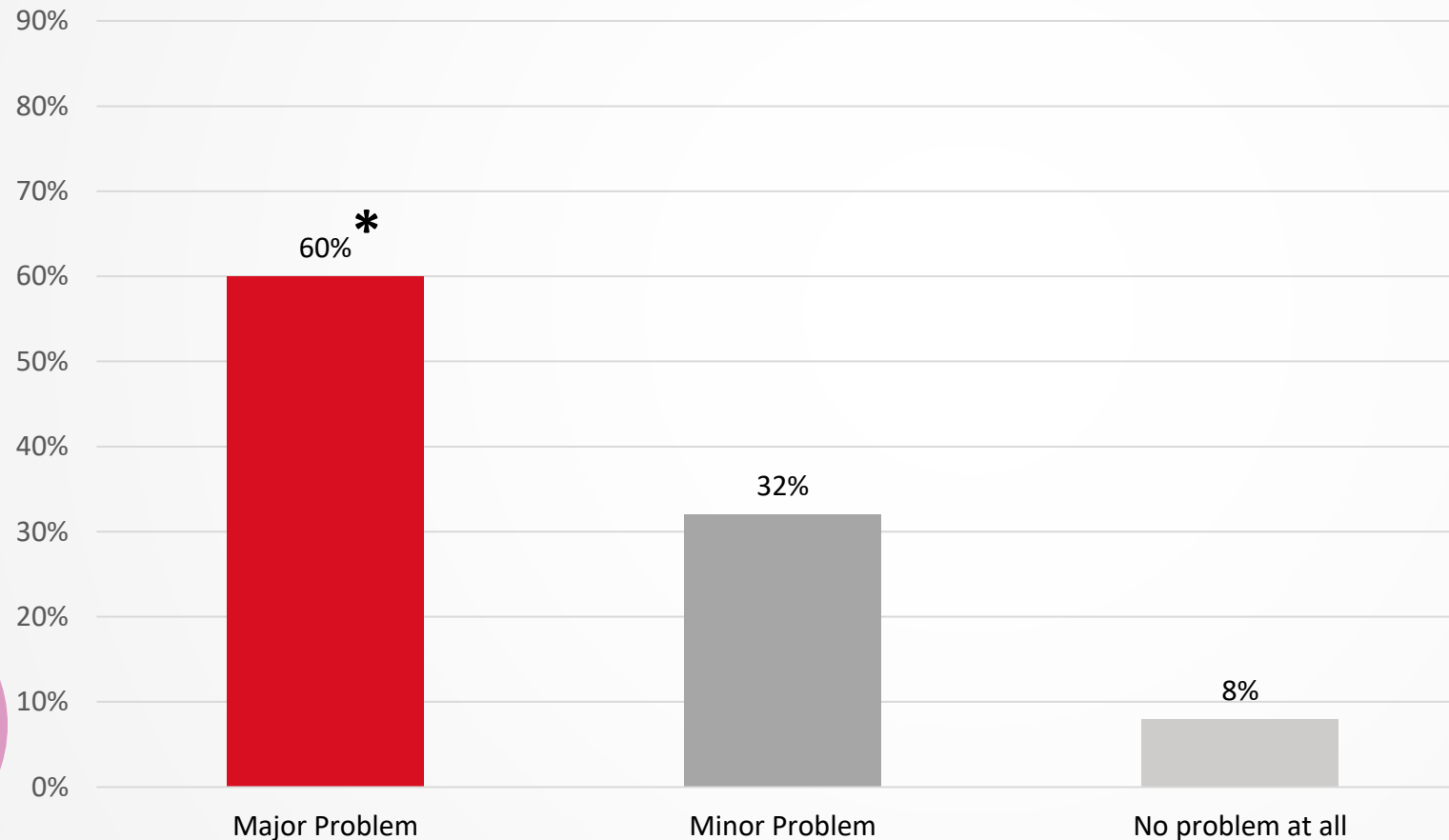
**Adults are also likely to think the following are major problems:**
- Antibiotic resistance (62%)
- Overuse of antibiotics (61%)
- People not getting vaccinated (58%)
- People not finishing their complete course of antibiotics (55%)
- Ability to develop new drugs to treat infections (44%)



**\* = significant difference**

**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 US (n=2007)

# Similarly, more than three-quarters of U.S. adults are worried about antimicrobial resistance.
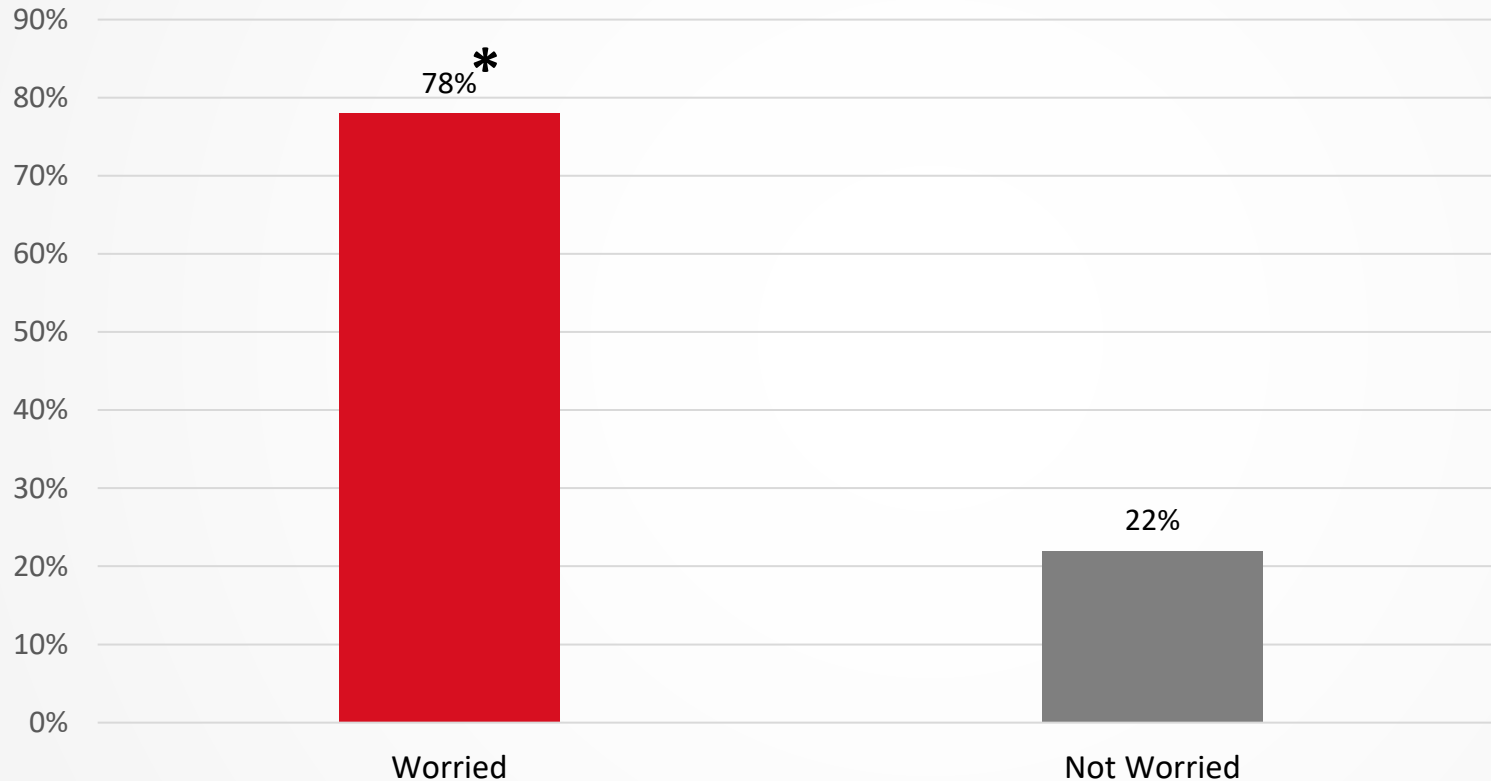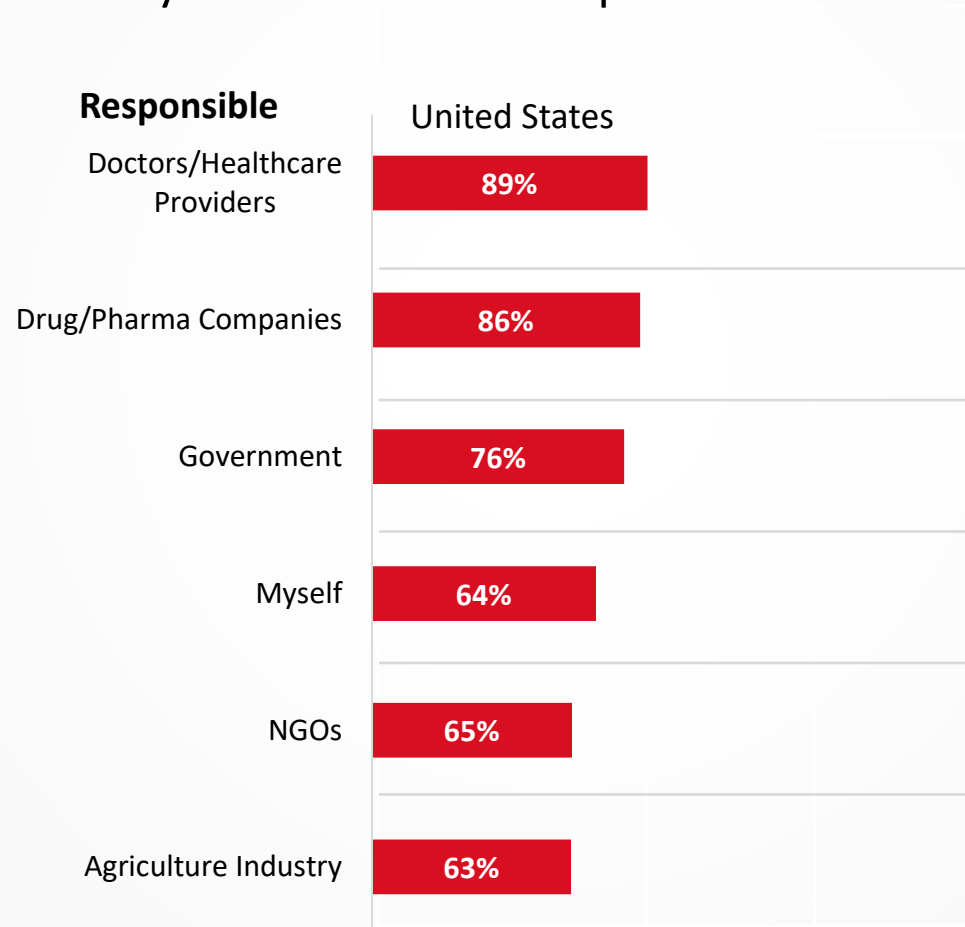


$*$ = significant difference

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

- Nearly two-thirds believe they themselves are responsible.

**Responsible**

United States

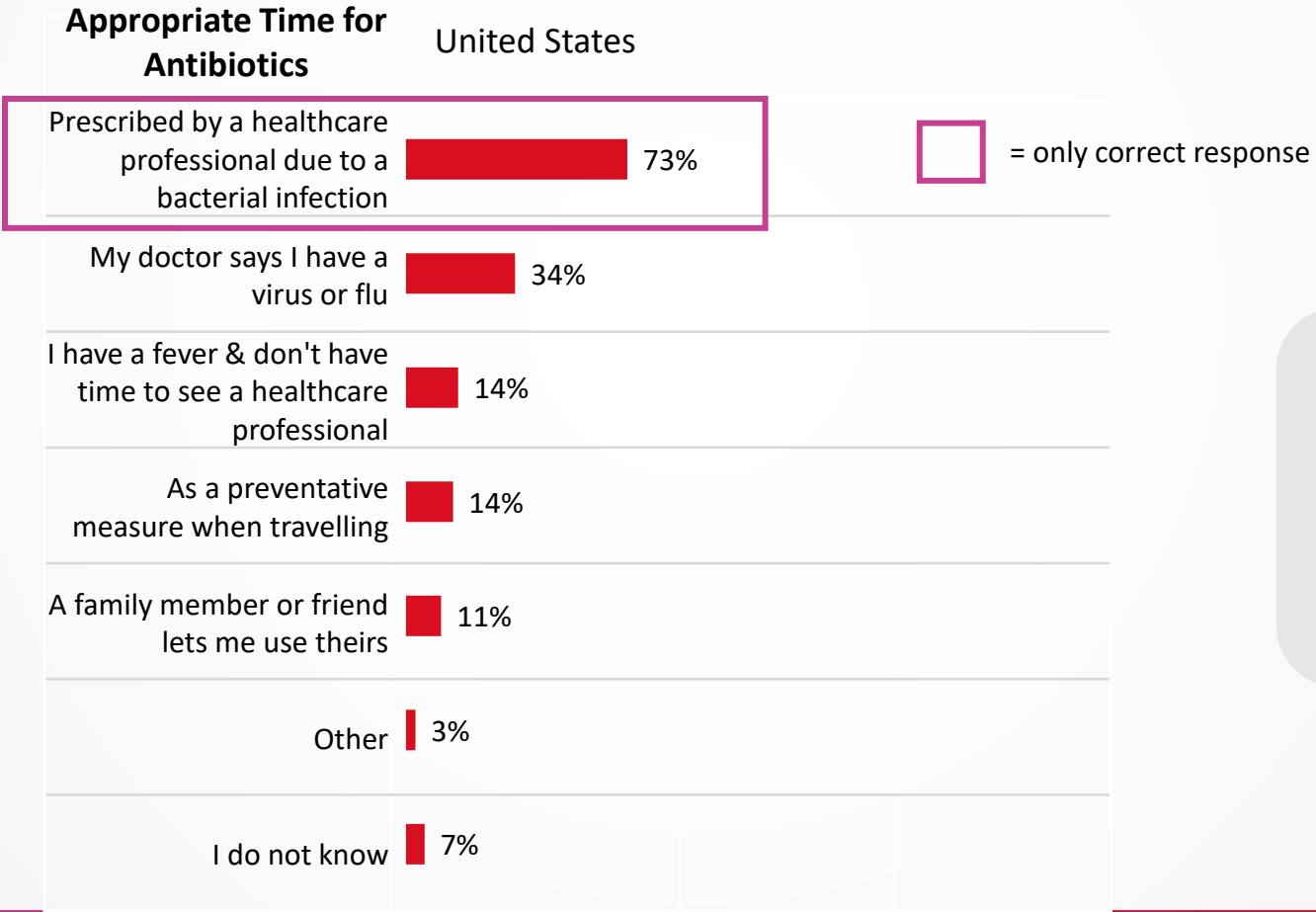| Doctors/Healthcare Providers | 89% |
| Drug/Pharma Companies | 86% |
| Government | 76% |
| Myself | 64% |
| NGOs | 65% |
| Agriculture Industry | 63% |

Q6 How responsible are the following, if at all, for solving antimicrobial resistance (AMR)? (Definition of AMR provided, see Appendix.)
Base: Total Sample US (n=2007)

# Nearly three-quarters know that it is appropriate to take antibiotics when a healthcare professional has written a prescription due to a bacterial infection.

- However, less than half know it is the <u>only</u> appropriate use.

### Appropriate Time for Antibiotics — United States

| Appropriate Time for Antibiotics | United States |
| --- | --- |
| Prescribed by a healthcare professional due to a bacterial infection | 73% |
| My doctor says I have a virus or flu | 34% |
| I have a fever & don't have time to see a healthcare professional | 14% |
| As a preventative measure when travelling | 14% |
| A family member or friend lets me use theirs | 11% |
| Other | 3% |
| I do not know | 7% |

= only correct response

Just 43% 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.

**Q7** When is it appropriate to use an antibiotic? Please select all that apply. Base: Total Sample US (n=2007)
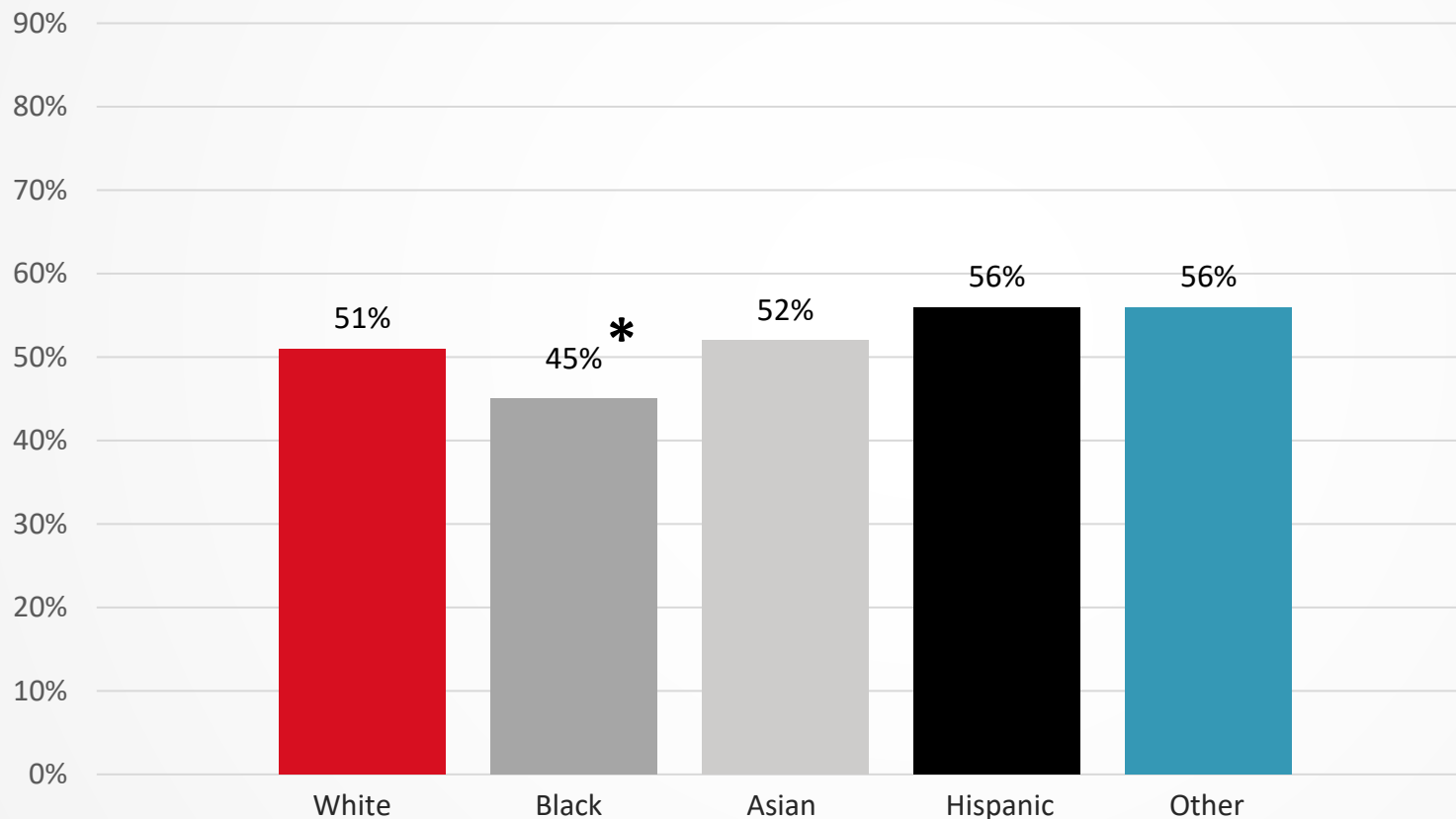
# Black adults are less likely to be aware of the term antimicrobial resistance (AMR).

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## Antimicrobial Resistance Awareness by Race/Ethnicity



Black adults are significantly less likely to be aware of AMR than white adults, Hispanic adults and those who selected Other.

* = significant difference from white, Hispanic, and Other (not significantly different from Asian)

# Those who identify as Black or Asian are less likely than those who identify as white, Hispanic or Other race to state that antimicrobial resistance is a major problem.



Antimicrobial Resistance is a Major Problem

| White | Black | Asian | Hispanic | Other |
|-------|-------|-------|----------|-------|
| 63% | 49% * | 49% * | 64% | 62% |
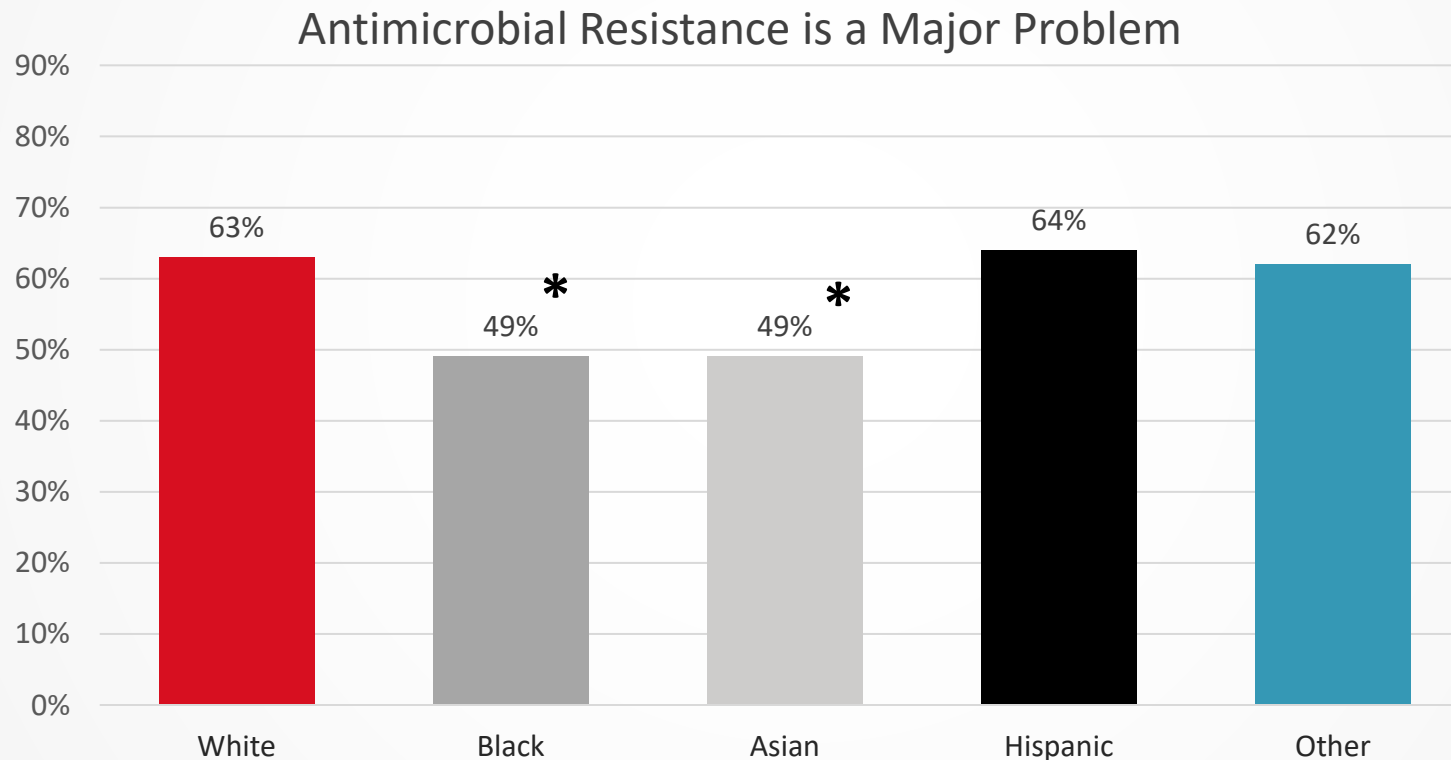
✱ = significant difference from white, Hispanic, and Other

**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.)
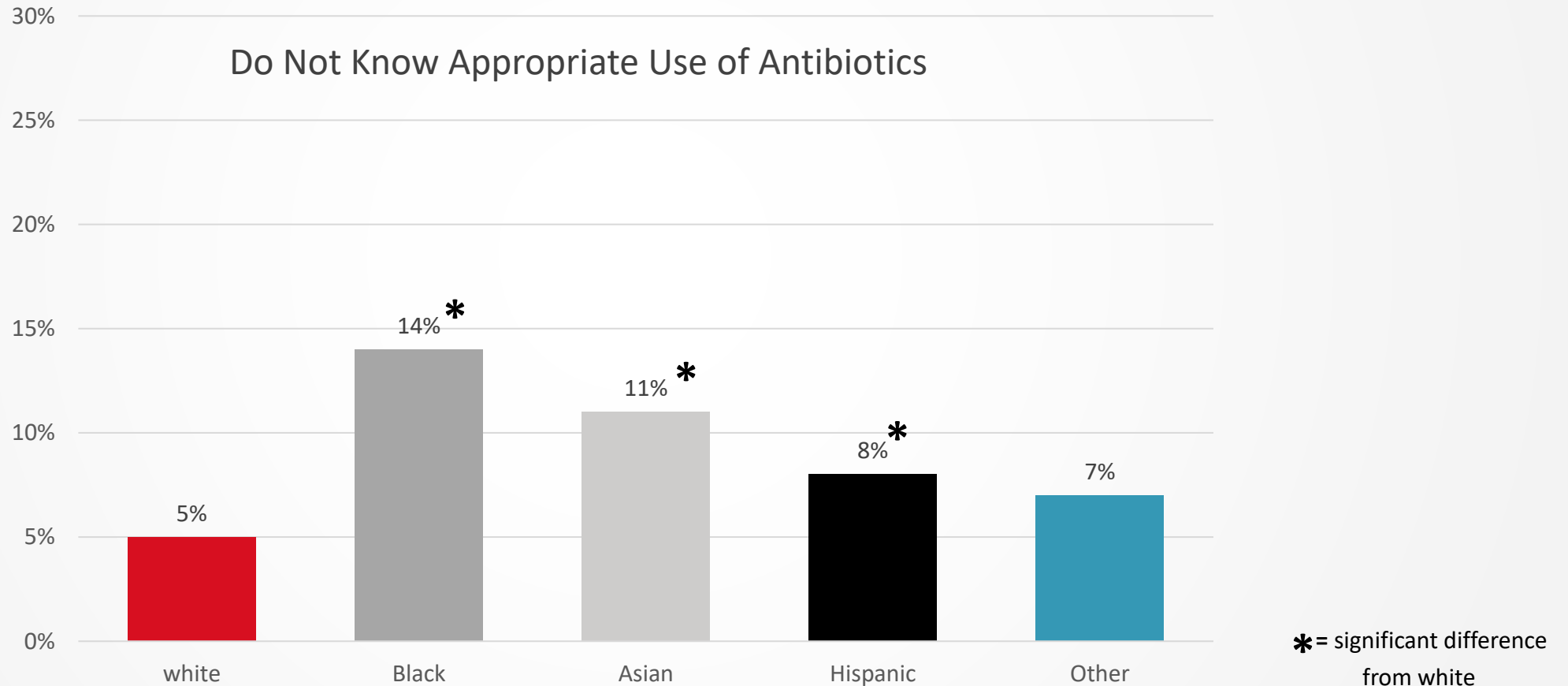Base: Total Sample  US (n=2007)

# Black and Asian adults are more likely to state they do not know the complications of an infection.

## Do Not Know Complications of an Infection



- White: 8%
- Black: 17% *
- Asian: 15% *
- Hispanic: 6%
- Other: 9%
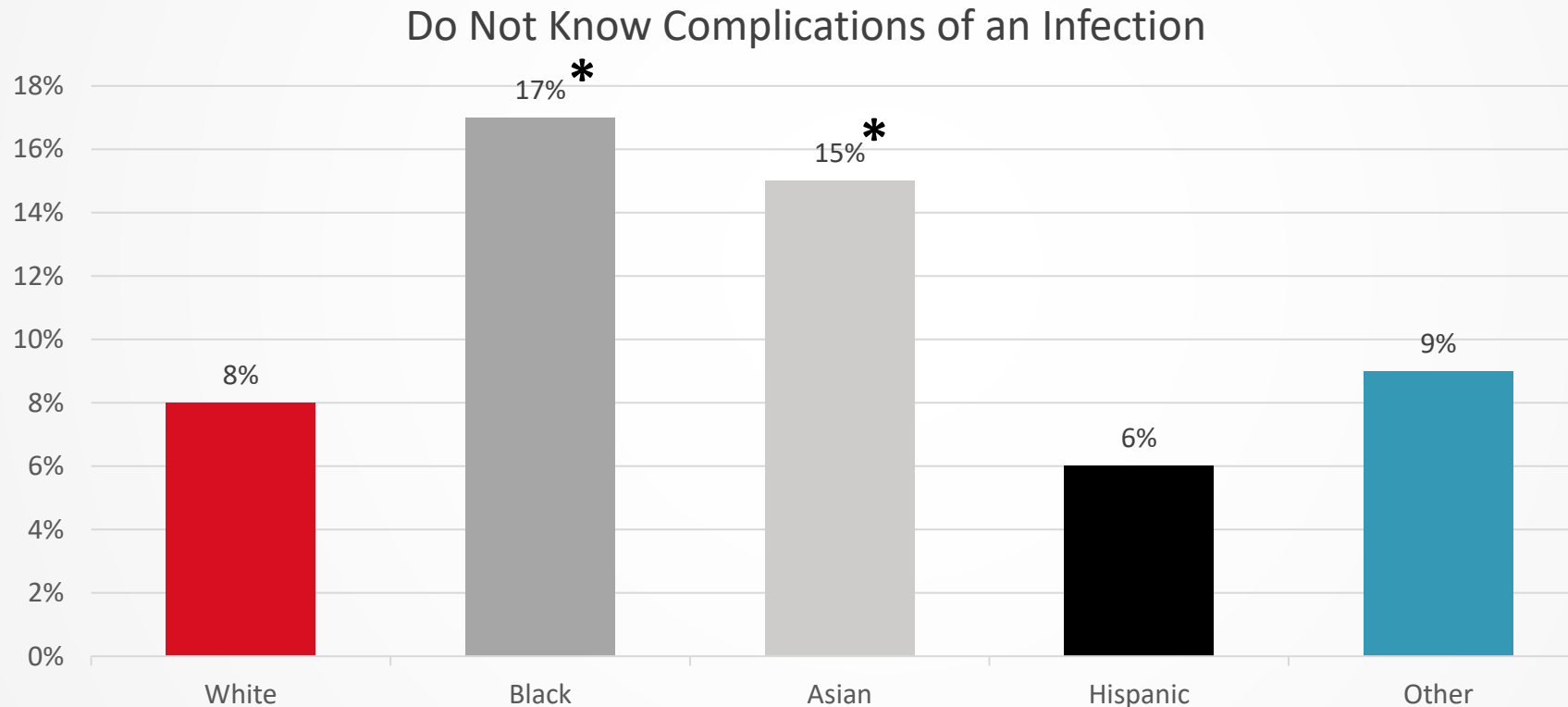
* = significant difference from white, Hispanic, and Other

**Q5** Which of the following, if any, can be complications of an infection?
Please select all that apply.
Base: Total Sample US (n=2007)

When asked about appropriate use of antibiotics, Black, Asian, and Hispanic adults are significantly more likely to state that they do not know compared to white adults.

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Do Not Know Appropriate Use of Antibiotics

- white: 5%
- Black: 14% *
- Asian: 11% *
- Hispanic: 8% *
- Other: 7%

* = significant difference from white

**Q7** When is it appropriate to use an antibiotic? Please select all that apply.
Base: Total Sample US (n=2007)

# Adults with lower household incomes are less likely to be aware of the term antimicrobial resistance.

**Antimicrobial Resistance Awareness by Income**

Under $50,000: 42% *
$50 - $99,999: 54% **
$100,000+: 67%

Legend:
- Under $50,000
- $50 - $99,999
- $100,000+
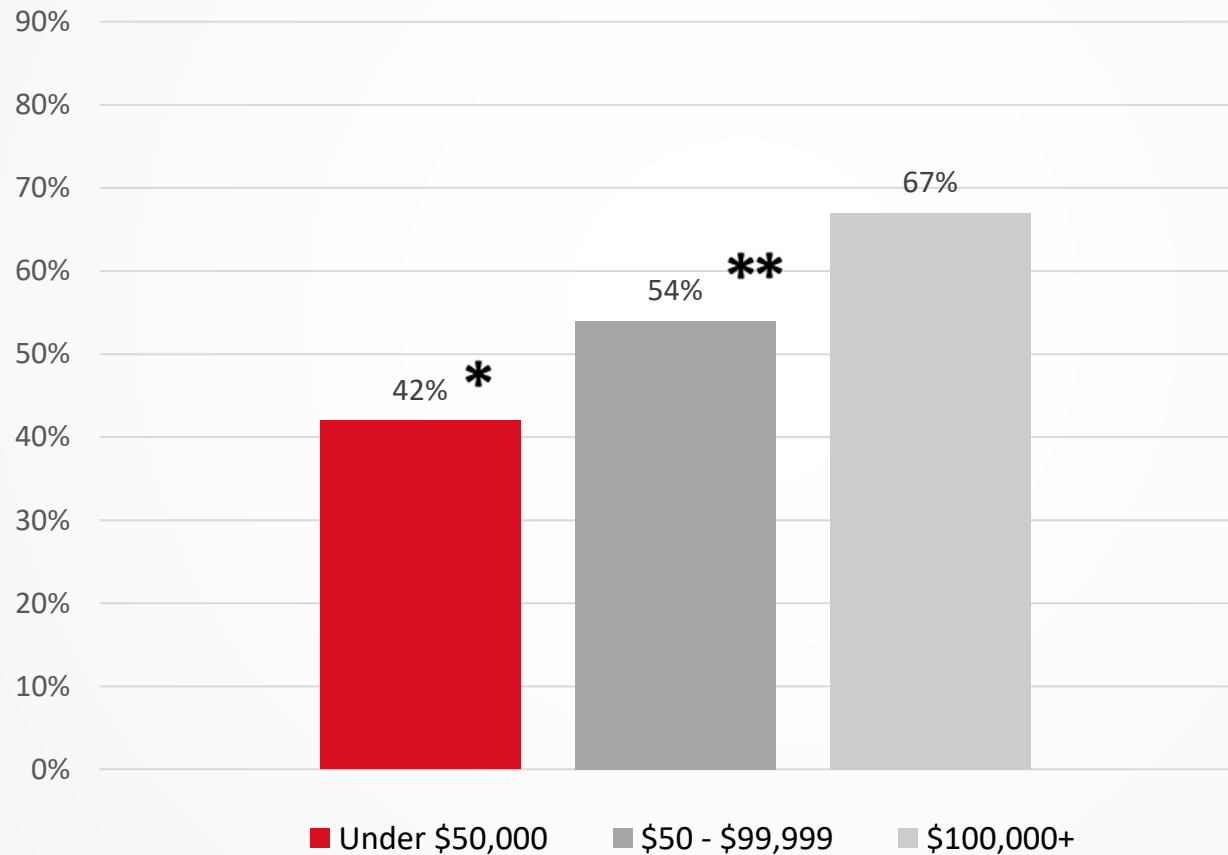
* = significant difference from $50 - $99,000 and $100,000+

** = significant difference from $100,000+

**Q1** How aware are you, if at all, of the following terms?
Base: Total Sample US (n=2007)

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# Adults with incomes under $50,000 indicate they do not know the description and effects of antimicrobial resistance (AMR) more often than those with higher incomes.
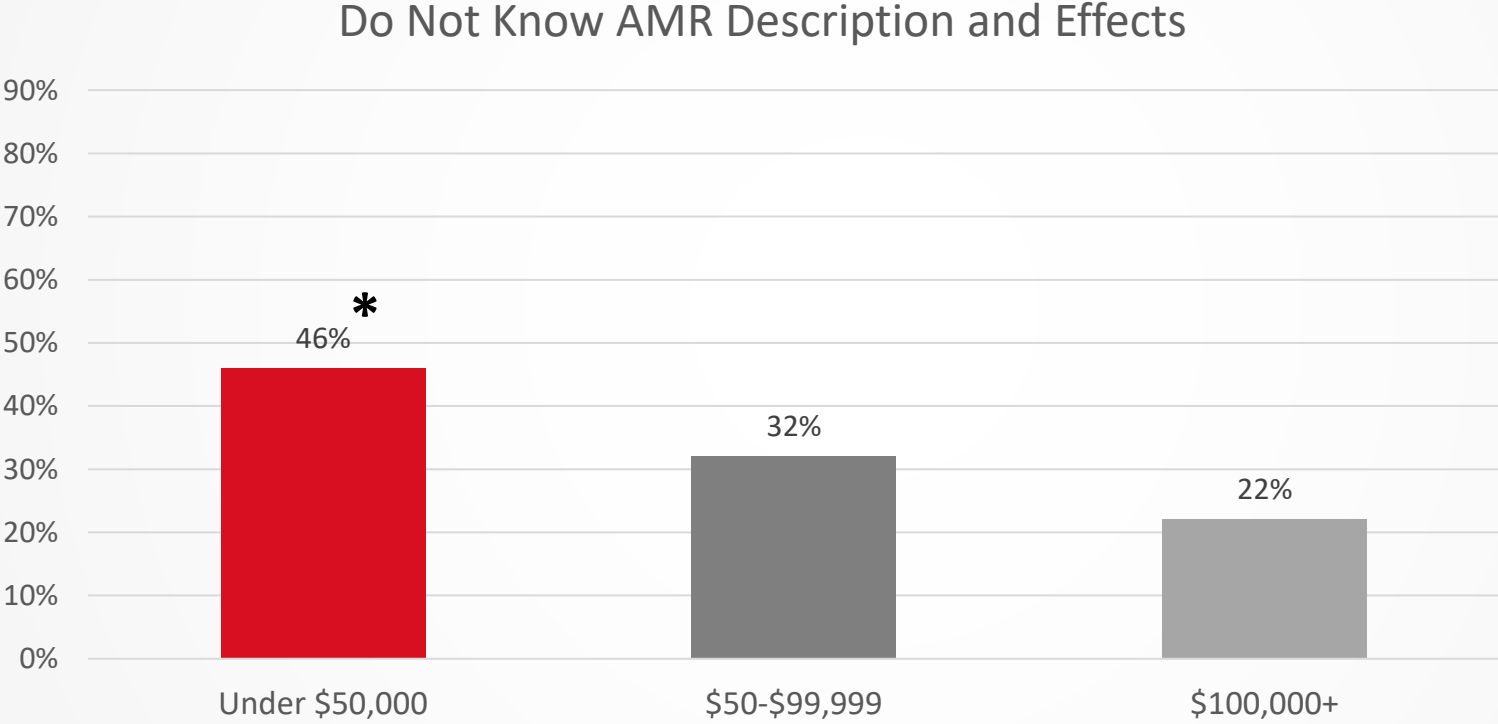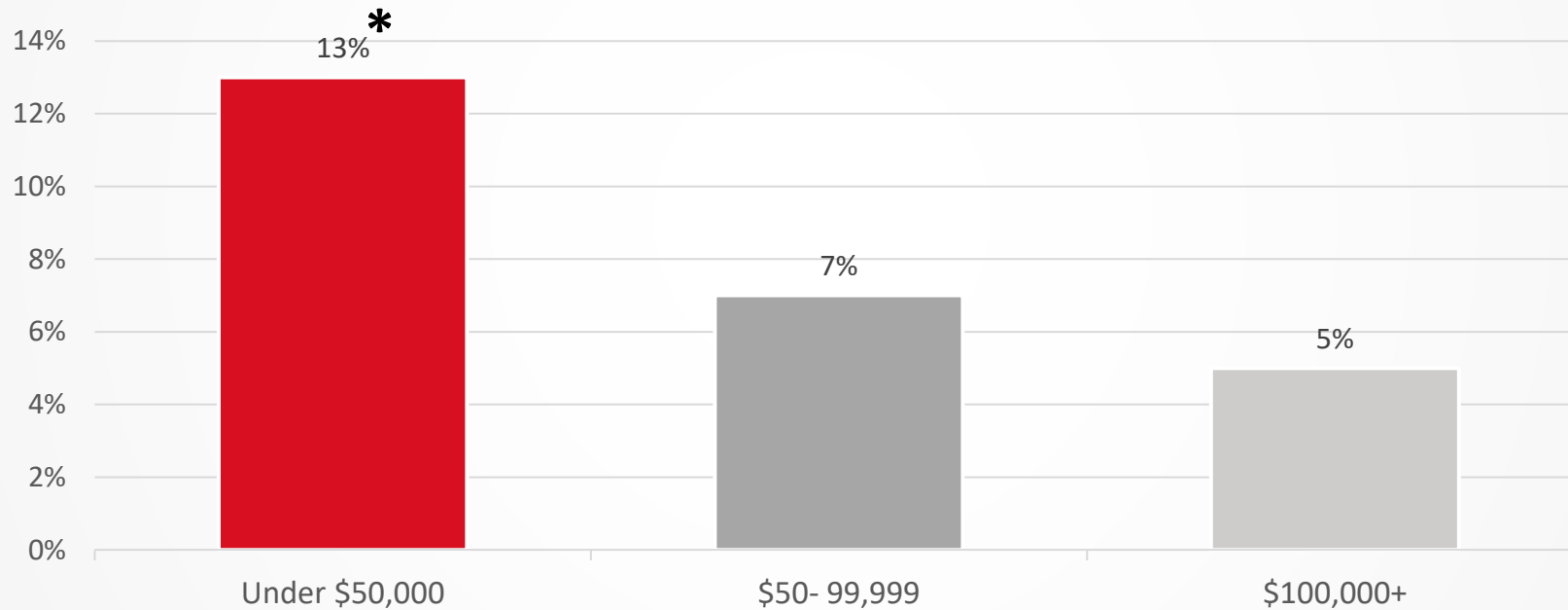


Do Not Know AMR Description and Effects

**Q2** Which of the following, if any, describes antimicrobial resistance (AMR) or its effects?
Base: Total Sample US (n=2007)

\* = significant difference from higher incomes

# Those with lower incomes are more likely to state they do not know the complications of an infection.

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## Do Not Know the Complications of an Infection



13% *

7%

5%

Under $50,000

$50- 99,999

$100,000+

* = significant difference from higher incomes

# 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

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| Gender |
| --- |
| • Female - 1047 |
| • Male - 960 |

| Age |
| --- |
| • 18-34 - 669 |
| • 35-54 - 774 |
| • 55+ - 564 |

| Race/Ethnicity* |
| --- |
| • White - 1414 |
| • Black – 236 |
| • Asian – 104 |
| • Hispanic – 324 |
| • Other - 208 |

| Income |
| --- |
| • Under $50,000 - 249 |
| • $50 - $99,999 - 1297 |
| • $100,000+ - 390 |
| • Prefer not to answer - 71 |

* More than one choice permitted

Total Sample Size US – 2,007

# 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. Centers for Disease Control. 2020. Antibiotic/antimicrobial resistance (AR/AMR), 7.20.2020. Accessed 2.23.2021. https://www.cdc.gov/drugresistance/index.html

4. Prestinaci, F., Pezzotti, P. and Pantosti, A. 2015. Antimicrobial resistance: a global multifaceted phenomenon. *Pathogens and global health*, *109*(7), pp.309-318.

5. 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.

6. U.S. Food and Drug Administration. 2019. Antiparasitic resistance, 12.20.2019. Accessed 2.23.2021. https://www.fda.gov/animal-veterinary/safety-health/antiparasitic-resistance

7. Martin, M.J., Thottathil, S.E. and Newman, T.B. 2015. Antibiotic overuse in animal agriculture: a call to action for health care providers. *American journal of public health,* 105(12), pp.2409-2410.

8. Pew Charitable Trusts. 2016. Antibiotics and animal agriculture: a primer. 12.19.2016. Accessed 2.23.2021. https://www.pewtrusts.org/en/research-and-analysis/fact-sheets/2016/12/antibiotics-and-animal-agriculture-a-primer

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.

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