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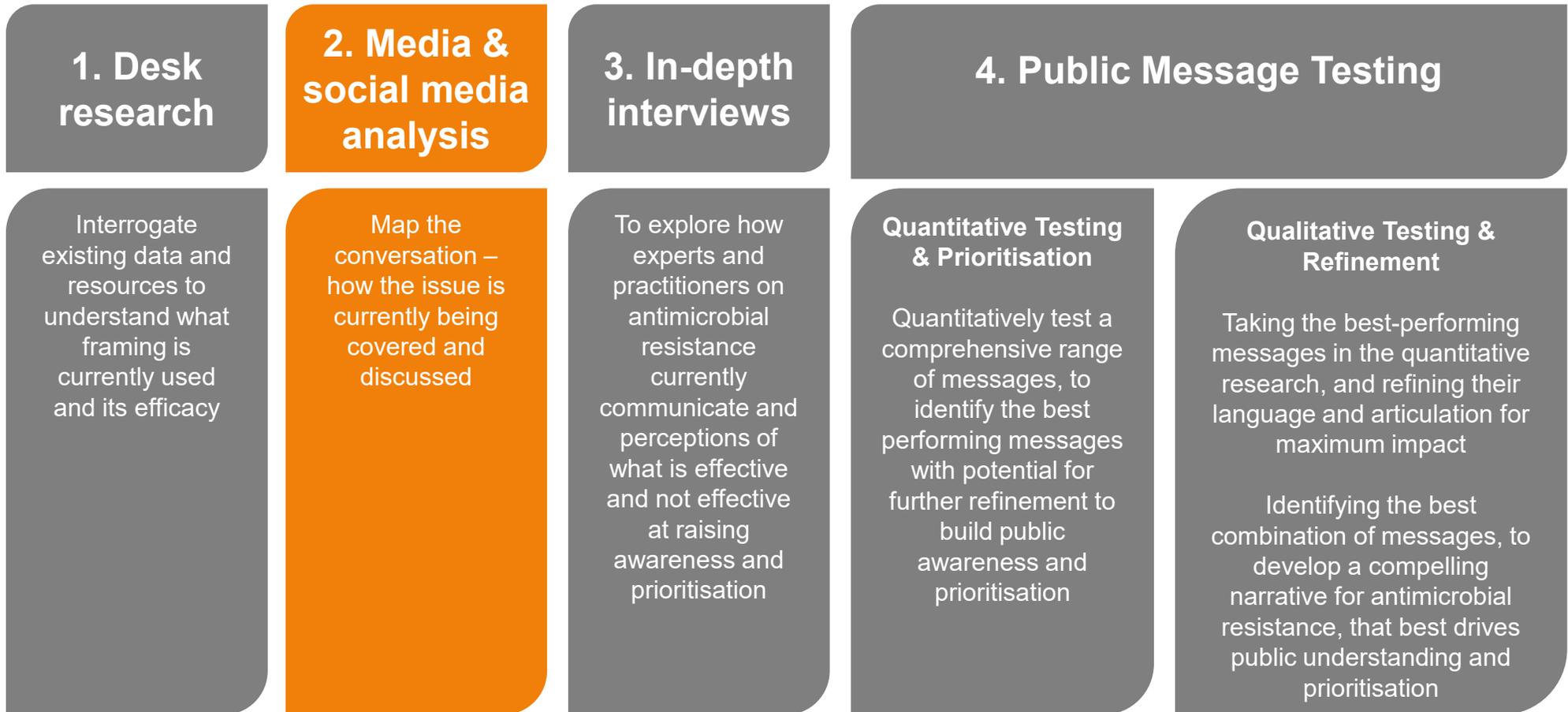
wellcome

# Reframing resistance

## Appendix B – Media and Social Media Analysis

# Objectives: Media and social media analysis

To analyse how antimicrobial resistance is currently being covered and discussed



# Key findings

<b>Volume of coverage &amp; conversation</b>	<ul style="list-style-type: none"><li>• The volume of media coverage of antimicrobial resistance varies considerably between countries – it is much higher in the UK than in the US or Germany.</li><li>• Conversation about antimicrobial resistance on social media is relatively low compared to other more high-profile issues such as climate change.</li></ul>
<b>Themes &amp; terms</b>	<ul style="list-style-type: none"><li>• Media coverage in the UK, US and Germany is typically driven by specific disease areas and outbreaks. This means that coverage of antimicrobial resistance often appears disjointed and fragmented when seen only through a disease- or outbreak-specific lens.</li><li>• The media also use a wide range of terms to describe the problem of antimicrobial resistance.</li><li>• This can make it more difficult for the public to make connections between different stories on the issue.</li></ul>
<b>Tone</b>	<ul style="list-style-type: none"><li>• Tone of media coverage of antimicrobial resistance can vary significantly, both within and between countries.</li><li>• For example, in the UK coverage is led by dailymail.co.uk and is sensationalist in tone, while in Germany the focus is more regional, and in Japan coverage tends to be more factual.</li></ul>
<b>A specialist conversation</b>	<ul style="list-style-type: none"><li>• Conversation of antimicrobial resistance on social media tends to be a specialist conversation – driven by institutions in the US, and by individual experts and specialists in the UK and Germany (including pharmacists, infection specialists and microbiologists).</li><li>• This, coupled with the low volume of conversation, means that the conversation is not ‘mainstream’ or one that many social media users beyond experts and practitioners working on antimicrobial resistance are likely to engage with.</li></ul>

# How to interpret a network map

Each node represents a document. A node sized by degree represents the number of connections, or similarity, to other nodes

Connections represent similar language used across nodes

A node bridging two clusters can indicate a document that intersects two concepts

Spread-out clusters contain highly differentiated documents

Dense clusters contain highly similar documents

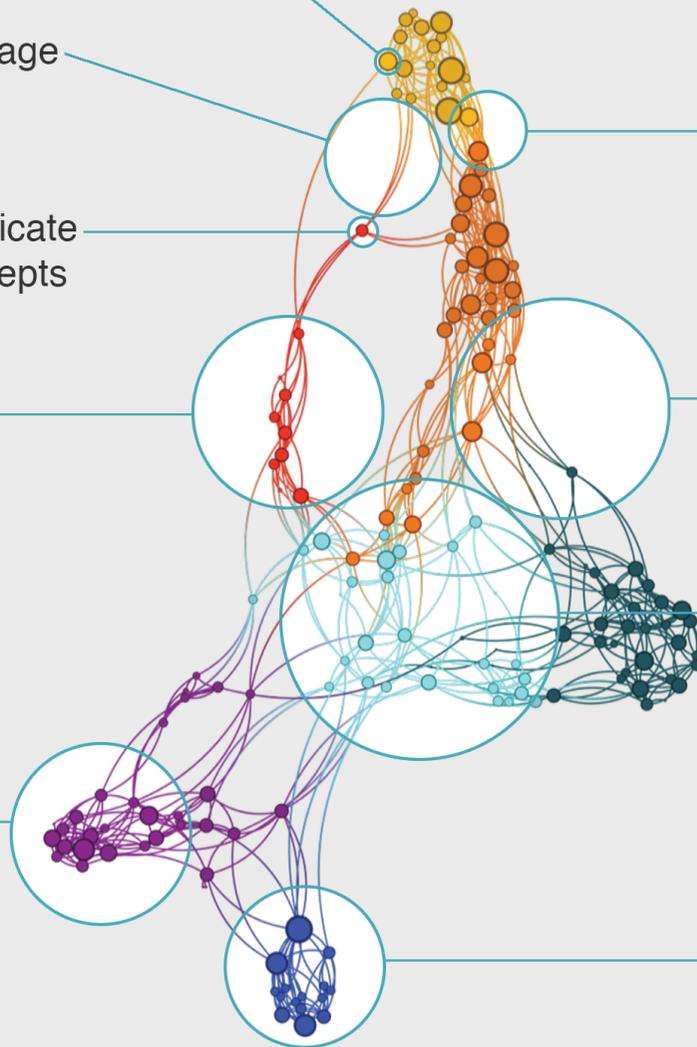
**Similar nodes typically group together into one cluster. Each cluster grouping is represented by a different color.**

Less distance between clusters indicates a high number of inter-related documents

Greater distance between clusters indicates a low number of interrelated documents

Centrally located nodes are core to the overall network, indicating central topics and bridging ideas

Peripheral clusters are less central to the overall network but could represent a niche interpretation on the topic



# Media Analysis

# Objectives & approach

## Research objectives:

- To assess the volume of coverage
- To map the topics and themes the media are focusing on
- To identify the news outlets generating the most content
- To identify the people and organisations most frequently cited in news coverage



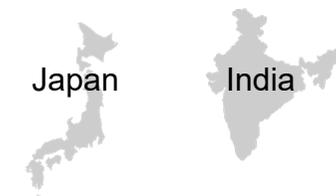
## Informed understanding of:

- The topics and themes driving current media conversation
- The outlets and individuals that are acting as the key voices on antimicrobial resistance
- The media conversation's role in driving public awareness and prioritisation of antimicrobial resistance

In-depth media analysis conducted in:



Manual media review conducted in:



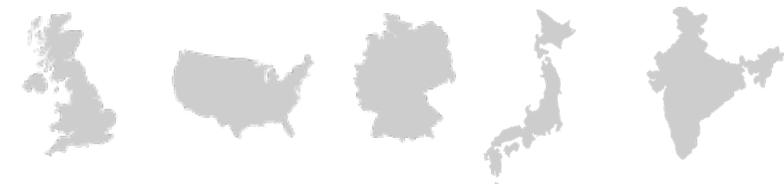
## Approach

A full methodological summary, with detailed search queries and source lists can be found in the Methodology Report – [Appendix A](#).

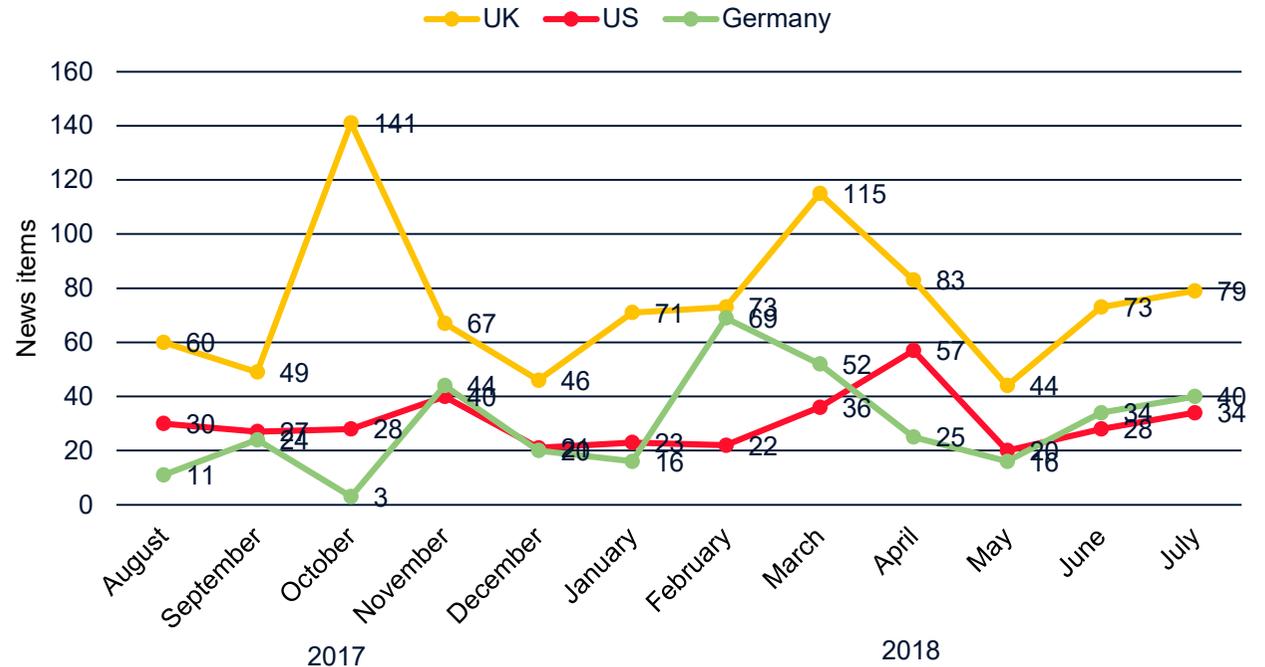
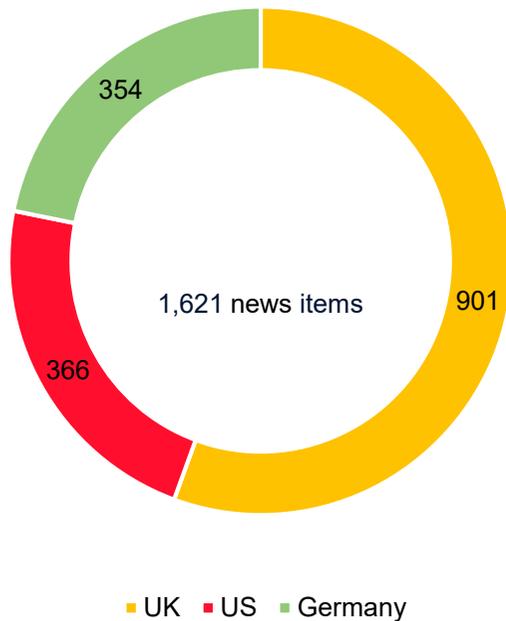
In summary, articles were identified by searching for key terms in headlines or lead paragraphs:

- Antimicrobial / Antibiotic / Drug / (specific disease) + Resistance / Overuse / Over prescription
- Common acronyms (e.g. AMR, MRSA, ABR) or single word terms (e.g. superbugs)
- Relevant campaigns or partnerships (e.g. World Antibiotic Awareness Week, Carb-X)

# Key findings – news volume



- Across the UK, US and Germany, 901 (55%) of the antimicrobial resistance-related news items identified were published in the UK media. The volume of antimicrobial resistance-related coverage published in the US and Germany was much lower: 366 (23%) and 354 (22%) news items respectively.
- The UK media published the most antimicrobial resistance-related news items in every month evaluated, with coverage spiking in October 2017 and March 2018 around specific campaigns. German news coverage spiked in November 2017 and February 2018 due to expert warnings about antimicrobial resistance generally and in specific bodies of water, though volume overall was lower. US news coverage of antimicrobial resistance appears to have been more consistent, although peaking in April 2018 around the release of reports.



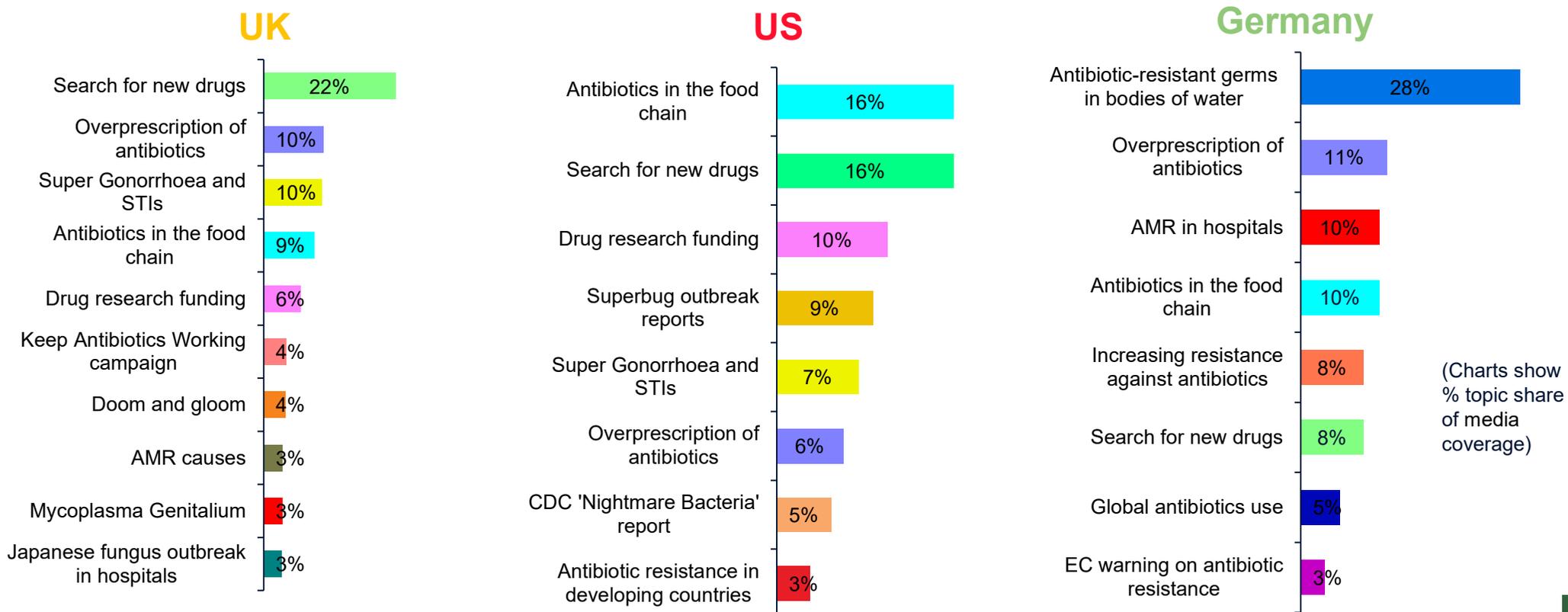
- In Japan, around 400 news items about antimicrobial resistance were identified, published in year to 31 July 2018. Most of those items published in city/regional papers were syndicated from the national newspapers.
- English-language newspaper coverage of antimicrobial resistance in India has been consistently around 750 items per year since 2010-2011. Daily newspapers, such as the Times of India and the Hindustan Times largely drive this.





# Key findings – news topics

- Although a wide range of topics relating to antimicrobial resistance are covered, the UK media are particularly focused on tackling antimicrobial resistance (be it through new drugs, or campaigns on the issue), discussion around the over-prescription of antibiotics and Super Gonorrhoea/STIs. UK coverage includes real extremes of tone – while some is “doom and gloom” whereas other stories celebrate exciting “cures” such as platypus milk, deep sea sponges, onions.
- In both the UK and US, the search for new drugs was a key topic in antimicrobial resistance coverage. Antibiotics in the food chain was also a very prominent topic in the US. Compared to the UK, the US media are less likely to cover campaigns and positive efforts to address antimicrobial resistance – such as the “Call to Action” conference.
- The German media cover fewer angles than the UK and US. Antibiotic-resistant germs in bodies of water was a major focus. Much of antimicrobial resistance coverage is backed by scientific research data or studies and quotes various experts e.g. the Robert Koch Institute or other prominent universities and institutions.





## Key findings – news topics

- Japanese media covered a range of topics, focusing principally on domestic presentations of the issue (hospital deaths, drug-resistant bacteria in chickens) and Japanese efforts to tackle antimicrobial resistance (government campaigns, work by Japanese pharma). Articles tended to be written using a very factual non-sensationalist tone, that at the same time emphasized the severity of the problem.
- Coverage in India was principally driven by concerns about drug-resistant TB. Given the prominence of the issue in India, coverage focused both on critiques of national efforts to tackle the spread of MRD-TB, as well as on India's pivotal role in tackling MRD-TB and antimicrobial resistance globally.

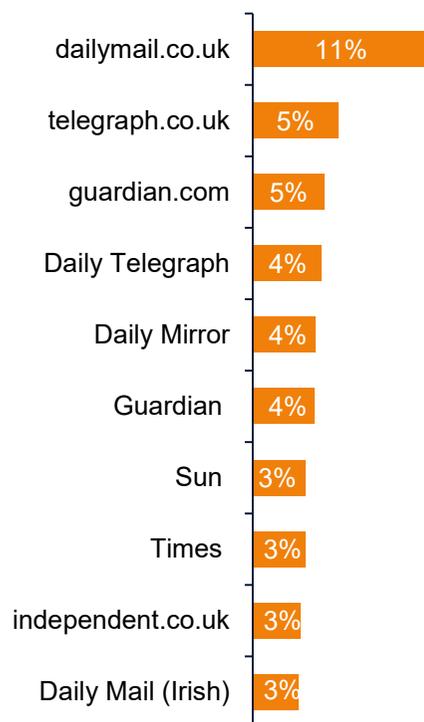
Japan	India
Hospital deaths in Kagoshima	Spread of MRD-TB in India
Drug-resistant bacteria in chicken	Government plan to end TB by 2025
Global studies of antimicrobial resistance	National TB drug-resistance survey
Tackling antimicrobial resistance	WHO reports
Pharma R&D associated with antimicrobial resistance	Sale of unapproved antibiotics
	Antibiotics misuse in the livestock industry



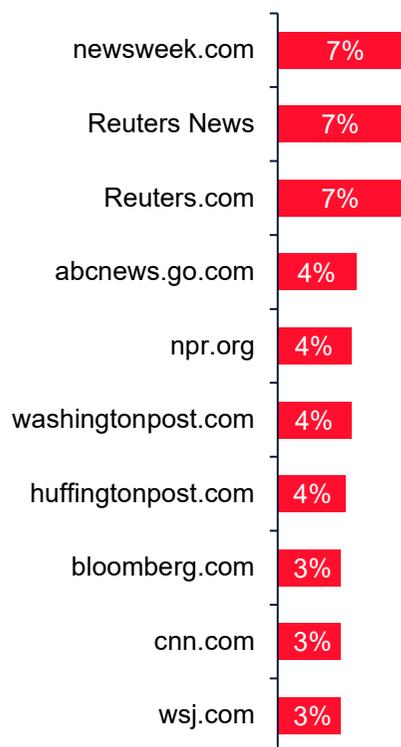
## Key findings – drivers of coverage

- In the UK, The Daily Mail is a key news source, generating 18% of total coverage.
- While in the US, Newsweek (print and online) and Reuters News (print and online) are the main sources of antimicrobial resistance news, contributing 21% of total coverage.
- In Germany, regional newspapers are the main news source (37% of coverage). Focus Online, Hamburger Abendblatt Online and Welt Online and are the main sources of antimicrobial resistance news. Most outlets are reporting on a broad set of antimicrobial resistance-related issues.

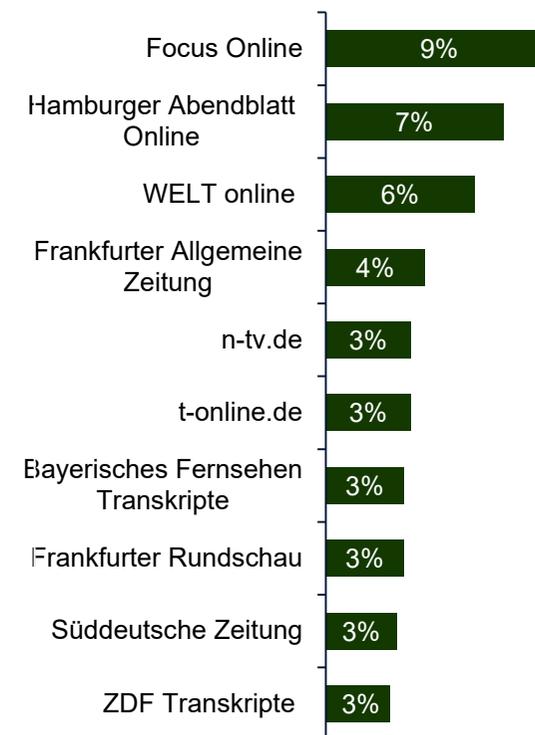
### UK



### US



### Germany

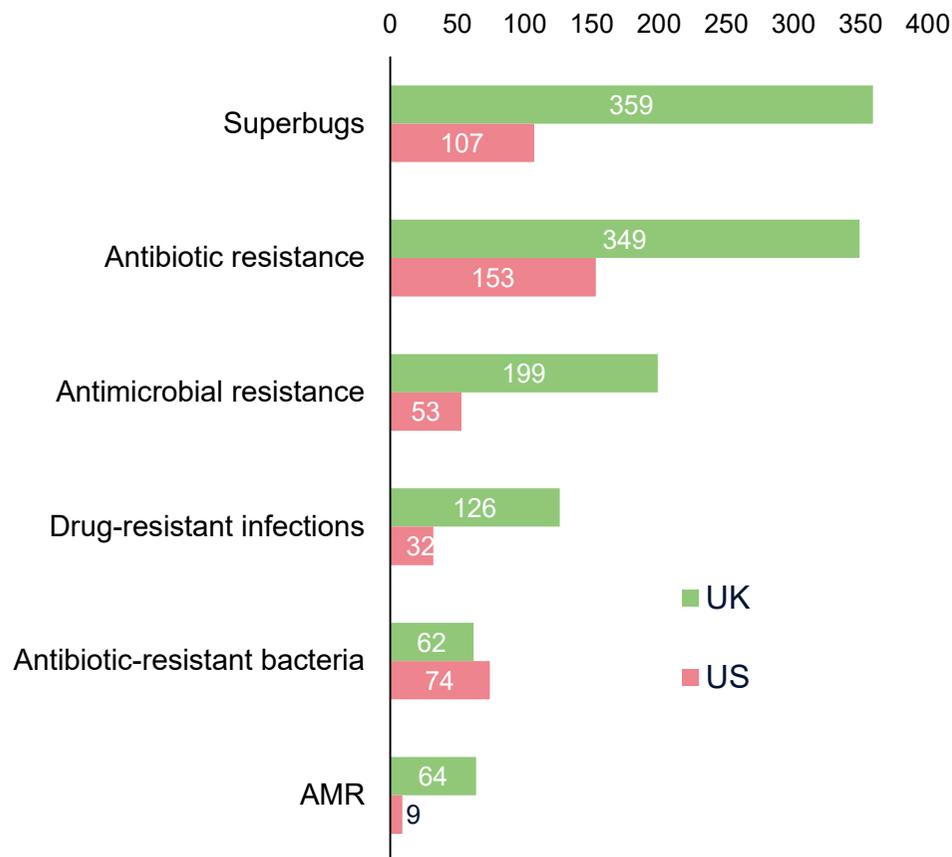


(Charts show % share of media coverage for top 10 news sources)

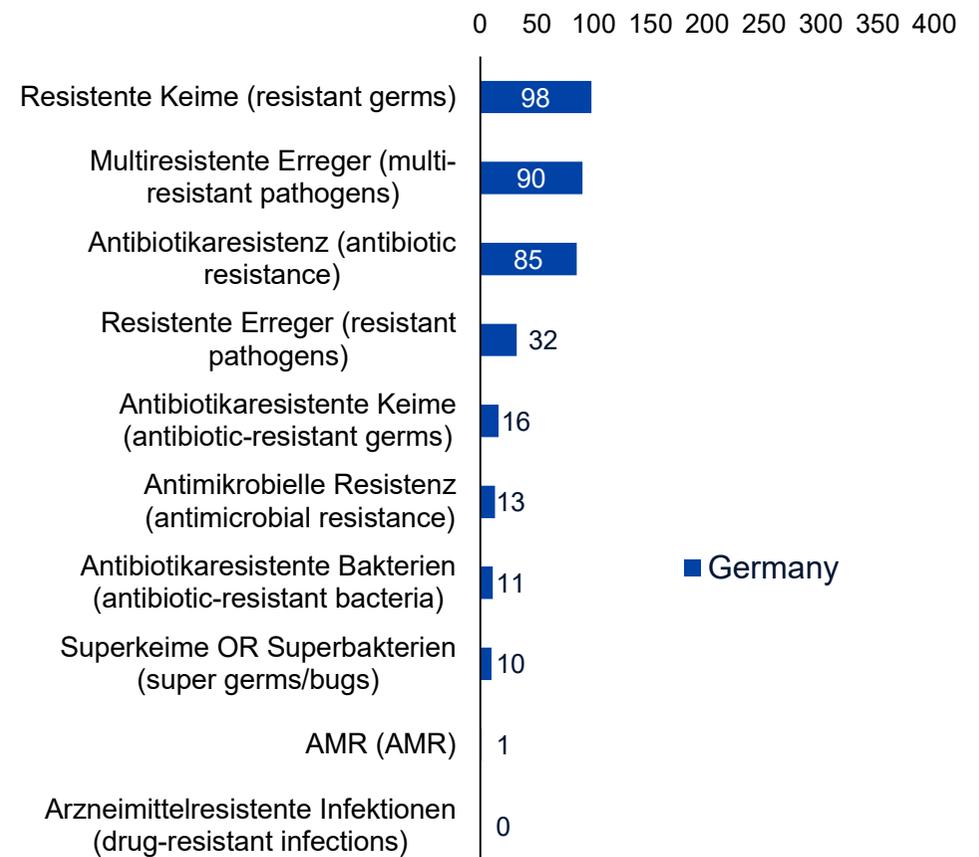
# Key findings – terminology

- Media coverage in the UK, US and Germany uses multiple terms for antimicrobial resistance at very different frequencies.

Number of articles mentioning each term (US, UK)



Number of articles mentioning each term (Germany)



# Media Analysis

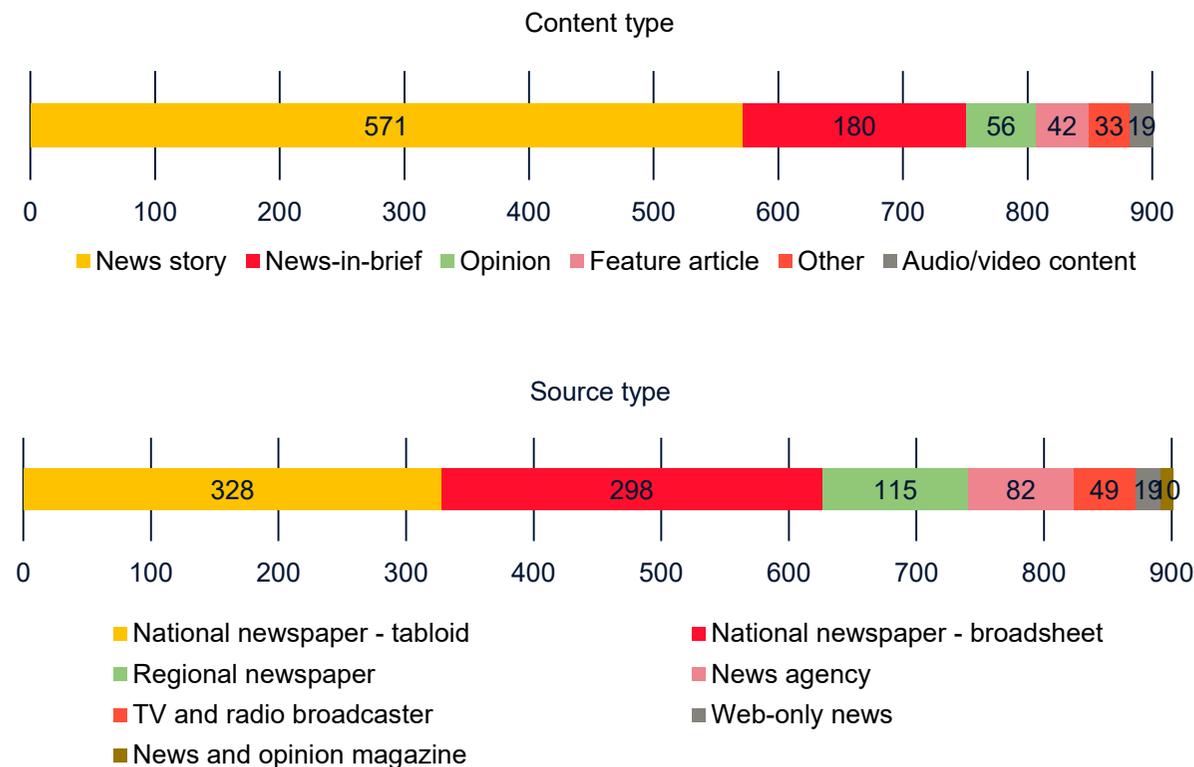
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United Kingdom



# News coverage in the UK

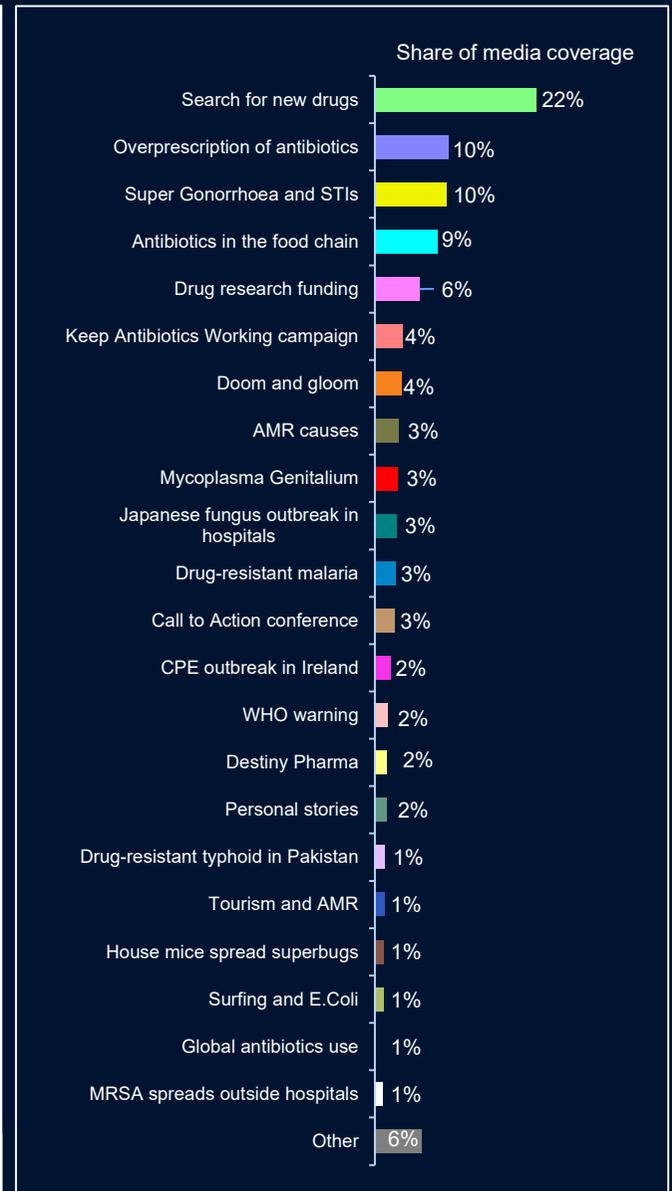
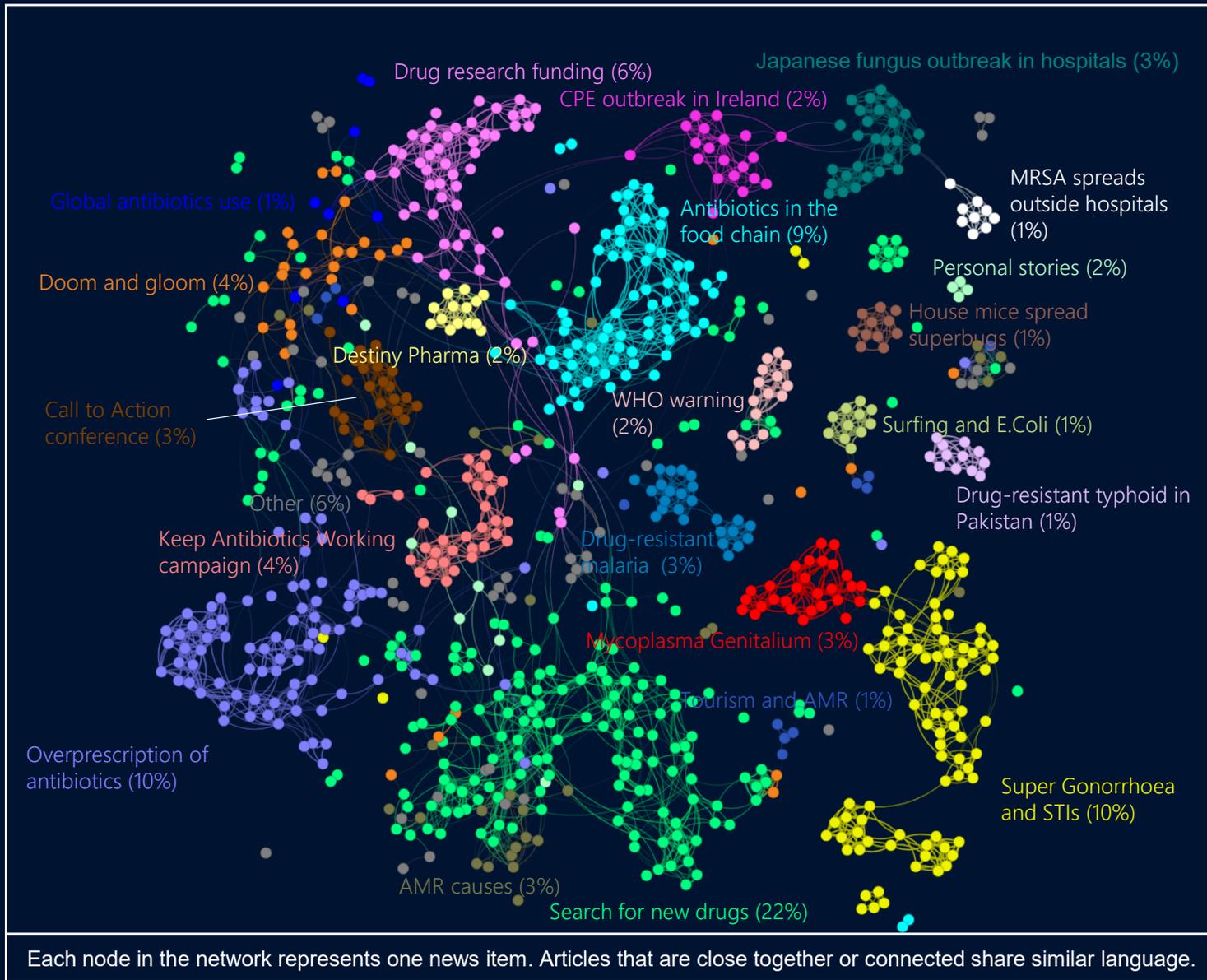
- 901 news items about antimicrobial resistance were identified as having been published by the mainstream UK news media in the year to 31 July 2018. This was more than double the amount of media coverage identified in each of the US and Germany analyses.
- News stories and news-in-briefs (stories of 200 words or fewer) accounted for 83% of coverage.
- National newspapers were the main source of antimicrobial resistance news, together accounting for 69% of coverage (36% tabloids, 33% broadsheets).
- Around 75 news items about antimicrobial resistance were published every month (including duplicate stories). Coverage peaked in October 2017 when 141 news items were published (driven largely by coverage of the Keep Antibiotics Working campaign and Call to Action conference), and again in March 2018 when 115 news items were published (driven principally by coverage in the UK of Super Gonorrhoea).





# How the UK media cover antimicrobial resistance

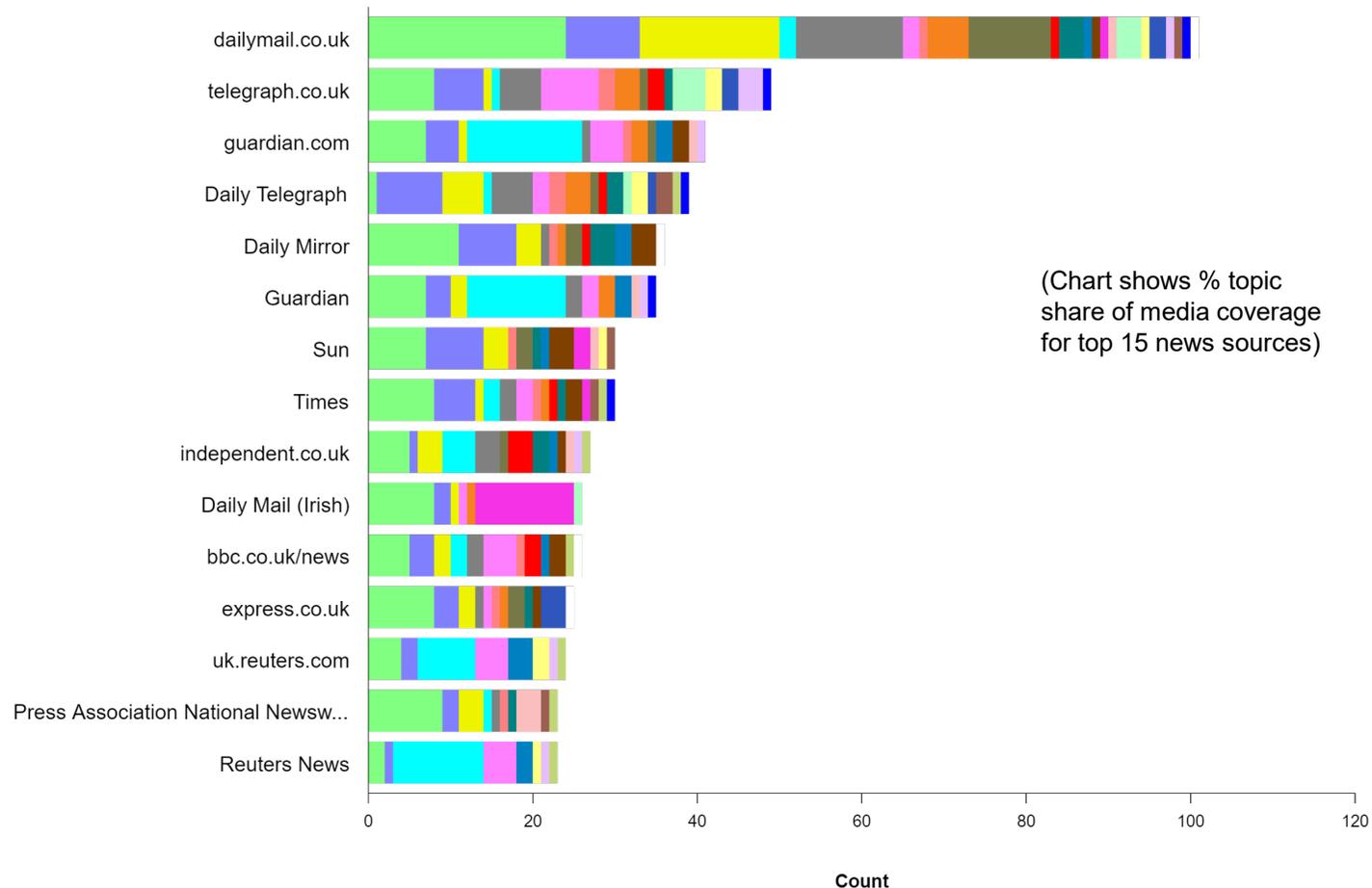
- 22 news themes in UK mainstream media coverage of antimicrobial resistance were identified. One fifth of the stories focused on tackling antimicrobial resistance – a topic comprising stories about both “miracle cures” and serious scientific research to combat the problem.





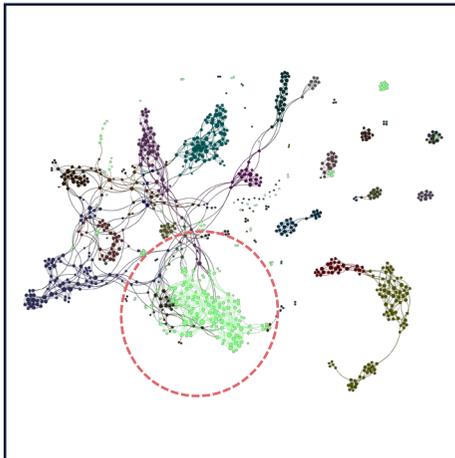
# News coverage by media source

- National newspaper websites were the top source of news stories about antimicrobial resistance, led by *dailymail.co.uk* due to its sensationalist coverage of the search for new drugs, Super Gonorrhoea /STIs and causes of antimicrobial resistance.
- *The Guardian* (print and online) and *Reuters News* generated most of the coverage about antimicrobial resistance in the food chain.
- The top 15 news sources – shown in the chart below – published 59% of the antimicrobial resistance news items identified.





# Search for new drugs



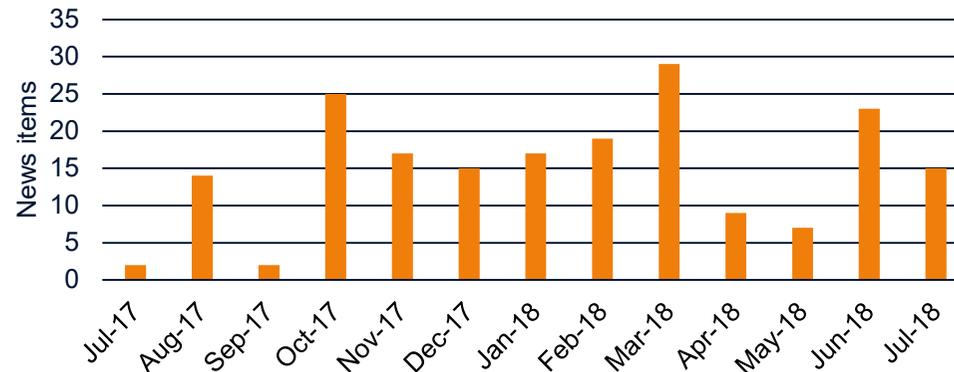
Efforts to combat antimicrobial resistance not only generated the most coverage in the UK media, but were also a consistent source of news throughout the period evaluated, with new stories appearing every month.

An important theme within this were stories about various substances (more than 20) which were touted as weapons in the battle against antimicrobial resistance. Many of these appear to have been based on published research and ranged from the believable (“Statins have power to help elderly fight off killer superbug”, *Express*, October 2017) to the outlandish (eg, “Revealed: How potent platypus milk could save lives as researchers make a ground-breaking discovery”, *Daily Mail*, March 2018). Most of these stories appeared in tabloid and regional newspapers, often as a news-in-brief opposed to a longer article.

The more serious side of the coverage has focused on research efforts involving phage therapy and bacteriology (“Could gargling a virus that eats bacteria solve the superbug crisis?”, *Daily Mail*, August 2017), the difficulty of discovering new antibiotics, as well as other research developments.

The media have also reported on funding towards combating superbugs (eg, “Scientists Awarded Millions For Research Into Antimicrobial Resistance in Africa”, *Press Association*, June 2018 & “Government pledges more than £30m to fight superbugs”, *Telegraph*, May 2018).

News items	202
Share of coverage	22%
Median publish date	10/02/2018
Top source category	National newspapers – Tabloid (42%)
Top news source	dailymail.co.uk (12%)
Top journalists	Alexandra Thompson (7), Jennifer Cockerell (7)
Mean word count	425



## Top organisations

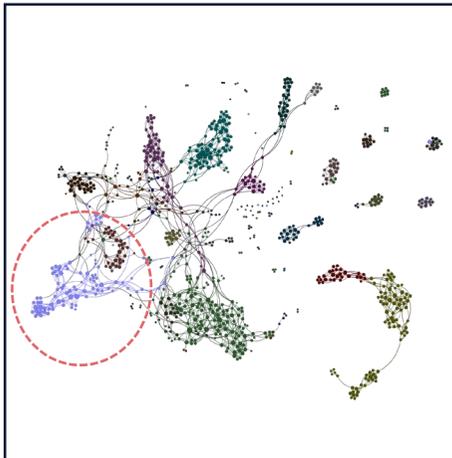
- World Health Organisation
- Medical Research Council
- University of Pittsburgh
- Department of Health

## Top people

- Jonathan Pearce, Medical Research Council
- Zamin Iqbal, University of Oxford
- David Harper, Evolution Technologies



# Over prescription of antibiotics

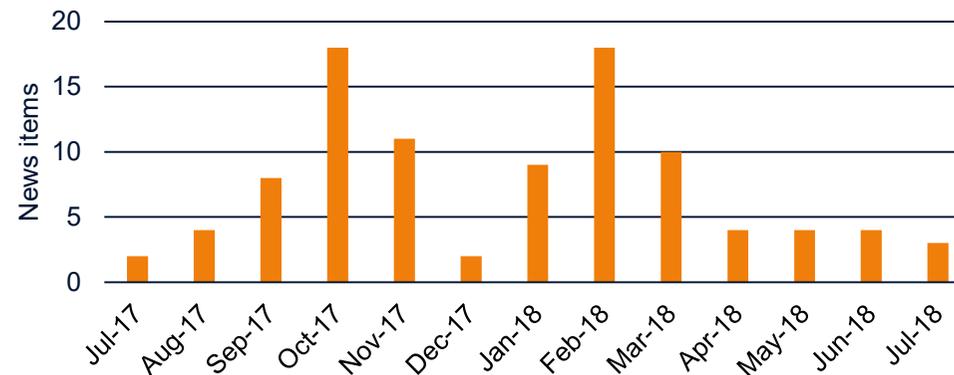


The second-most-covered topic was the over prescription of antibiotics in the UK. Coverage was driven mainly by research documenting that GPs are prescribing antibiotics unnecessarily (eg, “One in five GP antibiotic prescriptions ‘inappropriate’”, *ITV News*, February 2018), the implications of this (eg, “GPs handing out too many antibiotics harms cancer survival chances”, *Telegraph*, June 2018), and the warnings and guidelines issued to doctors by organisations such as the National Institute of Health (eg, “Stop prescribing useless antibiotics for sore throats, doctors are urged”, *Times*, January 2018), and public figures (e.g. “Superbugs set to kill more than cancer, Jeremy Hunt warns, with a fifth of antibiotic prescriptions needless”, *Telegraph*, February 2018).

One development that received significant media attention was the publication in January 2018 of new guidelines by NICE and Public Health England on the prescription of antibiotics for sore throats. This generated numerous media articles (eg, “Stop prescribing ‘precious’ antibiotics for sore throats, GPs told”, *BBC News*, January 2018) focusing on how GPs should cut down on antibiotics prescriptions.

Coverage of a similar study by Public Health England, which found that 20% of all antibiotic prescriptions written by GPs in England are inappropriate, drove a big spike in coverage in February 2018 (e.g. “GPs ‘too soft on tablets’”, *Sun*, February 2018).

News items	97
Share of coverage	10%
Median publish date	26/01/2018
Top source category	National newspapers – Tabloid (38%)
Top news publisher	dailymail.co.uk (9.3%)
Top journalists	Henry Bodkin (7), Ben Spencer (5), Laura Donnelly (5)
Top content type	News story (63%)
Mean word count	413



**Top organisations**

- Public Health England
- National Institute for Health and Care Excellence
- Royal College of GPs

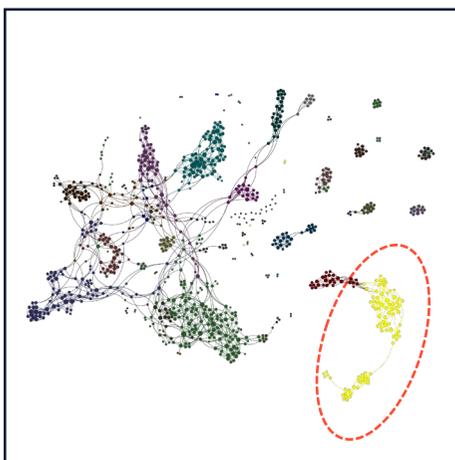
**Top people**

- Dame Sally Davies
- Tessa Lewis (National Institute for Health and Care Excellence)
- Jeremy Hunt





# Super Gonorrhoea and STIs



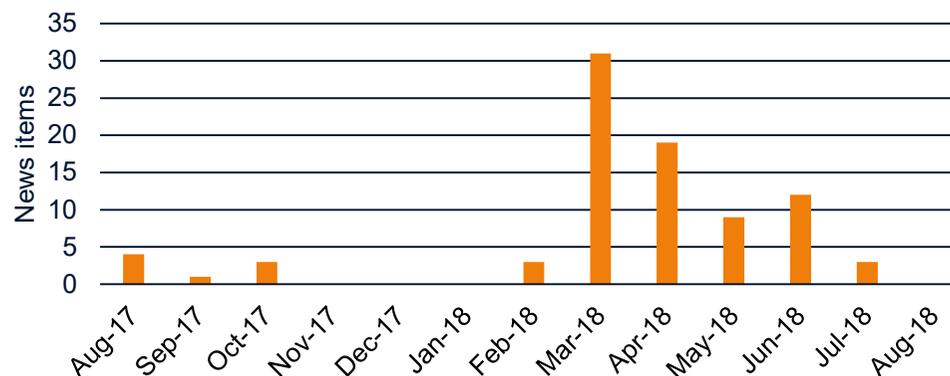
Super Gonorrhoea and STIs was the third most-reported-on aspect of antimicrobial resistance, accounting for 9.7% of news coverage, mostly in the spring of 2018. As well as being covered in its own right, the topic was also mentioned in some articles about Mycoplasma Genitalum (“MG”) which is obviously closely related.

Much of the news coverage centred on an anonymous British man who caught the first case of super gonorrhoea while holidaying in Asia (March 2018). The tabloids reported this story extensively (eg, “Dose encounter”, “Clap flat over Brit”, “Brit super STD first”), tracking his recovery and publishing stories about the threat of Super Gonorrhoea, as well as advice on how to recognise the symptoms and get tested.

Separately, a handful of news stories connected the rise of STIs, including gonorrhoea, to government cuts to health funding, arguing that sexual health services were at “tipping point” with clinics unable to keep up with demand for tests and treatments. A number of media outlets also picked up on a report from the Brexit Health Alliance, warning that disease prevention could be compromised if the UK leaves the EU early warning system (“Britain will be ‘mangy old lion’ and could struggle with super-gonorrhoea after Brexit”, “Brexit ‘Could hit UK’s ability to tackle infectious diseases”).

Super Gonorrhoea has been covered by online-only news outlets, such as *LADBible*, *BuzzFeed* and *HuffPost UK*, a reflection of the fact they cater mainly to young people.

News items	87
Share of coverage	9.7%
Median publish date	30/03/18
Top source category	National newspapers – Tabloid (57%)
Top news publisher	dailymail.co.uk (20%)
Top journalists	Alexandra Thompson (4), Sally Wardle (4), Stephens Matthews (4)
Mean word count	473



- Top organisations**
- World Health Organisation
  - European Centre for Disease Prevention
  - London School of Hygiene & Tropical Medicine
- Top people**
- Gwenda Hughes (Consultant Scientist in Epidemiology)
  - Teodora Wi (WHO)
  - Olwen Williams (BASHH President)



# Media Analysis

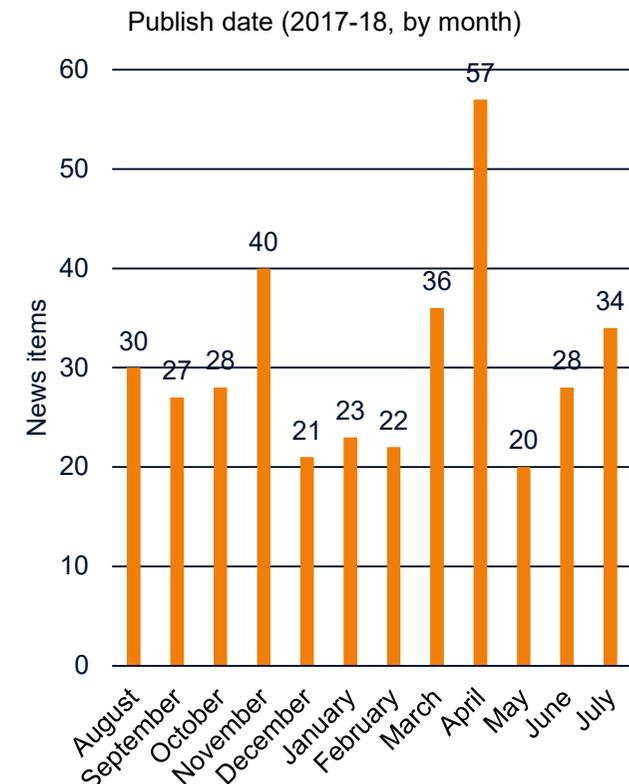
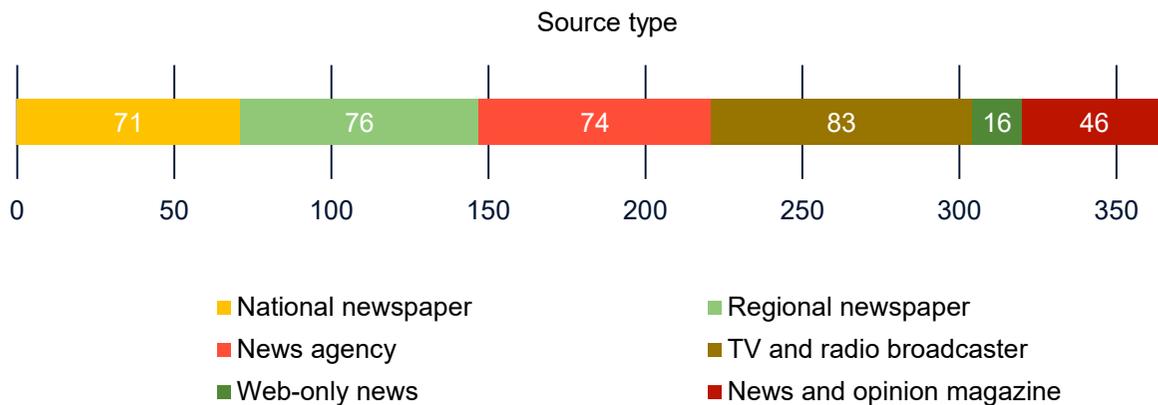
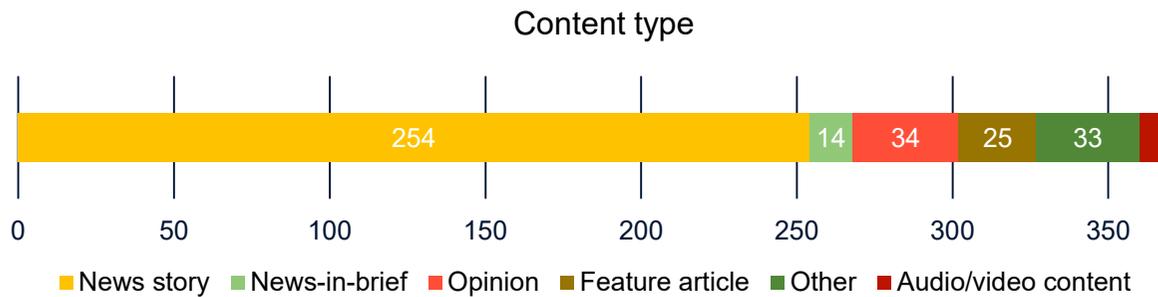
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United States



# News coverage in the US

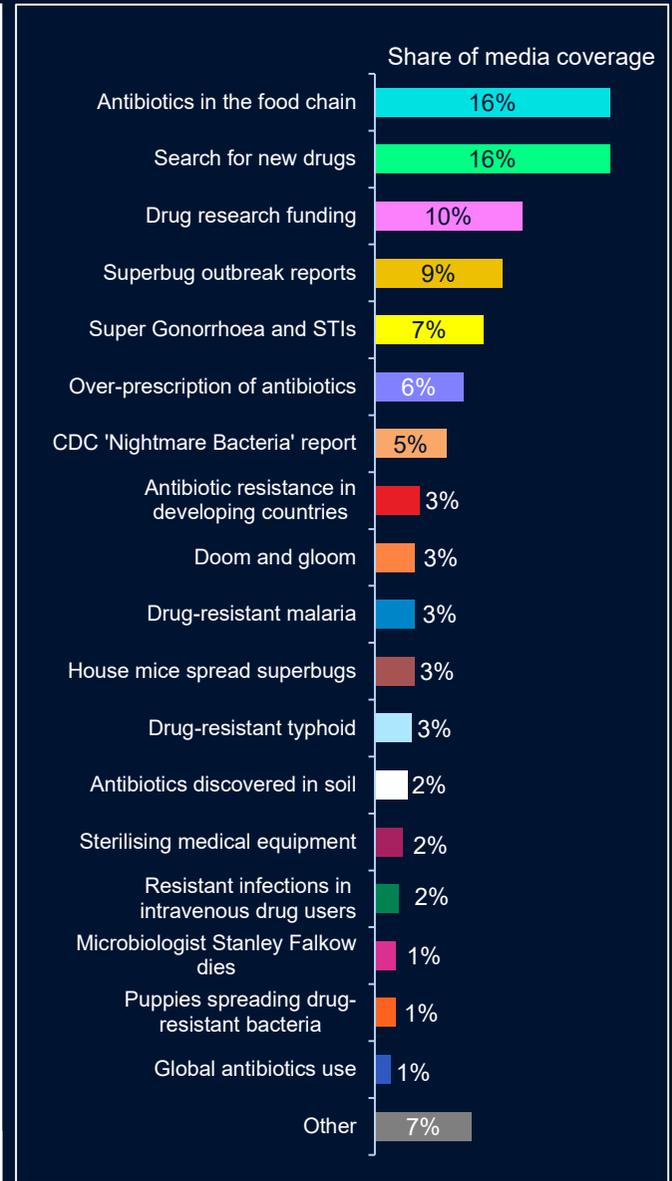
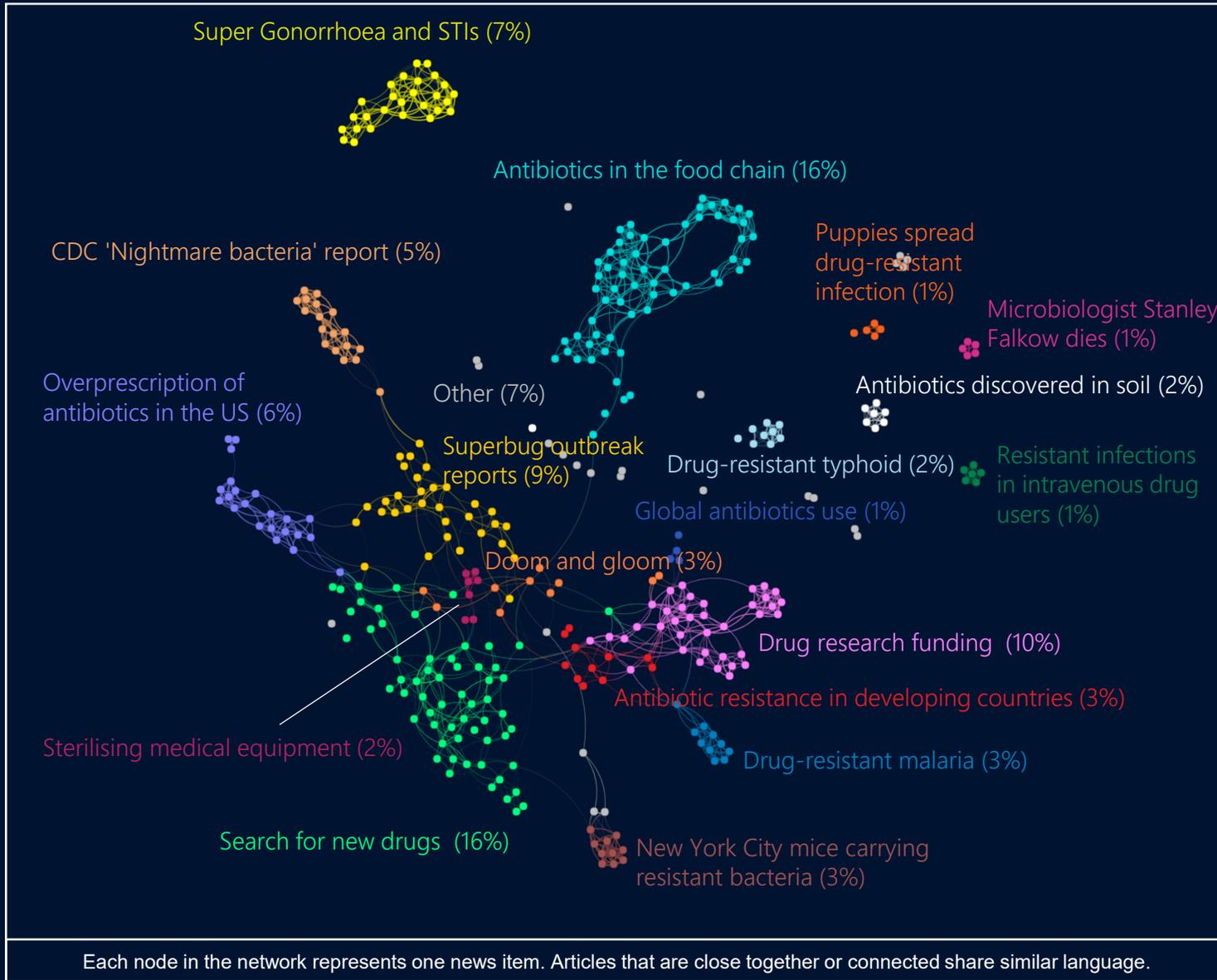
- 366 news items about antimicrobial resistance were identified as having been published by the mainstream US news media in the year to 31 July 2018. This was similar news volume to Germany (354), and much less than the UK (901).
- Most of the coverage (73%) took the form of news stories and news-in-briefs. TV and radio broadcasters were marginally the top news source, with regional/national newspapers and news agencies also generating significant coverage.
- Around 30 news items about antimicrobial resistance were published every month (including duplicate stories). US news coverage of antimicrobial resistance peaked in April 2018 when 57 news items were published (driven by coverage of the CDC's Nightmare Bacteria report and articles around house mice spreading superbugs).





# How the US media cover antimicrobial resistance

- 18 themes in US mainstream news coverage of antimicrobial resistance were identified. Antibiotics in the food chain and the search to find new drugs generated the most coverage.



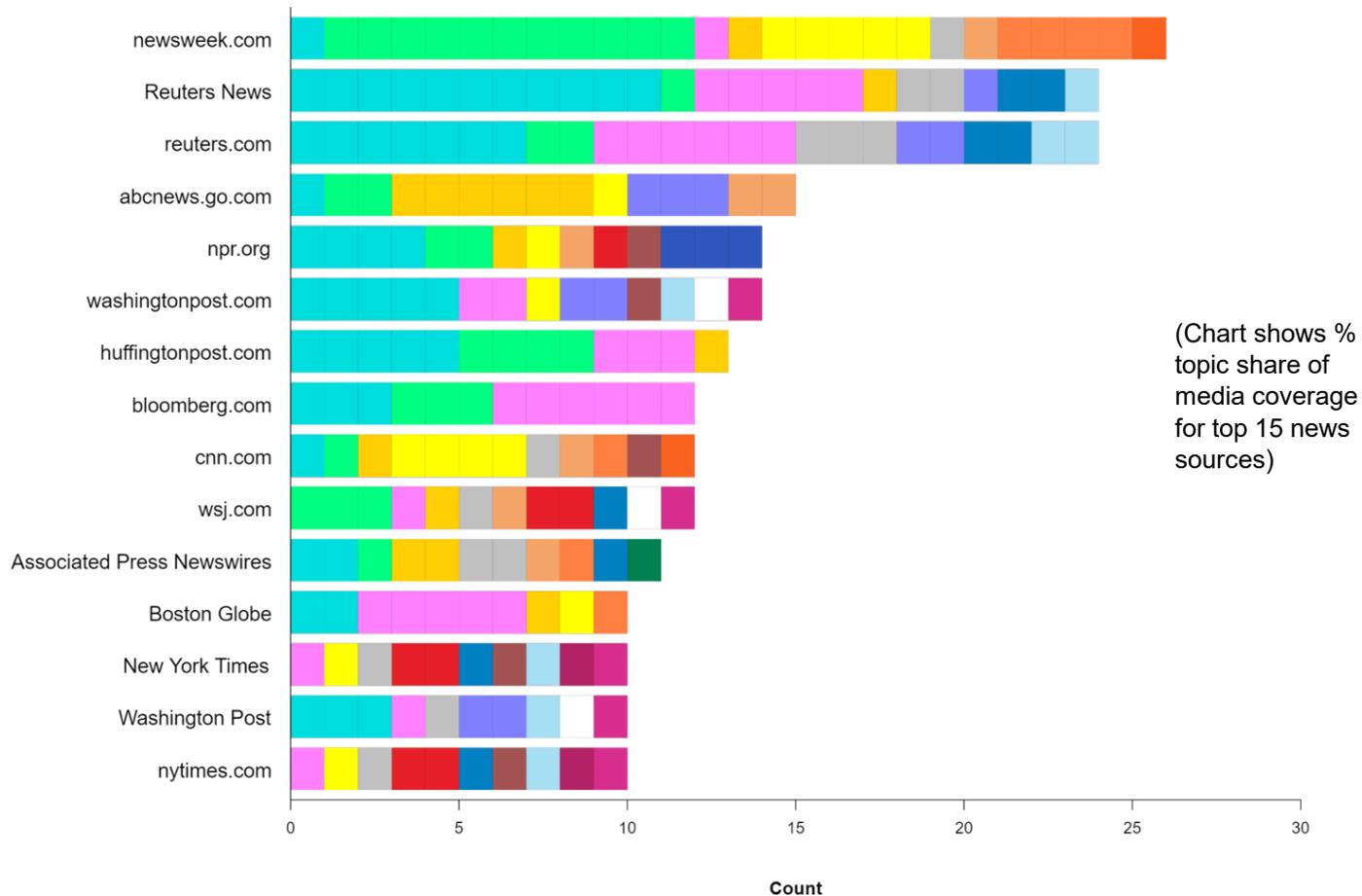
Network shows relationship between 366 news items about antimicrobial resistance published in the year to 31 July 2018. See Methodology Report – [Appendix A](#) for methodological detail.





# News coverage by media source

- Three news sources: *Newsweek.com*, *Reuters News* and *Reuters.com* generated a particularly large amount of coverage about antimicrobial resistance. Whereas *Newsweek.com* focused on the search for new drugs, *Reuters News/Reuters.com* drove coverage of antibiotics in the food chain
- *ABC News's* website was an important source of news about superbug outbreaks, and numerous outlets published coverage of research funding

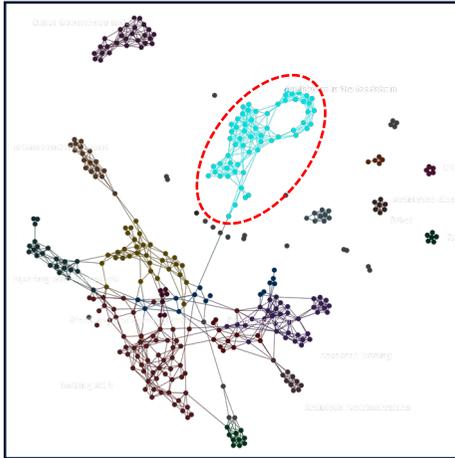


Analysis of 366 news items from the 15 news sources publishing the most antimicrobial resistance-related content among those evaluated.

Colours signify topics according to the key on the previous slide.



# Antibiotics in the food chain



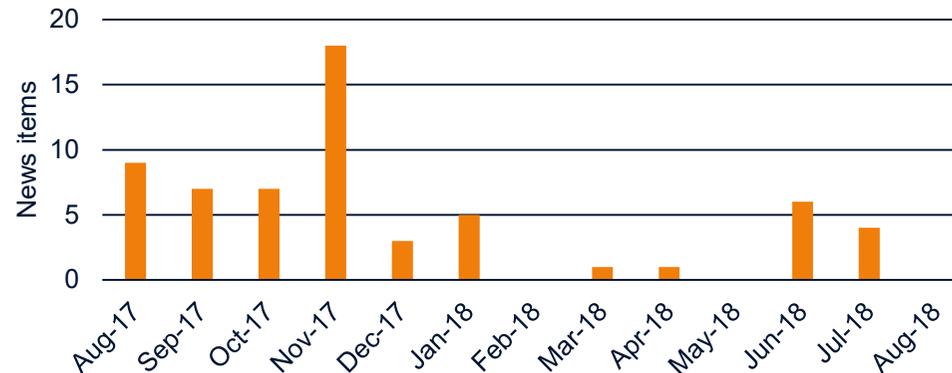
Antibiotics in the food chain was the joint most reported-on topic in the US, accounting for 16% of total coverage, most of which was published between August 2017 and January 2018.

Policy changes and campaigns against antibiotics use in agriculture (such as Maryland’s Keep Antibiotics Effective Act and the Joint Commission’s Antimicrobial Stewardship) were the main drivers of news coverage, which was led by news agencies, in particular Reuters. For example, in August 2017 the media widely reported the news that McDonald's was curbing the use of antibiotics in its global chicken supply. This generated a lot of follow up coverage about antibiotics use in the poultry industry and the fast food supply chain.

The biggest spike in media coverage, in November 2017, was caused by the release of WHO guidelines urging farmers to stop using antibiotics in healthy animals, and the publication of “Big Chicken”, a book about antibiotics in agriculture by public health and food policy journalist Maryn McKenna (also author of “Superbug” in 2010). As well as interviewing Ms McKenna, a number of media outlets published extracts from her book.

The topic also encompasses some articles about international agreements to curb antibiotic use in agriculture, and whether countries are sticking to these. Some articles report in depth on the geographical regions that are particular culprits for antibiotic abuse, such as South-East Asia.

News items	61
Share of coverage	16%
Median publish date	07/11/2017
Top source category	News agency (39%)
Top news source	Reuters News (29%)
Top journalists	Lisa Baertlein (5), Thin Lei Win (3), Caitlin Dewey (2)
Mean word count	759



### Top organisations

- World Health Organisation
- McDonald’s
- UN Food and Agriculture Organisation

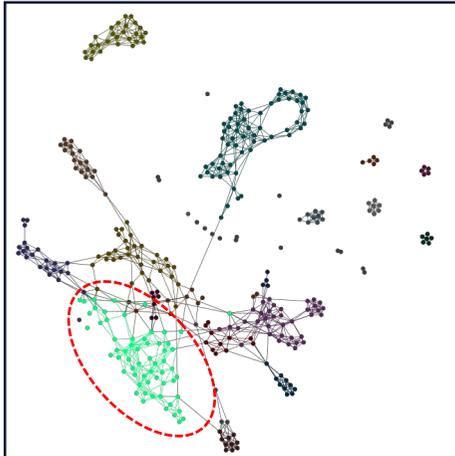
### Top people

- Maryn McKenna (author and journalist)
- Louise Slaughter (Democrat politician, deceased)
- Jim Perdue (Perdue Farms)





# The search for new drugs



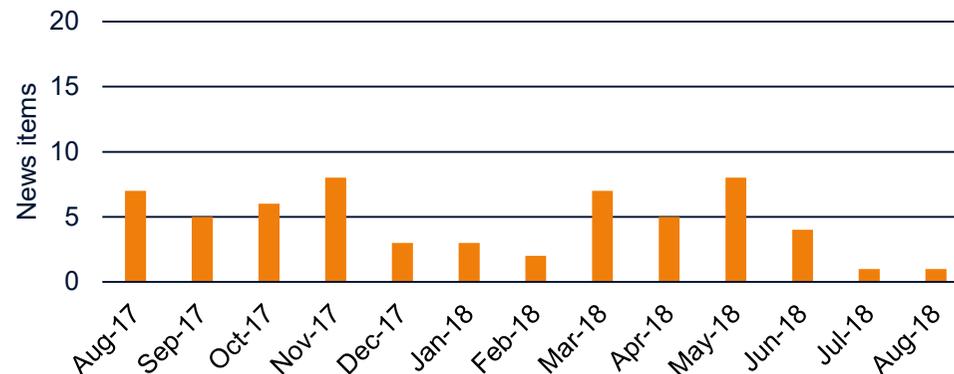
News items focusing on how antimicrobial resistance can be curtailed, or perhaps even stamped out, were a staple news story across the period evaluated, an average of four or five being published every month. *Newsweek.com*, the website of the weekly news magazine, was the main source of coverage.

Some of this was serious in tone, focusing on scientific research (eg, “Could Crispr Help to Knock Out Superbugs? A combination of gene editing and viruses that attack bacteria could help scientists fight antibiotic resistance”, *Wall Street Journal*, December 2017). But, as in the UK, the US media also regularly published stories about unusual remedies (eg, “Despite dubious claims, manuka honey may be antibiotic powerhouse”, *CNN*, November 2017).

Some news articles focused on specific remedies or solutions (e.g. “New CMU algorithm can help thwart antibiotic resistance”, *Pittsburgh Post-Gazette*, February 2018), while others took a more holistic view, exploring multiple proposed solutions (“The 'Post-Antibiotic Apocalypse' Can Be Prevented. Here's How”, *NBC News*, October 2017).

This topic also includes some coverage of how antimicrobial resistance is caused, and the ongoing debate about how it can be prevented (eg, “The New Conundrum About When to Stop Antibiotics; Ending treatment earlier may help prevent dangerous antibiotic resistance, but it's not the best course of action all the time”, *Wall Street Journal*, August 2017).

News items	60
Share of coverage	16%
Median publish date	24/01/2018
Top source category	Opinion or news magazine (35%)
Top news source	Newsweek (18%)
Top journalists	Aristos Georgiou (2), Ed Yong (2), Jason Gale (2)
Mean word count	969



### Top organisations

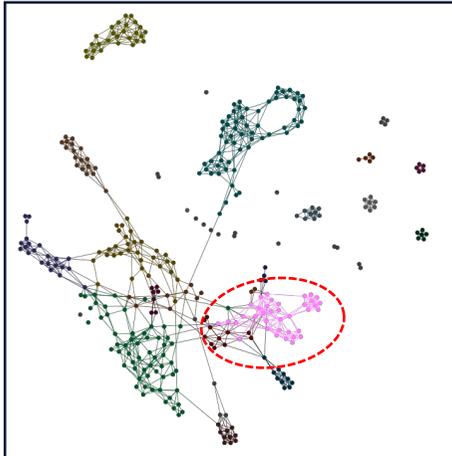
- World Health Organisation
- University of California San Diego
- Eliava Institute

### Top people

- Professor Barbara Murray (University of Texas)
- Dr Lauri Hicks (CDC)



# Drug research funding



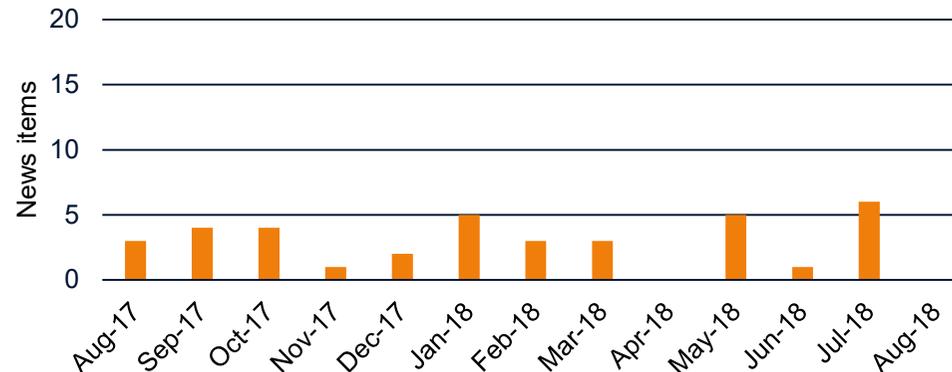
News about research funding for new antibiotics and other treatments for superbugs (eg, "The Startups Waging War Against Superbugs", *Bloomberg*, June 2018) generated 10% of total antimicrobial resistance coverage.

Much of this was negative in tone, with stories lamenting the small amount of investment and highlighting the absence of incentives for pharmaceutical companies to develop new drugs. Some articles focused specifically on the idea that profit margins are too low for big pharma to invest in antibiotic production (eg, "Superbugs Win Another Round as Big Pharma Leaves Antibiotics", *Bloomberg*, July 2018). Meanwhile Jeffrey Stein, the President and CEO of Cidara Therapeutics, penned an op-ed in the *Washington Post* calling for the public sector to be more involved in antibiotic development ("Developers of antibiotics urgently need government help", February 2018).

News articles also critically analysed how big pharma are tackling drug resistance (eg, "Companies ranked in fight against 'superbugs'", *New York Times*, January 2018; and "Drug companies told to do more to tackle 'superbug' crisis", *Reuters*, January 2018, in which Jeremy Farrar is quoted).

Ben Hirschler, Senior Correspondent at Reuters, who covers various aspects of healthcare and big pharma, is the journalist who has written most about this topic, though Bloomberg generated the most volume.

News items	37
Share of coverage	10%
Median publish date	14/02/18
Top source category	News agency (45%)
Top news source	Bloomberg (16%)
Top journalists	Ben Hirschler (6), Kate Sheridan (3), Paul Sandle (3)
Mean word count	528



### Top organisations

- World Health Organisation
- Novartis
- AstraZeneca

### Top people

- Ron Klain (US 'Ebola Czar')
- Dr Jeffrey Stein (Cidara)
- Ankit Mahadevia (Spero Therapeutics)



# Media Analysis

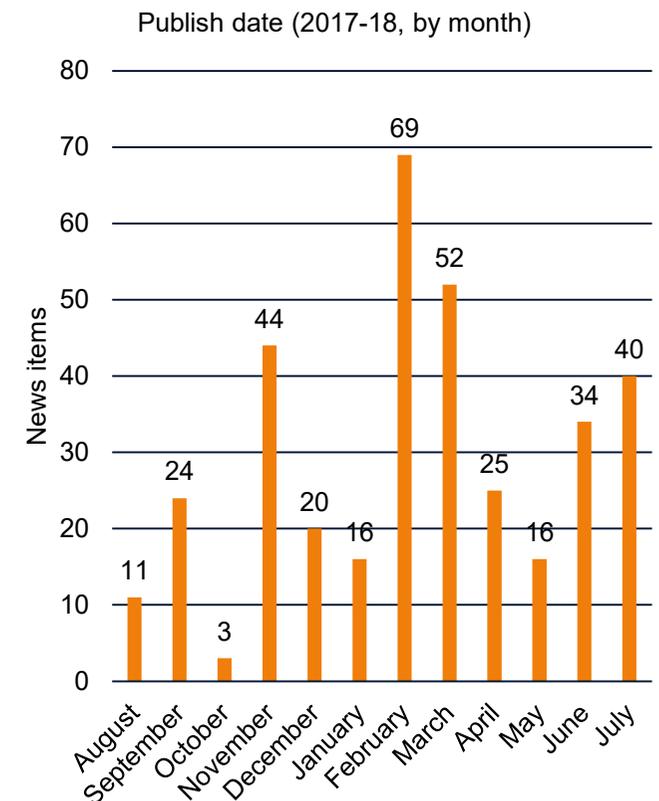
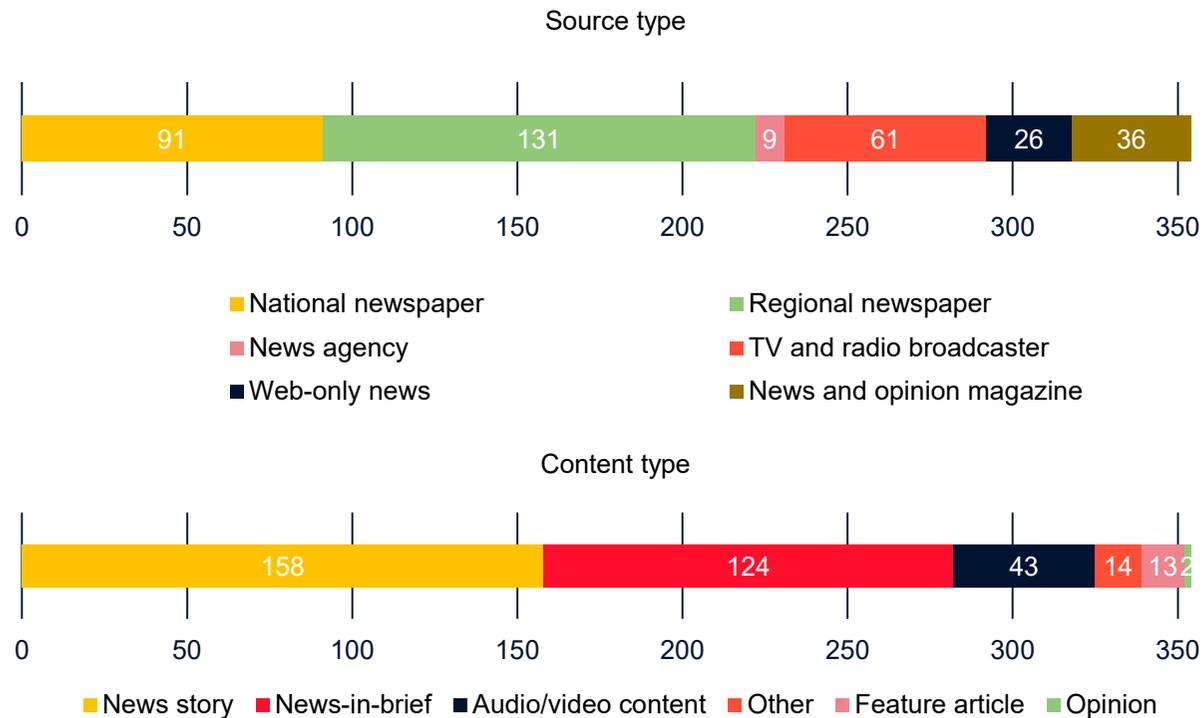
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Germany



# News coverage in Germany

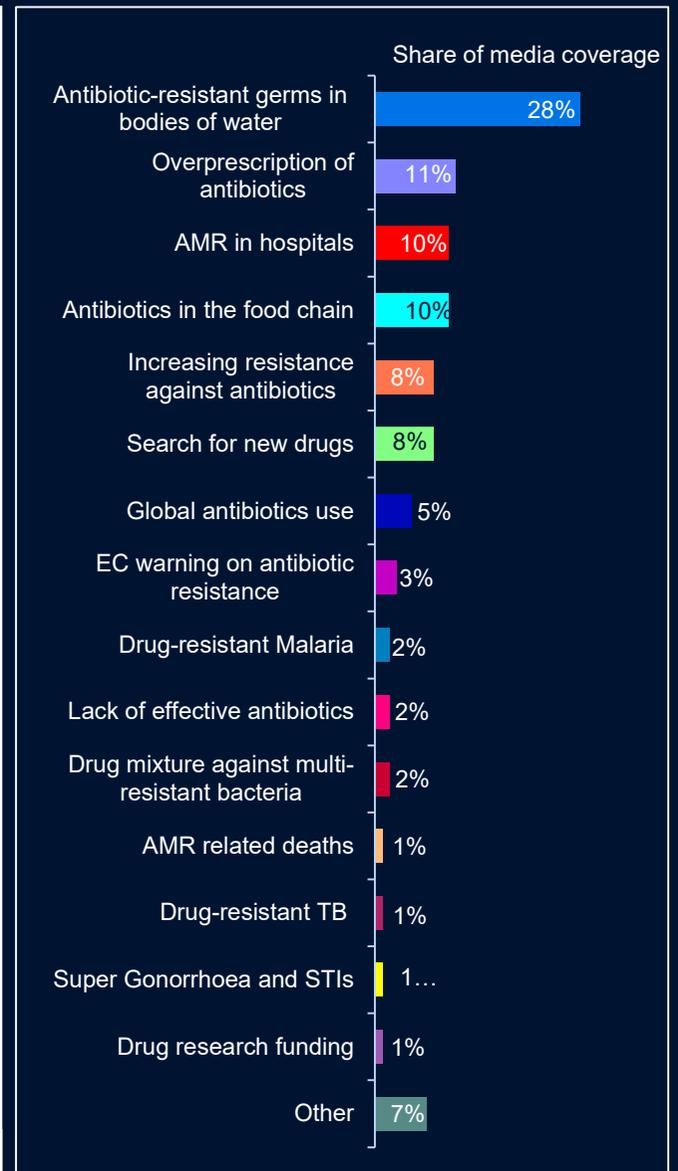
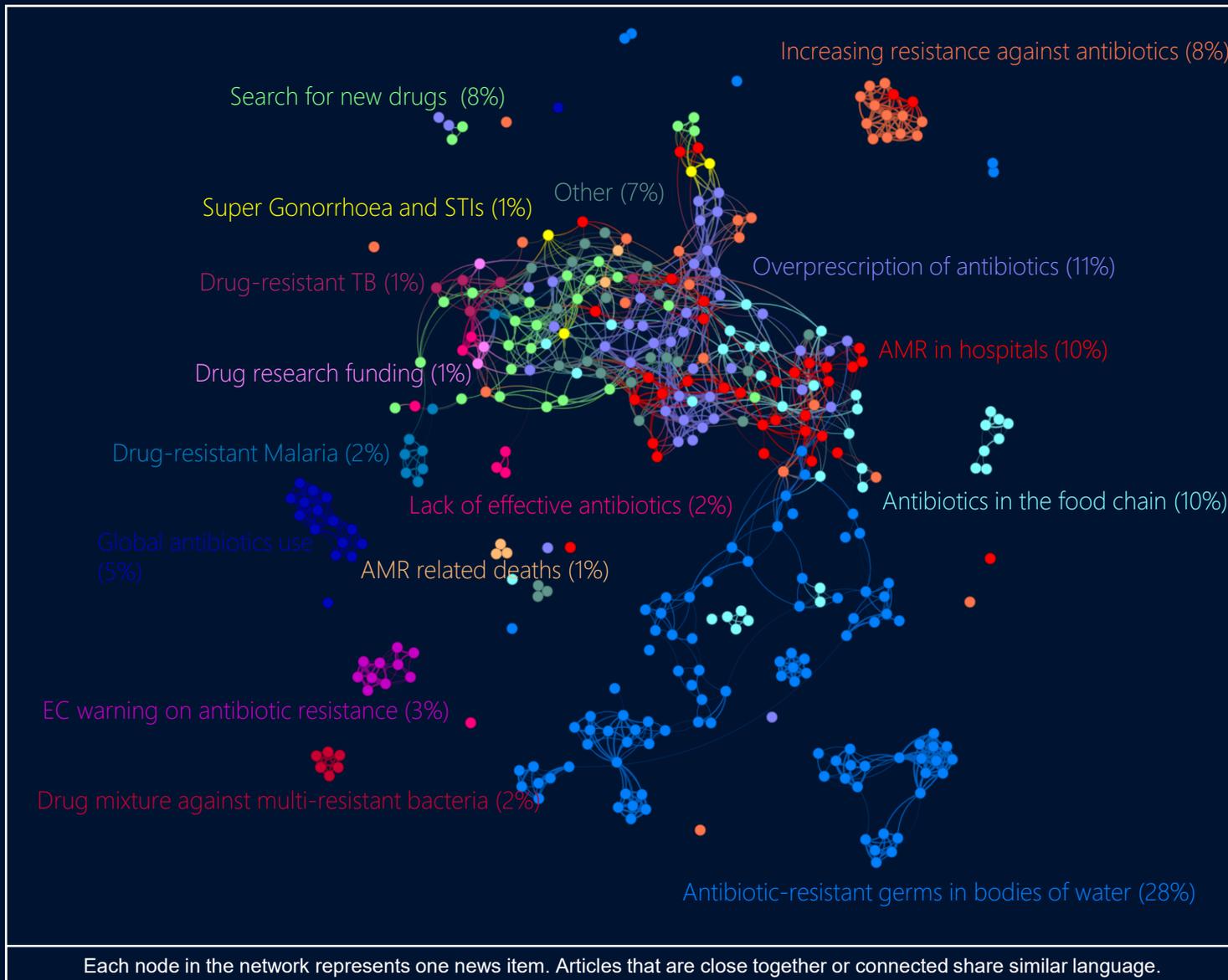
- 354 news items about antimicrobial resistance were identified as having been published by the mainstream news media in the year to 31 July 2018. This was a similar news volume to the US, and significantly less than the UK.
- Regional newspapers were the main news source (37% of coverage) followed by national newspapers (26%). News stories and news-in-briefs made up 80% of the coverage, followed by audio and video content (12%).
- An average of 29 news items about antimicrobial resistance were published every month, including duplicate stories. Coverage peaked in November 2017 (44 news items – driven by the European Commission’s warnings on antibiotic resistance) and then again in February 2018 (69 news items – driven by reports of drug-resistant bacteria being found in Germany’s rivers and lakes).





# How the German media cover antimicrobial resistance

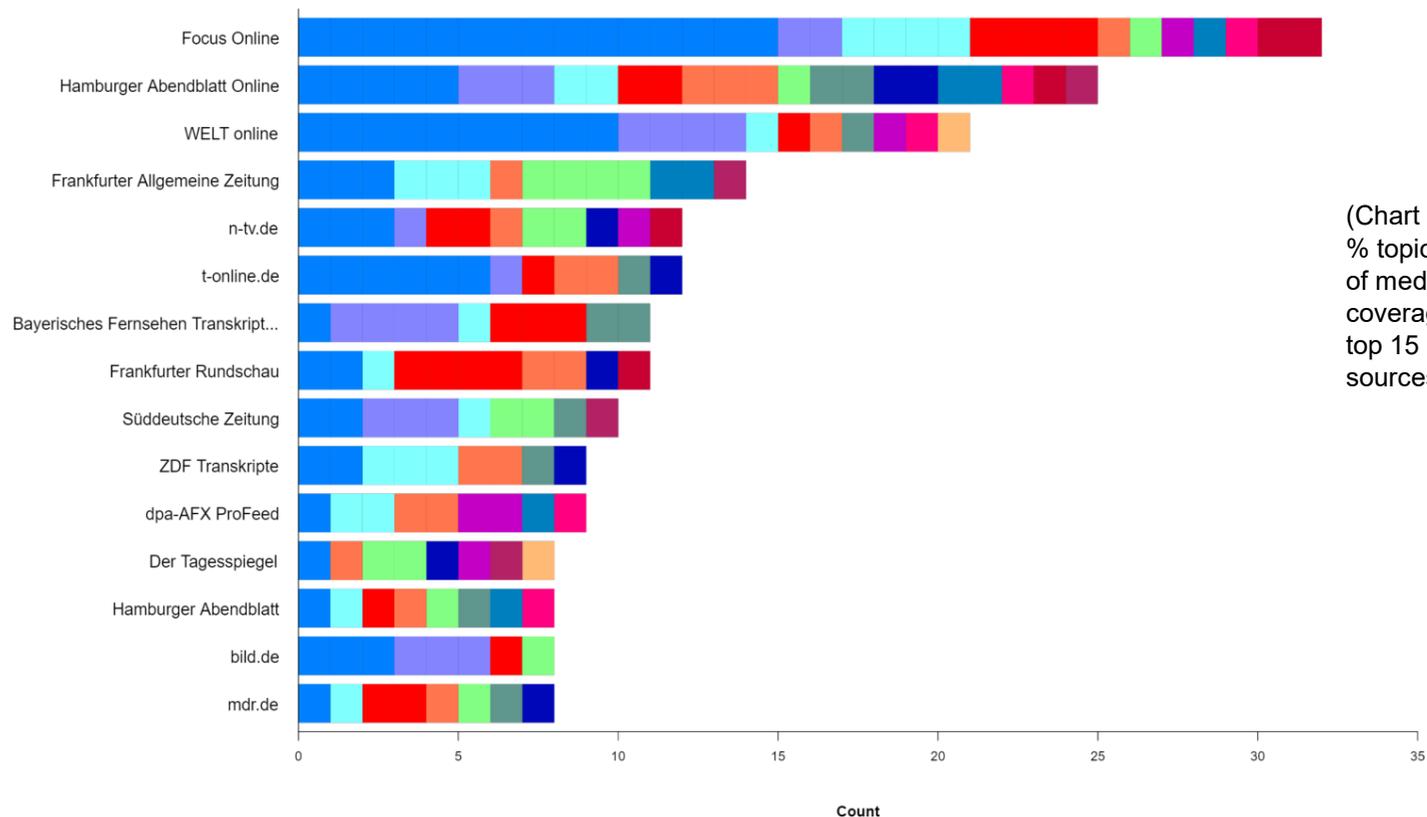
- 15 different themes in antimicrobial resistance-related news coverage were identified. By far the most prominent theme was antibiotic-resistant germs in bodies of water, which accounted for 28% of total news coverage.





# Antimicrobial resistance news coverage by media source

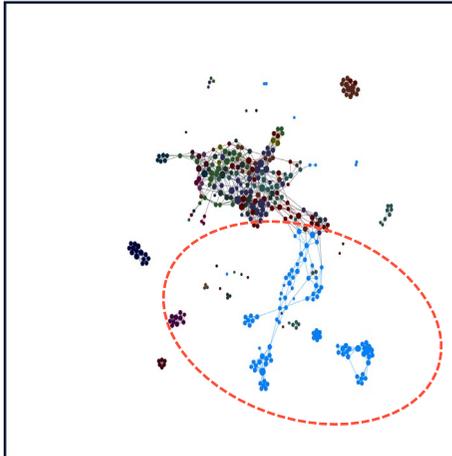
- *Focus Online*, the website of the popular weekly news magazine, was the top source of news coverage of antimicrobial resistance, thanks largely to its extensive reporting on antibiotic-resistant bacteria in bodies of water.
- *Welt Online*, the online version of the German national newspaper *Die Welt*, and the online version of the Hamburg-based daily newspaper *Hamburger Abendblatt*, also generated lots of news coverage about antimicrobial resistance. Next to coverage on antibiotic-resistant bacteria in bodies of water it also covered the overuse/misuse of antibiotics amongst other topics.
- The top 15 news sources accounted for 56% of antimicrobial resistance coverage.



(Chart shows % topic share of media coverage for top 15 news sources)



# Antibiotic-resistant germs in bodies of water

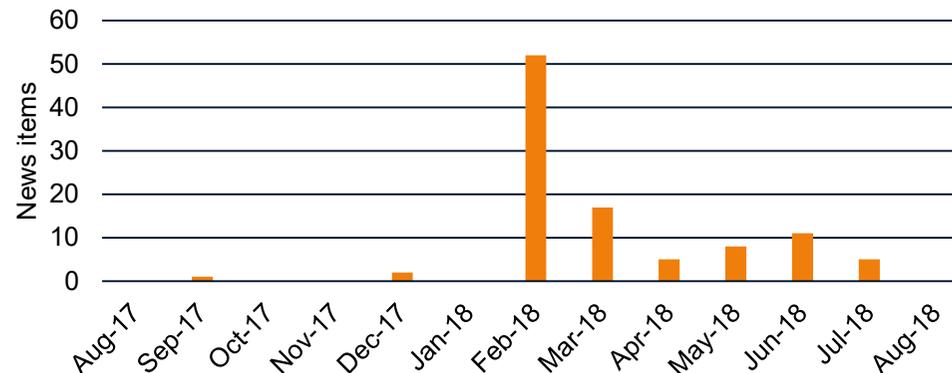


Biologists' discovery of antibiotic-resistant bacteria in German rivers and lakes has been widely reported since the start of 2018, accounting for 28% of antimicrobial resistance news coverage identified. Most of this has appeared in regional newspapers such as Hamburger Abendblatt, Hannoversche Allgemeine and Weser Kurier, though the story has also been covered by news magazines such as Focus Online (often based on dpa wires) and national newspapers such as Welt Online.

Coverage has been factual in tone, with news articles explaining how pathogenic microbes can harm humans. Most of the articles have included comment from third-party experts, among them Dr Tim Eckmanns, who monitors nosocomial infections for the Robert Koch Institut, and water scientists at the Technical University of Dresden, and the German Centre for Infection Research at Giessen University Hospital.

The main news driver was a story by NDR television magazine Panorama, published in February 2018, in which its reporters tracked scientists from the German Centre for Infection Research as they tested water samples in Lower Saxony. These were subsequently found to contain over 80 different multi-resistant bacterial species, causing alarm among environmentalists, the Federation for Environment and Nature Conservation Germany, and the Ministry for Environment of North Rhine-Westphalia. Subsequent media coverage has focused on the need for further investigation, to discover how harmful bacteria enter the water system and spread, in order to protect both humans and the environment.

News items	101
Share of coverage	28 %
Median publish date	15/03/2018
Top source category	Regional Newspapers (32%)
Top news publisher	Focus Online (14%)
Top journalists	Christian Baars / Oda Lambrecht (2)
Mean word count	321



### Top organisations

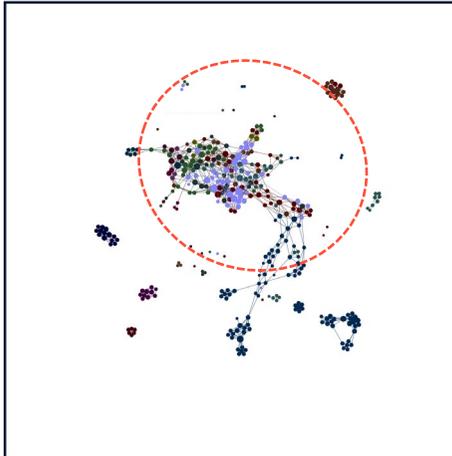
- Robert Koch Institut

### Top people

- Professor Thomas Berendonk (TU Dresden)
- Barbara Hendricks (SPD politician and former federal minister)
- Dr Tim Eckmanns (Robert Koch Institut)



# Over prescription of antibiotics

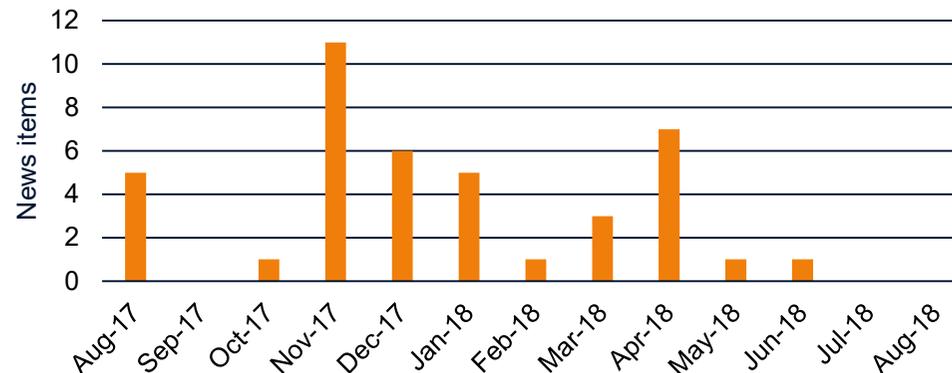


The overuse and misuse of antibiotics was the second-most-reported topic, accounting for 11% of antimicrobial resistance news coverage. Stories have focused on the critical response to the WHO's requirement that antibiotic prescriptions should always be used, and the threat posed to Germans by a "post-antibiotic" era in which harmless diseases become deadly. Some of the coverage has stressed that people should use fewer antibiotics, pointing to the latest studies which have shown the new mantra should be: "As little as possible, as much as necessary". The Association of Statutory Health Insurance Physicians, the German Association of General Practitioners, and insurance companies AOK, TK and IKK gesund plus have all used the media to call for antimicrobial resistance to be contained.

Overall the topic received most coverage in regional newspapers, though the top news source has been Bild, a daily national tabloid. The overuse/misuse of antibiotics has also been covered by BR Fernsehen, the regional television programme of Bayerischer Rundfunk as well as by Welt Online.

There has been sporadic coverage of the topic over the past 12 months, the most appearing in November 2017, coinciding with World Antibiotic Awareness Week and the start of flu season, which was often mentioned in news stories.

News items	41
Share of coverage	11 %
Median publish date	28/12/2017
Top source category	Regional Newspapers (39%)
Top news publisher	Bild / Bild Online (12%)
Top journalists	N/A
Mean word count	362



## Top organisations

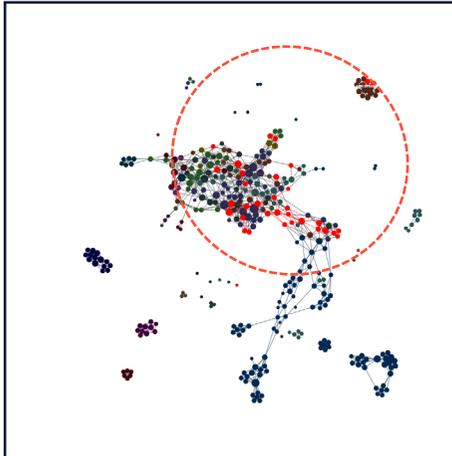
- WHO
- Deutscher Apothekerverband (German Association of Pharmacists)
- AOK (public health insurer)

## Top people

- Professor Michael Bauer (University Hospital Jena)
- Michael Kochen (President, German Society of General Medicine)



# Antimicrobial resistance in hospitals

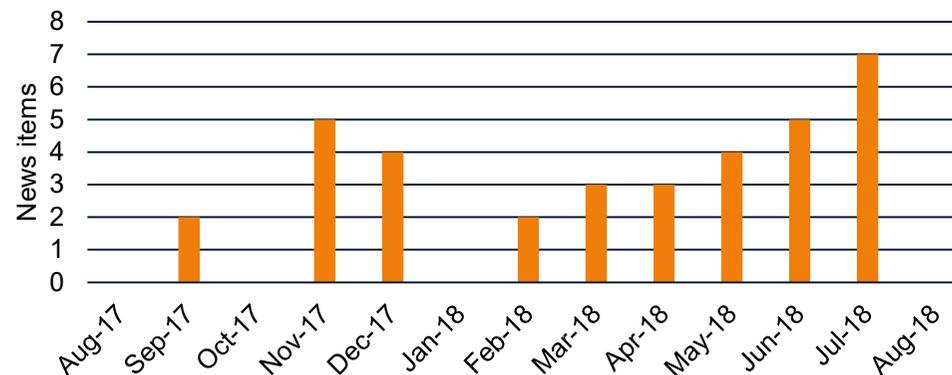


Both national and regional newspapers have reported on the presence of antimicrobial resistance in German hospitals, which accounted for 10% of news coverage. Most of the news stories have focused on :

- Hospital hygiene and infection prevention
- The development of a rapid test for multi-resistant hospital germs by scientists at the German Centre for Infection Research. This coverage has highlighted that infections are caused by, among other things, a lack of hygiene and the fact that the conventional antibiotics hardly work anymore. It is therefore up to the healthcare system to develop and implement effective hygiene measures.
- Results from data from the National Reference Centre for Gram-negative Hospital Pathogens (NRZ) at the Ruhr University in Bochum, which was published by the Robert Koch Institute in Berlin in July 2018, which noted that a growing number of hospital patients in Germany have been affected by germs which are resistant to important reserve antibiotics.

Separately, a handful of news stories have drawn attention to the fact that antimicrobial resistance, according to the European Health Authority, is one of the biggest health threats in Europe. According to the TV show Quarks (WDR) about three quarters of all people in Germany are afraid of contracting a dangerous germ in a hospital even though the main cause of the spread of resistant bacteria is in fact the frequent and undirected use of antibiotics, according to studies. This topic has been covered mainly by regional newspapers such as Frankfurter Rundschau, Hamburger Abendblatt and Stuttgarter Zeitung.

News items	35
Share of coverage	10 %
Median publish date	23/02/2018
Top source category	Regional Newspapers (51%)
Top news publisher	Focus Online & Frankfurter Rundschau (11% each)
Top journalists	N/A
Mean word count	514



### Top organisations

- Berthold Leibinger Stiftung
- Robert Koch Institut
- Dr Rolf M. Schwiete Stiftung

### Top people

- Florian Graf (CDU representative)
- Dr Volkhard Kempf (Institute for Medical Microbiology and Hospital Hygiene)

# Media Analysis

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Japan



# News coverage in Japan

## Terminology used

- Japan's media and government most often use the term 薬剤耐性 (“antimicrobial resistance”) to refer to antimicrobial resistance.
- Synonyms such as 薬剤抵抗性, 薬物耐性 (both “drug resistance”) and 抗菌薬耐性 (“antibiotic resistance”) are used less frequently, with the acronym “AMR” often appearing in brackets afterwards, for clarity.
- スーパー耐性菌, the Japanese term for “superbug”, is also used by the media, though not as much as in the UK and US, and again the acronym for antimicrobial resistance is commonly provided as well.
- Both broadsheet and tabloid newspapers use similar terminology when writing about antimicrobial resistance.

## Media coverage overview

- 400 news items about antimicrobial resistance were identified as having been published in year to 31 July 2018. Most of those items published in city/regional papers were syndicated from the national newspapers.
- Broadly speaking, media coverage of antimicrobial resistance is factual in tone. It provides insight on how Japanese government and pharmaceutical companies are addressing the challenge, while at the same time communicating the severity of the problem.
- The coverage is notable for being less sensationalist than in the West, and while deemed a major threat, antimicrobial resistance is not positioned as an intractable problem.



## Notable news stories (1/3)

<p><b>Hospital deaths in Kagoshima</b></p>	<p>In August 2018, Kagoshima University Hospital in south-western Japan disclosed that multidrug-resistant Acinetobacter, and similar bacteria, had been found in 15 patients, eight of whom had died since 2016. The hospital said the environment of its intensive care unit could have caused the infections and issued an apology to patients' families.</p> <p>Among the news outlets to cover the story was the national newspaper, the Asahi Shimbun, which used the opportunity to publish an editorial highlighting the global threat posed by antimicrobial resistance and making the point Japan must be prepared for an “endless war” against it. Other coverage appeared in English-language papers including the Mainichi Shimbun, Japan Today and Japan Times.</p> <p>Reporting was factual in nature, citing the WHO's classification of Acinetobacter as “among the antibiotic-resistant pathogens that pose the greatest threat to human health” to emphasise the severity. The story was also picked up by trades including Japan Pharma and Yakuji Nippou.</p>	<ul style="list-style-type: none"> <li>• “<a href="#">8 inpatients die after infected with bacteria at Kagoshima</a>”, Asahi Shimbun, 3 August 2018</li> <li>• “<a href="#">8 die at Japan hospital after infection with drug-resistant bacteria</a>”, Mainichi Shimbun, 3 August 2018</li> <li>• “<a href="#">Kagoshima hospital reveals 15 cases of 'superbug' infections after logging eight deaths since 2016</a>”, Japan Times, 3 August 2018</li> <li>• “<a href="#">Infection at hospital, an endless war against virus</a>”, Asahi Shimbun, 25 August 2018</li> </ul>
<p><b>Drug-resistant bacteria in chicken</b></p>	<p>In April 2018, an investigation by Japan's Ministry of Health, Labour &amp; Welfare found that 50% of domestically raised and imported chicken carried drug-resistant bacteria.</p> <p>The story was reported by major Japanese newspapers including the Nikkei Shimbun, Mainichi Shimbun and Sankei Shimbun.</p> <p>Coverage was factual, with articles noting the EU had banned the use of antibiotics on livestock in 2006 and emphasising the importance of taking an integrated approach to reducing the misuse of antibiotics, and the development of new drugs.</p>	<ul style="list-style-type: none"> <li>• “<a href="#">Ministry of Health found drug-resistant bacterium in more than 50% of chicken</a>”, Nikkei Shimbun, 31 March 2018</li> <li>• “<a href="#">Ministry of Health study found that more than 50% of chicken has drug-resistant bacterium and may hinder medical treatment for elderly</a>”, Sankei Shimbun, 1 April 2018</li> <li>• “<a href="#">50% of chicken has drug-resistant bacterium, hindering antibiotics treatment for elderly</a>”, Mainichi Shimbun, 3 April 2018</li> </ul>



# Notable news stories (2/3)

## Global studies of antimicrobial resistance

A number of stories focused on the global threat posed by antimicrobial resistance, the overuse of antibiotics and the failure to develop new drugs. Newspapers such as the Sankei Shimbun, Mainichi Shimbun, Nikkei Shimbun, Shizuoka Shimbun and Nishi Nihon Shimbun have all published stories on antimicrobial resistance outside Japan, including the UK government’s 2016 Review on Antimicrobial Resistance, which estimated 10m antimicrobial resistance-related deaths by 2050. The Shizuoka Shimbun and Kobe Shimbun also covered research by a team of US and European scientists, which found the use of antibiotics increased globally 2000 – 2015 mainly due to economic development in low-income nations.

The coverage of the issue was factual, framing antimicrobial resistance as a global health issue that’s garnering attention worldwide, not just in Japan.

- “Japan also reinforces and expands antibiotics regulation to livestock”, Sankei Shimbun, 5 April 2018
- “Global use of antibiotics on the rise, lifted by developing nations”, Shizuoka Shimbun, 17 July 2018
- “Temperature changes may be related to antimicrobial resistance”, Sankei Shimbun, 25 July 2018

## Tackling antimicrobial resistance

There has also been coverage of Japanese efforts to tackle antimicrobial resistance, though it appears the topic gets less attention than the global challenge and incidents such as one at Kagoshima. The Ministry of Health, Labour & Welfare is the main government body driving antimicrobial resistance-related policies and campaign, and its initiatives have been covered by the Nikkei Shimbun and Kyodo News, the regional paper Nishi Nihon Shimbun, and trades Japan Pharma and Yakuji Nippou. Coverage has focused on Japan’s antimicrobial resistance Action Plan, which aims to reduce domestic use of antibiotics by 30% by 2020, and the publication of a manual for doctors asking them not to prescribe antibiotics for colds and gastroenteritis.

Separately, a small number of articles have focused on efforts to raise public and HCP awareness of antimicrobial resistance, via training, seminars, etc. Some of these stories were published to coincide with Japan’s antimicrobial resistance Policy Promotion Month (November 2017) which itself was timed to coincide with the WHO’s World Antibiotic Awareness Week.

Coverage has been factual in tone, reporting on the objectives and activity but not offering a view on whether these initiatives are making an impact.

- “Ministry of Health publishes guidelines on controlled use of antibiotics for flu”, Nikkei Shimbun, 6 March 2017
- “Editorial: Drug-resistant bacterium, the appropriate use of antibiotics”, Kyodo Shimbun, 20 Nov 2017
- “Enlightenment on antimicrobial resistance through events, talk shows and seminars”, Fuji Sankei Business, 20 March 2018
- “Doctors call for caution on overuse of antibiotics. antimicrobial resistance may cause deaths and permanent damage”, Nishi Nihon Shimbun, 23 July 2018





## Notable news stories (3/3)

### Pharma R&D associated with antimicrobial resistance

The Japanese business media and trades also report on antimicrobial resistance research and development conducted by pharmaceutical companies, with stories appearing in titles such as the Nikkei Shimbun and Nikkan Kogyo Shimbun.

For instance, the former recently reported how Shionogi, the Japanese pharmaceutical company best-known for developing the statin Crestor, is developing medication for superbugs in conjunction with the UK's Nemesis Bioscience.

Japan Pharma and Yakuji Nippou meanwhile reported that Shionogi is the only Japanese pharmaceutical company to meet the requirements of a report on antimicrobial resistance policies at pharmaceutical companies published by the NPO Access to Medicine Foundation at the World Economic Forum in Davos.

The pharmaceutical companies' efforts are positioned as important given drug development is lagging behind the growth of new strains of superbugs. Some of the coverage portrays Japanese pharma companies as part of a larger, global effort to develop new drugs for treating antimicrobial resistance.

- "Kanto Chemical's antimicrobial resistance CRE detection kit compatible to seven genetic types", Chemical Daily, 5 April 2018
- "Interview: Sawai Pharmaceutical CEO invests in Japan's first generic medicine of Tamiflu", Nikkan Kogyo Shimbun, 26 July 2018
- "Shionogi develops new drug for antimicrobial resistance", Nikkei Shimbun, 14 August 2018

# Media Analysis

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India



# News coverage in India

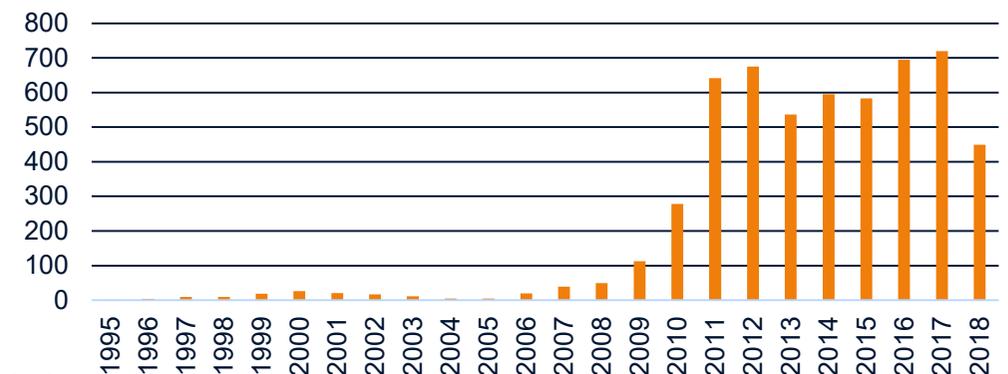
## Context

- India has traditionally given lower priority to science- and health-related journalism, focusing instead on political and economic news, according to previously published research on antimicrobial resistance media coverage.
- It also suffers generally from a lack of area specialists, due to low pay, and articles often borrow heavily from foreign news sources.
- Many articles are replete with techno-medical jargon, which makes them hard to understand. Inaccuracy and sensationalism can also be an issue in reportage, with the media sometimes describing an existing treatment as a “miracle cure” or a pre-existing condition as a “new disease”.
- “Indian reporters have limited knowledge in complex health-related issues, have insufficient training in health reporting, and do not make the necessary inquiries to obtain analytical comments from unbiased experts. As a result, discovery of one or two cases of an infectious disease is reported prominently as almost an epidemic, unusual but routine surgeries are named one of a kind; incorrect, misleading treatment information is given as expert advice; and statistically insignificant research findings are termed highly significant.”

## Media coverage overview

- English-language newspaper coverage of antimicrobial resistance appears to have been very low until around 2006, when it started increasing rapidly, doubling that year and again in 2010-11. Coverage now appears to have stabilised at just under 750 relevant news items per year.
- Efforts by India’s government and international public health organisations to raise awareness of antimicrobial resistance are likely to have played a major role, along with increased reporting of research and surveys on the topic. Rising number of antimicrobial resistance cases (particularly MDR-TB), the discovery of antibiotics in the food chain, and antimicrobial resistance awareness campaigns run by the local medical fraternity and NGOs, may also have boosted coverage.

Indian English-language news articles on antimicrobial resistance 1995-2018



Findings based on desktop research focusing on Indian English-language newspapers published in the year to 31 July 2018.

This section draws “News Media Reporting of Antimicrobial Resistance in Latin America and India”, by Marisabel Sanchez and Satya Sivaraman, in “Antimicrobial Resistance in Developing Countries”, Springer Science+Business Media, 2010.

Chart source: Factiva (2018 figure is to July).





# Leading voices in coverage

The news sources and journalists who mentioned antimicrobial resistance most frequently in the 12 months to 31 July 2018:

Publication	Type	Journalist	Role	Publication	Article count
Times of India	Daily newspaper	Aayushi Pratap	Senior Correspondent	Hindustan Times	19
Hindustan Times	Daily newspaper	Neetu Chandra Sharma	National Writer, Health	Mint	12
Hindu	Daily newspaper	Rupali Mukherjee	Senior Assistant Editor	Times of India	8
Press Trust of India	News agency	Prabha Raghavan	Senior Correspondent	Economic Times	7
Deccan Chronicle	Daily newspaper	Lata Mishra	Assistant Editor	Mumbai Mirror	7
United News of India	News agency	Jyoti Shelar	Assistant Editor	Hindu	6
Economic Times	Daily business newspaper	Maitri Porecha	Health Correspondent	DNA	6
Indian Express	Daily newspaper	Rhythma Kaul	Deputy Health Editor	Hindustan Times	5
Mint	Daily business newspaper	Sushmi Dey	Assistant Editor	Times of India	5
		Vidya Krishnan	Health, Correspondent	Hindu	5
		Divya Rajagopal	Assistant Editor, Healthcare and Pharma	Economic Times	5



# Notable news stories (1/3)

<b>Spread of MRD-TB in India</b>	<p>India’s efforts to deal with drug-resistant tuberculosis is an ongoing theme in English-language media coverage.</p> <p>Articles are mostly factual, often citing the alarmingly high number of domestic MDR-TB cases.</p> <p>Some outlets have criticised the Indian Government for failing to tackle MDR-TB, given its ambitious commitments to so do. Insufficient funding and an over-reliance on charitable donations have been cited as causes of the India’s MDR-TB problem.</p>	<ul style="list-style-type: none"> <li>▪ <a href="#">“If India Was Serious About TB, We Would Not Have Such A Staggering Disease Burden”</a>, <i>IndiaSpend</i>, 27 June 2017</li> <li>▪ <a href="#">“India’s dependency on charitable program for MDR TB drugs not helping, doctors say”</a>, <i>Economic Times</i>, 17 November 2017</li> <li>▪ <a href="#">“More efforts needed to combat antimicrobial resistance in India: survey”</a>, <i>Business Standard</i>, 29 January 2018</li> <li>▪ <a href="#">“By underfunding its own TB control plan, centre shoots itself in the lung”</a>, <i>Wire</i>, 17 February 2018</li> </ul>
<b>Government plan to end TB by 2025</b>	<p>In early March 2018 India’s Prime Minister, Narendra Modi, announced an ambitious plan to end TB (and MDR-TB) in the country by 2025, five years ahead of a global deadline.</p> <p>This announcement attracted widespread media coverage, though was also received with some scepticism by the media. News outlets questioned the ambitious goal because slow progress has been made in combating TB so far, and there are obvious resource challenges.</p>	<ul style="list-style-type: none"> <li>▪ <a href="#">“Can India eliminate TB by 2025?”</a>, <i>Mint</i>, 14 March 2018</li> <li>▪ <a href="#">“PM Modi launches campaign to eradicate tuberculosis from India by 2025”</a>, <i>PTI</i>, 14 March 2018</li> <li>▪ <a href="#">“Funding and execution key to India’s plan to eliminate TB by 2025”</a>, <i>Moneycontrol</i>, 15 March 2018</li> <li>▪ <a href="#">“Ending TB in India by 2025 is ambitious, not impossible”</a>, <i>Hindustan Times</i>, 21 March 2018</li> </ul>
<b>National TB drug-resistance survey</b>	<p>On World TB Day (24 March 2018), India’s Government published the findings of the country’s first national TB drug-resistance survey. This reported higher treatment failure and death rates from multi-drug resistant TB than in other countries.</p> <p>The news was widely reported by the media, who focused on how one-quarter of TB patients in India are now resistant to at least one anti-TB drug, and the fact India accounted for the largest share of global MRD-TB cases.</p>	<ul style="list-style-type: none"> <li>▪ <a href="#">“World TB Day: Over 25% TB patients in India are resistant to at least one anti-TB drug”</a>, <i>Economic Times</i>, 24 March 2018</li> <li>▪ <a href="#">“A quarter of TB patients are resistance to anti-tuberculosis drugs, says survey”</a>, <i>Mint</i>, 24 March 2018</li> <li>▪ <a href="#">“Study finds one-fourth of world’s multi-drug resistant TB in India”</a>, <i>Hindustan Times</i>, 24 March 2018</li> <li>▪ <a href="#">“Survey reveals drug-resistant TB burden”</a>, <i>Telegraph India</i>, 25 March 2018</li> </ul>

Summaries of antimicrobial resistance-related news stories that have generated India media coverage in the past year, listed in descending order of news volume.

Links to English-language news articles have been provided where available.





## Notable news stories (2/3)

### WHO reports

In September 2017 the World Health Organisation published two reports, one highlighting the lack of new antibiotics under development to combat antimicrobial resistance, the other focusing on TB cases around the world.

Both reports received prominent coverage in the India media, with articles appearing in the influential business news outlets *Mint* and *Economic Times*.

- [“WHO report highlights lack of treatment options for antibiotic-resistant infections”](#), *Mint*, 21 September 2017
- [“World running out of antibiotics: WHO”](#), *Economic Times*, 20 September 2017
- [“India accounts for 27% of world TB cases in 2017”](#), *Pioneer*, 20 September 2018
- [“TB cases fall, but India is not doing enough to stop the disease: report”](#), *IndiaSpend*, 20 September 2018

### Sale of unapproved antibiotics

Several news articles drew attention to how the Indian Government’s failure to curb sales of unapproved antibiotics is contributing to antimicrobial resistance. In October 2017, online news website *Scroll* republished an article from the *Conversation* (itself based on an academic paper in the *Lancet*) on how the sale of huge volumes of antibiotics combining two anti-microbial drugs in one pill, are undermining efforts to combat antimicrobial resistance.

Then, in February 2018, both the *Times of India* and the *Deccan Chronicle* reported on a study published in the *British Journal of Clinical Pharmacology*, which found that millions of unapproved antibiotics are being sold in India each year and argued that multinational pharmaceutical companies are enabling this trade.

More recently, the *Economic Times* reported on a study published in the *Journal of Infection*, which found that between 2000 and 2010, the consumption of antibiotics increased globally from 50 billion to 70 billion standard units. The article noted that over-the-counter supply of antibiotics in India, among other countries, is worsening antibiotic resistance globally.

- [“Drug resistance threat: India is failing to curb sales of unapproved antibiotics”](#), *Scroll*, 14 October 2017
- [“ANI: Medicines sold in India are a global threat to antibiotic resistance control”](#), *Deccan Chronicle*, 5 February 2018
- [“64% of antibiotics sold in India unapproved: UK study”](#), *Times of India*, 5 February 2018
- [“Why increasing availability of antibiotics over-the-counter is worsening resistance globally”](#), *Economic Times*, 23 July 2018



## Notable news stories (3/3)

### Antibiotics misuse in the livestock industry

The media published several stories focusing on how the misuse of antibiotics in the livestock industry, particularly in poultry farms, is contributing to antimicrobial resistance.

In August 2017 the *Times of India* reported on the findings of a study conducted by the Centre for Science and Environment (CSE) called “Antibiotic Resistance in Poultry Environment”, which found drug-resistant bacteria at 12 randomly selected poultry farms in north of the country. The article highlighted how the misuse of antibiotics is encouraging the spread of drug-resistant bacteria outside of the farms, and into the broader environment.

The following month, the *Economic Times* drew attention to a new global study on antibiotic use in farm animals, published in *Science*, which posited that India’s antimicrobial resistance problem “is expected to get much worse because its consumption of antibiotics through animal sources is projected to nearly double during 2013-2030”. The article quoted Ramanan Laxminarayan, Director, Center for Disease Dynamics, Economics and Policy (CDDEP), and one of the study’s authors, as well as key messages from the WHO. In a related news item, the *Economic Times* also reported on moves by India’s health ministry to limit the maximum amount of antibiotics that can be used in meat and meat products.

More recently, the *Hindu*, a national newspaper with focus on social issues, published an investigative report (in collaboration with the Bureau of Investigative Journalism’s Madlen Davies) on how the unrestricted use of the antibiotic colistin at Indian poultry farms is promoting drug-resistance worldwide. The article notes how India has been called “the epicentre of the global drug-resistance crisis”.

- [“Multi-drug resistant bacteria proliferating through poultry waste”](#), *Times of India*, 31 August 2017
- [“Overuse of antibiotics in animals to worsen India’s antimicrobial resistance problem: study”](#), *Economic Times*, 29 September 2017
- [“Health ministry moves to limit antibiotics in meat”](#), *Economic Times*, 20 November 2017
- [“A game of chicken: how India’s poultry farms are spawning global superbugs”](#), *Hindu*, 30 January 2018

# 2. Social Media Analysis

# Objectives & approach

## Research objectives:

- To assess the volume of the antimicrobial resistance-related conversation on Twitter
- To map the topics and themes driving the conversation
- To understand the principal voices driving content and how it is shared



## Informed understanding of:

- The topics and themes driving current social media conversation
- The Twitter conversation's role in driving public awareness and support for action on antimicrobial resistance

Social media analysis conducted in:



## Approach

A full methodological summary, with detailed search queries and source lists can be found in the Methodology Report – [Appendix A](#).

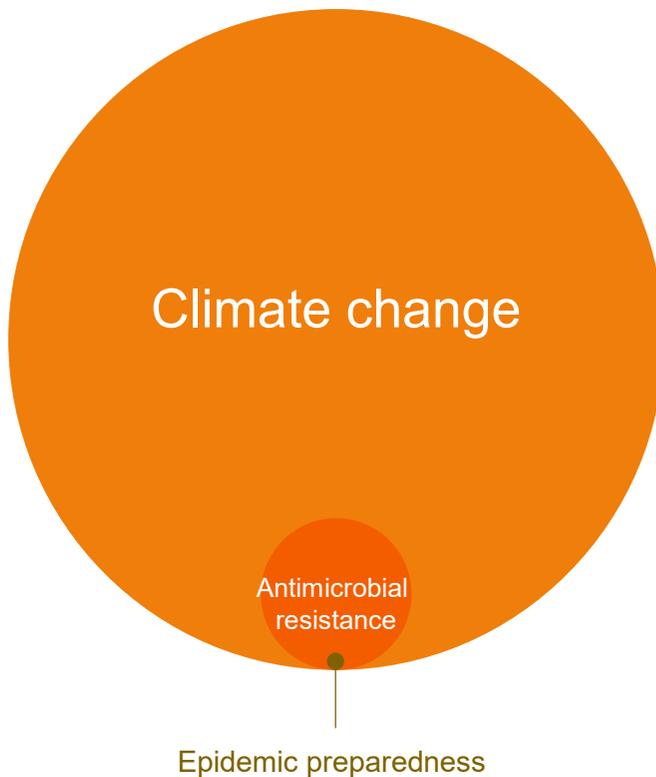
In summary, Tweets were identified by searching for key terms and associated relevant hashtags:

- Antimicrobial / Antibiotic / Drug / (specific disease) + Resistance / Overuse / Over prescription
- Common acronyms (e.g. AMR, MRSA, ABR) or single word terms (e.g. superbugs)
  - #antimicrobial resistance, #antibioticresistance, #superbugs, #stopsuperbugs,
- Relevant campaigns and partnerships (e.g. World Antibiotic Awareness Week, Carb-X)
  - #antibioticsawarenessweek, #waaw2017

# Key findings – comparative size of different conversations

- Antimicrobial resistance is mentioned much more frequently (26 times more) than epidemic preparedness in English-speaking Twitter. However climate change is mentioned much more often (19 times more) than antimicrobial resistance. A similar situation exists in German-speaking Twitter.

## English-language Tweets



## German-language Tweets





# Key findings – Tweet volume

- US and UK users account for a significant proportion of the global, English-language conversation about antimicrobial resistance on Twitter. Germans generate much less noise about antimicrobial resistance, mainly because far fewer of them use Twitter.
- While more Twitter users talk about antimicrobial resistance in the US, those in the UK mention the topic more frequently. German Twitter users talking about antimicrobial resistance averaged 2.1 mentions per user (versus 3.7 (UK) and 2.5 (US)).\*\*





# Key findings – Tweet volume over time

- World Antibiotics Awareness Week is by far the most important driver of antimicrobial resistance visibility on Twitter in the UK and US. However, this is not the case in Germany, where the event did not make much impact on the social network.
- Chatter in Germany peaked in February 2018, driven by the discovery of drug-resistant germs in water sources.

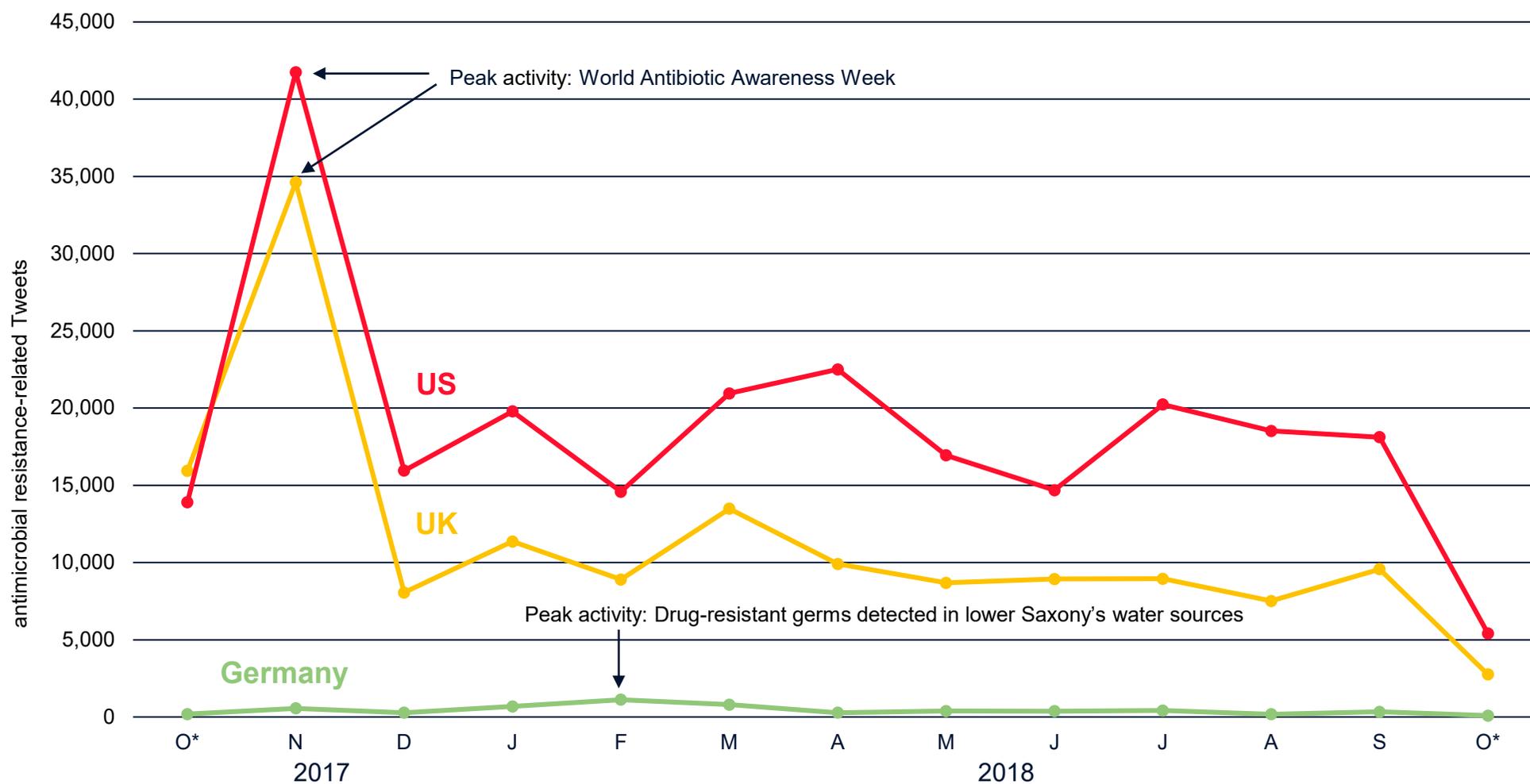


Chart showing overall volume for antimicrobial resistance-related Tweets published by UK, US and Germany-based Twitter users. October 2017 and October 2018 are incomplete months.



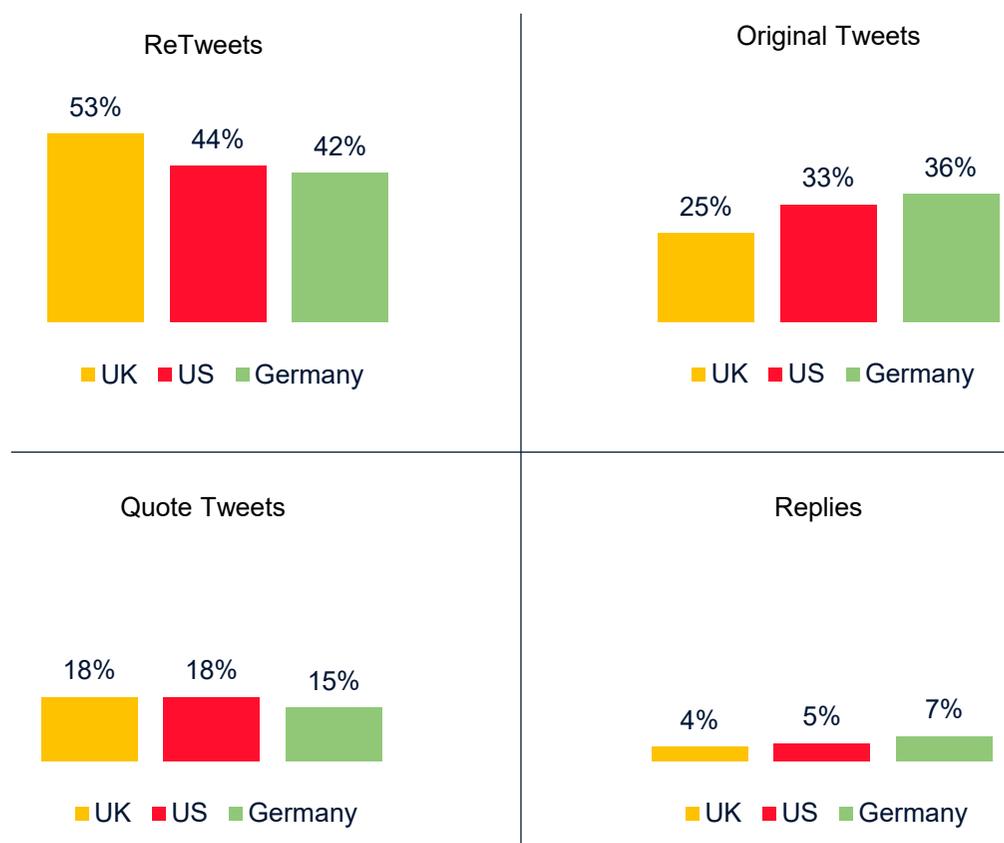


## Key findings – form of content sharing

- UK Twitter activity is more focused on sharing antimicrobial resistance-related content, reflecting the impact of awareness campaigns. In the US and Germany, users are posting more original content about antimicrobial resistance than in the UK.
- Individual people are among the most active users Tweeting about antimicrobial resistance in the UK and Germany. However in the US, Twitter activity is being driven more by research centres at universities, as well as campaigns.

Tweets can be divided into four types, reflecting different user behaviours:

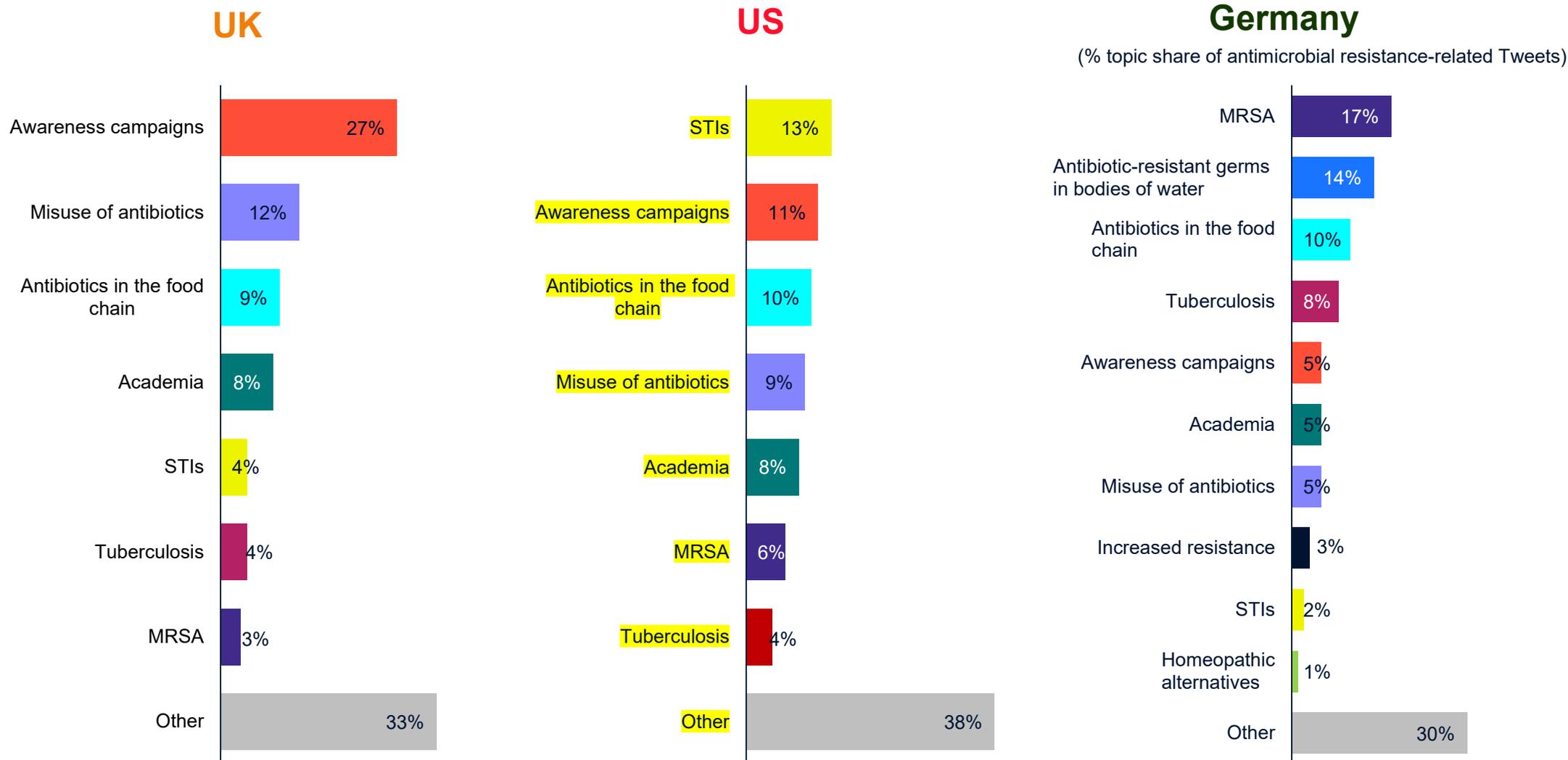
- **Original Tweet** – a Tweet created by the user
- **ReTweet** – a repost of another user's Tweet
- **Quote Tweet** – the same as a ReTweet, but with commentary added
- **Reply** – a Tweet directed at one or more other Twitter users





# Key findings – antimicrobial resistance Tweet topics

- Awareness campaigns are driving much of the Twitter activity in the UK. However, in the US and Germany, activity is focused around a variety of different antimicrobial resistance-related topics.



# Social Media Analysis

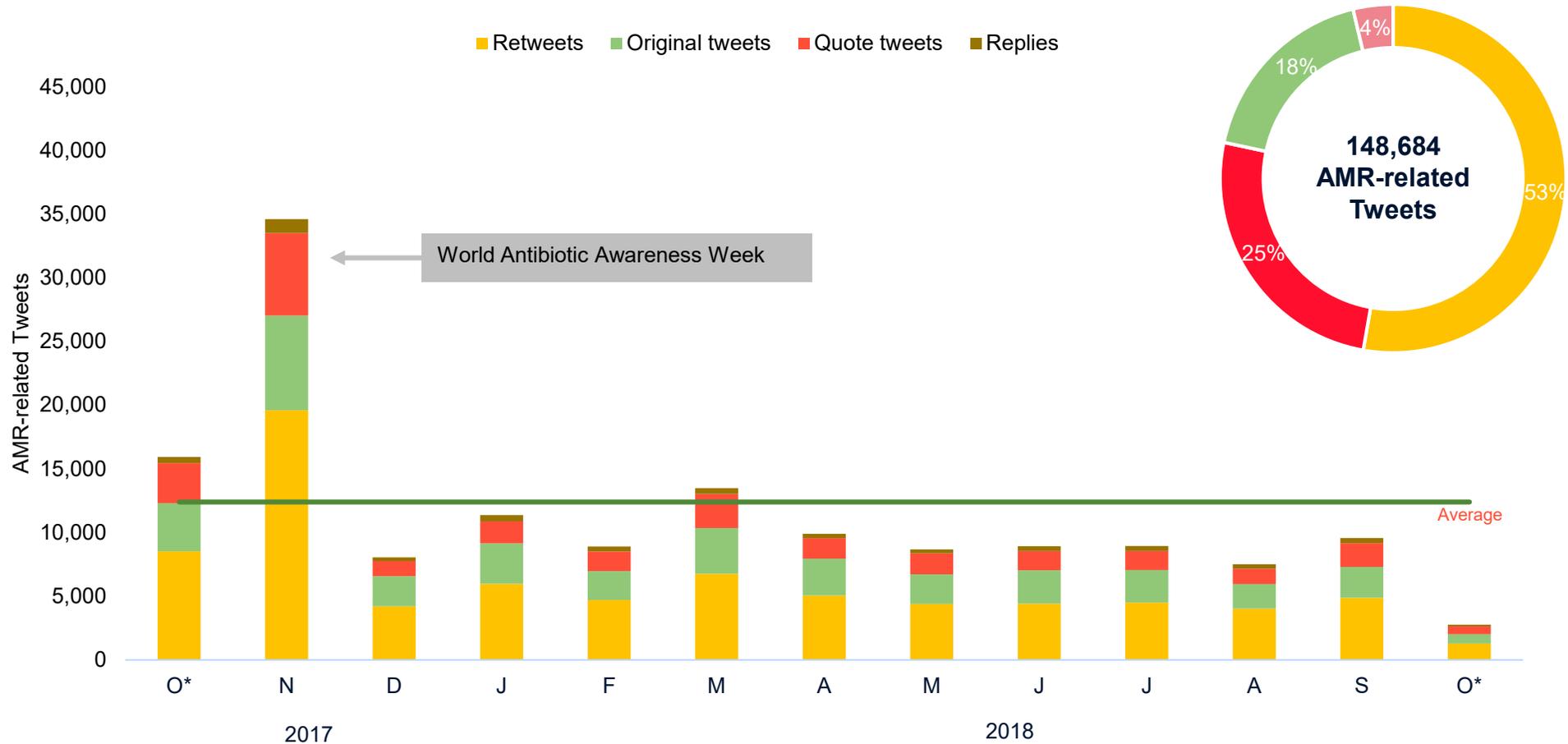
-

United Kingdom



# Volume and type of Tweets

- UK Twitter users published at least 148k Tweets relating to antimicrobial resistance in the period evaluated\*.
- The users published an average of 12.4k Tweets per month.
- Activity spiked in November 2017 when 34k Tweets were published (23% of total). World Antibiotics Awareness Week was the primary cause of this surge.
- Just over half the Tweets posted in the period were reTweets (ie shares). Original Tweets made up one quarter of the total.



\* Please note that October 2017 and October 2018 are incomplete months. See slide 13 for definitions of “ReTweet”, “Quote Tweet”, etc



# Topic focus of UK antimicrobial resistance-related Tweets

## Other (33%)

Drug-resistant malaria, research into new drugs and treatments (bacteriophages, platypus milk, etc), infection prevention, drug-resistant typhoid, and surfers swallowing drug-resistant E. coli

## MRSA (3%)

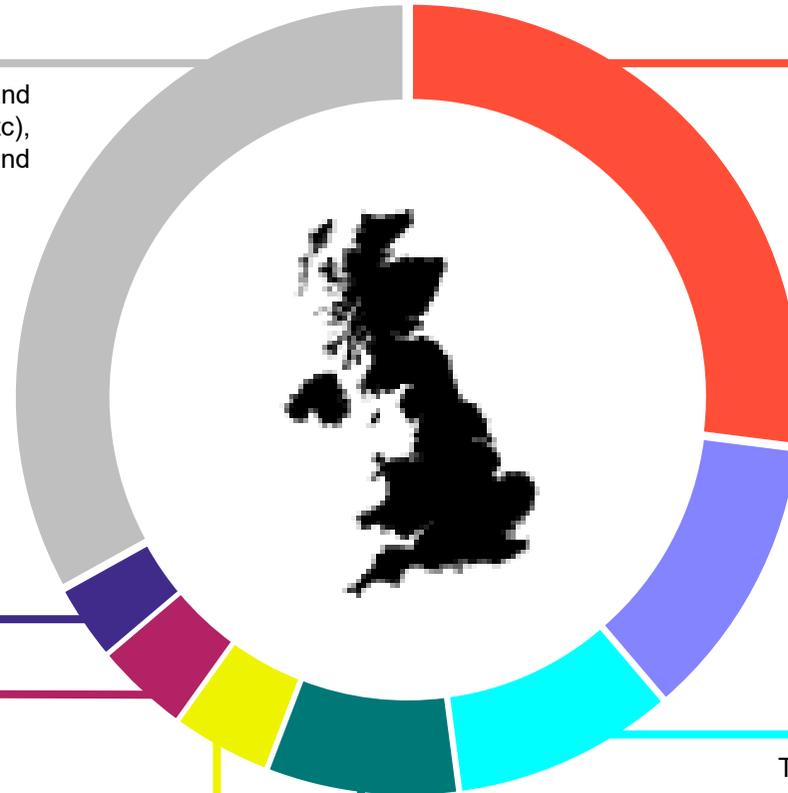
Sources of infection, infection prevention, new medication and statistics on MRSA incidence rates

## Tuberculosis (4%)

Drug-resistant TB, in particular the search for new treatments and reports of outbreaks in countries such as North Korea

## STIs (4%)

Mainly focused on “super gonorrhoea” though other sexually-transmitted infections were also mentioned



## Awareness campaigns (27%)

Tweets associated with campaigns and/or events designed to raise awareness of antimicrobial resistance (eg, the Science Museum’s “Superbugs” exhibition)

## Misuse of antibiotics (12%)

The over-prescription of antibiotics, as well as the prescription of antibiotics when it is unnecessary (eg, for the treatment of viral diseases)

## Antibiotics in the food chain (9%)

The challenges created by the overuse and/or misuse of antibiotics in the livestock and poultry industries, and the implications for human health

## Academia (8%)

Promoting academic papers related to antimicrobial resistance, job and funding opportunities, etc.



# Popular UK Tweets – campaigns and misuse of antibiotics

**Science Museum** @sciencemuseum

After a year of hard work, our [#Superbugs](#) exhibition is ready for its first museum visitors to explore the hidden world of bacteria and the threat antibiotic resistance poses to our health [sciencemuseum.org.uk/superbugs](http://sciencemuseum.org.uk/superbugs)



2:06 AM - 9 Nov 2017

153 Retweets 217 Likes

8 153 217

**BBC Health News** @bbchealth

Antibiotics 'may be lost' through overuse, says chief medical officer [bbc.in/2kMzD46](http://bbc.in/2kMzD46)

12:44 AM - 13 Oct 2017

119 Retweets 87 Likes

6 119 87

**Prof Sally Davies** @CMO\_England

Today UK Government are calling on researchers to apply to Innovate UK for a new £10million research competition to help tackle [#AMR](#). A fantastic opportunity that I hope will lead to new ways prevent, control, and combat [#superbugs ... for-innovation-funding.service.gov.uk/competition/17 ...](#)

5:22 AM - 10 Jul 2018

274 Retweets 249 Likes

1 274 249

**Diane Ashiru, PhD** @DrDianeAshiru

[#AntibioticResistance](#) in England. [#KeepAntibioticsWorking](#) campaign urges the public to always trust their HCP's advice. [#AntibioticGuardian](#)

9:35 PM - 22 Oct 2017

197 Retweets 176 Likes

Susan Hopkins, Elizabeth Beech, Linda J Dempster RN and 5 others

7 197 176

**Public Health England** @PHE\_uk

Taking antibiotics when you don't need them puts you and your family at risk. Always take your doctor's advice on antibiotics. [#KeepAntibioticsWorking](#) [bit.ly/2yJyRsC](http://bit.ly/2yJyRsC)



4:00 AM - 23 Oct 2018

201 Retweets 248 Likes

11 201 248

**NICE** @NICEcomms

Antibiotic resistance is back in the headlines today. We have published guidance to help & we are developing more: [bit.ly/2xCmAnI](http://bit.ly/2xCmAnI)



12:30 AM - 13 Oct 2017

126 Retweets 73 Likes

4 126 73

# Popular UK Tweets – food chain and academia



**Compassion in World Farming** @cwf Follow

Antibiotics are being overused to keep animals in cruel conditions, and this contributes to antibiotic resistance. Animals are suffering, and human health is being threatened. It's completely illogical.



**British supermarket chickens show record levels of antibiotic-resistant super...**  
Food Standards Agency reports 'significant increase' of harmful pathogen campylobacter in British-farmed chickens  
theguardian.com

11:45 AM - 22 Jan 2018

297 Retweets 243 Likes

**BBC Breakfast** @BBCBreakfast Follow

The use of antibiotics in #animals in the UK has fallen according to a new report. As the global threat of #AntibioticResistance continues to grow, farms like this are taking steps to reduce any unnecessary use of the vital drugs.



11:55 pm - 26 Oct 2017

94 Retweets 116 Likes

4 94 116

**Scientists for EU** @Scientists4EU Follow

Antibiotic resistance in bacteria is a huge health threat. Using antibiotics in farming is very dangerous, promoting new strains. The UK has been decreasing antibiotic use, but in US it's surging. A US-UK trade deal threatens to bring those practices here.



**US Farmers Using Double The Antibiotics Of UK Industry, Stoking Post-Brexi...**  
'We will return to an era when millions of lives could be lost every year to simple infections.'  
huffingtonpost.co.uk

4:39 AM - 26 Nov 2017

624 Retweets 470 Likes

24 624 470

**Laura Piddock** @LauraPiddock Follow

Important paper: antibiotic resistance genes expressed at higher levels in human infection than in vitro, potentially explaining why assays in the clinical laboratory underestimate resistance in patients

**Pseudomonas aeruginosa transcriptome during human infe...**  
Microbiologists typically use laboratory systems to study the bacteria that infect humans. Over time, this has created a gap between what researchers understand about bacteria growing i...  
pnas.org

9:17 PM - 15 May 2018

138 Retweets 174 Likes

2 138 174

**NICE** @NICEcomms Follow

#AntibioticResistance is now "common" in urinary tract infections. Read the story: nice.org.uk/news/article/a ... #ESPAUR #KeepAntibioticsWorking



4:30 AM - 23 Oct 2017

68 Retweets 47 Likes

1 68 47

**Tadhg O Croinin** @TadhgOCroinin Follow

PhD position open in my lab working on antibiotic resistance and biofilm formation in *C. jejuni*. Would really appreciate the re-tweet or forwarding on to anyone you think might be interested.

**An Investigation of Antibiotic Resistance and Biofilm Formation in Campylob...**  
PhD Project - An Investigation of Antibiotic Resistance and Biofilm Formation in Campylobacter jejuni. at University College Dublin, listed on FindA PhD.com  
findaphd.com

5:56 AM - 28 Jun 2018

217 Retweets 76 Likes

3 217 76

**IMI** @IMIBirmingham Follow

10 fully funded PhDs in Antimicrobial Resistance @IMIBirmingham. Apply now bit.ly/Wellcome-AAMR . Deadline 26th November 2017. Please RT!

8:26 AM - 21 Oct 2017

9 Retweets 5 Likes

9 5

**BVA** @BritishVets Follow

#AntibioticResistance is as much a problem in animals as in humans. Find out if you're antibiotic aware! #OneHealth  
ow.ly/vTed30lrzQm





# Most active users overall

Rank	Account name	@username	Biography	Tweet count	% Tweets
1	<b>AntibioticResistance</b>	AntibioticResis	Keep abreast of the latest developments in the fight against #AntibioticResistance #AMR with the latest publications curated from <a href="http://PubMed.Run">http://PubMed.Run</a> by @mccarthy_ronan	1,500	1.01%
2	<b>Diane Ashiru, PhD</b>	DrDianeAshiru	Lead Pharmacist HCAI & AMR; @PHE_UK. Dep Chair #ESPAUR, Chair #Antibioticguardian. Mum. FRPharmS. FFRPS #RPSPublicHealthPharmacist #TEDxNHS speaker. Views mine	1,438	0.97%
3	<b>Elizabeth Beech</b>	Elizbeech	Pharmacist NHS Bath & North East Somerset CCG; HAI & AMR Project Lead NHS Improvement; #ToDipOrNotToDip #Antibioticguardian; Q community; RPS; All views my own	1,422	0.96%
4	<b>Abid Hussain</b>	MicrobLog_me_uk	Medical Microbiologist, Associate Medical Director - IPC & Associate DIPC @uhbtrust. Team twitter: @uhbipc #TeamIPC	932	0.63%
5	<b>Philip Howard</b>	AntibioticLeeds	Consultant Antimicrobial Pharmacist in @LTHTrust & @LeedsMedHealth. @NHSImprovement #AMR Project Lead. @BSACandJAC @bsacpresident @ukcpapin Tweets = own view	717	0.48%
6	<b>Antibiotic Action</b>	TheUrgentNeed	A UK-led global initiative to increase awareness of the urgent need to discover, research and develop new antibiotics. Operated by @BSACandJAC	700	0.47%
7	<b>AMR at Wellcome</b>	Wellcome_AMR	Exploring global solutions to drug-resistant infections, now and for the future. Tweeting about all aspects of antimicrobial resistance. Part of @wellcometrust	670	0.45%
8	<b>Spectromics</b>	Spectromics	A Smarter Approach to Tackling Microbial Resistance to Antibiotics	452	0.30%
9	<b>Dr. Alicia</b>	aliciad3	Paediatric infections doctor @EvelinaLondon @GSTTnhs & epidemiologist interested in #AntimicrobialResistance, #AntimicrobialStewardship, #IPC. Views are my own.	447	0.30%
10	<b>NI AMR Network</b>	niamrnetwork	One Health Antimicrobial Resistance Cluster Bringing Together Academia, Industry, Health, Vet, Agri & Food in Northern Ireland. Tweets by Patrick Dunlop	438	0.29%



# Most active users by topic (1/2)

## AWARENESS CAMPAIGNS

Rank	Account name	@username	Tweet count	% Tweets
1	<b>Diane Ashiru, PhD</b>	DrDianeAshiru	1,168	2.91%
2	<b>Elizabeth Beech</b>	Elizbeech	1,054	2.63%
3	<b>Abid Hussain</b>	MicrobLog_me_u k	641	1.60%
4	<b>AMR:ABC</b>	TheAMRProject	338	0.84%
5	<b>Philip Howard</b>	AntibioticLeeds	316	0.79%

## MISUSE OF ANTIBIOTICS

Rank	Account name	@username	Tweet count	% Tweets
1	<b>Diane Ashiru, PhD</b>	DrDianeAshiru	93	0.53%
2	<b>Thurrock CCG</b>	ThurrockCCG	93	0.53%
3	<b>NHSSSCCG</b>	NHSSSCCG	92	0.53%
4	<b>NHSSFCCG</b>	NHSSFCCG	87	0.50%
5	<b>West Essex CCG</b>	nhswestessex	77	0.44%

## ANTIBIOTICS IN THE FOOD CHAIN

Rank	Account name	@username	Tweet count	% Tweets
1	<b>AntibioticResistance</b>	AntibioticResis	136	0.99%
2	<b>Public Health Wales</b>	PublicHealthW	115	0.84%
3	<b>Kristen Reyher</b>	Reyher_UofBVet	112	0.82%
4	<b>Antibiotic Action</b>	TheUrgentNeed	73	0.53%
5	<b>Philip Howard</b>	AntibioticLeeds	61	0.45%

## ACADEMIA

Rank	Account name	@username	Tweet count	% Tweets
1	<b>AntibioticResistance</b>	AntibioticResis	860	7.29%
2	<b>SystematicReview Bot</b>	EvidenceRobot	91	0.77%
3	<b>Andrew Singer</b>	OxonAndrew	70	0.59%
4	<b>Onisillos Sekkides</b>	onisillos	65	0.55%
5	<b>Spectromics</b>	Spectromics	60	0.51%



# Most active users by topic (2/2)

## STIs

Rank	Account name	@username	Tweet count	% Tweets
1	AntibioticResistance	AntibioticResis	129	2.11%
2	SpeedX in Europe	plexpcr	76	1.24%
3	Darren	PozLadLincolnUK	36	0.59%
4	Onisillos Sekkides	onisillos	20	0.33%
5	Avert	Avert_org	19	0.31%

## TUBERCULOSIS

Rank	Account name	@username	Tweet count	% Tweets
1	Mycobacterium Papers	MycobactPapers	255	4.39%
2	AntibioticResistance	AntibioticResis	167	2.87%
3	निशांत चव्हाण	nishantachavan	108	1.86%
4	Uli	uliwb	88	1.51%
5	Zamin Iqbal	ZaminIqbal	61	1.05%

## MRSA\*

Rank	Account name	@username	Tweet count	% Tweets
1	MRSA - News Research	MRSA_Bio	166	3.57%
2	AntibioticResistance	AntibioticResis	61	1.31%
3	Illingworth Library	IllingworthInfo	25	0.54%
4	Jon Otter	jonotter	22	0.47%
5	Innotec Hygiene	Innotec_Hygiene	21	0.45%

## OTHER

Rank	Account name	@username	Tweet count	% Tweets
1	AMR at Wellcome	Wellcome_AMR	345	0.70%
2	Antibiotic Action	TheUrgentNeed	311	0.63%
3	Spectromics	Spectromics	255	0.52%
4	Philip Howard	AntibioticLeeds	238	0.48%
5	NI AMR Network	niamrnetwork	188	0.38%

\* One or more bot/spam Twitter accounts has been removed from this list.



# Social Media Analysis

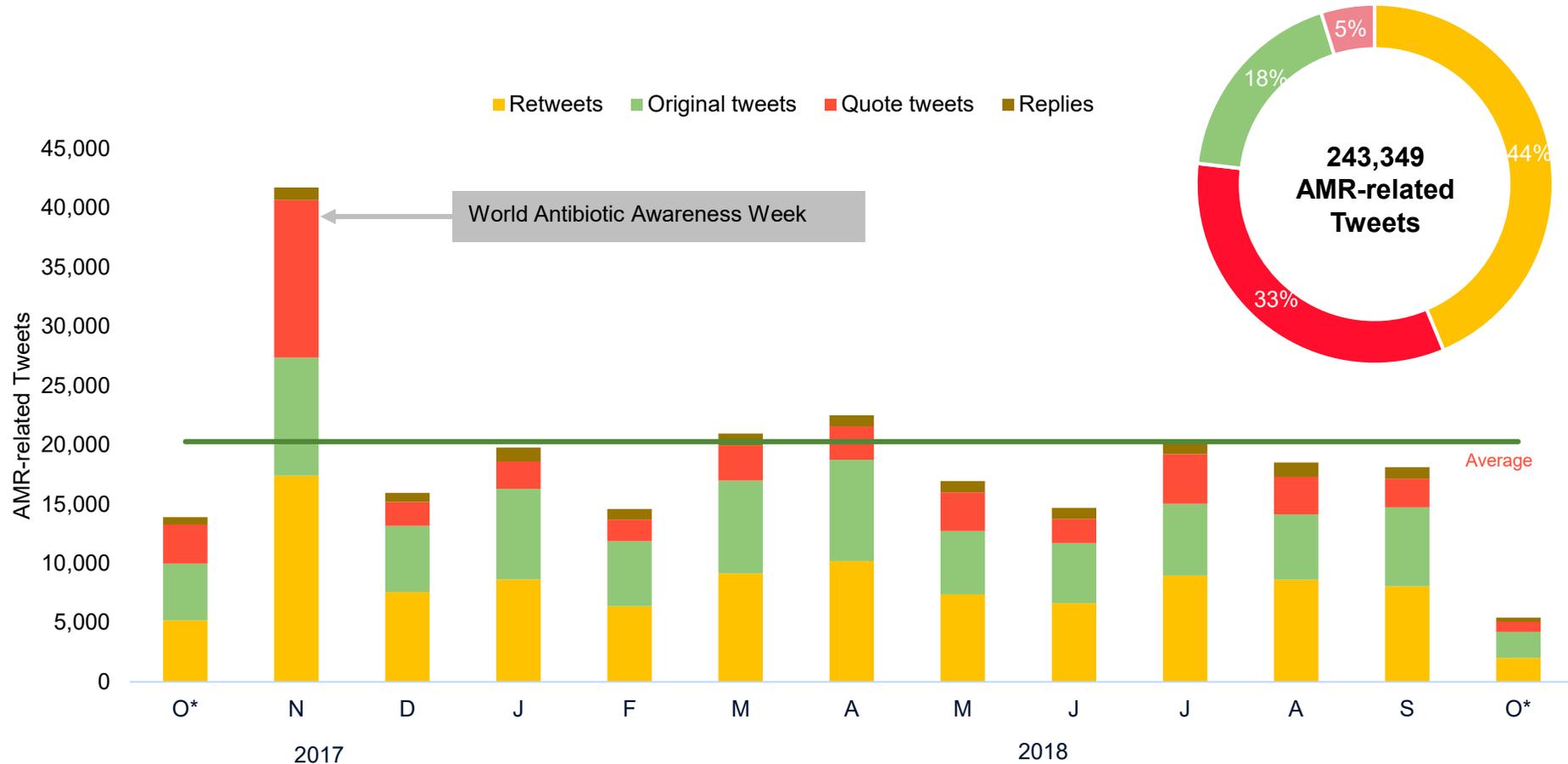
-

United States



# Volume and type of Tweets

- US Twitter users published at least 243k Tweets relating to antimicrobial resistance in the period evaluated\*.
- The users published an average of 20.3k Tweets per month.
- Activity spiked in November 2017 when 41.7k Tweets were published (17% of total). World Antibiotics Awareness Week was the primary cause of this surge.
- 44% of the Tweets posted in the period were reTweets (ie shares). Original Tweets made up one third of the total.



\* Please note that October 2017 and October 2018 are incomplete months.



# Topic focus of US antimicrobial resistance-related Tweets

## Other (38%)

Drug-resistant malaria, research into new drugs and treatments (bacteriophages, platypus milk, etc), infection prevention, drug-resistant typhoid, the CDC's report on drug-resistant bacteria in 27 states

## Tuberculosis (4%)

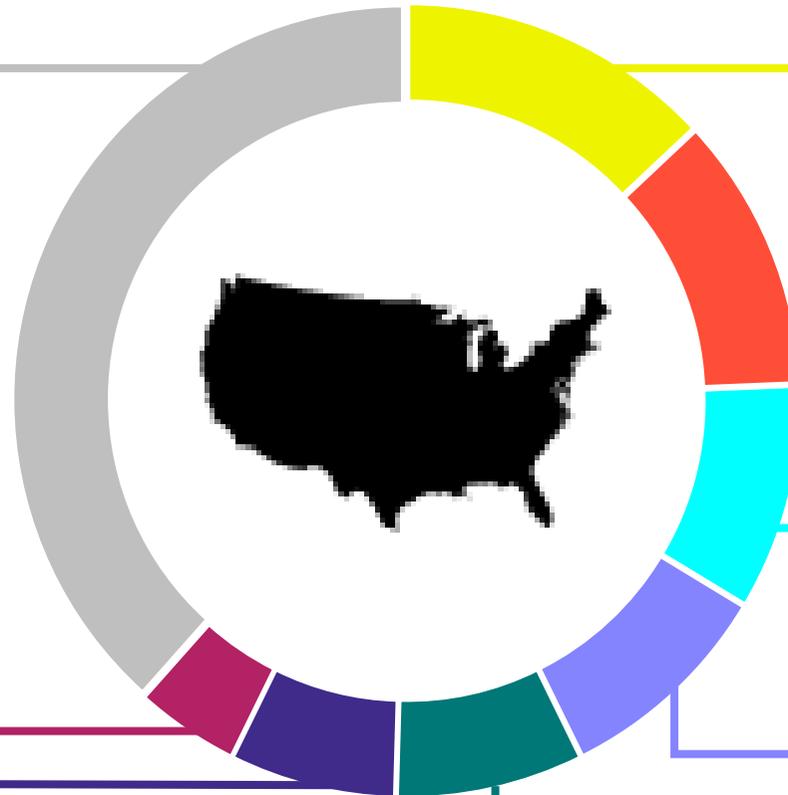
Drug-resistant TB, in particular the search for new treatments and reports of outbreaks in countries such as North Korea

## MRSA (6%)

Sources of infection, infection prevention, new medication and statistics on MRSA incidence rates

## Academia (8%)

Promoting academic papers related to antimicrobial resistance, job and funding opportunities, etc



## STIs (13%)

Mainly focused on “super gonorrhea” though other sexually-transmitted infections were also mentioned

## Awareness campaigns (11%)

Tweets associated with campaigns and/or events designed to raise awareness of antimicrobial resistance

## ABX in the food chain (10%)

The challenges created by the overuse and/or misuse of antibiotics in the livestock and poultry industries, and the implications for human health

## Misuse of antibiotics (9%)

The over-prescription of antibiotics, as well as the prescription of antibiotics when it is unnecessary (eg, for the treatment of viral diseases)



# Popular US Tweets – STIs and campaigns



Follow

The first case of super-resistant gonorrhoea has been reported in the UK [cnn.it/2uwvAhh](http://cnn.it/2uwvAhh)



6:45 AM - 29 Mar 2018

217 Retweets 253 Likes

90 217 253



Follow

So basically sex is cancelled for the rest of the century. Bet.



**AJ+** @ajplus  
This STD was discovered in 2015 and some experts think it could become a superbug by 2025.

11:03 PM - 14 Jul 2018

2,798 Retweets 5,889 Likes

8 2.8K 5.9K



**lydia** 1ST CLIPVERSARY OCT 24TH  
@generichoe

Follow

SO CAN ALL YALL "asking people to get tested is rude" ASS BITCHES SHUT UP



**Men's Health** @MensHealthUK  
Gonorrhoea is officially an antibiotic resistant superbug. This is not a drill [bit.ly/2BjBUbo](http://bit.ly/2BjBUbo)

6:48 PM - 26 Nov 2017

19,875 Retweets 38,922 Likes

38 20K 39K



**Baartman's Revenge**  
@honey\_of\_life

Follow

Offset gave Cardi B a 60k watch while y'all giving out resistant strains of gonorrhoea [twitter.com/karyewest/stat ...](http://twitter.com/karyewest/stat...)

This Tweet is unavailable.

12:18 AM - 14 Oct 2017

5,973 Retweets 10,414 Likes

92 6.0K 10K



**The Fight Against AMR**  
@fightagainstamr

Follow

#AMR could kill 10M people per year by 2050. Sign this petition to encourage development of new antimicrobials [bit.ly/2qJAQrk](http://bit.ly/2qJAQrk) #FAAR



**Take Action. Tell Congress to support legislation that supp...**  
Antimicrobial resistance is a global public health crisis that will affect all of us. Sign the petition and join me in the fight against AMR. #FAAR  
[petition.thefightagainstamr.com](http://petition.thefightagainstamr.com)

9:15 am - 7 May 2017

2,773 Retweets 3,316 Likes

176 2.8K 3.3K



Follow

Antibiotics are the most powerful tool we have to fight life-threatening infections, like those that can lead to sepsis. CDC is challenging partners worldwide to preserve the power of antibiotics. How will you step up to combat #AntibioticResistance? #SAM2018 #GlobalAMRChallenge



12:46 pm - 19 Sep 2018

86 Retweets 108 Likes



**World Health Organization (WHO)**  
@WHO

Follow

The world is running out of antibiotics, WHO report confirms [bit.ly/2xvon0Z](http://bit.ly/2xvon0Z) #AntibioticResistance



**The world is running out of antibiotics, WHO repor...**  
A report launched today by WHO shows a serious lack of new antibiotics under development to combat the growing threat of antimicrobial resistance.  
[who.int](http://who.int)

7:35 PM - 19 Sep 2017

1,708 Retweets 973 Likes

75 1.7K 973





# Popular US Tweets – food chain and misuse of antibiotics

**EWG** @ewg Follow

San Francisco set to become the first city to require the disclosure of antibiotics in meat: [bit.ly/2x245bE](http://bit.ly/2x245bE) #AntibioticResistance

**In a First, San Francisco May Require Disclosure of Antibio...**  
The overuse of antibiotics to raise livestock is creating superbugs, bacteria resistant to antibiotic drugs such as penicillin. San Francisco could soon become the first U.S. city to require major [ewg.org](http://ewg.org)

9:30 am - 3 Oct 2017

59 Retweets 97 Likes

**National Geographic** @NatGeo Follow

Antibiotic resistance could be the worst slow-brewing health crisis of our time—and it's mostly coming from chickens

**Hidden Dangers Could Lurk in Your Next Meal**  
The medicines that stave off infections in people are wreaking havoc on our food supply. [news.nationalgeographic.com](http://news.nationalgeographic.com)

10:00 am - 17 Sep 2017

1,041 Retweets 1,253 Likes

**Mercy For Animals** @MercyForAnimals Follow

#ICYM! Report finds more than three-quarters of meat sold in US supermarkets has antibiotic-resistant bacteria 🤔

**SUPERBUGS**

2:57 pm - 21 Jul 2018

76 Retweets 67 Likes

**Stacie H Connerty** @StacieinAtlanta Follow

Have you ever saved antibiotics in case of a future illness? Regrettably, I have and @CDCgov says don't do it. Get tips on how to #BeAntibioticsAware: [bit.ly/divinelifestyl...](http://bit.ly/divinelifestyl...) #ad

**BE ANTIBIOTICS AWARE**  
SMART USE, BEST CARE

If you need antibiotics, take them exactly as prescribed. Talk with your doctor if you have any questions about your antibiotics.

3:12 pm - 18 Jul 2018

81 Retweets 7 Likes

**World Health Organization (WHO)** @WHO Follow

ALWAYS seek the advice of a qualified healthcare professional before taking antibiotics 🧴  
Help us stop the spread of #AntibioticResistance.  
Let's #StopSuperbugs!

**0:56** 168K views

2:22 am - 18 Jul 2018

1,448 Retweets 1,502 Likes

**CDC** @CDCgov Follow

A11: Ask your doctor if the prescribed antibiotic is the one most targeted to treat your infection, while causing the least side effects. #AntibioticResistance #BeAntibioticsAware

11:11 am - 16 Nov 2017

20 Retweets 14 Likes





# Most active users overall

Rank	Account name	@username	Biography	Tweet count	% Tweets
1	<b>MRSA Eradication</b>	MRSAeradication	Learn how to beat MRSA infection	5,206	2.14%
2	<b>Battle Superbugs</b>	battlesuperbugs	Join the #AntibioticResistance Action Center at the George Washington University (#GWSPH) in the global battle against #antibioticresistance & #superbugs	1,790	0.74%
3	<b>Michael Lucroy, DVM</b>	oncodvm	Engaging speaker, passionate educator, and wannabe sailboat cruiser. Author of "Help! My Dog has cancer" <a href="http://amzn.to/2n1t8dl">http://amzn.to/2n1t8dl</a>	1,564	0.64%
4	<b>Save Antibiotics</b>	saveantibiotics	Working to save antibiotics by supporting new drug innovation & responsible use in agriculture & health care. A @PewTrusts campaign.	1,231	0.51%
5	<b>CIDRAP-ASP</b>	CIDRAP_ASP	CIDRAP's Antimicrobial Stewardship Project (ASP) provides current, accurate, and comprehensive information on antimicrobial resistance & stewardship	968	0.40%
6	<b>CIDRAP</b>	CIDRAP	The Center for Infectious Disease Research and Policy at the University of Minnesota	879	0.36%
7	<b>Infectious diseases</b>	InfectiousDz	Writing about Infectious Diseases here, there, and everywhere. Posts on infectious disease in English. ReTweets in Spanish, French, Portuguese, maybe more.	826	0.34%
8	<b>CDC Emerging Infections</b>	CDC_NCEZID	NCEZID works to protect people from emerging and zoonotic infectious diseases, from anthrax to Zika.	684	0.28%
9	<b>CMDoran</b>	TheFebrileMuse	PharmD/writer w/28y exp. Infect Diseases, education, & portrayal of ID in arts/literature. Passionate abt sci literacy & antimicrobial stewardship. Own. RT not endorsement	557	0.23%
10	<b>Mike Stevens</b>	Dr_Mike_Steven s	Infectious Diseases doctor interested in Antibiotic Stewardship, Infection Prevention & Health Disparities; views are my own; Follow or RT ≠ endorsement	460	0.19%

Table shows the ten Twitter accounts based in the US which posted the most antimicrobial resistance-related Tweets between 10 October 2017 and 10 October 2018. "% Tweets" is the percentage of the 243k antimicrobial resistance-related Tweets identified which the user posted.



# Most active users by topic (1/2)

## STIs

Rank	Account name	@username	Tweet count	% Tweets
1	<b>HIV Insight</b>	HIV_Insight	156	0.49%
2	<b>STD Test Options</b>	STDTestOptions	74	0.23%
3	<b>POZ Magazine</b>	pozmagazine	61	0.19%
4	<b>Infectious diseases</b>	InfectiousDz	55	0.17%
5	<b>Battle Superbugs</b>	battlesuperbugs	54	0.17%

## AWARENESS CAMPAIGNS\*

Rank	Account name	@username	Tweet count	% Tweets
1	<b>Battle Superbugs</b>	battlesuperbugs	417	1.51%
2	<b>Save Antibiotics</b>	saveantibiotics	287	1.04%
3	<b>MRSA Eradication</b>	MRSAeradication	273	0.99%
4	<b>CDC Emerging Infections</b>	CDC_NCEZID	247	0.90%
5	<b>CIDRAP-ASP</b>	CIDRAP_ASP	187	0.68%

## ANTIBIOTICS IN THE FOOD CHAIN

Rank	Account name	@username	Tweet count	% Tweets
1	<b>MRSA Eradication</b>	MRSAeradication	734	3.25%
2	<b>Battle Superbugs</b>	battlesuperbugs	343	1.52%
3	<b>Matt Ferreira DVM</b>	M_FerreiraDVM	204	0.90%
4	<b>HerbiVore</b>	herbivore_club	177	0.78%
5	<b>CIDRAP</b>	CIDRAP	141	0.62%

## MISUSE OF ANTIBIOTICS\*

Rank	Account name	@username	Tweet count	% Tweets
1	<b>MRSA Eradication</b>	MRSAeradication	402	1.82%
2	<b>Battle Superbugs</b>	battlesuperbugs	156	0.71%
3	<b>Save Antibiotics</b>	saveantibiotics	140	0.63%
4	<b>CDC Emerging Infections</b>	CDC_NCEZID	140	0.63%
5	<b>Kristen Cincotta</b>	kscincotta	109	0.49%

\* One or more bot/spam Twitter accounts has been removed from this list.





# Most active users by topic (2/2)

## ACADEMIA

Rank	Account name	@username	Tweet count	% Tweets
1	<b>Michael Lucroy, DVM</b>	oncodvm	207	1.10%
2	<b>CIDRAP</b>	CIDRAP	178	0.94%
3	<b>CIDRAP-ASP</b>	CIDRAP_ASP	163	0.87%
4	<b>Battle Superbugs</b>	battlesuperbugs	127	0.67%
5	<b>Infectious diseases</b>	InfectiousDz	112	0.59%

## MRSA\*

Rank	Account name	@username	Tweet count	% Tweets
1	<b>MRSA Eradication</b>	MRSAeradication	3,020	18.07%
2	<b>Tony Guerra - Pharmacy Leaders Podcast Host</b>	Tony_PharmD	228	1.36%
3	<b>Impetigo Remedy</b>	ImpetigoRemedy	112	0.67%
4	<b>Michael David</b>	MichaelDavid80	73	0.44%
5	<b>MRSA Survivors</b>	MRSAsurvivors	71	0.42%

## TUBERCULOSIS

Rank	Account name	@username	Tweet count	% Tweets
1	<b>Infectious diseases</b>	InfectiousDz	94	0.90%
2	<b>AIDS-Free World</b>	AIDS_Free_World	91	0.87%
3	<b>David_in_DC</b>	inchbyinch_rbr	74	0.71%
4	<b>CIDRAP</b>	CIDRAP	68	0.65%
5	<b>Battle Superbugs</b>	battlesuperbugs	45	0.43%

## OTHER\*

Rank	Account name	@username	Tweet count	% Tweets
1	<b>Michael Lucroy, DVM</b>	oncodvm	1,186	1.27%
2	<b>MRSA Eradication</b>	MRSAeradication	777	0.83%
3	<b>Battle Superbugs</b>	battlesuperbugs	618	0.66%
4	<b>Save Antibiotics</b>	Ozzmak	513	0.55%
5	<b>CIDRAP-ASP</b>	CIDRAP_ASP	340	0.36%

\* One or more bot/spam Twitter accounts has been removed from this list.



# Social Media Analysis

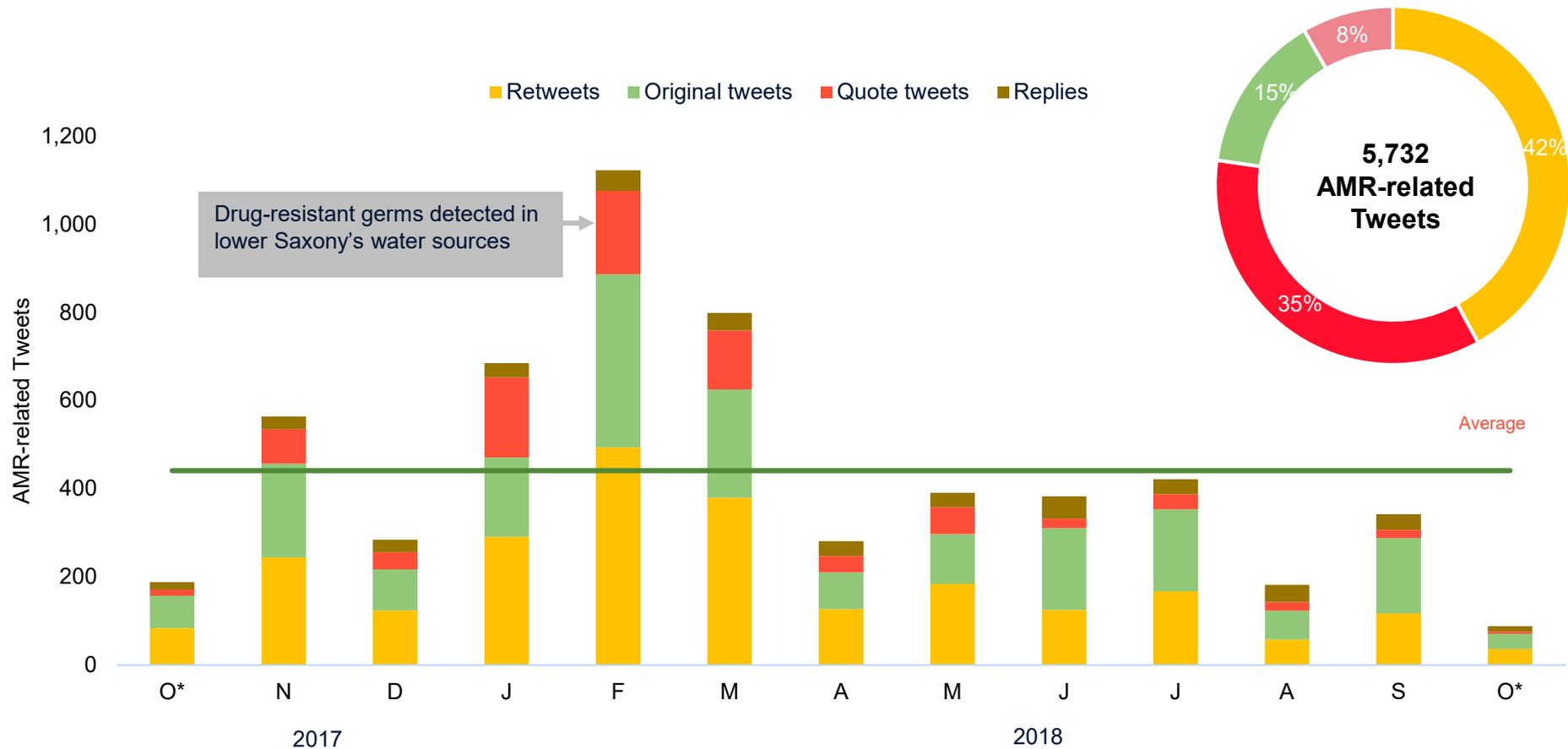
-

Germany



# Volume and type of Tweets

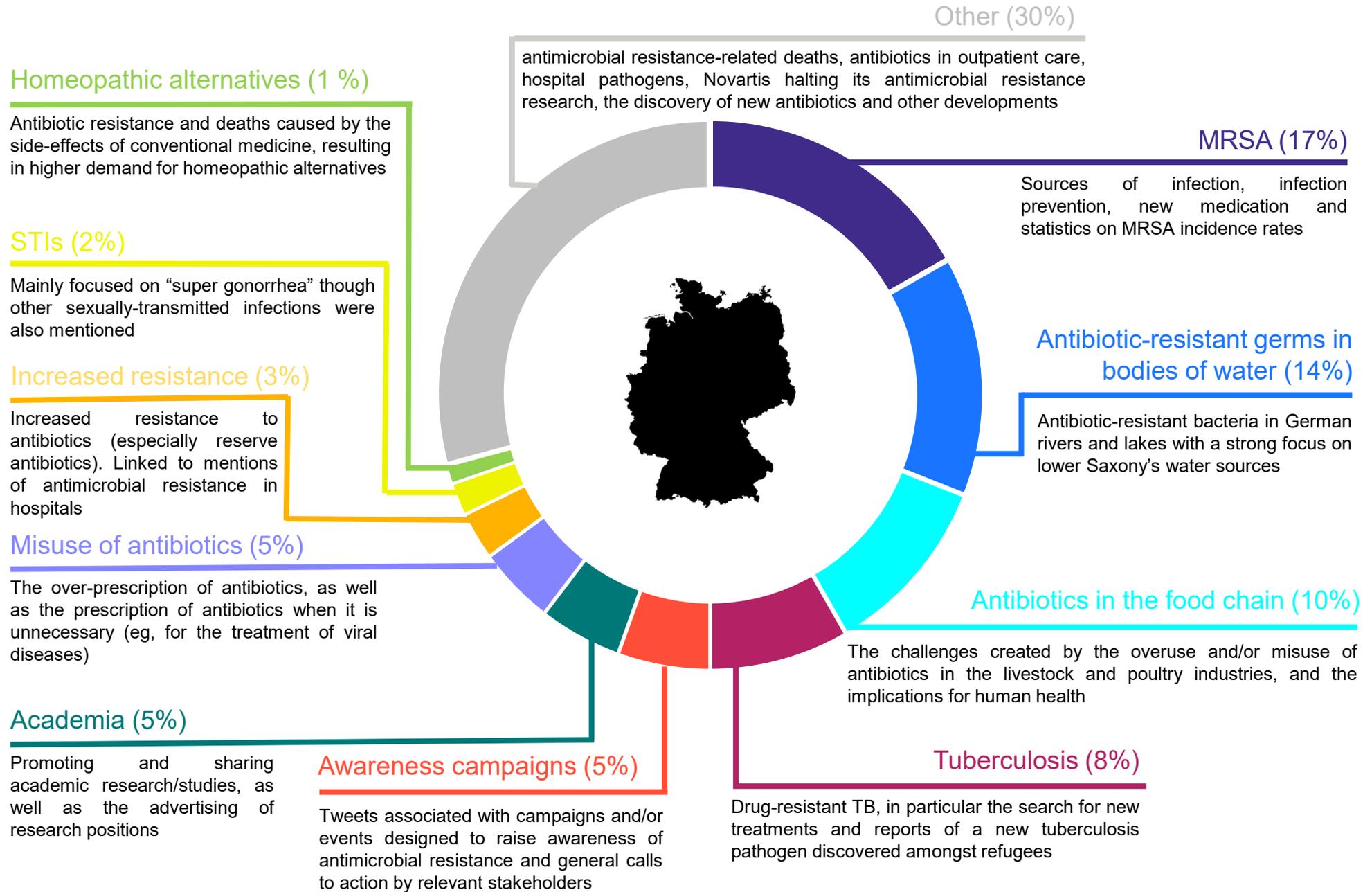
- German Twitter users published at least 5.7k Tweets relating to antimicrobial resistance in the period evaluated\*.
- The users published an average of just over 400 Tweets per month.
- Activity spiked in February 2018 when 1.1k Tweets were published (20% of total). The detection of drug-resistant germs in lower Saxony's water sources was the cause of this.
- 42% of the Tweets posted in the period were reTweets (ie shares). Original Tweets made up just over one third of the total.



\* Please note that October 2017 and October 2018 are incomplete months.



# Topic focus of German antimicrobial resistance-related Tweets





# Popular German Tweets – MRSA

 **Die Nachrichten**  
@DLFNachrichten Follow

"Das Problem ist global: Wie beim Klimawandel tragen alle dazu bei." Weil Antibiotika nicht mehr wirken, werden in den nächsten 5-10 Jahren laut Otto Cars vermehrt Menschen an Infektionen sterben. #MRSA [deutschlandfunk.de/gesundheits-forscher-erwartet-wegen-antibiotikaresistenz-in.1939.de.html?drn:news\\_id=817106](http://www.deutschlandfunk.de/gesundheits-forscher-erwartet-wegen-antibiotikaresistenz-in.1939.de.html?drn:news_id=817106) ... @Dif\_Forschung

[Translate Tweet](#)



**Mögliche Paketbomben an Clinton und Obama Weißes Hau...**  
Eine Serie verdächtiger Pakete alarmiert die Sicherheitsbehörden der USA. Der Secret Service hat Pakete mit möglichen Sprengsätzen abgefangen, die an Ex-Präsident Obama, Ex-Au...  
deutschlandfunk.de

4:18 PM - 18 Nov 2017

28 Retweets 13 Likes



### Translation:

"The problem is global: as with climate change, everyone is contributing. Because antibiotics are no longer effective, more people will die of infections in the next 5-10 years, according to Otto Cars. #MRSA [http://www.deutschlandfunk.de/gesundheits-forscher-erwartet-wegen-antibiotikaresistenz-in.1939.de.html?drn:news\\_id=817106](http://www.deutschlandfunk.de/gesundheits-forscher-erwartet-wegen-antibiotikaresistenz-in.1939.de.html?drn:news_id=817106) ... @Dif\_Research

 **pflegekraft-muenster.de**  
@pflegekraft\_ms Follow

Viele Fälle von #MRSA #MRGN & Co ließen sich #vermeiden, wenn genug #Zeit und #Personal für Flächendesinfektionen und andere #Hygienemaßnahmen vorhanden wäre. Weniger Todesfälle. Einsperren von "infektiösen" #Bewohnern ebenfalls unmenschlich.

[Translate Tweet](#)

4:30 PM - 27 Feb 2018

15 Retweets 22 Likes



### Translation:

Many cases of #MRSA #MRGN & Co could be avoided if there was enough time and staff to disinfect areas and take other hygiene measures. Fewer deaths. Locking-up "infectious" residents is also inhumane.

 **AfD Kompakt**  
@AfDKompakt Follow

Sachsen-Anhalt | #AfD-Fraktion kündigt Untersuchung an. - MdL Ulrich #Siegmond, gesundheitspolitischer Sprecher der @AfDFraktionLSA: "Das Wohl der Patienten darf nicht auch noch durch multiresistente Krankenhauskeime gefährdet werden." #LtLSA #MRSA

[afdkompakt.de/2018/01/17/kra](http://afdkompakt.de/2018/01/17/kra) ...

[Translate Tweet](#)



5:48 PM - 17 Jan 2018

42 Retweets 84 Likes



### Translation:

Saxony-Anhalt | #AfD faction announces investigation. - MdL Ulrich #Siegmond, health policy spokesman for the @AfD parliamentary groupLSA: "The well-being of patients must not be endangered by multi-resistant hospital germs. #LtLSA #MRSA

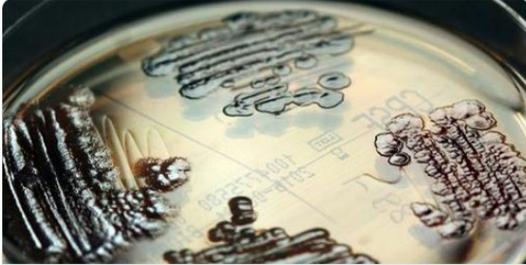
# Popular German Tweets – bodies of water



**Oda Lambrecht** @LambrechtO Follow

**#Antibiotika**-resistente Keime in Gewässern nachgewiesen: Experte vom Robert Koch Institut ist alarmiert. Unsere Reportage heute Abend im @ndr Fernsehen 21.15 Uhr Panorama - die Reporter @ChBaars Die @NDRrecherche-Ergebnisse bei @tagesschau

Translate Tweet



**Gefährliche Keime in Gewässern entdeckt**  
Gefährliche Keime, gegen die viele Antibiotika nicht mehr wirken, verseuchen Bäche, Flüsse und Badeseen. In Proben aus Niedersachsen fanden sich multiresistente ...  
tagesschau.de

7:25 AM - 6 Feb 2018

96 Retweets 68 Likes

**Translation:**  
Antibiotic-resistant germs detected in water: Expert from the Robert Koch Institute is alarmed. Our report tonight on @ndr television 21.15 Panorama - the reporters @ChBaars The @NDRresearch-Results at @tagesschau

**NDR 2** @ndr2 Follow

"Das ist wirklich alarmierend": Die Reporter von Panorama haben **#Antibiotika**-resistente Keime in Gewässern in Niedersachsen gefunden. Die @NDRrecherche-Ergebnisse heute Abend bei Panorama um 21:15 Uhr im @ndrfernsehen. Mehr [→](http://ndr.de/nachrichten/ni) **#Keime** **#Antibiotika**

Translate Tweet



0:38 1,745 views

**Gefährliche Keime in Niedersachsen**

6:50 PM - 6 Feb 2018 from Hamburg, Germany

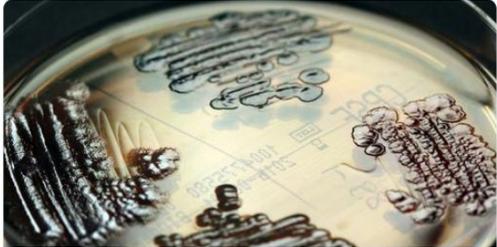
33 Retweets 20 Likes

**Translation:**  
"This is really alarming": The reporters of Panorama have found #antibiotic-resistant germs in waters in Lower Saxony. The @NDRrecherche-results this evening at Panorama at 21:15 o'clock on @ndrfernsehen. More [→](http://ndr.de/nachrichten/niedersachsen/Gefaehrliche-Keime-in-Baechen-Fluessen-und-Seen,gerime302.html) #germs #antibiotics

**tagesschau** @tagesschau Follow

Gefährliche Keime in Gewässern entdeckt [tagesschau.de/inland/keime-1...](http://tagesschau.de/inland/keime-1...) **#Superkeime** **#Antibiotikaresistenzen**

Translate Tweet



**Gefährliche Keime in Gewässern entdeckt**  
Gefährliche Keime, gegen die viele Antibiotika nicht mehr wirken, verseuchen Bäche, Flüsse und Badeseen. In Proben aus Niedersachsen fanden sich multiresistente ...  
tagesschau.de

2:11 AM - 6 Feb 2018

53 Retweets 54 Likes

**Translation:**  
Dangerous germs discovered in bodies of water  
<http://www.tagesschau.de/inland/keime-103.html> ... #Super germs #Antibiotic resistance



# Popular German Tweets – food chain



**Karl Lauterbach** @Karl\_Lauterbach Follow

Wichtige Studie zeigt d große Bedeutung der Antibiotika i Tiermast f Resistenzen. RoutineOPs bald lebensgefährlich [eurosurveillance.org/content/10.280](https://eurosurveillance.org/content/10.280) ...

Translate Tweet

1:26 AM - 4 Nov 2017

49 Retweets 77 Likes



9 49 77

**Translation:**

Important study shows the great importance of antibiotics in animal fattening for resistance. Routine operations soon life-threatening

**BUND** @bund\_net Follow

So trägt #Tierhaltung zu Verbreitung von #Antibiotika-#Resistenzen bei, zeigt @WHO in dieser Grafik. #MRSA #Keime #KlasseStattMasse

Translate Tweet



6:31 PM - 7 Nov 2017 from Berlin, Germany

41 Retweets 30 Likes



**Translation:**

Antibiotics are not only used incorrectly, but also unnecessarily in intensive animal husbandry. Bacteria can develop resistances and make antibiotics ineffective - bacterial infections can be fatal for humans. #GoVeg

**PETA Deutschland** @PETA.Deutschland Follow

Antibiotika werden nicht nur falsch, sondern auch unnötig in der Intensivtierhaltung eingesetzt. Bakterien können so Resistenzen entwickeln und Antibiotika wirkungslos machen – bakterielle Infektionen können also tödlich enden für den Menschen. #GoVeg 🌱

Translate Tweet



12:34 PM - 28 Jan 2018

44 Retweets 70 Likes



**Translation:**

Animal husbandry contributes to the spread of antibiotic resistance, shows @WHO in this graphic. #MRSA #germs #classinsteadofmass



# Popular German Tweets – Tuberculosis

**Frank Pasemann, MdB** @Frank\_Pasemann Follow

Haben Sie davon schon im ÖRR gehört? An der Universität Zürich wurde ein neuer multiresistenter Tuberkuloseerreger entdeckt. Der Keim wurde 2016 an insgesamt acht afrikanischen Migranten nachgewiesen. Daraufhin wurde ein europaweites Alarmsystem aufgebaut. @AfD #Bereicherung



**AargauerZeitung** @AargauerZeitung  
Neuer resistenter Tuberkuloseerreger bei Flüchtlingen entdeckt – europaweites Alarmsystem aufgebaut divr.it/Q95pIF

Translate Tweet

9:48 AM - 9 Jan 2018

421 Retweets 518 Likes



### Translation:

Have you heard of this in public broadcasting? A new multi-resistant tuberculosis pathogen was discovered at the University of Zurich. The germ was detected in a total of eight African migrants in 2016. As a result, a Europe-wide alarm system was set up. @AfD #enrichment

**WELT News** @WELTnews Follow

Multiresistente Tuberkulose-Keime bei Flüchtlingen entdeckt

Translate Tweet



**Unbekannter Erreger: Multiresistente Tuberkulose-Keime bei Flüchtlingen ent...**  
Forscher ist es gelungen, einen Ausbruch eines multiresistenten Stamms der Tuberkulose nachzuweisen. Dieser wurde bei 29 Flüchtlingen entdeckt, die über d... welt.de

4:20 PM - 16 Jan 2018

69 Retweets 35 Likes



### Translation:

Multi-resistant tuberculosis germs discovered in refugees

**Alternative für Deutschland** @AfD Follow

++ Gastgeschenke: Resistente #Tuberkulose-keime suchen heim! ++ Die oberste Regentin des Lazarets Buntland nimmt die Gefährdung des ihr anvertrauten Volkes schulterzuckend hin. Merkel leistet inzwischen täglich neu ihren Offenbarungseid.

#AfD

[facebook.com/alternativefue](https://www.facebook.com/alternativefue) ...

Translate Tweet



3:59 PM - 5 May 2018

148 Retweets 278 Likes



### Translation:

++ Gifts: Resistant #Tuberculosis germs haunt Germany! ++ The supreme regent of the hospital Buntland accepts the endangerment of the people entrusted to her with a shrug of the shoulders. In the meantime Merkel takes her oath of revelation every day. #AfD



# Most active users overall

Rank	Account name	@username	Biography (translated)	Tweet count	% Tweets
1	<b>Antibiotika-News</b>	AntibiotikaNews	Antibiotics - less is more! The worldwide increase in #resistance is one of the greatest threats to our health. Here are the latest #News	276	4.82%
2	<b>Gabriele Lang</b>	Tierverein	T61 consists of pure explosive prohibited DMF. Veterinarians do not know that resuscitating is contained & after the supposed death the heart still beats	213	3.72%
3	<b>Ann Walters</b>	Ann_Walters_	Quotes, Health, Research, Politics	110	1.92%
4	<b>Clara Becker</b>	Clara_Becker_	I am sport fan and am always up for an adventure but above all enjoy a laugh.	82	1.43%
5	<b>InfectoGnostics</b>	InfectoGnostics	Research Campus, Public-Private Partnership for Infection Diagnostics - Here the InfectoGnostics Team twitters!	42	0.73%
6	<b>Infektionsforschung</b>	Helmholtz_HZI	Helmholtz Centre for Infection Research - Stephan Dornbusch (sdo) twitters from the press and communication department.	39	0.68%
7	<b>Deutsches Ärzteblatt</b>	Dt_Aerzteblatt	German medical journal	38	0.66%
8	<b>Agrarindustrie? Nein Danke!</b>	FerkelfabrikAT	#Agriculture #Mass Animal Husbandry #Straathof #Agricultural Industry #Manure #Glyphosate #Maize #Farmers Association #Energy Turning #Permaculture #Agroforst #Land Life	24	0.42%
9	<b>Beate Schicker</b>	Saltytrees	Psychiatrist, psychotherapist, human rights and environmental activist, European, blogger. #HumanRights #Humanity #Resistance #Climate #Environment	24	0.42%
10	<b>Sanofi Deutschland</b>	sanofiDE	This is where the corporate communications department of Sanofi healthcare in Germany Tweets. Our terms of use can be found here: <a href="http://bit.ly/2wCOXUy">http://bit.ly/2wCOXUy</a>	22	0.38%

Table shows the ten Twitter accounts that posted the most antimicrobial resistance-related Tweets in German language between 10 October 2017 and 10 October 2018. “% Tweets” is the percentage of the 5.7K antimicrobial resistance-related Tweets identified.



# Most active voices by topic (1/2)

## MRSA

Rank	Account name	@username	Tweet count	% Tweets
1	<b>Gabriele Lang</b>	Tierverein	93	9.64%
2	<b>Antibiotika-News</b>	AntibiotikaNews	15	1.55%
3	<b>Colimafri Blumenkind</b>	colimafri	11	1.14%
4	<b>Sandra Leurs</b>	SandraLeurs	10	1.04%
5	<b>Ann Walters</b>	Ann_Walters_	8	0.83%

## ANTIBIOTIC-RESISTANT GERMS IN BODIES OF WATER

Rank	Account name	@username	Tweet count	% Tweets
1	<b>Antibiotika-News</b>	AntibiotikaNews	19	2.35%
2	<b>mates</b>	Mates60DN	8	0.99%
3	<b>Partner für Wasser</b>	WasserGesund	7	0.87%
4	<b>Semper Fi 1887</b>	Semper_Fi_1887	7	0.87%
5	<b>NDR Recherche</b>	NDRrecherche	7	0.87%

## ANTIBIOTICS IN THE FOOD CHAIN

Rank	Account name	@username	Tweet count	% Tweets
1	<b>Gabriele Lang</b>	Tierverein	106	17.18%
2	<b>Agrarindustrie? Nein Danke!</b>	FerkelfabrikAT	23	3.73%
3	<b>Antibiotika-News</b>	AntibiotikaNews	12	1.94%
4	<b>Beate Schicker</b>	Saltytrees	9	1.46%
5	<b>PETA Deutschland</b>	PETADeutschland	6	0.97%

## TUBERCULOSIS

Rank	Account name	@username	Tweet count	% Tweets
1	<b>Gabriele Lang</b>	Tierverein	12	2.53%
2	<b>aggi</b>	agidog61	6	1.26%
3	<b>Lungeninfodienst</b>	Lungeninfo	6	1.26%
4	<b>Antibiotika-News</b>	AntibiotikaNews	6	1.26%
5	<b>Regine</b>	sixteentender	5	1.05%



# Most active voices by topic (2)

## AWARENESS CAMPAIGNS

Rank	Account name	@username	Tweet count	% Tweets
1	<b>Antibiotika-News</b>	AntibiotikaNews	37	11.78%
2	<b>BIO Deutschland</b>	BIODeutschland	10	3.18%
3	<b>Sanofi Deutschland</b>	sanofiDE	8	2.55%
4	<b>InfectoGnostics</b>	InfectoGnostics	7	2.23%
5	<b>Pharma Fakten</b>	pharmafakten	6	1.91%

## MISUSE OF ANTIBIOTICS

Rank	Account name	@username	Tweet count	% Tweets
1	<b>Ann Walters</b>	Ann_Walters_	66	25.00%
2	<b>Clara Becker</b>	Clara_Becker_	54	20.45%
3	<b>Antibiotika-News</b>	AntibiotikaNews	25	9.47%
4	<b>Michael Stark</b>	Michael_Stark	5	1.89%
5	<b>Dr. Christian Lübbers</b>	drluebbers	4	1.52%

## INCREASED RESISTANCE

Rank	Account name	@username	Tweet count	% Tweets
1	<b>Antibiotika-News</b>	AntibiotikaNews	15	9.32%
2	<b>Martin E. Nagel</b>	MartinENagel	4	2.48%
3	<b>Martin Pieper</b>	cdpsMP	4	2.48%
4	<b>Hartmut's Erfolg</b>	hartmutboerner	4	2.48%
5	<b>Deutsches Ärzteblatt</b>	Dt_Aerzteblatt	3	1.86%

## STIs

Rank	Account name	@username	Tweet count	% Tweets
1	<b>Deutsche AIDS-Hilfe</b>	Dt_AIDS_Hilfe	8	7.21%
2	<b>AfD-Salzgitter</b>	AfDSalzgitterKV	2	1.80%
3	<b>Allergotrade</b>	Allergotrade	2	1.80%
4	<b>allergodome.de</b>	allergodome	2	1.80%
5	<b>Ärzte Zeitung</b>	aerztezeitung	2	1.80%

**Further information**

## For further information

For further detail on the research findings and recommendations, please see the full report, 'Reframing resistance'

For guidance on how to use the research findings, please see the communications toolkit

For further detail on the methodology and the public testing please see Appendices A & C

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