

Special Report **FT Health: Future of Antibiotics**

Antibiotic resistance

The threat of antibiotic resistance — in charts

Detailed information is starting to emerge on the problem and how to combat it



A dairy farmer administers medication in Yorkshire, England © Alamy

Andrew Jack and **Chris Campbell** DECEMBER 8 2020

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Overuse of antibiotics by humans and in the farming of meat and fish is driving increased microbial resistance and threatening the availability of life-saving treatments. The World Health Organization calls antibiotic resistance one of the top 10 public health threats and the UN [predicts](#) up to 10m deaths a year from drug-resistant infections by 2050.

Yet until recently there has been only a limited effort to measure trends in antibiotic use, their effects and to hold countries and companies to account. Governments, non-profits and investors alike are now starting to collect information to identify good and

bad practices.

Drug-resistant infections are a bigger problem in lower income countries

The [Centre for Disease Dynamics, Economics and Policy](#) (Cddep), a US-Indian think-tank, has developed a [Drug Resistance Index](#) to track antibiotic usage and resistance around the world. It provides a measure of the effectiveness of therapy in different countries by analysing usage of drugs and the degree of resistance of key pathogens to them.

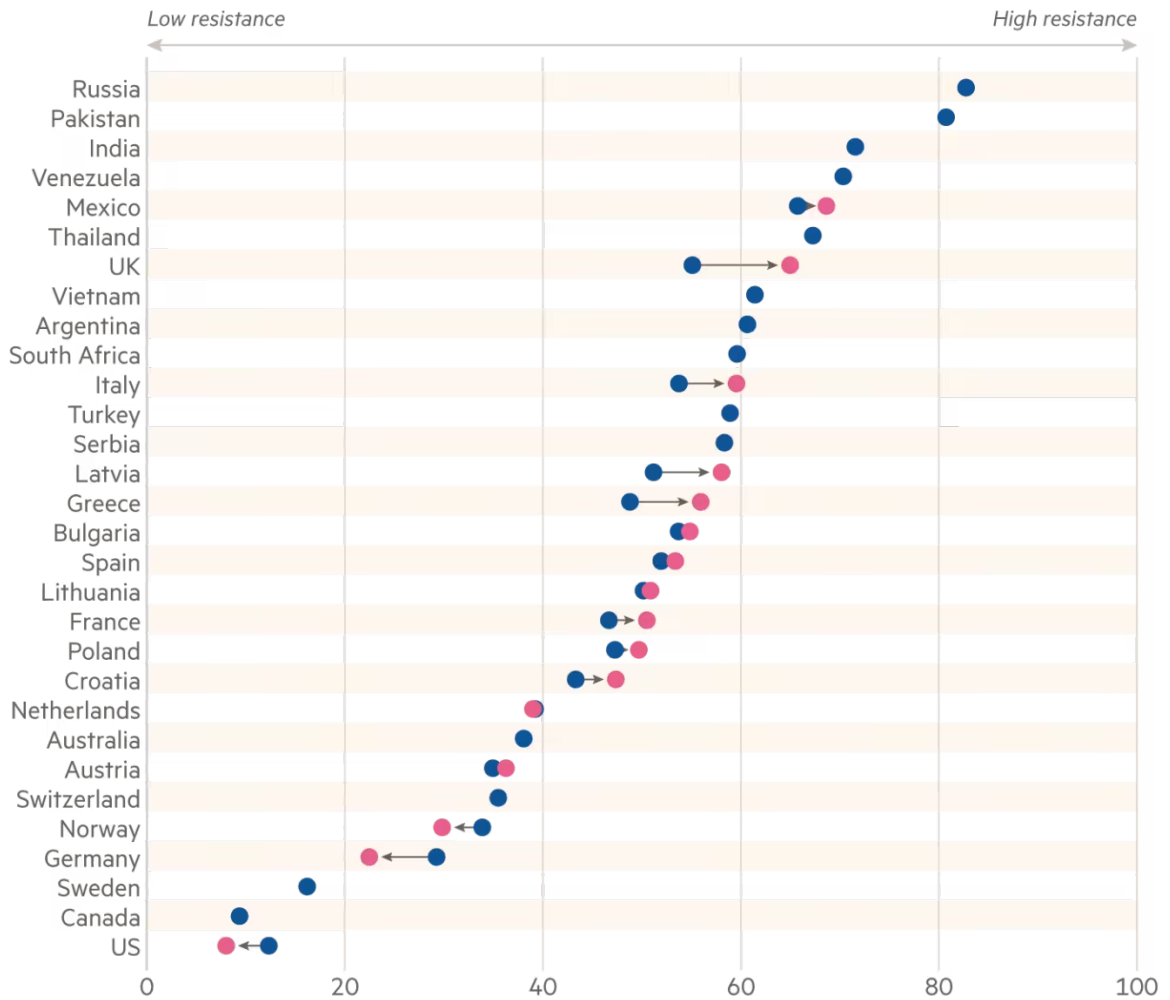
Poorer countries [such as India](#) frequently perform poorly (with a high score on the index) because of relatively widespread resistance to the small number of antibiotics that are available. Richer nations like the US typically score better because a wider range of antibiotics are used in a more targeted way.

The index is limited by countries' willingness and ability to report reliable data, and has [triggered debate](#) over its methodology in combining different statistics. But it helps to identify patterns such as variations in monitoring of resistance, health system operations, and drug availability and stewardship.

Developing economies in particular struggle with drug resistance

Drug Resistance Index* for WHO critical pathogens, by country

● 2015 ● 2020 projection (if known)



*The Drug Resistance Index measures how widely antibiotics are used in clinical practice and their ability to treat infections
 Source: Center for Disease Dynamics, Economics & Policy
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Usage varies significantly between countries

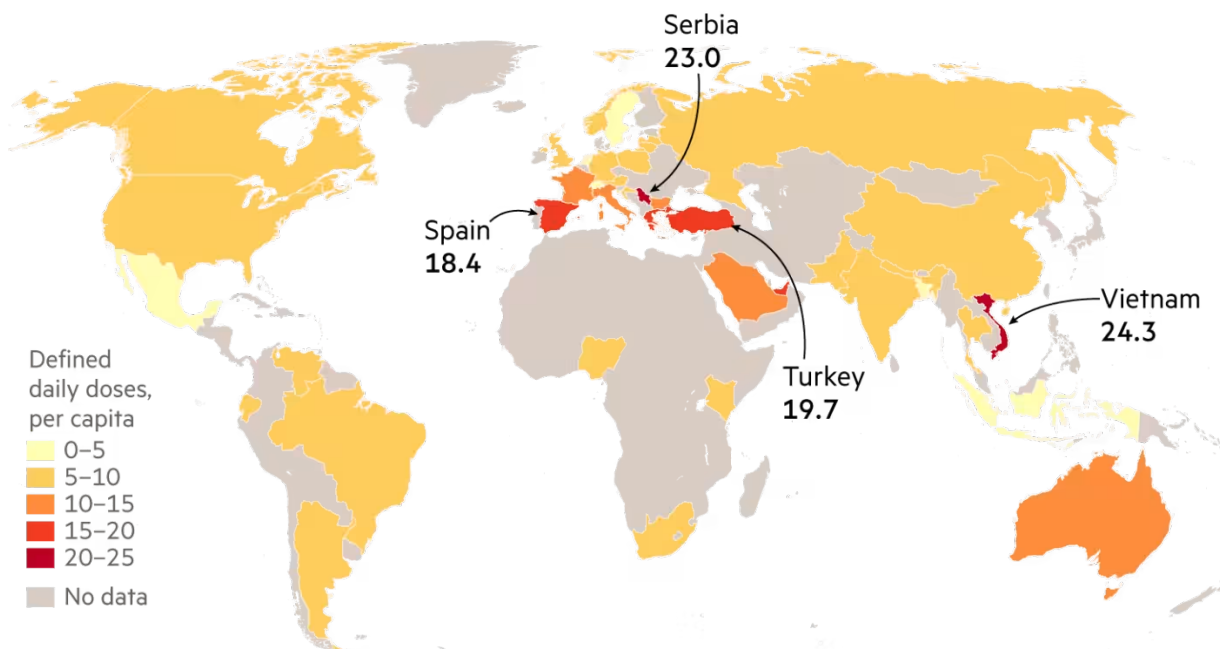
Cddep’s compilation of [statistics](#) on antibiotic consumption highlight growing use in humans and animals and the need for tighter rules for accessing the drugs. [Vietnam](#) has very high overall levels of use in agricultural production, in the community and in hospitals, where patients often acquire infections.

Turkey had among the highest rates of resistance in OECD countries, partly reflecting

Turkey had among the highest rates of resistance in OECD countries, partly reflecting widespread use of antibiotics among [outpatients](#). Analyses of [Serbia](#) showed high level of usage and inappropriate prescribing in hospitals.

Vietnam has the highest antibiotic use

Per capita antibiotic consumption (humans), 2020



Source: Center for Disease Dynamics, Economics & Policy
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Many drugmakers could do more to combat the problem

The [Access to Medicines Foundation](#) tracks the activities of pharmaceutical companies on antimicrobial resistance, providing a tool for investors and policymakers. While highlighting progress, it concludes that “the pace of change in 2020 does not match the scale of the AMR challenge”.

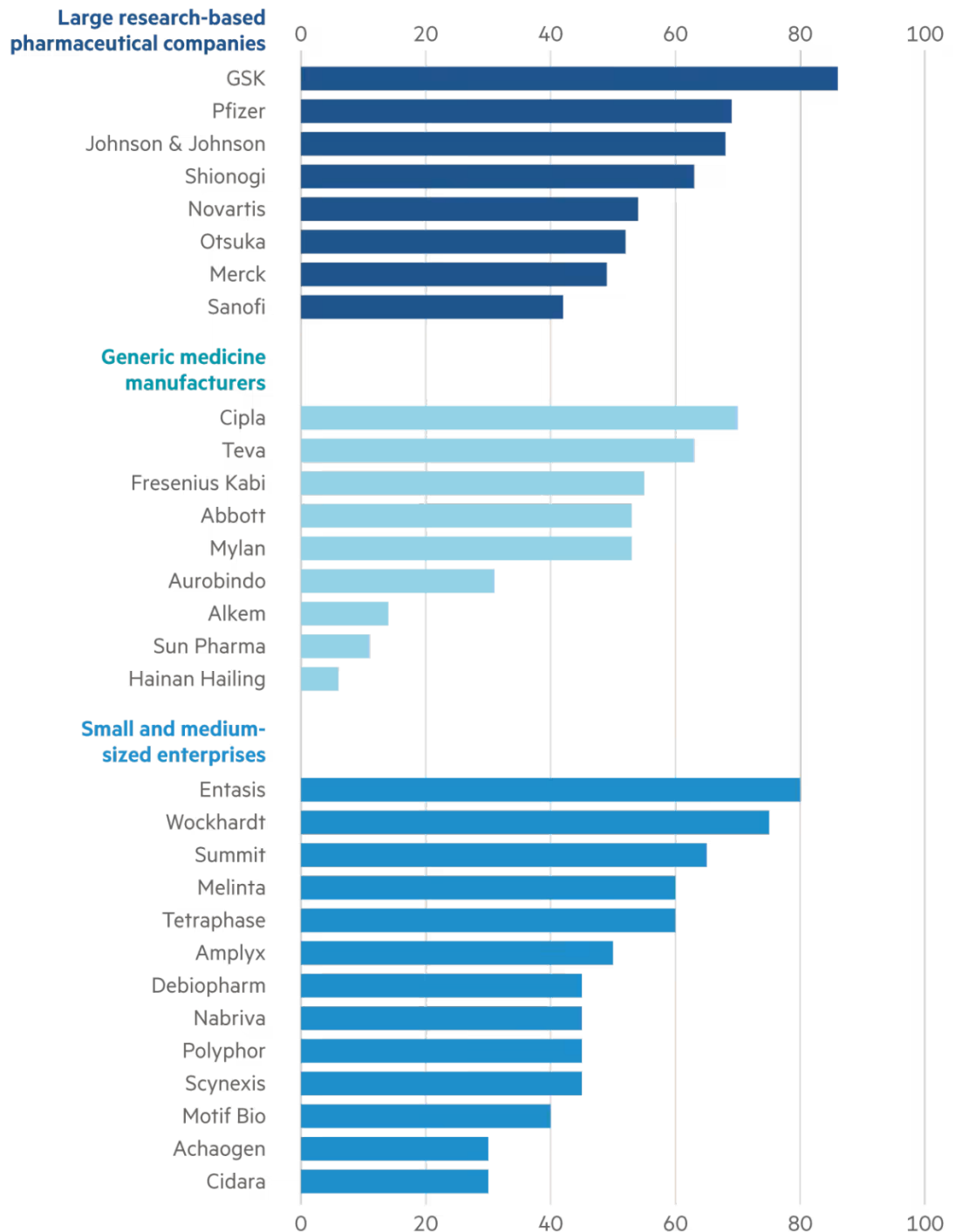
Its [antimicrobial resistance benchmark](#) analyses companies’ widely varying investments in the research and development of new antibiotics, efforts to limit aggressive marketing and overprescription of drugs by their sales teams, and programmes to reduce waste and enhance surveillance.

[GSK](#) performs well with active research into new antibiotics, a detailed strategy to limit discharge during manufacturing, a programme to ensure access to drugs, to control their use and monitor resistance. [Hainan Hailing](#), which scores poorly, sells 47

anti-bacterial or antifungal drugs but provides little information on its environment-risk management, access or stewardship measures.

Some drug companies are making more progress than others

Antimicrobial resistance benchmark, performance in 2020



The benchmark measures research and development, responsible manufacturing, access and stewardship

Source: Access to Medicine Foundation

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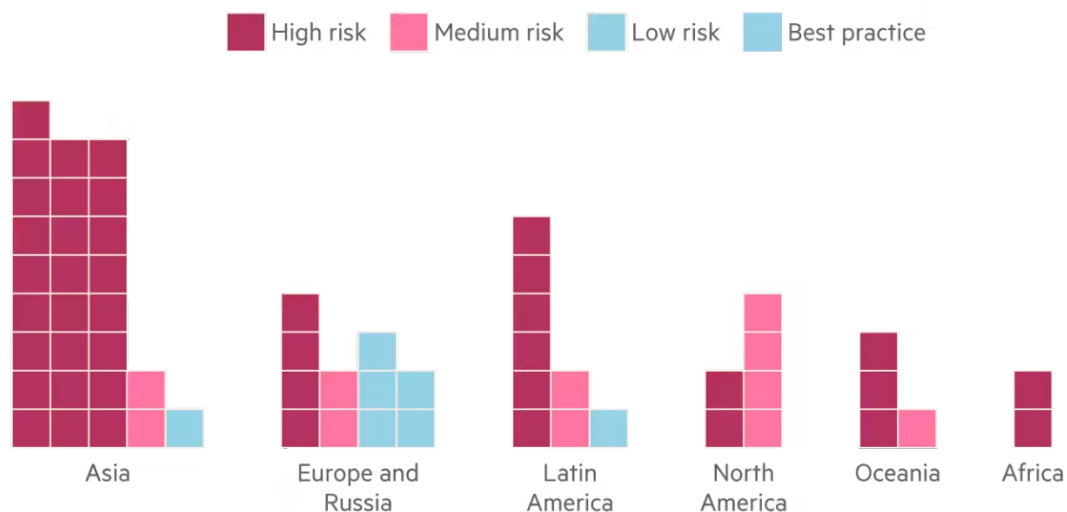
Antibiotic use by food producers is widespread

The problem of antibiotic resistance is driven by food-chain practices as well as overuse of the medication in humans. The Farm Animal Investment Risk & Return initiative ([Fairr](#)), a network of investors concerned about the environmental, social and governance consequences of intensive livestock production, has produced a “[protein index](#)”. It tracks activities by agri-food companies, monitoring their disclosure of antibiotic practices and reduction efforts in rearing cattle, pork, chicken and fish.

Among 60 quoted companies analysed, 70 per cent are classified as high risk, two-thirds disclose no information on antibiotic use and only a quarter state they do not use antibiotics routinely. Companies based in Europe perform better, reflecting tougher regulations in force from 2022 that mean antibiotics will only be permitted when a disease is present and with the approval of a veterinarian.

Most high-risk food producers are in Asia

Number of companies by risk category



Source: Fairr
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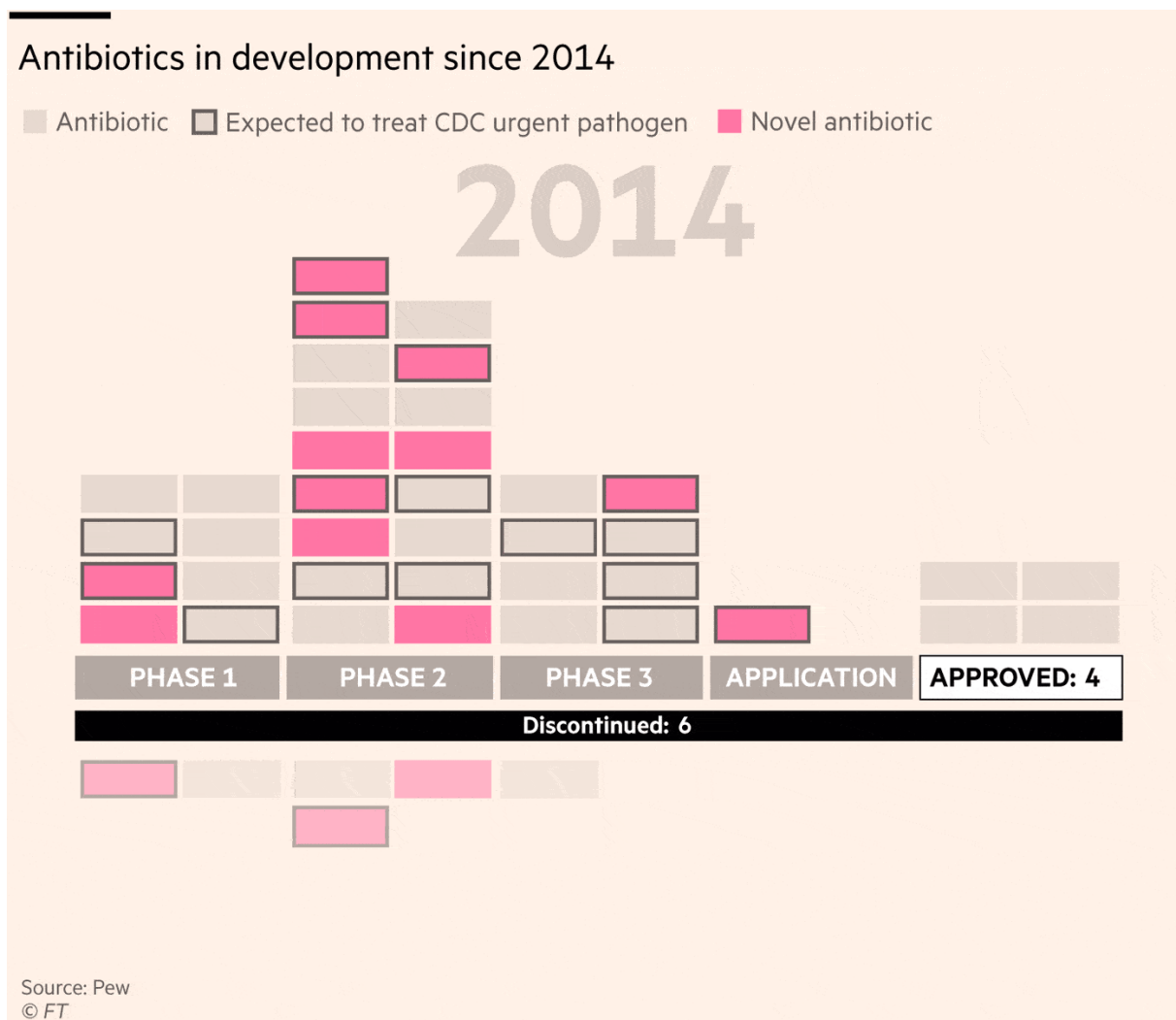
The antibiotic pipeline remains thin

The pipeline of experimental antibiotics in development tracked by the [Pew Charitable Trusts](#) remains thin compared with drugs for other medical conditions. Relatively few companies are researching new treatments, some experimental

medicines are not tackling the areas of greatest need, there are high costs and failure rates during trials and some are discontinued because of poor commercial prospects.

New funding mechanisms have been developed with “push” incentives for early-stage research and bridging support for companies with promising trial results. “Pull” mechanisms offering incentives for successfully launched new products remain limited.

As Pew reports, the graphic “underscores the longstanding concerns of scientists, doctors, public health officials, and other stakeholders regarding the dangerously low number of antibiotics in development . . . particularly for treating the most urgent bacterial threats.”



Other resources

AMR data is incomplete, infrequently updated and often available only after a

AMR data is incomplete, infrequently updated and often available only after a significant time lag. Some important additional sources and ways to visualise the trends are:

- [The Global AMR R&D Hub](#), which is co-ordinated by the German Centre for Infection Research, tracks investments in research
- [The Tripartite AMR Country Self-assessment Survey](#) tracks the status of national plans to tackle drug resistance
- [Resistance Bank](#) collates data on antibiotic resistance detected in animals, with a focus on low and middle income countries

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