



## Editorial Commentary

## Antimicrobial resistance, trade, food safety and security



### 1. Introduction

The global threat of antibiotics becoming ineffective from overuse generated several apocalyptic scenarios that grabbed the public imagination. These antimicrobial resistance (AMR) ‘superbug’ scenarios helped governments recalibrate policies and regulate to reduce human use of antibiotics. Surprisingly, the other main contributor to AMR - antibiotics used in food production - received less attention.

The World Health (WHO), Food and Agriculture (FAO) and Animal Health (OIE) agencies' collaborative work on AMR over many years produced research and policy options to reduce antibiotic use in food production. But with a few exceptions, progress at the national level in this key economic sector has been slow.

But the risk assessment for AMR has now shifted substantially in response to research in China revealing the development of resistance [1] to the antibiotic colistin. This new resistance, labeled MCR-1, discovered in food producing animals has also been found in humans, animals, pets and food. AMR experts were even more shocked to then discover MCR-1 in over 30 countries [2]. Colistin is on the WHO's Critically Important Antimicrobial list but continues to be used in food production in many countries, including the EU.

Worth noting, the US strategically preserves colistin exclusively for human use as a critical last-line antibiotic, including for treating injuries received in Iraq and Afghanistan exposed to a strain of bacteria in the soil (labeled by media as Iraqibacter). But despite taking such precautions MCR-1 was discovered in two unrelated incidents in the US [3].

### 2. Scientific evidence-based data: what is missing?

Although curtailing the use of antibiotics used in food production is an integral part of WHO's Global Action Plan (GAP), national policy makers have been slow to act on the risks this overuse causes, often resting on claims that scientific ‘evidence-based’ data is not available. But this view is now being questioned. And it also undervalues documented evidence from some key industrial food producers who have successfully decreased their use of antibiotics by improved animal husbandry practices i.e. Denmark, Sweden and Netherlands).

At the national level, Public health experts are now somewhat belatedly turning their attention to the incidence of AMR in domestic and international food chains including the risk of resistance organisms entering the human gut via food. But governments may not have adequately prepared for this politically and economically sensitive form of AMR.

Government inaction on AMR can have real human costs and will become more politically sensitive [4] as AMR increases. Also the rational underpinning antibiotics used in food production, when compared to human use, will increasingly receive greater analysis and scrutiny. Circular arguments around the lack of evidence-based data may be difficult to defend and could activate more precautionary policy-making.

### 3. AMR and trade

One important global response by governments has been to direct the international food safety and standard setting agency, Codex Alimentarius Commission, to review and revise its ten-year-old AMR policy framework. The Republic of Korea will chair this important AMR Taskforce [5] to facilitate this process and ensure Members have the necessary guidance to ‘enable coherent management of AMR along the food chain’.

Codex meetings are technically focused and recommendations based on science and expert input. But on AMR it will be difficult to develop ‘scientifically supported evidence’ given that evidence-based data along the international food chain has not been systematically studied.

This AMR Taskforce will also be carefully monitored by non-state entities such as national food export industries, global food producers and pharmaceutical companies. WTO members can apply stricter food safety measure than those set by Codex but may be required to justify these measures scientifically. Codex food standards therefore can have far reaching implications for food exporters and in resolving trade disputes so the outcomes from this Taskforce will resonate politically and economically.

Although Codex is not expected to finalise its work until 2020, AMR related research is growing exponentially. Information on resistant organisms in the food chain will likely become accessible, including from international institutions and leading AMR experts and researchers. Consequently, governments could then be pressured by consumers to adjust their food safety regulatory frameworks in advance of any political consensus reached through Codex.

#### 4. The political challenge: trade and/or health security

Health and scientific experts already have evidence of AMR identified in animals, seafood, fertilisers, agricultural outputs, soil, water, pets and food – all important in trade and commerce. Resistance organisms in the food chain can have financial and other consequences for citizens, health systems, domestic food security, and, national strategic interests linked to development options, including export industries [6].

It would therefore seem obvious that any strategic analysis of routes of the spread of AMR would identify food imports that fall outside of domestic regulation as important. Yet ‘trade’ is one of the key pathways for transmission of resistant organisms receiving little if any substantive attention in National AMR Action Plans – representing a significant gap in AMR containment and countermeasure strategies.

#### 5. National interest: resistance testing and trade obligations

Maintaining food safety is already an integral part of the global trading system. Food imports are already tested to confirm their safety, including using Codex standards to check for pesticide levels and toxic bacteria and antibiotic residues (but not for antibiotic-resistant organisms).

The World Trade Organization's (WTO) non-discriminatory National Treatment Provisions (imports be treated no less favourably than the same or similar domestically-produced goods once they have passed customs) provides a framework for utilising the WTO's governance and trade facilitation tools to address: food safety - Sanitary and Phytosanitary (SPS) [7] and Technical Barriers to Trade (TBT) Agreements; and, priorities assigned to public health. These WTO compliant trade measures are used by governments and remain relevant for issues such as ‘mad cow disease or bovine spongiform encephalopathy’ or outbreaks of other dangerous zoonotic diseases.

Non-discriminatory and transparent testing regimes send strong market signals. Testing for resistant organisms would provide essential information for both exporting countries and domestic markets. Results could be used to identify development and technical assistance gaps and opportunities for capacity-building; and this in turn could lead to sharing expertise and stronger global surveillance efforts while strengthening the safety of food trade.

The question is why well-understood non-discriminatory testing mechanisms similar to those used by the WTO for food safety are generally not being used to protect food chains from resistant micro-organisms.

#### 6. Financial investors: reaction to AMR

While governments have been slow to act decisively in view of the threat of AMR, some corporate interests are. For example, 71 global asset managers controlling US\$2 trillion assessed their exposure to financial and brand damage from global restaurant corporations' lack of response to the threat posed by AMR.

Their message to that corporate sector was clear: stop using antibiotics for non-therapeutic purposes (promoting growth) and antibiotics medically important for human health should not be used on food producing animals [8].

The business rationale applied by these and other investors has already minimised and in some cases eliminated the use of antibiotics in food-producing animals in the markets they control. The development of this special segmented market, welcome as it is, cannot alone guarantee a food chain free of resistant organisms given the complexity and many paths of transmission of antibiotic resistant bacteria.

#### 7. Consumers and AMR in the food chain

Reaction to information from credible sources that AMR can enter the gut through the food chain and capable of altering the human microbiome may not yet have fully registered, including at the political level. This lag in consumer response is understandable as most public campaigns focus on reducing human antibiotic consumption and the science behind AMR is difficult to penetrate and absorb.

It is therefore not surprising that some public audiences accept the need to reduce their own individual antibiotic consumption. As they become aware of the risk of AMR by consuming food contaminated by resistant organisms they may make more demands responding to this personal and politically sensitive issue.

Independent action in California and Maryland, for example, goes beyond the current U.S. federal and state requirements and is already providing consumers with some food products produced without the use of antibiotics. Given this consumer leadership model, demand for foods that are antibiotic free is likely to expand significantly.

Likewise gut microbiome research emphasising the importance of maintaining healthy gut bacteria is becoming generally understood in the community and is a popular topic on Social Media, offering consumers an expanded framework of reference to critique government's response to resistance organisms entering the food chain.

#### 8. Testing for antibiotic resistance organisms

Without active testing and monitoring, particularly at strategic points in the food chain, it will be difficult to pinpoint the source of the resistant organisms so testing is an essential monitoring and governance tool. Unfortunately, such monitoring is not yet being systematically done by many national governments.

Economically and politically, preserving national reputation in export markets will require governments to intervene and regulate to protect food safety and food security. As evidence continues to emerge [9] the transmission of AMR through the global food chain has the potential to undermine consumer confidence and generate further negative reaction to globalisation. The consequences of AMR spreading significantly without new antibiotics and/or vaccines could be catastrophic from a health perspective.

The dynamic and unpredictable nature of AMR will challenge governments to reinvent their health security and regulatory responses to make them fit for purpose. And trade strategies designed to minimise regulation and eliminate barriers around the food chain may have to adapt accordingly. Food safety regulation is ultimately the responsibility of governments and spread of resistant organisms through the food chain is likely to be one of the most politically sensitive contributors to AMR.

## References

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