

I 3. AMR and One Health

More than half of global antibiotic use is for animal protein production, largely as a growth-promotion agent, but also for the prophylaxis and metaphylaxis of infection, often as a less costly alternative in the absence of biosecurity and biosafety, animal welfare and nutrition management to safeguard animal health.¹⁶ The use of antibiotics is expected to grow rapidly in LMICs in tandem with increasing income and demand for animal protein.¹⁷ Intensive use of antibiotics in food animals increases the risk of AMR occurrence in the animals in question (see [Section 4](#)). Moreover, antibiotics used in humans and animals are reaching the environment through urine and excreta. Between 40 per cent and 90 per cent of a given antibiotic dose is excreted as metabolites that retain antimicrobial activity, eventually reaching the environment, contaminating soil, water and vegetation.¹⁸ Wastewater treatment plants, hospitals and livestock farms can be sources of contamination in the form of active antibiotic ingredients, AMR bacteria and genes, inducing AMR (see [Section 9](#) for more on pharmaceutical manufacturing waste standards and [Section 10](#) for the European Union [EU] approach to wastewater treatment plant monitoring of AMR).¹⁹

In addition, on a worldwide scale, up to 39 countries have been found to use antibiotics to treat or prevent infections caused by plant pathogenic bacteria,²⁰ which are responsible for various plant diseases.²¹ While data are limited, antibiotics are reportedly recommended far more frequently and for a much greater variety of crops than previously thought. Relative to human and animal use, the quantities of antibiotics used for crops globally are comparatively small, but this does create some unique avenues through which resistance can develop in human pathogens.²² The agricultural use of antifungal compounds that have high human medicine value is another concern.²³

The environment is considered a reservoir of AMR bacteria and a pathway for AMR genes to transfer horizontally to other bacteria. Other contaminants, such as biocides and heavy metals in the environment, can act as a stressor for AMR occurrence.²⁴ The use of antimicrobials, such as antibiotics, in humans, animals and plants and their contamination of the environment need to be understood in the context of a One Health integrated and multidisciplinary approach, which aims to sustainably balance and optimise the health of people, animals, plants and ecosystems (see [footnote 2](#)).

¹⁶ See Ritchie (2017).

¹⁷ See Mulchandani et al. (2023).

¹⁸ See Polianciuc et al. (2020).

¹⁹ See Han et al. (2023).

²⁰ See European Food Safety Authority (2024).

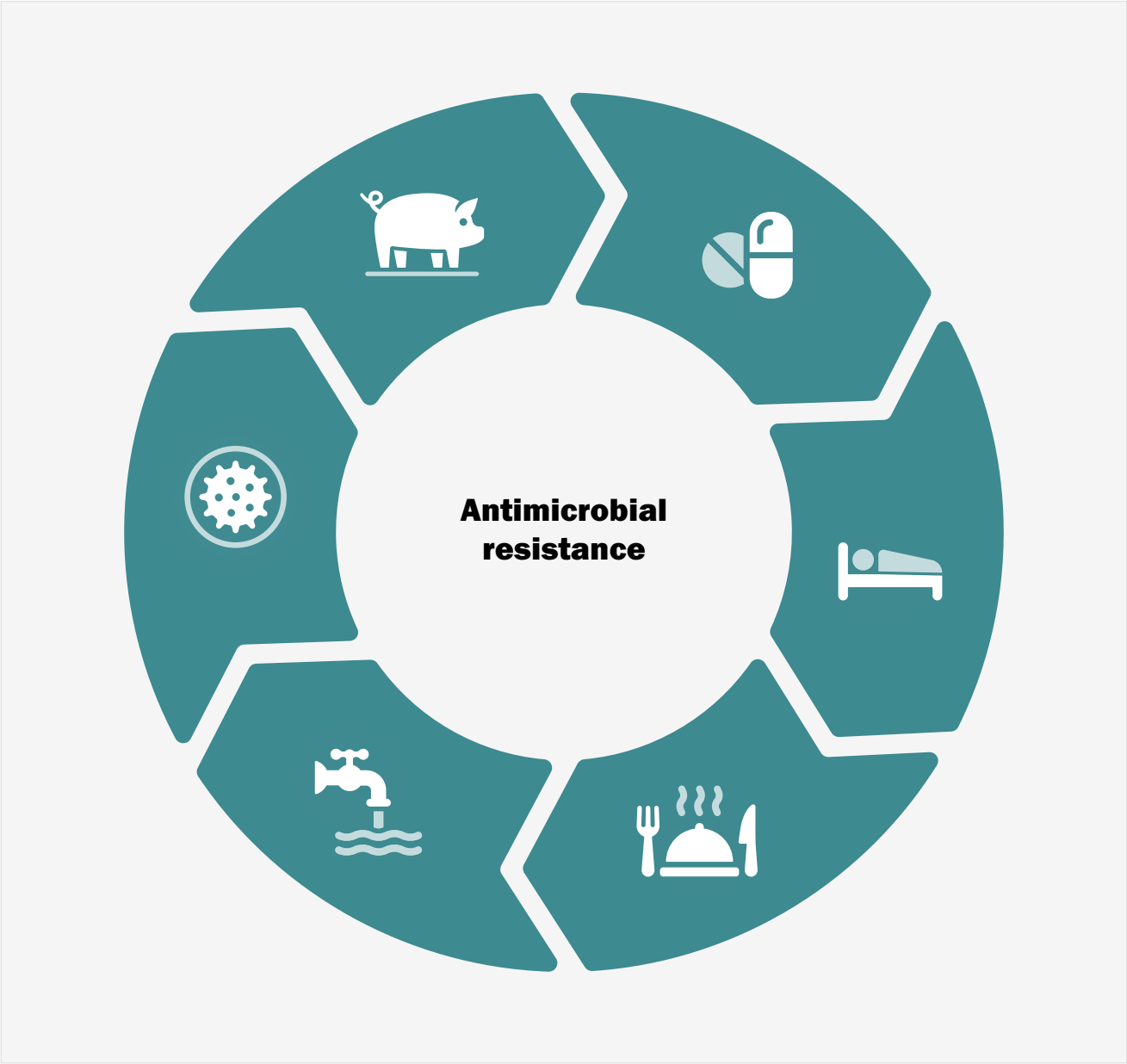
²¹ See Gautam and Kumar (2020).

²² See Taylor and Reeder (2020).

²³ See Fisher et al. (2022).

²⁴ See Samreen, Malak and Abulreesh (2021).

Figure 2. One Health



Source: Kensuke Matsueda, UN-HABITAT Afghanistan office.