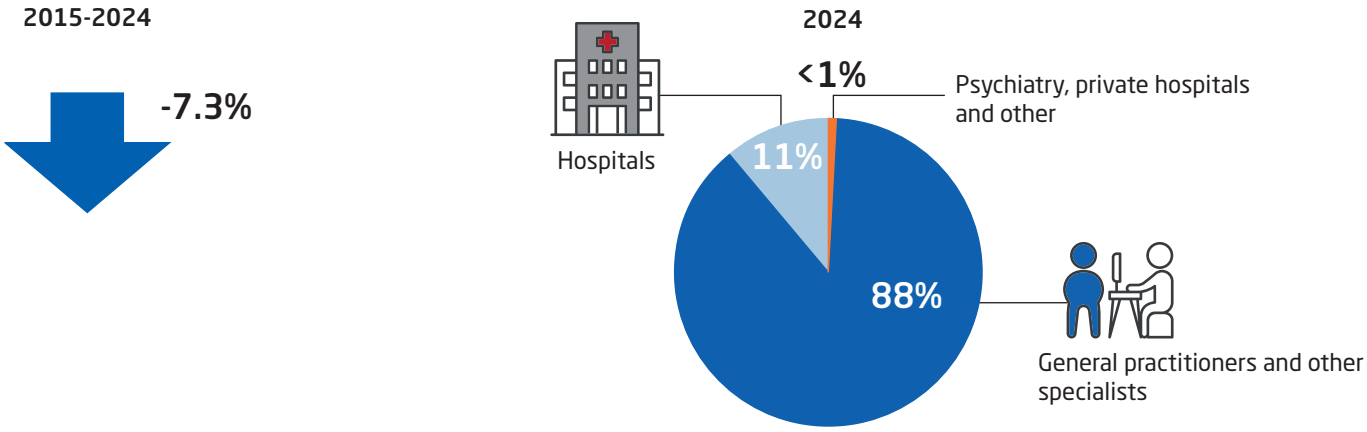
3. Antimicrobial consumption in humans

Surveillance of antimicrobial consumption in humans is based on sales data from all public and private healthcare providers in Denmark. In the following sections, antimicrobial consumption data are presented at national level as well as at health care sector level, i.e. primary health care and hospital care.

Antimicrobials in Denmark

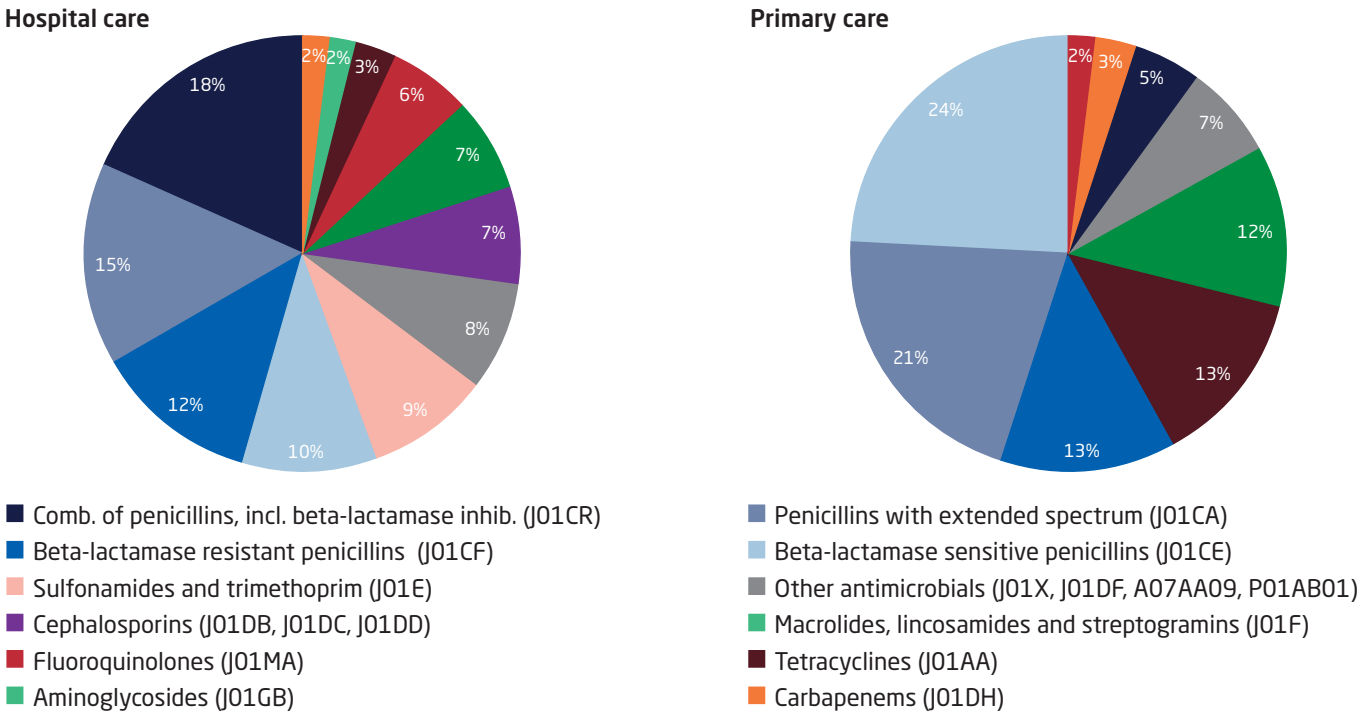
Antimicrobial consumption in Denmark was 16.27 DID in 2024, which is 7.3% lower than consumption in 2015 (17.55 DID) and almost similar to 2023 (16.47 DID). Changes in the total consumption were driven by changes in antimicrobial prescribing in primary care, which accounts for 88% of antibiotics used in Denmark, Figure 3.1.

Figure 3.1 Change in total antimicrobial consumption and distribution by healthcare providers, Denmark, 2015-2024



Penicillins are the main drug classes in Denmark, in primary health care they account for 64% and at hospitals for 55% (Figure 3.2). Hospitals prescribe the majority of broad spectrum and critically important antimicrobials (cephalosporins and carbapenems). Assessed by WHO's AWaRe classification system, "access antimicrobials" constituted 82% of consumption in Denmark in 2024.

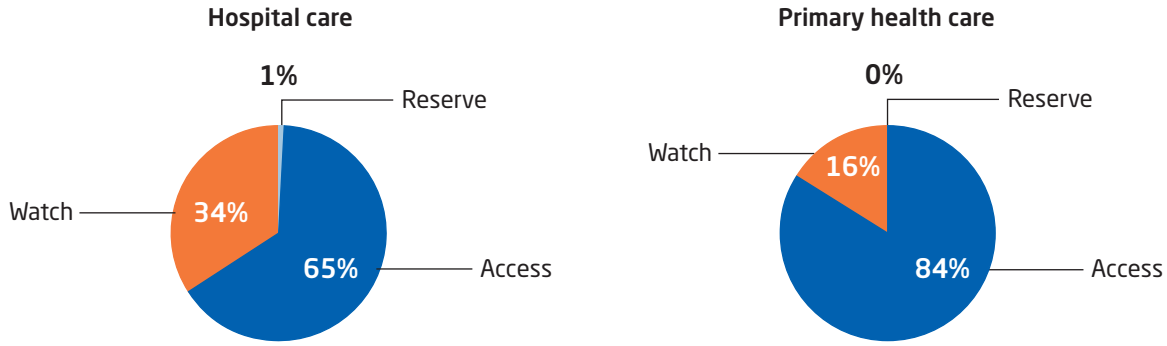
Figure 3.2 Percentage distribution of antimicrobial agents in primary health care and hospital care, DDD, Denmark, 2024



AWaRe classification of antimicrobials in Denmark, 2024

The World Health Organization (WHO) has developed the AWaRe classification system as a tool to assist antibiotic stewardship and to reduce antimicrobial resistance. Antibiotics are classified into three groups to emphasise the importance of their appropriate use:

- **Access:** Antibiotics used to treat common susceptible pathogens with lower resistance potential than antibiotics in the other groups. 60% of total antimicrobial consumption should consist of Access agents.
- **Watch:** Antibiotics that have higher resistance potential, including most of the highest priority agents. These antibiotics should be prioritised as key targets of stewardship programs and monitoring.
- **Reserve:** Antibiotics reserved for treatment of confirmed or suspected infections due to multidrug resistant organisms. These antibiotics should be considered as "last resort" options.

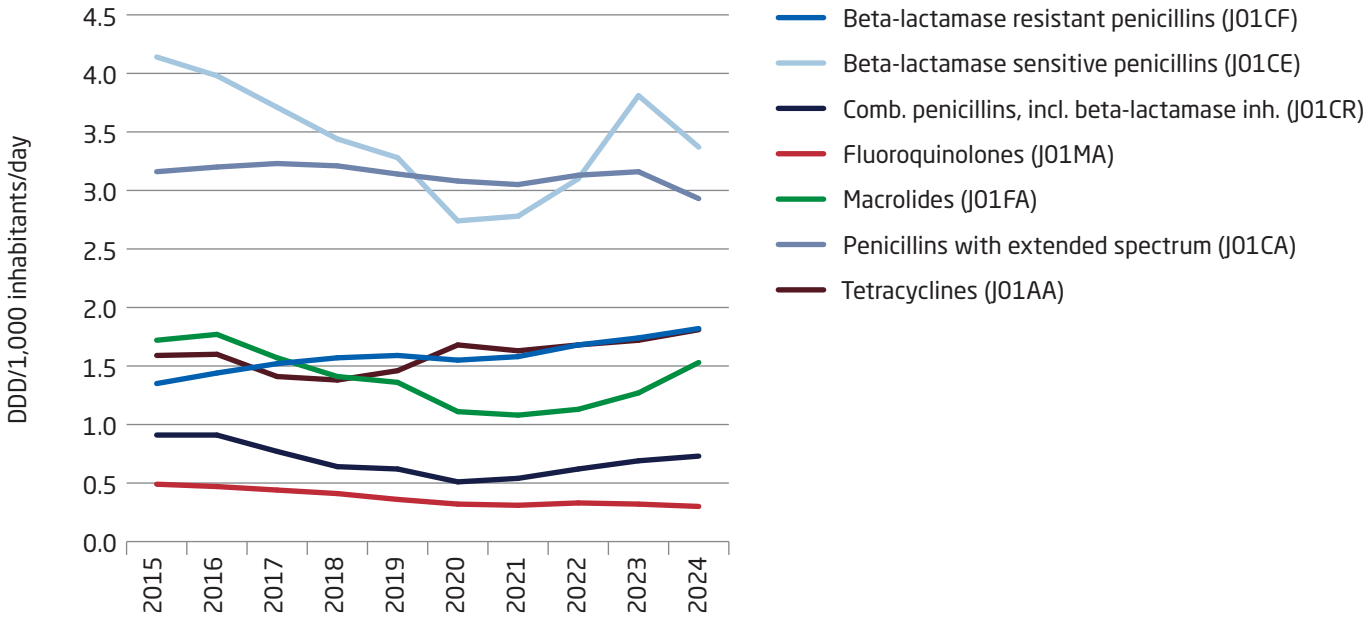


WHO Access, Watch, Reserve (AWaRe) classification of antibiotics for evaluation and monitoring of use, 2017. Geneva: World Health Organization; updated 2023 (WHO-MHP-HPS-EML-2023.04)

Antimicrobials in primary health care

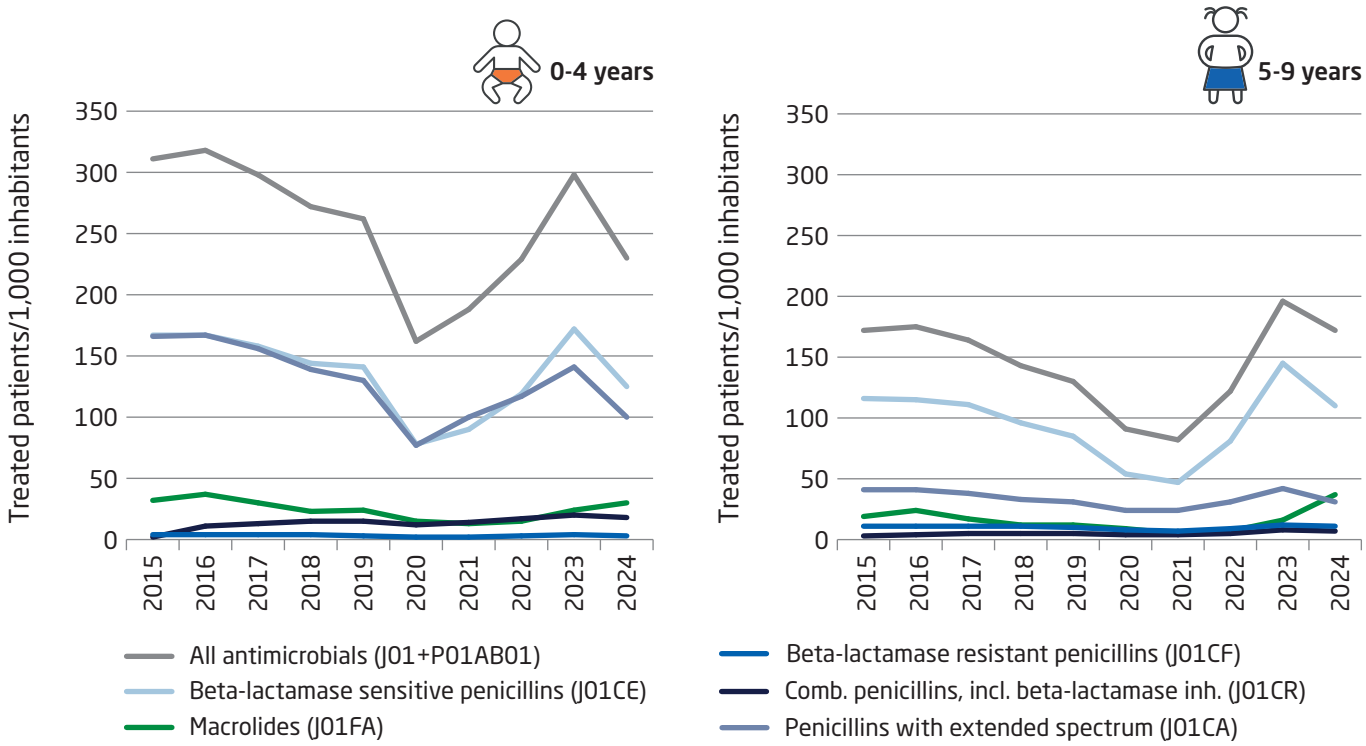
The COVID-19 related increase in cumsption of beta-lactamase sensitive penicillins discontinued in 2024 (-11.6% from 2023 to 2024) probably due renormalized circulation of airway (Figure 3.3). However, beta-lactamase sensitive penicillins was still the largest antimicrobial group in primary health care in Denmark, accounting for 24% in 2024, which is in line with Danish treatment guidelines.

Figure 3.3 Consumption of leading antimicrobial groups for systemic use in primary health care, DDD per 1,000 inhabitants per day, Denmark, 2015-2024



On the other hand, consumption of macrolides increased by 21% from 2023 to 2024, probably due to the Group A streptococcal pandemic in 2023 and 2024, mainly among children and their parents. Among children, the decrease in consumption of beta-lactamase sensitive penicillins (up to 23%) and the increase in macrolide consumption (up to four times) are illustrated in Figure 3.4.

Figure 3.4 Consumption of main antimicrobial agents among children, treated patients/1,000 inhabitants, Denmark, 2015-2024



For the elderly, the consumption has been decreasing since 2016, with steeper decreases observed among elderly living at care homes. However, in 2024 the decreasing trend in consumption discontinued, and the consumption was unchanged for the first time when comparing to the previous year of 2023 (Figure 3.5). Elderly inhabitants living at care homes received 93% more antimicrobials than elderly inhabitants living in their own homes in 2024. Urinary tract infections were the main driver of the difference observed in treatment frequency based on residential status (1116 versus 459 prescriptions for urinary tract infections per 1,000 elderly inhabitants in 2024).

Figure 3.5 Consumption of antimicrobials (J01 and P01AB01) in primary health care for elderly inhabitants living in long term care facilities and for elderly inhabitants living in their own homes, Denmark, 2016-2024

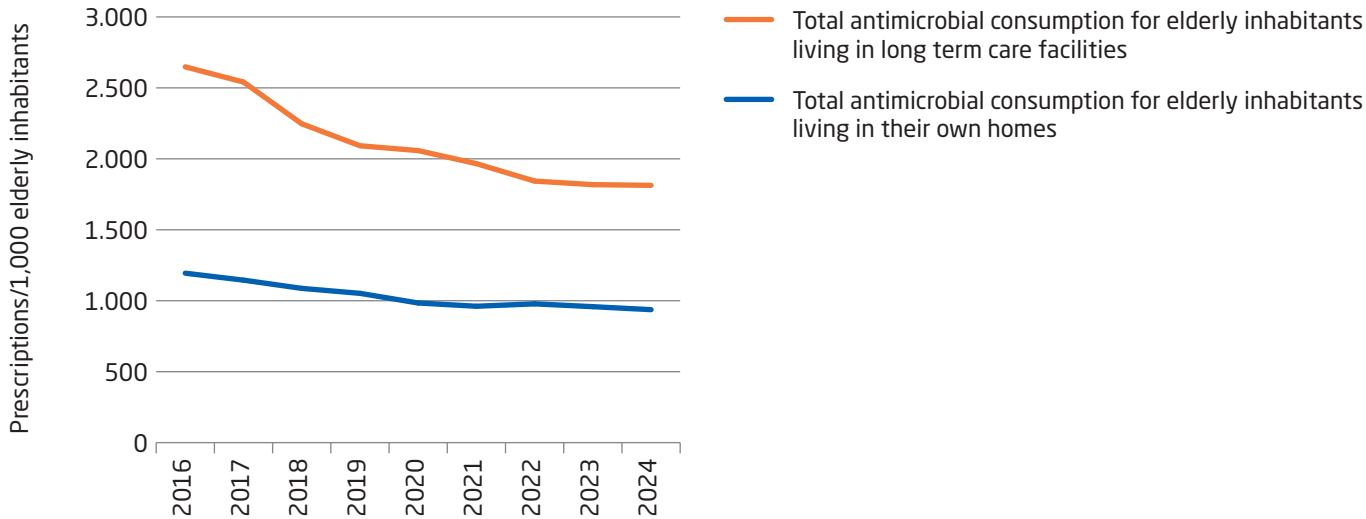
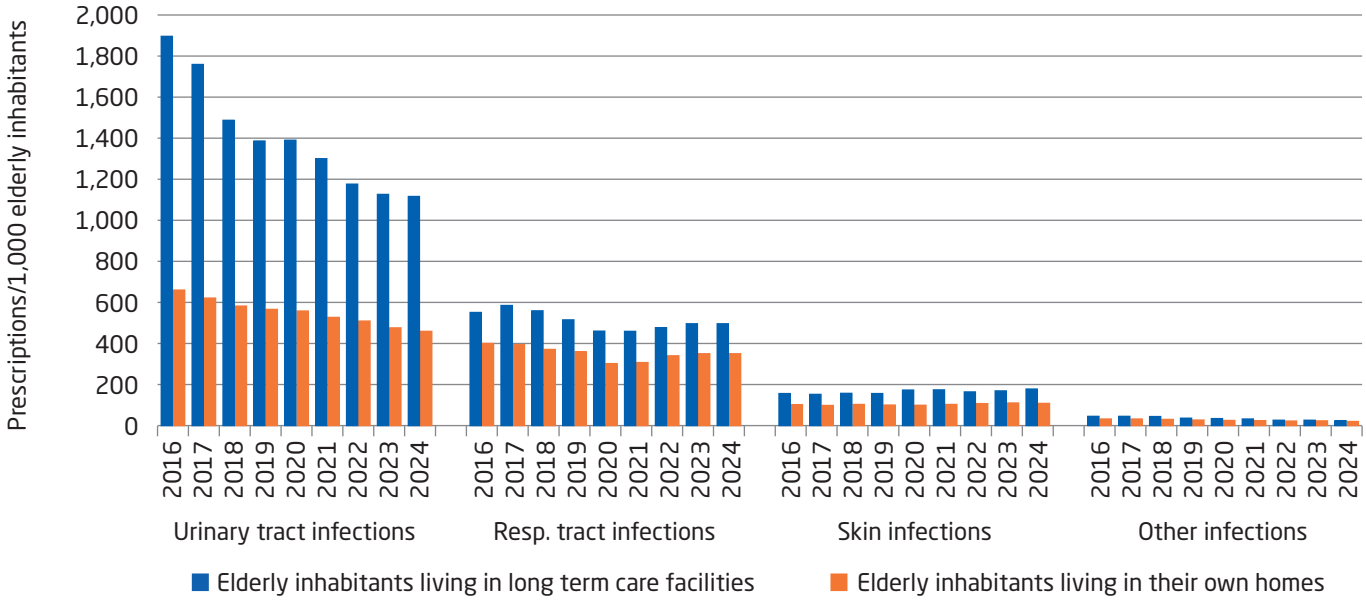


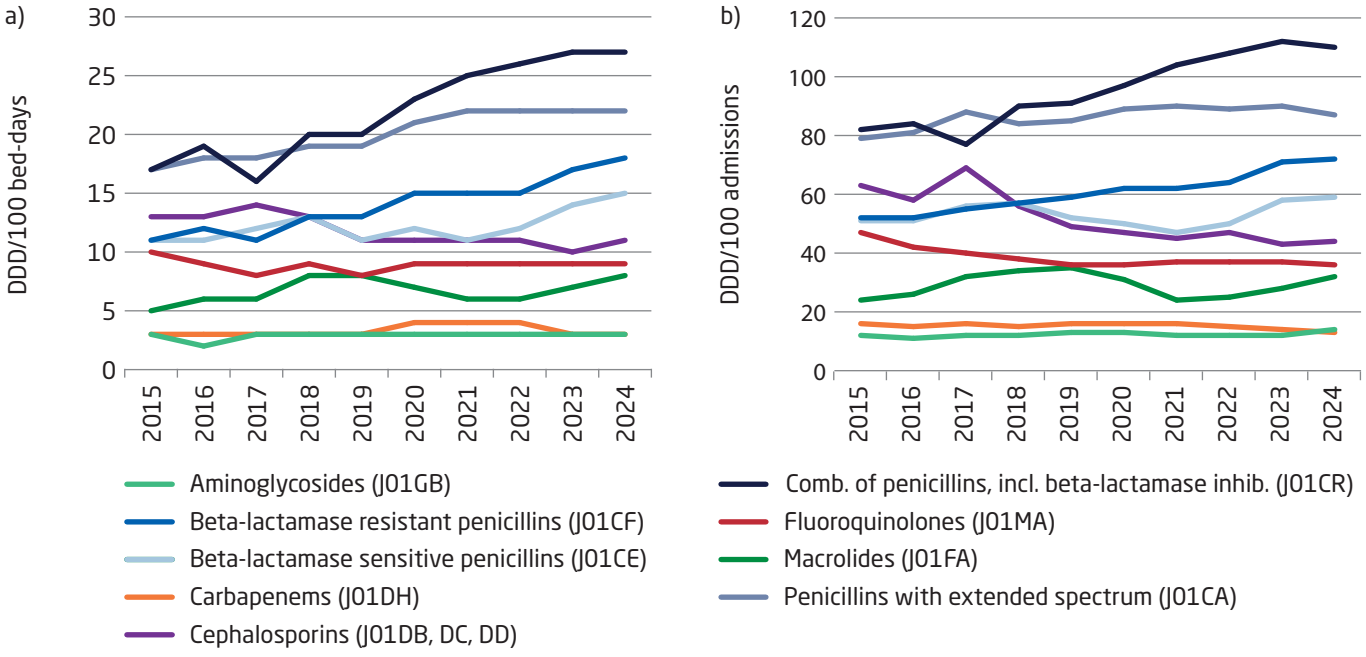
Figure 3.6 Treatment of infections in primary health care for inhabitants ≥65 years, Denmark, 2016-2024



Antimicrobials in hospital care

In hospital care, antimicrobial consumption in 2024 was similar to 2023 after several years with increasing trends when measuring in DDD per 100 bed-days or admissions (Figure 3.7). In particular, combinations of penicillins, including beta-lactamase inhibitors has shown steep increases in recent years but was 2-3% lower in 2024 compared to 2023. Simultaneously, consumption of beta-lactamase sensitive penicillins has increased by 20% since 2022 (DDD per 100 bed-days).

Figure 3.7 Antimicrobial consumption at somatic hospitals by antimicrobial group, a) DDD per 100 bed-days and b) DDD per 100 admissions, Denmark, 2015-2024



Over the last decade consumption of critically important antimicrobials (cephalosporins, carbapenems and fluoroquinolones) has decreased continuously and by 13% in 2024. This reflects the long-standing efforts in everyday clinical practice to keep the consumption low. Also, the national action plan on antimicrobials in human healthcare published in 2017 presented a goal fof 10% decrease in consumption of critically important antimicrobials and the recent action plan published in June 2025 further encourages the positive development.