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AGENZIA ITALIANA DEL FARMACO

2025 AIFA Report

on Antibiotics

Rising consumption and misuse push up bacterial resistance to antibiotics

Consumption of antibiotics is increasing, with peaks of up to 40% in the winter months that suggest their improper use against influenza and para-influenza viruses, against which they are ineffective. Almost half of the geriatric population uses antibiotics at least once a year, with peaks of more than 60% in the South. Rise in paediatric prescriptions. Consumption is also increasing in hospitals, where bacteria resistant to antimicrobial therapies are circulating more than elsewhere. European record of consumption of stomach antacids altering the intestinal bacterial flora can favour the selection of resistant germs. Thus, the Drug Resistence Index (DRI), which combines antibiotic consumption and drug resistance in a single measurement, increases in most regions for some important micro-organisms such as *Escherichia coli, Streptococcus pneumoniae* and *Enterococcus faecium*, threatening to claim even more lives than the 12,000 deaths estimated in Italy by ECDC, the European Centre for Disease Control.

The figures of the AIFA Report on antibiotic consumption in 2023 show that there is still much to do to combat the silent pandemic of bacteria increasingly resistant to drug therapies. The Report, from a One Health perspective and as provided for in the National Antimicrobial Resistance Plan, provides a detailed analysis of human antibiotic consumption in the human, as well as a comparison with veterinary consumption and correlation analyses between antibiotic consumption and resistance.

Consumption and inappropriate use

In 2023, the **overall consumption of antibiotics for systemic use**, both public and private, amounted to 22.4 average daily doses per thousand inhabitants, a 5.4% increase compared to 2022 and an even higher variation when considering only antibiotics dispensed at a local level (+6.3%). A trend in contrast to the 14.4% decrease in consumption under approved care regime that was observed in the period 2013-19, to -23.6% in the period 2019-20 and to the 4% decrease in 2021. The **consumption of antibiotics for non-systemic, i.e. local use**, which was 28 average daily doses per thousand inhabitants, also increased by 4.3% compared to 2022.

If there is a quantitative reversal of the negative trend, things are not better in terms of quality, because at the same time as consumption increases, there is an increase in the prescriptions of broad-spectrum molecules compared to those with a narrower spectrum, although they are at higher risk of generating microbial resistance. With 54.4% of the prescriptions for antibiotics belonging to the '**Access' group**, i.e. those that should be used as a first or second choice treatment for the most frequent infections due to a lower risk of generating resistance, Italy is still well below the 65% target set by the Recommendation of the Council of the European Union (EU) of 26 April 2023. Although it accounts for a minority share of consumption, particular attention is paid to monitoring consumption in **hospitals**, where healthcare-related infections caused by multidrug-resistant germs are on the rise and where 84 doses were administered every 100 days of hospitalisation, a 1.3% increase compared to the previous year. This is part of a negative trend, which in 2019-23 recorded an 8.8% increase in consumption at a national level, in contrast to the target of a 5% reduction in 2025 over 2022 set out in the **National Antimicrobial Resistance Plan.**

Also in 2023, there was strong **regional variability**, with higher consumption in the South, with 18.9 average daily doses per thousand inhabitants purchased in pharmacies under approved care regime, compared with 12.4 in the North and 16.4 in the Centre. This is an uneven trend in consumption at a regional level, which can also be an index of inappropriate prescription. However, this must be contextualised to the different regional health systems, because the precautionary prescription of antibiotics by doctors can also be explained by the difficulties, especially in the South, of quickly accessing diagnostic services, without which it is difficult to exclude complications that require the use of these drugs.

The same applies to the **seasonal variation** in consumption, in the period October-March compared with the period April-September, which returned to high levels in the two years 2022-23, with consumption 40% higher in the cold months, while in the two years 2023-2024 it recorded a new reduction to +25%. Such peaks suggest improper use against influenza and parainfluenza syndromes. This is also confirmed by the contextual analysis of trends in antibiotic consumption and the incidence of influenza syndromes.

From 2022 to 2023, the share of children up to 13 years of age who have received at least one prescription of antibiotics for systemic use increased from 33.7 to 40.9%, which is 48% among those over 65, a 1.5% increase compared to 2022. In the **paediatric** field, the data show a preference for broad-spectrum molecules in the Central and Southern Regions compared to Northern Regions, indicating a problem of inappropriate prescription, which requires targeted measures.

Compared with the EU, as for overall consumption of antibiotics at local level, Italy ranks seventh among the countries with the highest consumption, with levels above the European average of more than 15%. The same goes for consumption in the hospital sector, where Italy ranks sixth in the EU. The differences are not only related to the amount of antibiotics consumed, but also to the prescription appropriateness. Italy has, in fact, a much higher ratio of consumption of broad spectrum molecules compared to narrower spectrum molecules than the European average (13.6% against 5.5%) and in the hospital sector a higher percentage of the consumption of broad spectrum or last-line antibiotics on the total consumption in this care setting (52.5% against 40.15%).

Increased drug resistance

After a decline in consumption and **bacterial resistance** in the first two years of the pandemic, both values started to grow again. Thus, *Escherichia coli*, which also generates bloody forms of diarrhoea, rose from a third-generation cephalosporin resistance rate of 23.8% in 2021 to 26.7% in 2023. Following the EMA recommendations on a more limited use of fluoroquinolones, a class of antibiotics subject to bacterial resistance and side effects of a certain magnitude, consumption fell from 70 million doses in 2018 to around 24 in 2023, while *Escherichia coli* bacterial resistance fell from around 40% to 34.1%. On the other hand, there is still a high resistance to third-generation cephalosporins by *Klebsiella pneumonie*, which infects the urinary tract with a mortality rate of up to half of cases. The proportion of resistant cases rose slightly from 52.7% to 55.2% from 2018 to 2023. For the same bacterium, resistance to fluoroquinolones has been stable at 50% over the last three years. From 2018 to 2023, resistance to macrolides of *Streptococcus pneumonie*, which causes pneumonia, sepsis and meningitis, rose from 20.3 to 26.2%.

AIFA's President Robert Nisticò: "Antibiotic resistance costs our NHS EUR 2.4 billion"

"Antibiotic resistance is a silent pandemic, which according to the latest estimates by ECDC not only causes 12,000 deaths a year in our country, but also generates economic damage. According to estimates by the European Agency, it has an annual cost for our NHS of EUR 2.4 billion, with 2.7 million beds occupied due to these infections", says **AIFA's President Robert Nisticò**. "For this reason, in the face of this emergency – he continues – a comprehensive approach is needed, which on the one hand promotes the conscious use of antibiotics, including in the veterinary field, and on the other hand strengthens prevention action, especially in hospitals, where bacteria resistant to antibiotics are widely more widespread." "This – concludes Nisticò – without neglecting, through incentives and regulatory simplifications, the search for new antimicrobial drugs capable of circumventing current resistances".

AIFA's Technical-Scientific Director Pierluigi Russo: "Pay attention also to the excessive use of stomach antacids"

However, the phenomenon of antibiotic resistance is also fuelled by the not-always-appropriate use of anti-acid medicines. "Italy is the first European country in the consumption ranking of proton pump inhibitors, used mainly against esophageal reflux. These medicinal products – explains **AIFA's Technical and Scientific Director Pierluigi Russo** – if used in excess, can alter the intestinal microbial flora, favouring the selection of multi-resistant germs, such as *clostridium difficile*. This is why it is necessary to combat the do-it-yourself or inappropriate use of this category of medicines, which, in addition to other side effects, exacerbates the problem of antimicrobial resistance, which is now a major public health emergency".

Massimo Andreoni (Simit): "Against antibiotic resistance, strategic use of vaccines required"

"As the World Health Organisation reminds us, one of the strategies to be used to combat antibiotic resistance is vaccination. By getting vaccinated – explains **Massimo Andreoni, Scientific Director of Simit (Italian Society of Infectious and Tropical Diseases)** – we do not encounter respiratory infections, for which antibiotics are otherwise used, often incorrectly because in most cases they are viral infections". "A study published years ago in the Lancet but still relevant – continues Andreoni – estimates that only universal coverage with conjugated pneumococcal vaccine could prevent 11.4 million days of antibiotic therapy per year in children under 5 years of age. A 47% reduction in antibiotics used to treat pneumonia caused by *Streptococcus pneumoniae*. The same goes for vaccination against rotarivirus or respiratory syncytial virus. Vaccination – concludes Andreoni – therefore allows us not to take antibiotics incorrectly and to create within our body microorganisms that are antibiotic-resistant and therefore will cause great problems if we encounter these infections".

Maria Rosaria Campitiello (Ministry of Health): "Coordinated action and targeted measures to preserve the effectiveness of antibiotics"

"Antimicrobial resistance is one of the most urgent health challenges at global level, so much so that it was a core issue of the G7 Health, where Italy, for the first time – underlines **Maria Rosaria Campitiello, Head of the Department of Prevention, Health Emergencies and Research at the Ministry of Health** – allocated EUR 21 million to an international partnership for the development of new antibiotics. To counter this threat, the Ministry of Health, under the leadership of Minister Schillaci, has strengthened the National Antibiotic Resistance Plan (PNCAR) 2022-2025, adopting a One Health approach to monitor and prevent the spread of resistant microorganisms. With an annual budget of EUR 40 million, the plan now has the structural resources to ensure its continuity. In addition, the Budget Law 2025 provided for a fund of EUR 100 million to boost the development of and access to new innovative antibiotics. In parallel, in collaboration with AIFA, we promote awareness campaigns for a more responsible use of these drugs and strengthen hospital infection prevention strategies. Only with coordinated action and targeted measures can we preserve the effectiveness of antibiotics and protect public health."