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Fighting Antimicrobial Resistance in EU and EEA countries

EMBRACING A ONE HEALTH APPROACH








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Key findings

- Antimicrobial resistance (AMR) – the ability of microbes to gain resistance to the very antibiotics intended to fight them – is amongst the top global health challenges today. Misuse of antimicrobials in human and animal health remains a key driver of AMR. While, in the last few years, the European Union (EU)/European Economic Area (EEA) countries made significant progress in tackling AMR, there is still room for improvement:
  - In 2019, the sales of antibiotics for human health averaged at 22.2 defined daily doses (DDD) per 1 000 inhabitants per day, remaining 3.4% above the 2000 levels. Without policy action, antibiotic consumption in human health could further increase by 5.1% by 2035 compared to 2019.
  - The average total veterinary antibiotic sales used in chicken, cattle and pig systems more than halved since 2000 and projections suggest a considerably smaller decrease for the next 12 years. But veterinary antibiotic sales still account for about 60% of total sales of active antimicrobial substance across the region.
- Fuelled by inappropriate antibiotics use, resistance proportions for 12 antibiotic-bacterium combinations grew by 3 percentage points between 2009 and 2019 in the EU/EEA countries and, today, more than one in five bacterial infections are caused by resistant organisms. If historical trends continue, the average resistance proportions are expected to remain mostly flat by 2035. But worrisome trends are expected unless there is stronger policy action:
  - An 8-fold difference will persist in the estimated average resistance proportions across the EU/EEA countries with the highest and lowest prevalence.
  - Resistance to last resort drugs is expected to grow significantly, making it more challenging and costly to treat difficult to treat infections. Resistance to second-line antibiotics is projected to increase by nearly 45% by 2035 compared to the 2005 levels whereas resistance to third-line antibiotics (e.g. carbapenems) could reach 3.2 times higher in the same period.
- High resistance rates will put considerable pressure on the European hospitals. Every year, patients spend more than 9.5 million extra days in hospitals to receive treatment for resistant infections and their consequences. This is roughly equivalent to using the entire acute bed capacity in a country such as Portugal in 2020 for a whole year.
- Every year, higher health expenditure and reduced workforce productivity due to AMR costs to the EU/EEA countries nearly EUR 11.7 billion (almost EUR 24 per capita), adjusting for purchasing power parity (PPP). Around 56% of the total cost of AMR, approximately EUR PPP 6.6 billion, is due to extra health expenditure whereas the remaining economic losses are due to reduction in participation in the workforce and reduced productivity gains.
- A review of the policies across the EU/EEA countries identified several priorities for action. First, while all the EU/EEA countries have developed national action plans to tackle AMR, only a fraction of them financed the implementation of these plans. In addition, countries should strengthen the nationwide implementation of best practices on promoting prudent use of antimicrobials and preventing the spread of infections in human and animal health, agri-food systems and the environment. They should also bolster their multisectoral surveillance systems and should invest in research and development (R&D) for new antimicrobials, vaccines and diagnostics.
- One Health action, closing many of the current policy gaps, is affordable and effective. Investing EUR PPP 3.4 per capita per year in a mixed package that involves policy action in human health and food sectors can prevent nearly 613 000 infections, avoid more than 10 000 deaths, save more than EUR PPP 2.5 billion in health expenditure and yield around EUR PPP 2.3 billion in productivity gains. Every Euro invested in this package is expected to return nearly EUR PPP 3 in economic benefits.

Antibiotic consumption: more progress in agri-food systems than in human health

The EU/EEA countries[1] have been at the forefront of promoting prudent use of antimicrobials both in humans and the agri-food system. In the human health sector, initiatives primarily aimed at promoting guidelines and best practices to encourage using the most appropriate antibiotics and only when they are needed and at intended doses. In the agri-food sector, recent efforts focused particularly on legislative and regulatory initiatives that have forbidden antimicrobial use as growth promoters in the EU/EEA countries, that promoted prudent antimicrobial use outside of the European common market and optimised their use for other purposes (Council of the European Union, 2023[1]). Despite these efforts, there is still room for introducing and scaling up new policies, including setting clear targets for antibiotic consumption (Box 1).

Box 1. Setting measurable targets to monitor progress in antibiotic consumption

Globally, misuse of antibiotics in human and animal health remains a key driver of AMR. A crucial factor to address the misuse of antimicrobials is to set up measurable common international targets for antibiotic consumption that can help monitor and compare progress towards optimising antimicrobial use across sectors. Recognising this, the global community considered options to develop and adopt targets in the context of the Transatlantic Taskforce on AMR, the United Nations (UN) Sustainable Development Goals, Group of 7 (G7) and the 3rd Global High Level Ministerial Conference on Antimicrobial Resistance in 2022.

Despite the recent global efforts, there are currently no international common targets that can be used to monitor progress in optimising antimicrobial use. In Europe, the Council of the EU recently adopted a recommendation endorsing an EU-wide and country-specific reduction targets for antibiotic consumption, for key pathogens (e.g. Methicillin-resistant *Staphylococcus aureus*) and for the incidence of bloodstream infections (Council of the European Union, 2023[1]). The EU target for total antibiotic consumption in humans is a reduction of 20% by 2030. In animal health, EU/EEA countries have been spearheading efforts to set targets for optimising antimicrobial consumption. For example, a target of 50% reduction in overall EU sales of antimicrobials for farm animals and aquaculture was introduced when the European Commission (EC) rolled out the Farm to Fork Strategy and the Zero Pollution Action Plan in 2021 (Council of the European Union, 2023[1]; EC, 2020[2]; EC, 2021[3]). Moving forward, the EC aims to support the progress towards this target amongst others, by strengthening the collection and reporting of relevant and comparable data on the volume of sales of antimicrobial veterinary medicinal products and the use of antimicrobial medicinal products per animal species.

Source: (Council of the European Union, 2023[1]; EC, 2020[2]; EC, 2021[3])

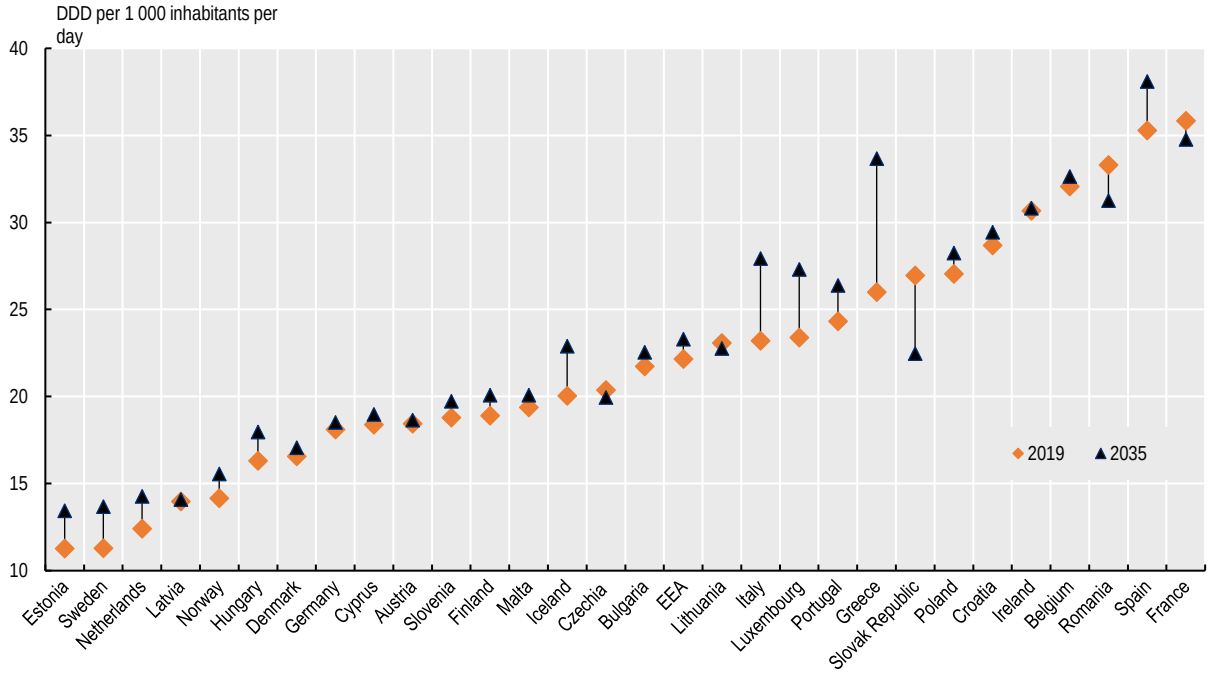
[1]The EU/EEA countries included in the OECD analysis are: Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic (hereafter “Czechia”), Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, the Slovak Republic, Slovenia, Spain and Sweden.

Despite these positive developments, recent trends in antibiotic sales show that there is no room for complacency in the fight against AMR. Specifically:

- The latest data show that average sales[2] of antibiotics for human health in 2019 stood at 22.2 DDD per 1 000 inhabitants per day, corresponding to a 7.5% decline since 2009. Yet, the level of antimicrobial consumption in 2019 remained 3.4% higher than the 2000 levels. OECD projections indicate that without robust policy action, the average antimicrobial sales in human health in the EU/EEA countries could increase by 5.1% by 2035 compared to the 2019 levels (Figure 1).
- The average total veterinary antibiotic sales used in chicken, cattle and pig systems more than halved since 2000, standing at 66.3 milligram of antimicrobial per kilogram of food animal in 2019 after adjusting for key factors (Tiseo et al., 2020[4]). Despite this improvement, veterinary antibiotic sales still account for about 60% of total sales of active antimicrobial substance (ECDC, EFSA, EMA, 2021[5]). In addition, the OECD projections suggest that the sales of veterinary antibiotics in the EU/EEA countries are expected to decline at a slower pace than in the past, on average, by around 12% by 2035 compared to the 2019 levels.

Figure 1. All but 5 EU/EEA countries are projected to see a rise in antibiotic sales by 2035

Estimated average sales of all classes of antibiotics in human health between 2019 and 2035



Note: The EU/EEA average is unweighted. Countries are sorted by the level of antibiotic consumption in 2019.
Source: (OECD, 2023[6]), *Embracing a One Health Approach to Fight Antimicrobial Resistance*, https://oe.cd/amr-onehealth.

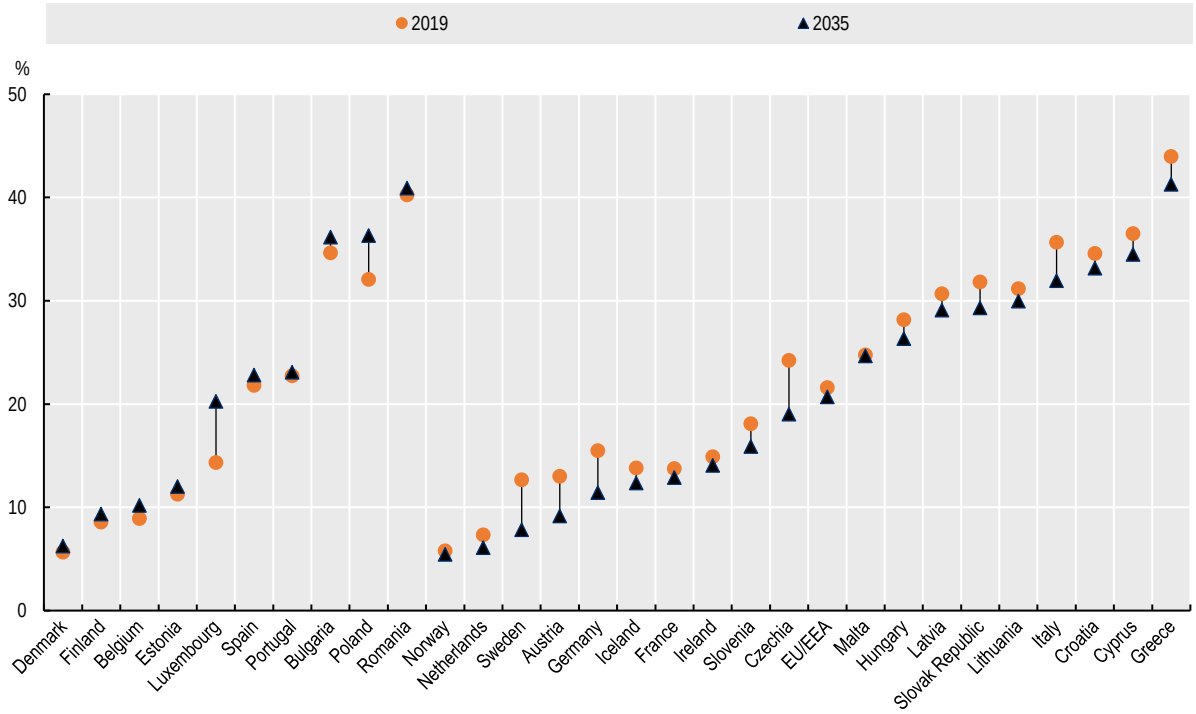
[2]The OECD estimates differ from those produced by the ECDC due to the differences in the data sources and the scope of the analyses. OECD analyses measure sales of antibiotics while ECDC analyses measure consumption. Antibiotic classes included in the OECD analysis include those monitored through ResistanceMap/IQVIA whereas the ECDC uses data from the European Surveillance of Antimicrobial Consumption Network (ESAC-Net). Despite these differences, general trends in antimicrobial consumption produced by the OECD and ECDC broadly match.

AMR will continue to grow in many EU/EEA countries

Despite the efforts to optimise antimicrobial consumption in human and animal health, EU/EEA countries saw a 3 percentage point rise in the resistance proportions for 12 antibiotic-bacterium combinations since 2009.[3] The average resistance proportions in the EU/EEA countries stood at nearly 22% in 2019. This means that today, organisms resistant to antimicrobials cause more than one in every five bacterial infections in EU/EEA countries. In 2019, there was a nearly 8-fold difference in the estimated average resistance proportions across the EU/EEA countries with the highest and lowest prevalence. The OECD projections suggest that the average resistance proportions for the 12 antibiotic-bacterium combinations in the EU/EEA countries will remain mostly flat between 2019 and 2035, though one-third of these countries will see a rise in their AMR rates (Figure 2). Complicating this, the long-term impact of the COVID-19 pandemic on AMR remains unknown, particularly for the spread of resistant pathogens in healthcare settings (ECDC, 2022[7]).

Figure 2. One-third of EU/EEA countries will see a rise in AMR rates by 2035 compared to 2019

Percentage of infections caused by resistant organisms in the EU/EEA countries, 2019 and 2035



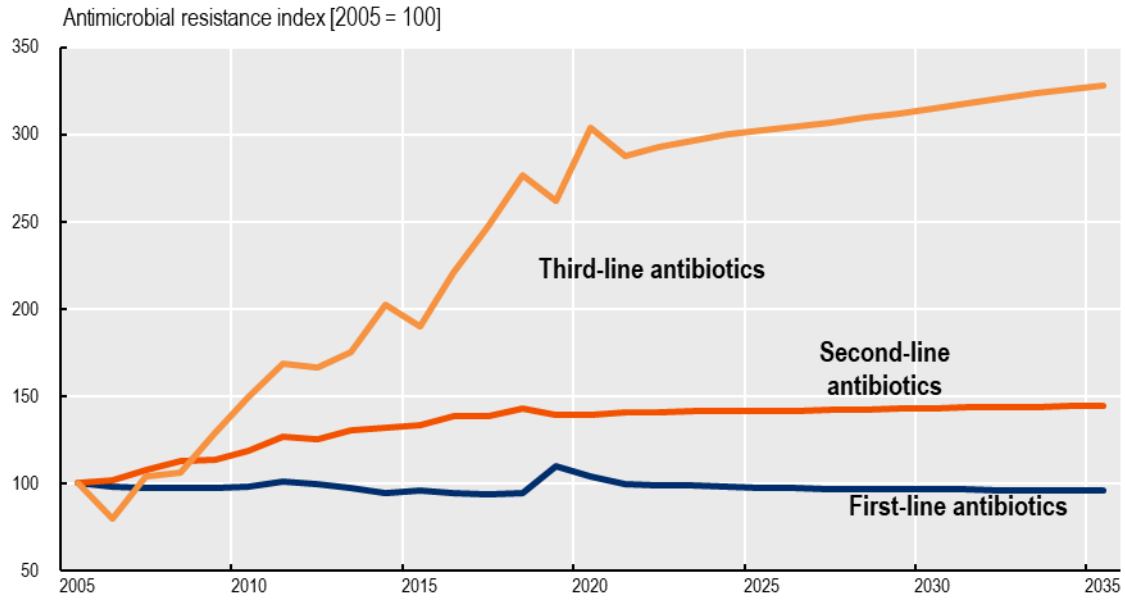
Note: For countries on the left of this graph, resistance proportions are projected to be higher in 2035 compared to 2019. For countries on the right, resistance proportions are projected to be lower in 2035. The EU/EEA countries' average is unweighted.
Source: Based on Figure 2.6. in (OECD, 2023[6]), *Embracing a One Health Approach to Fight Antimicrobial Resistance*, https://oe.cd/amr-onehealth.

[3] Twelve priority antibiotic-bacterium combinations included in the analysis are vancomycin-resistant *Enterococcus faecalis* (*E. faecalis*), vancomycin-resistant *E. faecium,* third-generation cephalosporin-resistant *E. coli*, carbapenem-resistant *K. pneumoniae*, third-generation cephalosporin-resistant *K. pneumoniae*, carbapenem-resistant *Pseudomonas aeruginosa* (*P. aeruginosa*), meticillin-resistant *S. aureus*, penicillin-resistant *Streptococcus pneumoniae* (*S. pneumoniae*), fluoroquinolone-resistant *A. baumannii*, carbapenem-resistant *A. baumannii*, fluoroquinolone-resistant *E. coli* and carbapenem-resistant *E. coli*.

Without robust policy action, today's worrisome trends in the EU/EEA countries will become much worse by 2035:

- Resistance to 12 antibiotic-superbug combinations is expected to remain dangerously high in the EU/EEA countries with the highest prevalence (e.g. Greece and Romania) by 2035.
- Rising resistance to second- and third-line antibiotics – last-resort drugs against difficult to treat infections – is another alarming trend facing EU/EEA countries (Figure 3). The OECD analysis suggests that in the EU/EEA countries, resistance to second line antibiotic can increase by nearly 45% by 2035 compared to the 2005 levels whereas resistance to third-line antibiotics could reach 3.2 times higher in the same period.
- The growth in resistance to the second- and third-line antibiotics across the EU/EEA countries is expected to outpace the growth in resistance in OECD and Group of 20 (G20) countries. A rising resistance to last-resort antibiotics means that it will become more difficult and costly to treat many resistant infections and carry out life-saving medical procedures (e.g. cancer treatment and organ transplantation).

Figure 3. In EU/EEA countries, resistance to last-resort drugs could more than triple by 2035 compared to the 2005 levels

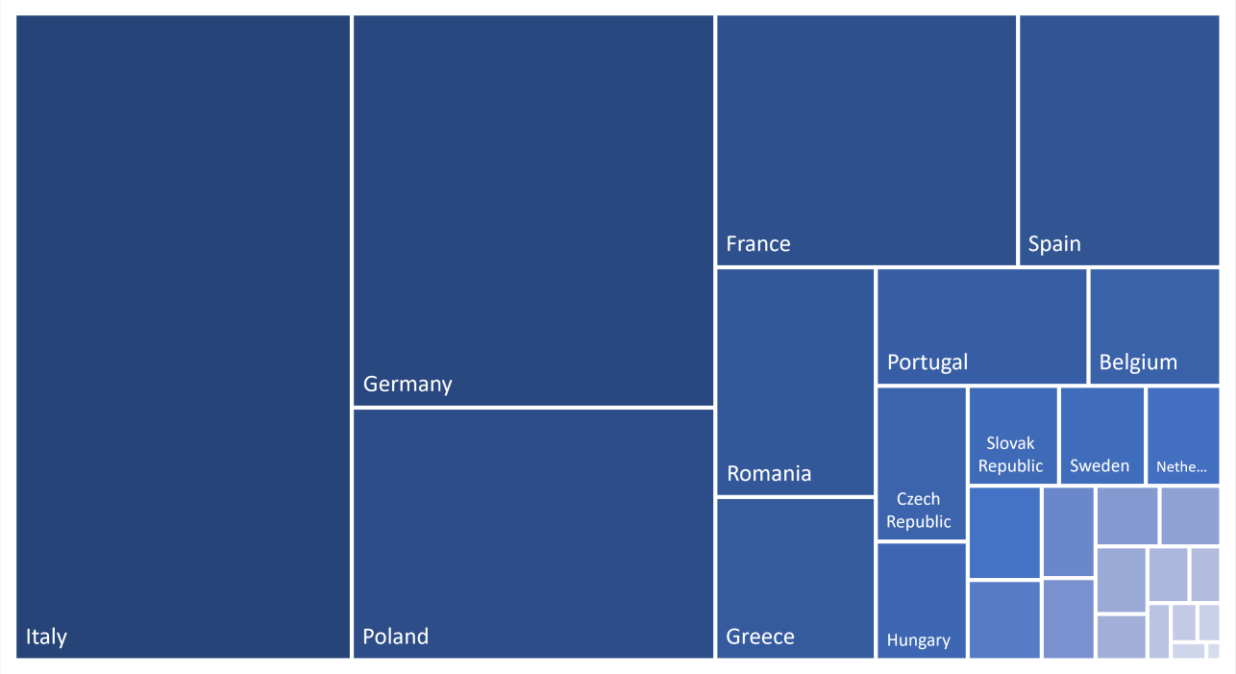


Note: Data were normalised to average antimicrobial resistance in 2005 (equal to 100) for each treatment line (e.g. a value of 130 for resistance to third-line antibiotics in 2015 in EU/EEA countries means that resistance to the third-line antibiotics is 30% higher than it was in 2005 in EU/EEA countries). Historical data go from 2005 to 2020, and forecasts start in 2021.
Source: Based on Figure 2.8 in (OECD, 2023[6]), *Embracing a One Health Approach to Fight Antimicrobial Resistance*, https://oe.cd/amr-onehealth.

Resistant infections put hospitals under strong pressure

The high levels of AMR exert a growing burden on hospital resources that undermines the resilience of healthcare systems.[4] Patients with resistant infections risk staying in hospitals longer due to a combination of factors such as a higher risk of complications and slower recovery from illness. The OECD analysis suggests that across the EU/EEA countries, patients spend more than 9.5 million extra days in hospitals per year to receive treatment for resistant infections and their consequences (Figure 4). This is roughly equivalent to using the entire acute bed capacity in a country such as Portugal in 2020 for a whole year. Cross-country variation reflects the differences in the incidence of infections and in practices for treating resistant infections. The extra pressure on hospital resources is particularly worrisome considering that the hospitals across the EU/EEA countries have been overwhelmed since the COVID-19 pandemic.

Figure 4. Across the EU/EEA countries, patients spend 9.5 million extra days in hospitals every year to receive treatment for the consequences of resistant infections



Note: Countries are shown in descending order of extra days spent in hospitals due to AMR: Italy (2 666 221), Germany (1 751 402), Poland (1 121 940), France (938 677), Spain (630 583), Romania (449 576), Greece (319 657), Portugal (308 253), Belgium (192 148), Czechia (174 844), Hungary (133 251), the Slovak Republic (111 576), Sweden (105 960), the Netherlands (92 126), Austria (85 199), Ireland (72 505), Bulgaria (60 398), Denmark (53 969), Croatia (47 502), Finland (45 486), Lithuania (42 846), Norway (29 270), Slovenia (29 036), Cyprus (21 993), Latvia (16 297), Malta (12 679), Estonia (11 340), Luxembourg (7 884) and Iceland (3 264).
Source: Based on Figure 3.2. in (OECD, 2023[6]), *Embracing a One Health Approach to Fight Antimicrobial Resistance*, https://oe.cd/amr-onehealth.

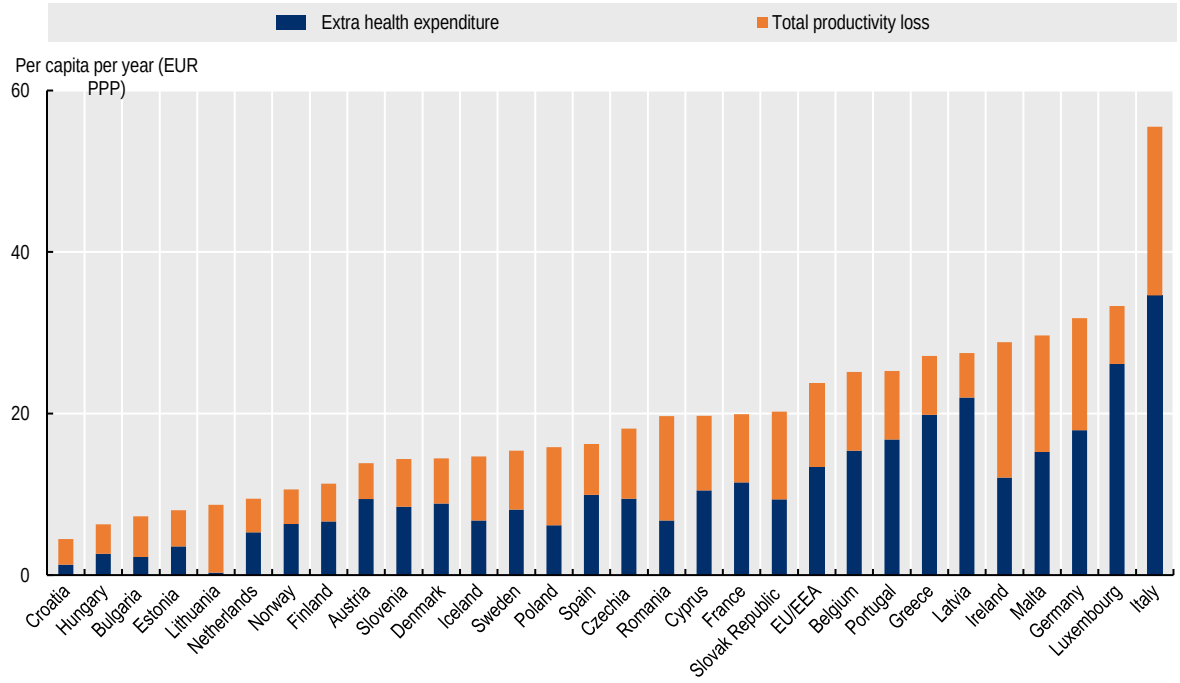
[4]Results presented in this brief show the total economic burden of AMR, that in the report is referred to as the 'Elimination Scenario'. Alternatively, the economic burden of AMR can be calculated as the incremental cost caused by AMR over an equal number of susceptible infections (i.e. 'Replacement Scenario'), which is also widely used in the literature, including in the previous OECD publication on AMR (OECD, 2018[17]). Additional information and a comparison between these two scenarios can be found in (OECD, 2023[6]).

The EU/EEA countries are paying a heavy price for AMR

The European Centre for Disease Prevention and Control (ECDC) estimates that in 2020, more than 865 000 resistant infections occurred across the EU/EEA countries and more than 35 000 people lost their lives due to resistant infections every year (ECDC, 2022[8]). The OECD analysis suggests that the cost of AMR to the EU/EEA economies reaches nearly EUR PPP 11.7 billion a year (Figure 5), corresponding to almost EUR PPP 24 per capita. This is roughly equivalent to one-third of the gross domestic product in a country like Estonia in 2020.

Around 56% of the total cost of AMR, corresponding to approximately EUR PPP 6.6 billion, are attributable to extra health expenditure incurred from treating resistant infections and their consequences (around EUR PPP 13.4 per capita).[4] The remaining 44% of the total costs consists in economic losses due to reduced workforce participation and productivity and amounts to around about EUR PPP 10.4 per capita.

Figure 5. In EU/EEA countries, the annual cost of AMR averages almost EUR PPP 24 per capita through extra health spending and loss of productivity at work



Note: Productivity loss refers to reduction in participation in the labour market and reduced productivity at work. Results for Greece are not directly comparable to other countries, because data for *S. pneumoniae* in Greece was not available.
Source: Based on Figures 3.9. and 3.11. in (OECD, 2023[6]), *Embracing a One Health Approach to Fight Antimicrobial Resistance*, https://oe.cd/amr-onehealth.

[4]See Note 4.

It is time to step up the One Health policy action in Europe

A recent assessment by the European Commission's Health Emergency Preparedness and Response Authority indicated that AMR is among the top-3 health threats facing the EU countries, together with pathogens of high pandemic potential and chemical, biological, radiological and nuclear threats (EC, 2022[9]). Today, all EU/EEA countries have a national action plan to tackle AMR (AMR-NAP) (Health and Food Safety Directorate-General, 2022[10]). In addition, many EU/EEA countries and the EC help shape the global AMR agenda (Box 2).

Box 2. The EU/EEA countries contribute to shaping the global health priorities to tackle AMR

The EU/EEA countries explicitly acknowledge that a global response is key to tackling AMR and actively encourages international co-operation in the context of the UN, G7, G20, the Food and Agriculture Organisation of the UN, the UN Environment Programme, the World Organisation for Animal Health and the World Health Organization.

Considering the urgency of tackling AMR, the EU and its Member States actively participate in many initiatives to shape the global priorities in the AMR agenda. For example, the EU's Global Health Strategy places AMR squarely at the centre of the global health agenda and calls for multisectoral action grounded in the One Health approach – a multidisciplinary and multisectoral approach that promotes co-ordinated policy action across human and animal health, agri-food systems and the environment (EC, 2022[11]). Importantly, EU/EEA countries and the EC remain a key funding source for supporting the AMR agenda in low- and middle-income countries. It is estimated that in 2020, approximately one-third of all development assistance allocated to addressing resistant infections was provided by the EU/EEA countries through various channels including bilateral funding and the EC (IHME, 2023[12]).

Source: (EC, 2022[11]), EU Global Health Strategy; (IHME, 2023[12]), Development Assistance for Health Database 1990-2021.

Yet, challenges remain. A recent review by the EC reported that only 2 out of 27 EU/EEA countries have allocated a budget to support the implementation of the AMR-NAPs whereas 12 countries have limited budgets and 13 countries do not have any budget (Health and Food Safety Directorate-General, 2022[10]). There are also gaps in the implementation of One Health action. By 2023, all EU/EEA countries established mechanisms to co-ordinate multi-sectoral policy action. But only 11 countries adopted integrated approaches to implementing their national action plans for AMR, with relevant data and lessons learnt from all sectors being used to fine-tune the policy implementation.

OECD analysis highlights the following policy priorities for action for the EU/EEA countries (Figure 6):

- Strengthening antimicrobial stewardship programmes in line with international standards and best practices across human and animal health, as well as agri-food systems.
- Scaling up nationwide implementation of programmes for infection prevention and control.
- Investing in more robust surveillance systems across sectors.
- Enhancing farm biosecurity and scaling up best practices in food handling.
- Raising AMR awareness in the general public and improving training and education for prescribers.
- Bolstering investments in research and development for new antibiotics, vaccines and diagnostics (Box 3).

Figure 6. Important gaps persist in the implementation of policies to tackle AMR

Optimising ATB use in human health	Optimising ATB use in animal health	Infection prevention and control	Monitoring AMR in human health	Monitoring ATB consumption in human health	AMR training in human health	Raising AMR awareness	Farm biosecurity for terrestrial animals	Best practices in food processing
LU	MT	PL	LU	LU	CY	BG	NL	LU
CY	EL	IT	EL	PL	LU	EL	MT	PL
LV	LU	LU	IE	SK	BG	HU	LU	FI
LT	PL	LV	SI	NO	EL	PL	CY	MT
HU	IT	SI	MT	CY	HU	EE	PL	IT
PL	ISL	CY	PL	BG	PL	FI	IT	ISL
IT	SK	EE	SK	EE	EE	HR	ISL	SI
CZ	BG	LT	NO	LV	HR	IE	SK	EE
ISL	HR	CZ	CY	FI	IE	IT	BG	EL
BG	SI	ISL	BG	LT	LV	LT	HR	SK
HR	NL	SK	EE	IT	BE	LV	EL	BG
SI	AT	BG	LV	DE	CZ	SI	SI	HR
EE	LV	DE	FI	FR	ISL	BE	EE	HU
SK	ES	HU	LT	EL	FI	CY	DE	CY
DE	HU	BE	IT	HU	IT	CZ	CZ	LT
BE	CY	SE	DE	HR	SI	DE	PT	NL
IE	EE	DK	HU	IE	DE	ISL	AT	AT
FI	DE	EL	BE	BE	SE	LU	LV	LV
ES	CZ	IE	CZ	CZ	AT	MT	ES	ES
FR	PT	MT	ES	ISL	DK	PT	HU	SE
AT	IE	NO	NL	SI	LT	SK	IE	DE
SE	FI	FI	FR	SE	MT	SE	FI	CZ
DK	SE	ES	HR	AT	PT	AT	SE	PT
EL	LT	NL	ISL	DK	SK	DK	LT	IE
MT	BE	FR	SE	MT	ES	ES	BE	BE
NO	FR	HR	AT	PT	FR	FR	FR	FR
NL	DK	AT	DK	ES	NL	NL	DK	DK
PT	NO	PT	PT	NL	NO	NO	NO	NO

Notes: ATB = Antimicrobial use; Grey = no implementation, light blue = first stage of implementation, medium blue = second stage of implementation, blue = third stage of implementation, dark blue = most advanced stage of implementation.
Source: WHO, FAO, WOAH and UNEP (2023), Global Database for Tracking Antimicrobial Resistance Country Self- Assessment Survey 2023, https://amrcountryprogress.org/.

Box 3. The EU/EEA countries are making sizable investments in AMR R&D

While interventions aiming to optimise antimicrobial use and to prevent the spread of infections are crucial, solely focusing on these interventions will only postpone the arrival of a post-antibiotic world. Tackling AMR at a global scale requires that the time gained by scaling up these interventions is used to develop novel antimicrobials. Despite this urgent need, the R&D pipeline for AMR innovations is drying up. Currently, approximately 50 antibiotics are in different stages of clinical trials, 32 of which target pathogens identified in the WHO's priority list (WHO, 2020[13]).However, the vast majority of these antibiotics offer only marginal benefits in comparison to already existing antibiotics.

In Europe, ramping up investments in AMR R&D is considered as a policy priority. For example, in 2024, the EU will commence the second round of the Join Action on Antimicrobial Resistance and Healthcare-Associated Infections (JAMRAI-II). JAMRAI-II will provide funding for AMR R&D in key policy priority areas, with an overall budget exceeding EUR 62 million.

In addition, the EU/EEA countries and the EC are considering a wide range of pull and push incentives to revitalise the antimicrobial pipeline or to increase access to the existing antimicrobials (e.g. subscription payment models, market entry rewards and transferrable data exclusivity vouchers etc.) (European Observatory on Health Systems and Policies, 2023[14]). Among these options, subscription payment models, which delink access to antibiotics from revenues for producers, are already implemented in countries such as Sweden and the United Kingdom in order to ensure access to existing antimicrobials. More recently, the policy discussion also focused on transferrable data exclusivity vouchers whereby an antibiotic developer can be offered a voucher that would provide an additional year of data protection from competition for the specific medicine that the voucher specifies (EC, 2023[15]). Though this option may impose substantial financial burden on other therapeutic areas and have implications for the generic drug market.

Source: (European Observatory on Health Systems and Policies, 2023[14]; WHO, 2020[13]; EC, 2023[15])

Closing the current policy gaps with One Health actions saves lives and money

The EU/EEA countries have in their arsenal a wide range of options to close the policy gaps identified in Figure 6 and to tackle AMR in line with the One Health approach including (Table 1):

Table 1. One Health policies included in the OECD analysis

Hospital-based interventions	Community-based interventions	Policies outside of human health
• Strengthening antimicrobial stewardship programmes in human health. • Enhancing hand hygiene. • Enhancing environmental hygiene practices.	• Delayed antimicrobial prescribing. • Scaling up the availability of rapid diagnostic tests (RDTs). • Mass media campaigns to improve AMR awareness. • Increasing coverage of 23-valent pneumococcal polysaccharide vaccines (PVV23). • Using financial incentives to optimise antimicrobial use. • Improving health professional training and education.	• Enhancing food handling practices. • Improving biosecurity in farms.

Source: (OECD, 2023[6]), *Embracing a One Health Approach to Fight Antimicrobial Resistance*, https://oe.cd/amr-onehealth.

Results of a modelling-based analysis demonstrate that all the assessed policies are effective in limiting the deleterious impact of AMR on population health and the economy in the EU/EEA countries:

- **Hospital-based interventions** promise the greatest reductions in the number of AMR-related deaths. Strengthening stewardship programmes can help avoid the highest number of deaths due to resistant infections (nearly 2 700 deaths) per year across the EU/EEA countries. Infection prevention and control measures, such as improving hand hygiene and enhancing environmental hygiene, are also effective, with these interventions preventing around 1 600 and 1 750 deaths due to resistant infections every year respectively.

- **Community-based interventions** are also attractive investments. For example, across the EU/EEA countries, delayed antibiotic prescribing can help avoid more than 1 800 deaths due to resistant infections every year. A more systematic use of rapid diagnostic testing to inform therapeutic choices can avert over 1 700 deaths every year.

- **Outside of human health**, enhancing food handling practices and raising biosecurity standards are also effective improving population health and economic outcomes but the effectiveness of these interventions is estimated to be more modest.

One Health policy action is an affordable and valuable investment. 7 out of the 11 modelled interventions cost less than EUR PPP 1 per capita per year while others cost less than EUR PPP 2.1 per capita. This corresponds to only a fraction of the healthcare budgets in the EU/EEA countries, averaging at EUR PPP 3 542 per capita in 2020 (OECD, 2023[16]).

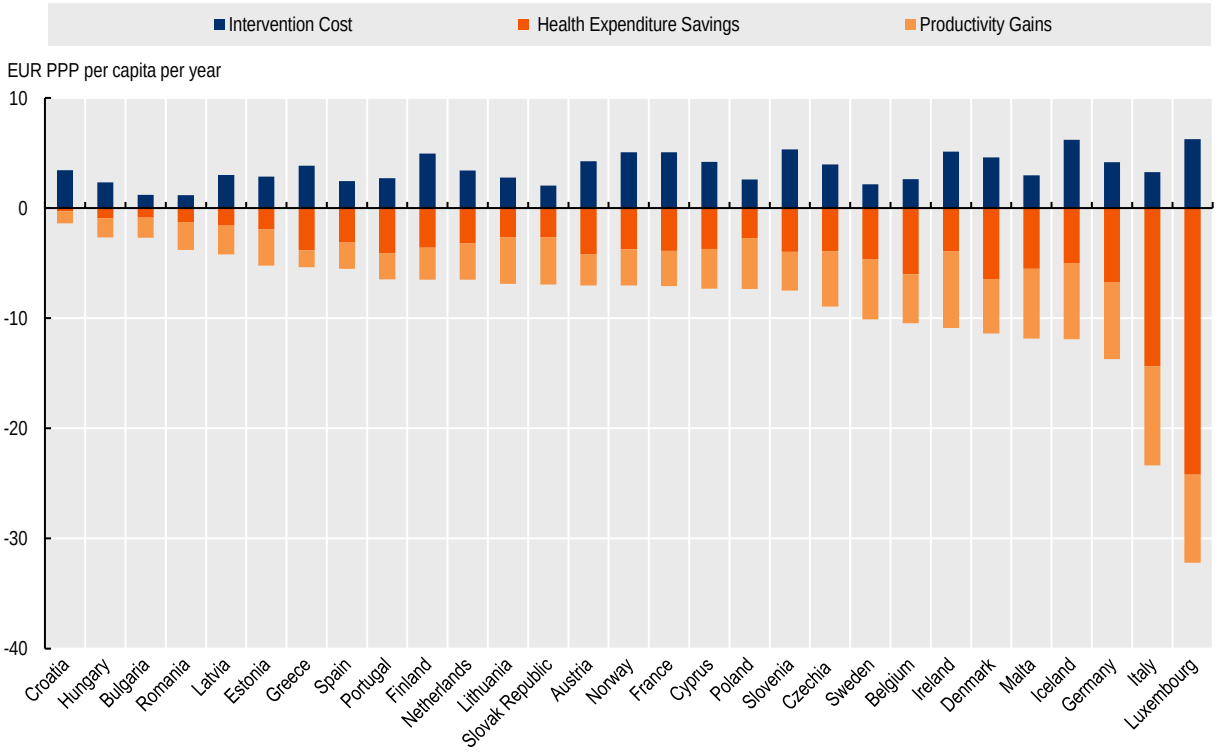
By scaling up investments on these One Health interventions, the EU/EEA countries stand to achieve considerable gains through savings in health expenditure and improved workforce productivity. These gains are generally estimated to exceed implementation costs, suggesting a positive return-on-investment (ROI) ratio. In particular, improving hand hygiene in healthcare facilities, scaling up delayed prescription practices and increasing the coverage of vaccination campaigns to prevent pneumococcal disease offer the greatest return on investment (ROI ratio = 11.9, 6.3 and 6 respectively). The benefits of enhancing farm biosecurity nearly offset implementation costs.

Implementing One Health actions as policy packages yields even greater impact. In isolation, even the most impactful policies are unlikely to create a critical mass to tackle AMR effectively. For this reason, the OECD analyses also included the assessment of policy packages covering the key areas of policy gaps (Figure 7). Findings shows that all three policy packages promise to reduce the health burden of AMR while generating savings in health expenditure and gains in workforce productivity. For example, by investing EUR PPP 3.4 per capita every year in a mixed package, the EU/EEA countries can avert nearly 613 000 infections, prevent more than 10 000 deaths, save more than EUR PPP 2.5 billion in health expenditure and gain around EUR PPP 2.3 billion in improved productivity.

Figure 7. Investing only EUR 3.4 per capita each year in One Health action is cost-effective

The benefits of implementing these policy packages more than make up for their implementation costs. Across EU/EEA countries, the benefits of implementing the mixed package – measured as a combination of savings in health expenditure and gains in productivity – is nearly 3 times that of the implementation costs (Figure 8). This result suggests that One Health action is a highly cost-effective strategy to tackle AMR.

Figure 8. Across the EU/EEA countries, every EUR PPP 1 invested in a mixed package returns nearly EUR PPP 3 in savings in health expenditure and gains in productivity



Note: Results for Greece are not directly comparable to other countries, because data for *S. pneumoniae* in Greece was not available.
Source: (OECD, 2023[6]), *Embracing a One Health Approach to Fight Antimicrobial Resistance*, https://oe.cd/amr-onehealth.

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Acknowledgements

EC: Velina PENDOLOVSKA, Barbara MENTRE, Hannah SIEVERS
ECDC: Dominique L MONNET

Contacts in the OECD Health Division

Michele CECCHINI, Lead for Public Health (✉ michele.cecchini@oecd.org)
Ece A ÖZÇELİK, Health Policy Analyst (✉ ece.ozcelik@oecd.org)
Aliénor LEROUGE Lead Modeller for Public Health (✉ alienor.lerouge@oecd.org)

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Fighting Antimicrobial Resistance in EU and EEA countries

Despite the efforts made by the European Union (EU) and European Economic Area (EEA) countries in recent years, antimicrobial resistance (AMR) – the ability of microbes to resist antimicrobials – remains a global health threat. Unless additional effective interventions are scaled up quickly, AMR rates are forecasted to increase in the next two decades across many EU/EEA countries, with costs due to AMR putting strong pressure on the healthcare budgets.

This policy brief provides an overview of the key findings for the EU/EEA countries presented in the new OECD report titled “Embracing One Health to Fight Antimicrobial Resistance”. Using microsimulation and machine-learning techniques, this report analyses critical policy levers to inform the next generation of AMR initiatives. It shows that tackling the detrimental health and economic impact of AMR requires embracing a One Health framework – a collaborative, trans-disciplinary and multi-sectoral approach that promotes close co-operation and collaboration across human health, animal health, agrifood systems and the environment. This report identifies 11 One Health “best buys” that, if implemented systematically, would improve population health, reduce health expenditure and generate positive returns for the economy.

Co-funded by the European Union