



Prudent use of antimicrobial agents in human medicine: third report on implementation of the Council recommendation

Analysis of countries' reports on the implementation of the Council recommendation of 15 November 2001 (2002/77/EC) on the prudent use of antimicrobial agents in human medicine

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1. Executive summary

Context and methods

To address the threat of antimicrobial resistance (AMR), the Council recommendation of 15 November 2001 (2002/77/EC) on the prudent use of antimicrobial agents in human medicine asked Member States to develop strategies comprising measures in relation to surveillance, education, information, prevention and control, and research. The establishment of an intersectoral mechanism by Member States was also recommended.

In June 2015, European Union (EU) Member States and other Member States of the European Economic Area (EEA) were asked to report on the implementation of this Council recommendation. The questionnaire used for this survey took into account lessons from two previous reports on the implementation of this recommendation, and included input from the Council recommendation of 9 June 2009 (2009/C 151/01) on patient safety, including the prevention and control of healthcare-associated infections (HAIs), and from the European Commission action plan on the rising threats from AMR adopted in 2011 ⁽¹⁾. Specific questions were added which aimed at further exploring the use of indicators; prevention and control of extensively drug-resistant (XDR) and multidrug-resistant (MDR) bacteria; activities to promote rational use of antimicrobials, including antimicrobial stewardship activities in hospitals; and activities targeting nursing homes and other long-term care facilities (LTCFs).

Main findings

Twenty-nine EU/EEA Member States out of a total of 31 responded to the survey questionnaire. Twenty countries ⁽²⁾ had defined a strategy to promote prudent use of antimicrobial agents and contain AMR. These strategies were linked to a strategy for prevention and control of HAIs in around 75 % of cases. Twenty-one countries reported having an AMR action plan. All other respondents except three were in the process of developing strategies and/or action plans. Action plans had been adopted or updated in the last 2 years by 12/21 countries. In most countries, these action plans included measures regarding surveillance, prudent use of antimicrobial agents, information and education. Detection and control of outbreaks, research and the use of rapid diagnostic tests (RDTs) were addressed in 16, 14 and nine action plans respectively. Nursing homes and LTCFs were covered by 14/21 action plans. Indicators were used to assess the implementation and/or the results of the national action plan in 18 countries.

An intersectoral coordinating mechanism (ICM) including representatives of human health, animal health or agriculture sectors was in place in 25 countries and was established by regulation or governmental decision in 15 countries. Representatives of the nursing home sector were involved in the ICM in four countries only; patients groups were represented in the ICM in four countries. The ICM was involved in the definition of priorities for research in the field of AMR and prudent use of antimicrobial agents in less than half of the countries.

A dedicated budget for implementation of the AMR action plan or strategy was identified in 10 countries. Five countries reported that funding for AMR control activities were included in health authorities' and agencies' budgets.

⁽¹⁾ Communication from the Commission to the European Parliament and the Council — Action plan against the rising threats from antimicrobial resistance (COM(2011) 748), November 2011. <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2011:0748:FIN:EN:PDF>

⁽²⁾ The term 'countries' is used throughout the report to refer to EU and EEA Member States.

All countries participated in European surveillance networks; the European Antimicrobial Resistance Surveillance Network (EARS-Net), the European Surveillance of Antimicrobial Consumption Network (ESAC-Net) and the Healthcare-Associated Infections Surveillance Network (HAI-Net). National surveillance systems providing additional information were reported from 26 countries, including surveillance of carbapenem-resistant Enterobacteriaceae (CRE) in 26/26 countries and extended-spectrum beta-lactamase-producing Enterobacteriaceae (ESBL-E) in 24/26. Additional systems were in place in 19 countries to monitor consumption of antimicrobial agents. In 13 (AMR) and eight (consumption of antimicrobial agents) countries, these surveillance systems covered the nursing homes and other LTCFs sector. A system for alert and early reporting of specific multiple-drug-resistant bacteria of public health concern was operational in 21 countries.

Health authorities had access to individual hospital data in 18 countries for AMR and in 16 countries for antimicrobial consumption. Regarding the use of data by professionals, prescribers in ambulatory care had access to their individual antimicrobial prescribing data in 11 countries. In 11 countries, the national surveillance system was able to provide hospital antimicrobial consumption data at the specialty or ward level.

Actions to improve antimicrobial prescribing practices were implemented in most countries (25 in ambulatory care, 22 in hospitals). However, a system of indicators to assess their impact had been developed in less than half of the countries (12 in ambulatory care, 10 in hospitals).

Regarding control and preventive measures, all countries but one had national legislation defining antimicrobial agents for systemic use as medicinal products subject to medical prescription. However, eight countries reported that sales of antimicrobial agents without prescription accounted for more than 1 % of the total sales of these medicines, representing a potential source of misuse. Electronic prescriptions were routinely used in less than half of the responding countries: 14 countries in the hospital sector, 13 countries in ambulatory care and six countries in nursing homes and other LTCFs. Regarding measures to improve diagnosis, all but three countries stated that RDTs were used in ambulatory care. The use of RDTs was encouraged by the government in nine countries (e.g. by providing free tests to prescribers).

Guidelines on appropriate use of antimicrobial agents in the treatment of the main community-acquired infections and HAIs were available in most countries. In six countries, the existing guidelines were not endorsed by health authorities. Assessment of compliance and impact of these guidelines was rarely reported, even in the hospital sector. In 20 countries, hospitals were required to implement antimicrobial stewardship activities.

Nineteen countries reported having legal requirements or professional guidelines for the number of infection control/hospital hygiene professionals in hospitals. National guidelines for infection prevention and control were available in all 29 countries; they addressed nursing homes and other LTCFs in all but four. Eighteen countries had developed guidelines for the prevention and control of CRE. Eleven countries reported national requirements to communicate on the infection status of a patient in case of cross-border transfer. Twenty-two countries had assessed the compliance of healthcare workers with the guidelines for hand hygiene. Only 13 countries had assessed the impact of required infection control and hospital hygiene measures on the incidence of some infections in hospitals and six had carried out such assessments in nursing homes and other LTCFs.

Regarding education, the curriculum of medical doctors and of pharmacists included matters related to AMR and prudent use of antimicrobial agents in most countries. However, appropriate use of antimicrobial agents was not included in the continuing

education of professions other than medical doctors in many countries. National campaigns to raise awareness on the part of the general public and/or healthcare professionals had been performed in all but four countries in 2013/2014. These campaigns had been designed based on the results of behavioural research in seven countries. When asked about upcoming challenges, 10 countries reported that a major challenge was to increase public awareness and improve the education and commitment of healthcare workers.

All but three countries were able to provide information on indicators used to monitor the implementation of surveillance and/or preventive measures and/or changes in the results achieved. The most commonly used indicators were related to AMR.

Discussion and conclusions

Interpretation of findings from this survey should be cautious as the information was provided as part of a questionnaire completed by respondents in EU Member States and EEA countries. The questions may have been interpreted in different ways by respondents, reflecting the variety of national situations and practices.

Overall, most countries had implemented several measures in accordance with the Council recommendation. Compared to the previous survey, improvements had occurred in several areas, including surveillance systems, the use of indicators and awareness campaigns. Moreover, recent concerns regarding emerging MDR or XDR bacteria were addressed in a significant number of countries.

However, there were huge differences between countries in the governance and the scope of national strategies and action plans, and in the way measures were implemented and assessed. Some countries reported they had implemented most of the provisions of the Council recommendation, while other countries have developed activities in only some areas covered by the recommendation. Considering the limitations of this survey, and the fact that innovations and changes may have been implemented since the survey was carried out, areas for further actions may be suggested as follows.

- Establishment of clear governance of national strategies and national action plans to contain AMR in all countries, to ensure that: (1) all healthcare sectors (hospitals, nursing homes and other LTCFs as well as ambulatory care) are addressed; (2) qualified resources are available; and (3) coordination with the strategy for HAI prevention and/or patient safety is achieved.
- Reinforcement of surveillance and evaluation systems: (1) best use of surveillance data (AMR and antimicrobial use) at local level; (2) development of methods and systems to assess compliance with and the impact of guidelines and to ensure relevant feedback to concerned healthcare professionals; (3) assessment of the implementation of the action plan and of its effectiveness using a system of appropriate indicators.
- Strengthening of prevention and control measures: (1) effective enforcement of regulation on 'prescription-only medicines' for antimicrobial agents for systemic use; (2) promotion of multidisciplinary antimicrobial stewardship programmes in hospitals.
- Education of healthcare professionals and the general public, making the best use of lessons from behavioural sciences.
- National support for research in areas with national added value such as behavioural sciences, healthcare organisation and cost-effectiveness of recommended measures.
- International coordination and exchange to share tools and best practices for surveillance, early warning, communication and assessment (indicators to assess changes in key areas).

At EU level, future developments could consist in: (1) taking measures to increase policymakers commitment to address the issue of AMR; (2) providing appropriate support for the implementation of sustainable and relevant surveillance and evaluation systems; (3) fostering research in key areas to overcome current gaps in AMR control.

2. Introduction

This is the third report on the implementation of the Council recommendation of 15 November 2001 on the prudent use of antimicrobial agents in human medicine (2002/77/EC). This recommendation asked Member States to develop strategies* ⁽³⁾ aiming at containing AMR. These strategies should comprise measures in relation to surveillance, education, information, prevention and control, and research. It also recommended the establishment of an intersectoral mechanism to ensure the coordinated implementation of the strategies and promote exchange and coordination with the Commission and the other Member States.

Reports on the implementation of the Council recommendation by Member States, issued in 2005 ⁽⁴⁾ and in 2010 ⁽⁵⁾, highlighted the need for improvement in several areas. These included establishing an ICM*; national strategies or action plans*; coordination with the animal sector; surveillance systems (sustainability and use of data to inform regional/local activities); involvement of the nursing home* sector; and monitoring and evaluation of national policies.

Informed by these lessons and taking into account the adoption of the Council recommendation of 9 June 2009 on patient safety, including the prevention and control of healthcare associated infections (2009/C 151/01), the Commission published, in 2011, a 5-year action plan against the rising threats from AMR ⁽⁶⁾. This plan put forward 12 key actions covering both human and veterinary medicine and the following areas: appropriate use of antimicrobial agents; prevention of infections and their spread; reinforcement of research and international collaboration. The action plan also included a commitment to report on progress in promoting prudent use of antimicrobials at national and EU levels, which this report contributes towards.

3. Methods

A questionnaire and reporting template were created based on the content of the Council recommendation of 15 November 2001 on the prudent use of antimicrobial agents and on the findings from previous reports on the implementation of this recommendation (Annex). The questionnaire also took into account the Council recommendation of 9 June 2009 on patient safety, including the prevention and

⁽³⁾ A glossary is provided to clarify the meaning of some of the terms used in this report. These terms are indicated by '*' the first time they appear in the report.

⁽⁴⁾ Report from the Commission to the Council on the basis of Member States' reports on the implementation of the Council recommendation (2002/77/EC) on the prudent use of antimicrobial agents in human medicine (COM(2005) 684), December 2005. <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52005DC0684&qid=1448802402655&from=EN>

⁽⁵⁾ Second report from the Commission to the Council on the basis of Member States' reports on the implementation of the Council recommendation (2002/77/EC) on the prudent use of antimicrobial agents in human medicine (COM(2010) 141), April 2010. <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52010DC0141&qid=1448802054353&from=EN>

⁽⁶⁾ Communication from the Commission to the European Parliament and the Council — Action plan against the rising threats from antimicrobial resistance (COM(2011) 748), November 2011. <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2011:0748:FIN:EN:PDF>

control of healthcare associated infections (2009/C 151/01) and the EU action plan against the rising threats from antimicrobial resistance.

The questionnaire included items on: the use of indicators*; prevention and control of MDR* bacteria such as CRE and vancomycin-resistant enterococci (VRE); activities to promote rational use of antimicrobials (regulation, use of diagnostic tests); antimicrobial stewardship* activities in hospitals based on the set of structure and process indicators for hospital antimicrobial stewardship programmes as defined by a Tatfar working group ⁽⁷⁾; and activities covering nursing homes and other LTCFs*.

The questionnaire was sent to members of the EU Health Security Committee in June 2015, in the form of an Excel sheet. The analysis that forms the basis of this report was carried out in November 2015. When relevant, results were compared with results from the second report on the implementation of the Council recommendation (2002/77/EC) and with those from the survey performed in 2011 on the implementation of the Council recommendation on patient safety, including the prevention and control of healthcare associated infections (2009/C 151/01) ⁽⁸⁾.

An explanatory analysis of countries' situations regarding the implementation of the Council recommendation was performed to identify clusters of countries with common features.

The following country codes are used in this report.

AT: Austria	FR: France	NL: Netherlands
BE: Belgium	HR: Croatia	NO: Norway
CY: Cyprus	HU: Hungary	PL: Poland
CZ: Czech Republic	IE: Ireland	PT: Portugal
DE: Germany	IS: Iceland	RO: Romania
DK: Denmark	IT: Italy	SI: Slovenia
EE: Estonia	LT: Lithuania	SR: Slovakia
EL: Greece	LU: Luxembourg	SE: Sweden
ES: Spain	LV: Latvia	UK: United Kingdom
FI: Finland	MT: Malta	

⁽⁷⁾ Transatlantic Taskforce on Antimicrobial Resistance (Tatfar), *Summary of the modified Delphi process for common structure and process indicators for hospital antimicrobial stewardship programs*, June 2015. http://www.cdc.gov/drugresistance/pdf/summary_of_tatfar_recommendation_1.pdf

⁽⁸⁾ Report from the Commission to the Council on the basis of Member States' reports on the implementation of the Council recommendation (2009/C 151/01) on patient safety, including the prevention and control of healthcare associated infections (COM(2012) 658), November 2012. http://ec.europa.eu/health/patient_safety/docs/council_2009_report_en.pdf

4. Results

By 16 November 2015, when data collection was completed, 30 responses had been received from 29 countries:

- 27 EU Member States;
- 2 EEA countries (IS, NO).

Only the United Kingdom stated that there were regional* differences and two separate questionnaires were received from England (UK-En) and from Northern Ireland (UK-NI). In addition, Scotland (UK-Sc) sent comments to point out specific activities in the region. In this report, information is given for the United Kingdom as one country and differences between regions are reported where relevant.

4.1. National strategy

Among the 29 responding countries, 20 had an established national strategy targeted to contain the problem of AMR and promote the prudent use of antimicrobial agents (AT, BE, CY, CZ, DE, DK, EL, ES, FR, HR, IE, IS, LU, LV, NL, NO, PT, SE, SI, UK) and six were in the process of preparing such a strategy (HU, IT, LT, MT, PL, SK). Three countries (EE, FI, RO) reported that they did not have a national strategy.

The national strategies that existed or were under preparation were linked to the national strategy for prevention and control of HAIs in 20/26 countries (77 %). Eight strategies (AT, BE, ES, IE, IS, LU, PT, IT;) were linked to the national strategy for patient safety. HU stated that its future strategy would be linked with other strategies such as its general public health programme.

Eighteen (90 %) of 20 existing strategies and four of six strategies under preparation were intersectoral:

- 15 were linked to the strategy for controlling AMR in animals (prudent use of antimicrobial agents in veterinary medicine and/or in the food chain);
- 17 comprised actions regarding veterinary medicine and/or the food chain.

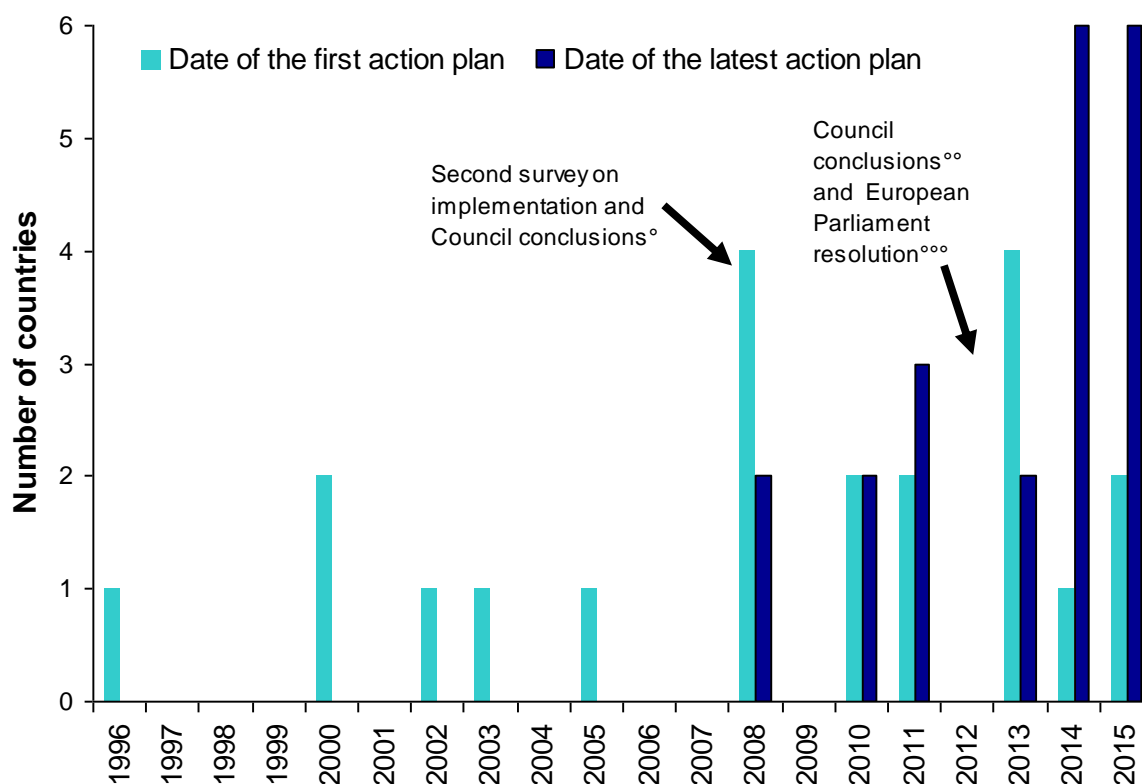
4.2. National action plan

A national action plan to contain the problem of AMR and promote the prudent use of antimicrobial agents had been produced in 21 countries (AT, BE, CY, CZ, DE, DK, EL, ES, FR, HU, IE, IS, LT, LV, NL, NO, PT, SE, SI, SK, UK) ⁽⁹⁾ and was under preparation in two (HR, IT). In addition, two countries (MT and PL) gave information on activities carried out, although they had no formal action plan. Altogether, information was available on action plans or activities carried out in 25 countries.

In fifteen of the countries (15/21), the first action plan had been issued in 2008 or later. Most (12/21) of the currently active national action plans had been launched in 2014 or 2015 (Figure 1).

⁽⁹⁾ LT and SK were in the process of updating their action plans.

Figure 1: Year of release of the first national action plan and of the latest national action plan in 21 countries



° In 2008, Member States were asked to report on the implementation of Council recommendation 2002/77/EC (questionnaire sent out in October). In June 2008, Council conclusions on AMR were adopted and called upon Member States to ensure that structures and resources were in place to implement strategies to contain AMR ⁽¹⁰⁾.

°° Council conclusions on the impact of AMR were adopted in June 2012 and called upon Member States to implement strategies and action plan and adopt a 'one health' perspective.

°°° In December 2012, the European Parliament adopted a resolution calling for firm governmental commitment to full and timely implementation of recommendation 2002/77/EC ⁽¹¹⁾.

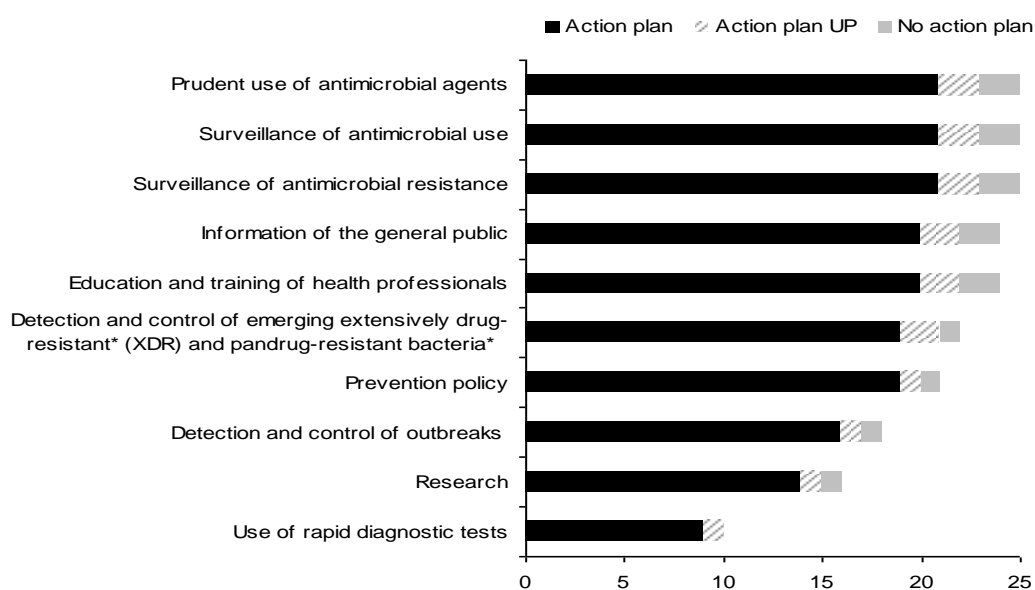
Topics covered

All national action plans included activities regarding prudent use of antimicrobial agents, surveillance of AMR and surveillance of antimicrobial use. All action plans but one addressed education and training of health professionals and information to the general public (Figure 2).

⁽¹⁰⁾ Council conclusions on antimicrobial resistance (AMR), 2876th Employment, Social Policy, Health and Consumer Affairs Council, Luxembourg, 10 June 2008. http://www.consilium.europa.eu/ueDocs/cms_Data/docs/pressData/en/lsa/101035.pdf

⁽¹¹⁾ European Parliament resolution of 11 December 2012 on the microbial challenge — Rising threats from antimicrobial resistance (2012/2041(INI)). <http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//NONSGML+TA+P7-TA-2012-0483+0+DOC+PDF+V0//EN>

Figure 2: Topics covered by the national action plan in 25 countries^o



^o of which two countries with action plans under preparation (UP) and two with no formal action plan

Sectors covered

All national action plans but one (IS) covered hospital and all but two (EL and SK) covered primary care*. Nursing homes and other LTCFs were addressed in 16/23 action plans (of which two in preparation) and in one country with no formal action plan.

Twenty countries gave internet links to their national strategy. The same link was given for the national action plan by 16 countries. Two countries provided a different link for the action plan (EL and SE) and two others stated that the action plan was under preparation (LT, SK).

4.3. Indicators

Indicators to assess the implementation and/or the results of the national action plan were in place or under preparation in 18 countries (AT, BE, CY, DK, EL, ES, FR, HU, HR, IE, IS, LV, LT, NL, NO, PT, SK, UK) (Table 1). In addition, HU and SI monitored indicators that were not specifically intended to evaluate their action plan.

Among the 18 countries that provided details on the indicators used all had developed indicators in the hospital sector, which included methicillin-resistant *Staphylococcus aureus* (MRSA) bacteraemia incidence and antimicrobial consumption (Table 1). All but two countries (EL, NL) had indicators for the ambulatory care* sector, namely surveillance of antimicrobial consumption (16/16).

Half of the countries with indicators (DK, HR, HU, IE, IS, NO, PT, SI, SK) and UK-NI had implemented indicators covering nursing homes and other LTCFs.

In eight countries, some or all hospital indicators were publicly available at the institution level; in two countries, indicators collected in nursing homes and other LTCFs were made publicly available. In addition, in the United Kingdom, most indicators were publicly available at the trust level.

Table 1: Use of indicators in ambulatory care, in hospitals and in nursing homes and other LTCFs, by type of indicator (n = 18 countries)

Indicators	Ambulatory care sector (n = 16)	Hospitals (n = 18)	Nursing homes and other LTCFs (n = 9)		
Outcome					
Antimicrobial resistance, MRSA all types of infection, incidence	7	10	not publicly available at hospital level	2	not publicly available at facility level
		5	publicly available at hospital level	2	publicly available at facility level
Antimicrobial resistance, MRSA bacteraemia, incidence	8	13	not publicly available at hospital level	2	not publicly available at facility level
		5	publicly available at hospital level	2	publicly available at facility level
Antimicrobial resistance, ESBL-E incidence	7	9	not publicly available at hospital level	3	not publicly available at facility level
		5	publicly available at hospital level	1	publicly available at facility level
Antimicrobial resistance, Other indicators ^a	7	11	not publicly available at hospital level	3	not publicly available at facility level
		3	publicly available at hospital level	1	publicly available at facility level
<i>Clostridium difficile</i> infection, incidence	6	14	not publicly available at hospital level	5	not publicly available at facility level
		2	publicly available at hospital level	1	publicly available at facility level
Antimicrobial consumption	16	13	not publicly available at hospital level	3	not publicly available at facility level
		5	publicly available at hospital level	1	publicly available at facility level
Structure and process					
Volume of alcohol hand rub used per year/1 000 beds (or other denominator)	2	8	not publicly available at hospital level	1	not publicly available at facility level
		5	publicly available at hospital level	0	publicly available at facility level
Number of FTE ^b of IC/HH ^c professionals ^d /1 000 beds (or other denominator)		11	not publicly available at hospital level	1	not publicly available at facility level
		2	publicly available at hospital level	0	publicly available at facility level
Annual report on implementation of antimicrobial stewardship programmes		4	not publicly available at hospital level	0	not publicly available at facility level
		3	publicly available at hospital level	0	publicly available at facility level

^a Other indicators, for example: CRE, 11 countries; VRE, four countries; AMR in *S. pneumoniae*, two countries).

^b FTE: full-time equivalent.

^c IC/HH: infection control and hospital hygiene.

^d Nurses and doctors.

Specific targets had been defined for some of the indicators in eight countries (BE, EL, FR, HR, IE, NL, PT, UK). Examples are shown in Table 2.

Table 2: Examples of specific targets for indicators reported by eight countries

Sector	Indicator (<i>current value where relevant</i>)	Target	Timeline
Ambulatory care	Number of prescriptions/1 000 inhabitants/year (<i>800 in 2015</i>)	600 400	2020 2025
	Proportion of fluoroquinolone use among total antibiotic use (<i>10 % in 2015</i>)	5 %	2018
	Ratio of amoxicillin to amoxicillin-clavulanic acid (<i>50/50 in 2015</i>)	80/20	2018
	Number of antibiotics prescribed by physician	Reduction ≥ 1 %	2015/2016
Hospital	Duration of surgical prophylaxis compliant with local guidelines	> 90 % of cases	-
	Duration of surgical prophylaxis < 24 hours	> 90 % of cases	2015
	Percentage of treatments lasting more than 7 days without justification	< 10 %	2016
	Total antibiotic use in number of defined daily doses (DDD)/1 000 inhabitants/day	25 % reduction	2020
	Percentage of hospitals involved in surveillance of AMR	100 %	
	Percentage of hospitals with antimicrobial stewardship reports	100 %	2017
	Hand hygiene compliance by clinical staff	> 90 %	2015
All sectors	Incorrectly prescribed antibiotics	50 % reduction	2020

Comments

Achievements

- More countries had adopted a national strategy in 2015 (20) compared to 2008 (15). National action plans covered a wide range of topics and had been launched or updated in the two previous years (2014-2015) in half of the countries.
- Inclusion of the detection and control of emerging XDR and pandrug-resistant (PDR)* bacteria in the action plans reflects adaptation of the countries to new threats.
- Indicators to monitor the implementation of the national action plan and its results were used by 18 countries versus 12 in 2008.

Room for improvement

- Eight countries still did not have a national strategy or an action plan (of which five reported that a strategy and/or an action plan was under preparation).

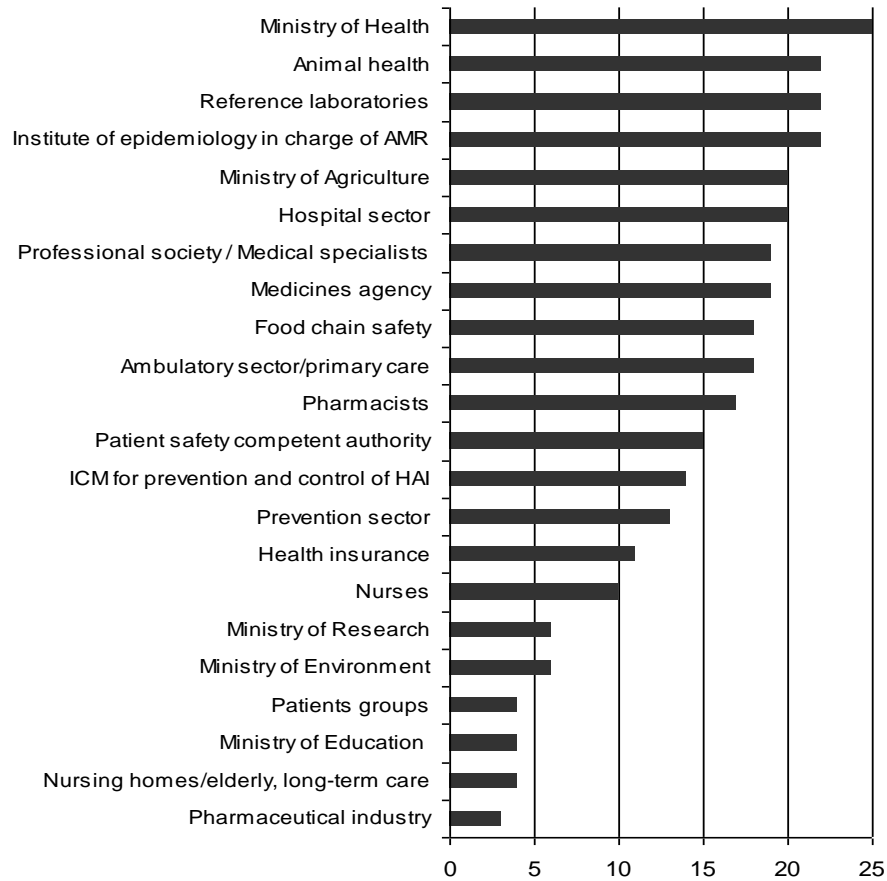
- Strategies on AMR were not always linked to strategies for HAI prevention and control and to strategies for patient safety. Yet many areas of action, methods and key players need strong coordination to address all aspects of AMR (e.g. infection control, reporting, analysis of adverse events, etc.).
- National action plans did not always encompass all the key areas (ambulatory care, nursing homes and other LTCFs, and hospital sectors) or include a sufficiently wide range of actions (including the use of RDTs, prevention policy, detection and control of outbreaks, research) to ensure that the fight against AMR is addressed in a comprehensive and global approach according to the recommendation provisions and in line with the 2012 resolution of the European Parliament.
- Monitoring and evaluation needs strengthening to ensure best use of resources and adjustment to technological, organisational and epidemiological changes. A system of indicators is needed to monitor progress in the implementation and the effectiveness of the national action plans, not only in the hospital sector but also in ambulatory care and in nursing homes and other LTCFs. To this end, the use of structure, process and outcome indicators, in addition to those collected through the surveillance networks run by the European Centre for Disease Prevention and Control (ECDC), would be helpful.
- Quantitative targets for indicators had been set by less than half of countries with such indicators. Setting goals or targets to achieve within a defined timeframe, based on local needs and resources, may help to foster mobilisation of stakeholders.

4.4. Intersectoral coordinating mechanism on antimicrobial resistance

An ICM or equivalent system was in place in 25 countries (AT, BE, CY, CZ, DE, DK, EL, ES, FI, FR, HR, HU, IE, IS, IT, LT, LU, LV, MT, NL, PT, SE, SI, SK, UK) and under preparation in two countries (EE, PL). These ICMs had been established by regulation or governmental decision in 15 countries and by another official text in nine countries (no information for ES; no ICM in NO and RO). The ICMs had a written mandate to monitor the implementation of the national strategy and to report to the government in 10 countries. The ICM was also in charge of the strategy for prevention and control of HAIs in 11 countries and of the strategy for patient safety in two countries.

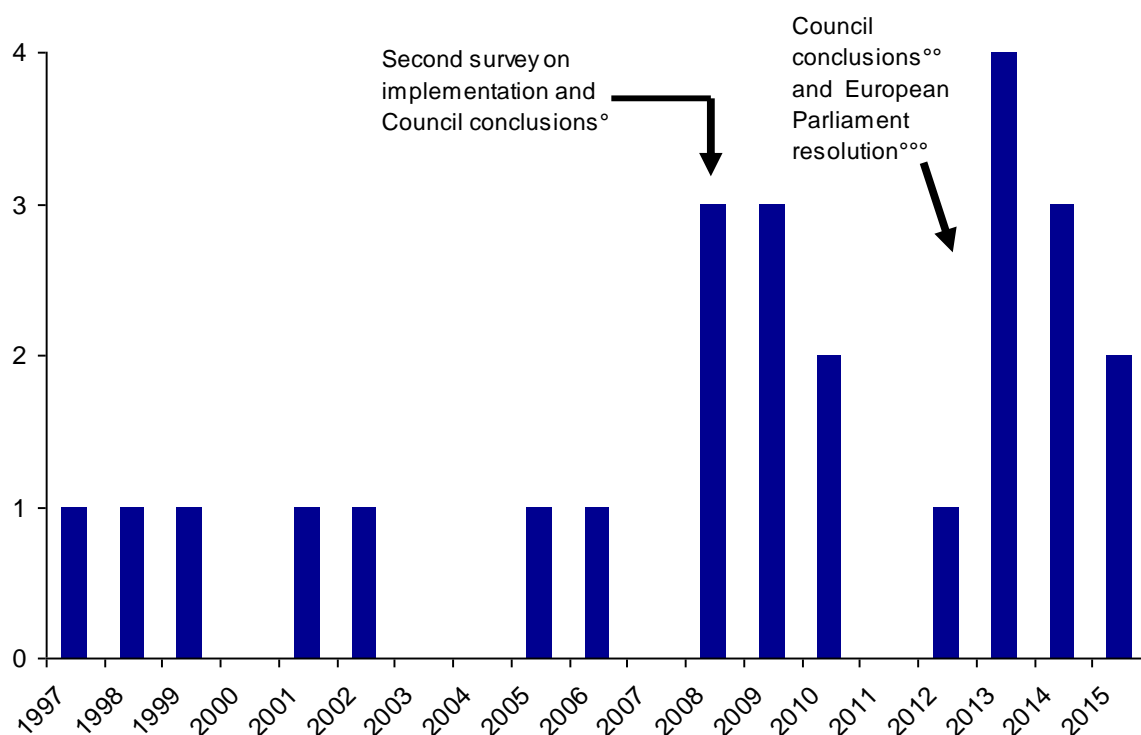
Twenty-six countries detailed the composition of the ICM (including PL where the ICM was under preparation) (Figure 3). The Ministry of Health was represented in all ICMs except in SE, where the ICM was run jointly by the Public Health Agency and the National Board of Agriculture. The Ministry of Agriculture and representatives from the animal health sector participated in 20 and 22 of 26 ICMs, respectively. Only four countries (FI, FR, NL, PT) had included representatives of the nursing home sector in their ICM. Only four ICMs (in FR, HR, NL, PT) comprised representatives of patients' groups and one country (IE) reported being in the process of offering membership to a patient group representative. Members representing the pharmaceutical industry participated in the ICM in three countries (LT, NL, PT). Other ICM members were universities in two countries (AT, LT), health education institutions in two countries (DE, UK), the Environmental Protection Agency in one country (IE) and representatives of regional health authorities in one country (IT).

Figure 3: Composition of the ICM (*n* = 26 countries, including PL with an ICM under preparation)



The median date of implementation of the ICM was 2009 (Figure 4). A periodic report was issued by less than half (11) of the ICMs (of which eight issued an annual report). The median number of ICM meetings per year was 2.5.

Figure 4: Year of implementation of the ICM (*n* = 25 countries)



° In 2008, Member States were asked to report on the implementation of Council recommendation 2002/77/EC (questionnaire sent out in October). In June 2008, Council conclusions on AMR were adopted and called upon Member States to ensure that structures and resources were in place to implement strategies to contain AMR ⁽¹²⁾.

°° Council conclusions on the impact of AMR were adopted in June 2012 and called upon Member States to implement strategies and action plan and adopt a 'one health' perspective.

°°° In December 2012, the European Parliament adopted a resolution calling for firm governmental commitment to full and timely implementation of Council recommendation 2002/77/EC ⁽¹³⁾.

A dedicated budget for implementation of the national action plan was reported by 10 countries (BE, CY, DK, ES, FR, HR, NL, PL, PT, SI) and was under development in two countries (NO and LT). This budget came from the government (annual and/or occasional) in all countries but one that specified the source of the budget. The budget was annual in seven countries.

⁽¹²⁾ Council conclusions on antimicrobial resistance (AMR), 2876th Employment, Social Policy, Health and Consumer Affairs Council, Luxembourg, 10 June 2008. http://www.consilium.europa.eu/ueDocs/cms_Data/docs/pressData/en/lsa/101035.pdf

⁽¹³⁾ European Parliament resolution of 11 December 2012 on the microbial challenge — Rising threats from antimicrobial resistance (2012/2041(INI)). <http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//NONSGML+TA+P7-TA-2012-0483+0+DOC+PDF+V0//EN>

Five countries (AT, DE, EL, IT, UK) mentioned that activities were funded by the Ministry of Health, regional health authorities and other partners. Thus, a specific budget could not be identified.

When specified (seven countries), this budget varied from EUR 2 000 (support for the European Antibiotic Awareness Day campaign in CY) to EUR 4 225 000 in BE. The most commonly funded activities were awareness campaigns and education activities (six countries) and information technology support (three).

Comments

Achievements

- In 2015, ICMs were in place in more countries than in 2008 (25 in place and two in preparation in 2015 versus 19 in place and seven in preparation in 2008).
- Representatives of the Ministry of Agriculture were involved in the ICM in more countries in 2015 compared to 2008 (20/26 in 2015 versus 12/22 in 2008).

Room for improvement

- There were still four countries without an ICM (of which two had an ICM under preparation), and three of these countries still did not have a national strategy (EE, PL, RO).
- Multidisciplinarity and involvement of key stakeholders in ICM composition:
 - the ICM comprised representatives from all three healthcare sectors (hospital, ambulatory care, nursing homes and other LTCFs) in only four countries, and from only two sectors (hospital and ambulatory care) in 12 countries;
 - representatives of pharmacists and nurses were involved in the ICM in less than two thirds of countries (in 17 and 10 countries, respectively), although their role in promoting prudent use of antimicrobial agents is acknowledged;
 - patient groups participated in the ICM in only four countries, although raising awareness of patients and of the general public is a key issue in containing AMR.
- Increasing accountability of the ICM could be achieved with a better definition of its status (they had been established by regulation or governmental decision in 15/25 countries), provision of a written mandate and periodic reports to inform decision-makers and citizens.

4.5. Surveillance systems for antimicrobial resistance

All 29 countries participated in EARS-Net. Additional surveillance systems were in place in 26 countries. These systems covered hospitals in all countries but one, ambulatory care in 20 countries and nursing homes and other LTCFs in 13 countries. In addition, IE considered its participation in EARS-Net as a national system, given that 100 % of hospitals and laboratories participate in this surveillance system.

In 27/29 countries, surveillance systems were implemented continuously, by the government. In addition, a surveillance system was implemented continuously by independent scientific societies in HR and surveillance was carried out in IT by the government, through specific projects. One country (HR) specified that nursing homes were considered as part of ambulatory care.

CRE were monitored in hospitals by all 26 national surveillance systems, but not ESBL-E (Table 3). Penicillin-resistant/intermediate *Streptococcus pneumoniae* was the most common pathogen monitored in ambulatory care and in nursing homes and other LTCFs. In all healthcare sectors, *Clostridium difficile* was less often surveyed

than other bacteria. However, in some countries, *C. difficile* might be monitored by systems other than surveillance in place for MDR bacteria.

Table 3: Number of countries with a national surveillance system including specific bacteria, by sector covered (n = 26 countries with a national surveillance system)

Bacteria	Hospitals		Ambulatory care		Nursing homes and other LTCFs	
	n	%	n	%	n	%
MRSA	22	85	15	58	10	38
ESBL-E	24	92	15	58	9	35
CRE	26	100	16	62	11	42
Penicillin-resistant/intermediate <i>Streptococcus pneumoniae</i>	21	81	18	69	11	42
VRE	22	85	12	46	9	35
Carbapenem-resistant <i>Pseudomonas aeruginosa</i>	23	88	13	50	9	35
Carbapenem-resistant <i>Acinetobacter baumannii</i>	23	88	11	42	8	31
<i>Clostridium difficile</i>	17	65	11	42	8	31
MDR/XDR <i>Mycobacterium tuberculosis</i>	21	81	16	62	9	35

Four countries reported that they surveyed other microorganisms such as antimicrobial-resistant bacteria causing HAIs (e.g. bacteria resistant to antimicrobial agents by means other than those listed in Table 3 (*Acinetobacter spp.*, Enterobacteriaceae, *Stenotrophomonas*). Antimicrobial resistance in bacteria causing food- and waterborne diseases (e.g. *Salmonella*, *Campylobacter*) was monitored by three countries, and in *Neisseria meningitidis*, *N. gonorrhoeae* and fungi by three countries each. Due to differences in completing the questionnaire, more countries may have a system in place to perform surveillance of AMR in these microorganisms but did not report such systems.

Twenty-eight countries participated in the external quality assurance system conducted by EARS-Net (assessment performed by the United Kingdom National External Quality Assessment Service (NEQAS)). Only 17 countries had set up a national system for external quality assessment of antimicrobial susceptibility testing (one under preparation in LV).

Twenty-four countries organised a system of reference laboratories in charge of the characterisation of AMR mechanisms, for example XDR bacteria of public health concern. Three additional countries specified that such a system was under preparation.

Antimicrobial resistance data were collated in national reports (in addition to the annual EARS-Net reports) in 25 countries. These reports were issued each year in 22 countries. Eleven countries reported that AMR data were collated in an interactive database, available on the internet.

In 26 countries, health authorities had access to resistance data. The level of aggregation was the whole country for 24 countries (92 %), the region for 16 countries (62 %) and the hospital for 18 countries (69 %). The data were publicly available in a report or on a website at the country level in 22 countries, at the region level in nine countries and at the hospital level in seven countries. Obstacles to access in three countries were: legal status (two countries), budgetary reasons (one) and information technology-related reasons (one).

The surveillance system was used as a tool to support disease control/infection control in 27 countries and outbreak investigation in 22 countries. The surveillance system in human medicine was compatible, in terms of standardisation of methods and interpretation, with the surveillance systems for AMR in:

- the food chain/veterinary medicine in 15 countries,
- the environment in six countries.

All countries participated in at least one of the HAI surveillance networks coordinated by the ECDC. They all had participated in the ECDC point prevalence survey of HAI and antimicrobial use in European acute care hospitals. Nineteen countries and UK-Sc participated in surveillance of HAI in intensive care units, and 19 were involved in the surveillance of surgical site infections. Fifteen countries participated in the three surveillance networks.

Systems for alert and early reporting of specific MDR bacteria of public health concern to health authorities/competent body for early warning and response were operational in 21 countries, and under preparation in two countries. They targeted:

- CRE in 19 countries (and in two federal states in DE);
- VRE in 11 countries.

In addition, 17 countries (AT, DE, DK, EE, EL, ES, FR, HU, IE, IS, LT, NL, NO, PT, SI, SK, UK) specified that other MDR microorganisms or outbreaks, or other significant events of national importance, should be reported in a national system.

The Early Warning and Response System had been used by 10 countries, and by UK-NI and UK-Sc, to notify other Member States and EU authorities of a cross-border threat due to MDR bacteria of public health concern.

4.6. Surveillance systems on prescription and use of antimicrobial agents

All countries participated in ESAC-Net. Only one country (RO) reported not detailing consumption for ambulatory care but providing information for the ambulatory and hospital sectors together. Twenty-two countries provided information on consumption in the hospital sector.

Nineteen countries (66 %) had set up other surveillance systems for antimicrobial consumption that may provide additional information to data collected via ESAC-Net. These surveillance systems covered: hospitals in all but two countries, ambulatory care in all but two countries and nursing homes and other LTCFs in only eight countries and in UK-Sc. These systems were implemented by the government in more than three quarters of countries.

Antimicrobial consumption data were collated in national reports (in addition to the annual ESAC-Net reports) in 23 countries (annual report in 19 countries) and in an interactive database, available on the internet, in six countries.

Health authorities had access to individual hospital antimicrobial consumption data in 16 countries. Eleven countries listed some obstacles to access these individual hospital data: legal status (seven countries), budgetary reasons (five), information technology-related reasons (four).

Aggregated national data on antimicrobial prescribing in ambulatory care were available in 20 countries. Prescribers had access to their own individual data in 12 countries, with peer-review comments in one country (FR) and via continuing education* groups in five countries. In nine countries, health authorities could access these individual data. The main obstacle preventing health authorities to access these data was legal status of the data (in 7/11 countries where data are available for prescribers). Budgetary and information technology-related reasons were reported by two and three countries, respectively.

Only four countries and UK-Sc reported that they had access to antimicrobial consumption data collected by nursing homes and other LTCFs. Some countries stated that nursing homes were part of ambulatory care data and that specific projects addressed nursing homes.

Sixteen countries reported consumption data could be broken down by indication, more often for ambulatory care (14 countries) than for hospital (10). Nineteen countries reported that hospital consumption data could be broken down by hospital and 11 (58 %) of these countries could also break down consumption data by specialty or ward. This could be done continuously as part of the surveillance system (and not only through research projects) in 14 countries.

Surveillance data on antimicrobial consumption could be linked to data on resistance in 18 countries, most commonly (67 %) through specific research projects rather than continuously.

Most countries were coordinating actions to improve antimicrobial prescribing practices in ambulatory care (25 countries) and in hospitals (22 countries). Only 11 countries, UK-NI and UK-Sc reported such activity for nursing homes and other LTCFs. These actions included: dissemination of guidelines* for prescription (10 countries), antimicrobial stewardship activities in hospitals (10), dissemination of tools for audit (two), educational activities (eight) and awareness campaigns (five).

Indicators* to monitor prescribing practices of antimicrobial agents were used by less than half of the responding countries: 12 in ambulatory care, 10 in hospitals and only one in nursing homes and other LTCFs. In most of the cases (i.e. 11/12 countries that provided information), the indicators consisted in antimicrobial agent consumption data (total consumption or consumption of specified classes of antimicrobial agents) expressed as a number of defined daily doses or number of prescriptions per 1 000 inhabitants per day or per year. Three countries specified prescribing indicators designed for targeted populations (children; women with urinary tract infection aged 18-79 years; adults aged 15-65 without chronic disease). Other indicators consisted in compliance with guidelines (one) or structure and process indicators in hospitals (one).

The majority of countries performed activities regarding antimicrobial consumption in animals. Twenty-three countries had implemented a surveillance system for antimicrobial consumption in animals and 23 reported actions aimed at improving prescribing practices by veterinarians.

Comments

Achievements

- Sustainability of surveillance systems has improved: in all countries but one AMR surveillance was implemented continuously. It was implemented by the government in 27/29 countries (versus only 18 in 2008).
- Emerging pathogens of public health interest such as CRE were monitored in all countries with a surveillance system in addition to participation in EARS-Net (26 countries); *C. difficile* was surveyed in more countries in 2015 (17 versus 12 in 2008 and 14 in 2011).

Room for improvement

- In many countries, surveillance of AMR did not cover ambulatory care (only 20/26 countries) and nursing homes and other LTCFs (only 13/26 countries); ESBL-E were not included in all national surveillance systems.
- A national external quality assurance system was in place in only 17 countries in 2015.
- In 2015, there were still gaps in the availability and the use of data at local level to inform healthcare professionals, health authorities and the general public:
 - AMR data were available at regional level and hospital level in only 16 and 18 countries, respectively;
 - prescribers had access to their own individual antimicrobial consumption data in only 12 countries);
 - health authorities had access to hospital antimicrobial consumption data in only 16 countries and had rarely access to data from nursing homes and other LTCFs (four countries).

4.7. Control and preventive measures

Less than half of the respondents (14 countries: CZ, DE, DK, EE, EL, FI, IS, IT, LU, NL, NO, SI, SK, UK) reported that antimicrobial agents for systemic use were not sold without a prescription at pharmacies in their country. In seven countries (AT, BE, FR, HU, IE, PT, SE), sales of antimicrobial agents without a prescription were assumed to be marginal (<1 %). Eight countries (CY, ES, HR, LT, LV, MT, PL, RO) reported that sales of antimicrobial agents without prescription accounted for between 1 % and more than 10 % of total sales of these medicines, representing a potential source of misuse.

Antimicrobial agents for systemic use are medicinal products subject to medical prescription (according to criteria listed in Article 71 of Directive 2001/83/EC). All countries but one (IT) have transposed this requirement into national legislation. In 24 countries the requirement for antimicrobial agents to be subject to medical prescription is through general provisions on medicines and in four countries it is through specific provisions for antimicrobial agents⁽¹⁴⁾. Twenty-three countries stated they were taking measures to enforce their national legislation, mainly via inspections of pharmacies.

⁽¹⁴⁾ A link to the national legislation was provided by 20 countries, and reference to the legislation by three countries.

All medicinal products for topical (i.e. non systemic) use containing antimicrobial agents were subject to medical prescription in 13 countries (45 %). In 14 countries, some of these medicinal products (e.g. eye drops, ear drops) were not prescription-only medicines and in two countries all these medicinal products could be obtained without prescription.

Healthcare professionals other than medical doctors or dentists were allowed to prescribe antimicrobial agents in seven countries, under certain conditions: midwives (four countries), nurses (four), podiatrists (two), doctor's assistants (one), nurse practitioners (one), pharmacists (one), physiotherapists (one), diagnostic and therapeutic radiographers (one) and optometrists (one).

In four countries, it was allowed to sell or buy antimicrobial agents online, in accordance with Directive 2011/62/EU ⁽¹⁵⁾ general provisions.

Ten countries claimed that they had taken measures to restrict the use of certain antimicrobial agents for systemic use ⁽¹⁶⁾ in the last 5 years. Five countries specified that this had been carried out in hospitals via restriction protocols or antimicrobial stewardship programmes and five reported activities in ambulatory care.

Thirteen countries reported that prescription of certain antimicrobial agents required a special order form in hospitals (nine countries), in ambulatory care (seven) and in nursing homes and other LTCFs (six). However, this question may have been answered in different ways by the respondents since the use of these special forms may result from local hospital policies rather than from a national requirement.

Electronic prescriptions* were routinely used for antimicrobial agents in half of the countries or less: in the hospital sector (14 countries), in ambulatory care (13) and in nursing homes and other LTCFs (six). These electronic prescriptions were supplemented by electronic tools integrating aid into decision-making or local guidelines in only one country (EL).

Point-of-care RDTs are useful to identify whether a clinical situation requires antimicrobial treatment or not. Their use contributes to reducing the need for and rationalising the use of antimicrobial agents by providing information to clinicians. Only three countries (IT, MT, RO) stated that RDTs were not used in ambulatory care. Nine countries (AT, DE, DK, ES, FR, LU, NO, SK, UK) reported that the government encouraged the use of such rapid tests (e.g. by providing tests for free). The impact of the use of RDTs had been assessed in one country (EL) and was under evaluation in three countries (DK, ES, UK).

Other tools to help prescribers identify clinical situations where antimicrobial agents are not needed (e.g. memo, non-prescription pad) had been developed in 10 countries (EE, EL, ES, HR, IE, LU, PT, SI, SK, UK) and were in preparation in five countries (BE, FR, LV, MT, NO).

The practice of taking clinical samples for microbiological culture to inform management of community-acquired urinary tract infections for patients that do not respond to initial treatment was common (routine or frequent) in 20 countries and

⁽¹⁵⁾ Directive 2011/62/EU of the European Parliament and of the Council of 8 June 2011 amending Directive 2001/83/EC on the Community code relating to medicinal products for human use, as regards the prevention of the entry into the legal supply chain of falsified medicinal products.

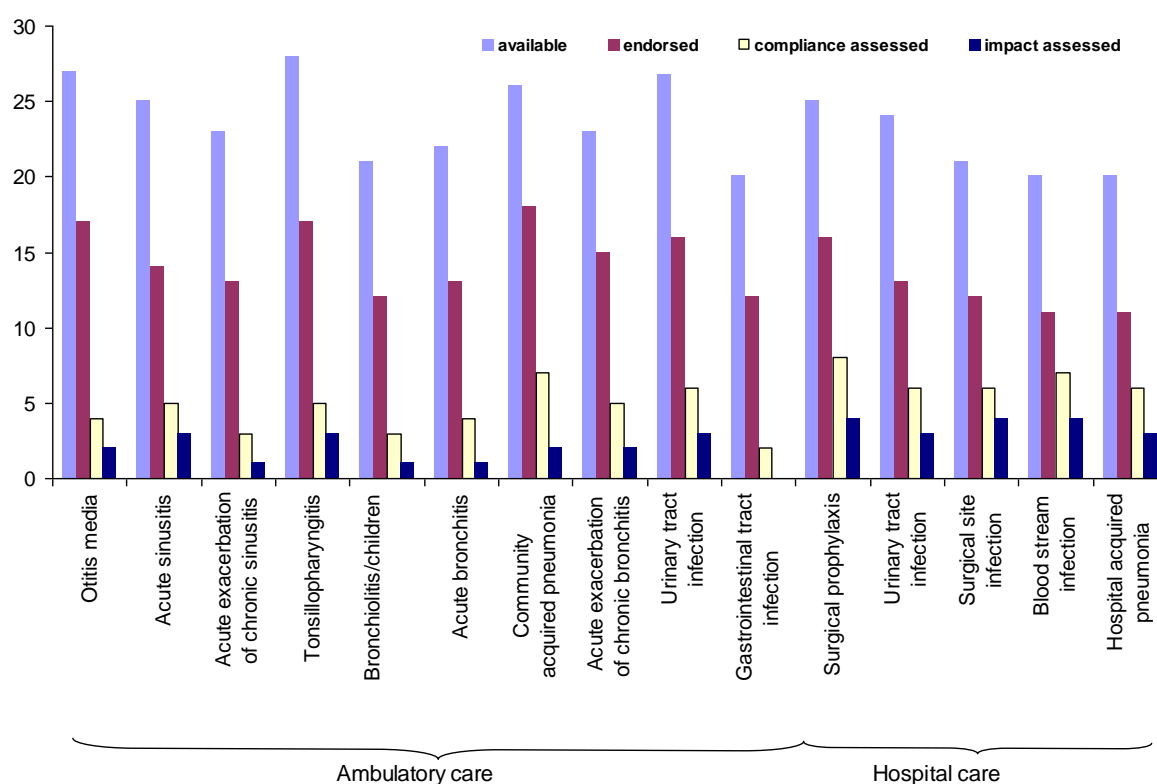
⁽¹⁶⁾ For example, restriction of the use of some antibiotics characterised as 'critically important' by the WHO. *Critically important antimicrobials for human medicine*, WHO, 2011. http://apps.who.int/iris/bitstream/10665/77376/1/9789241504485_eng.pdf

rare in four countries. This practice was also in place in 15 countries in other situations (e.g. recurrent/complicated infections, infection in children).

4.8. Guidelines* on appropriate use of antimicrobial agents

Most countries (25/29, 86 %) reported having general guidance on the prudent use of antimicrobial agents. All countries but one (RO) had specific guidelines (Figure 5).

Figure 5: Number of countries with specific guidelines on appropriate use of antimicrobial agents and status of these guidelines (n = 28 countries with specific guidelines)



Guidelines on the appropriate use of antimicrobial agents in the treatment of main community-acquired infections and HAIs were available in most countries. These guidelines were endorsed by the public health authorities in half to two thirds of the countries depending on the topic. No endorsement was reported by six countries (AT, CZ, DE, EE, ES, LT). In nine countries, guidelines had been developed for the treatment of other infections than those listed in ambulatory care (skin/soft tissue infections, bacteraemia, *C. difficile* infections, *Chlamydia* infections, etc.). Seven countries reported guidelines for the treatment of other infections in hospitals (*C. difficile* infections, MRSA infections, coagulase-negative staphylococci infections, meningitis, endocarditis, etc.).

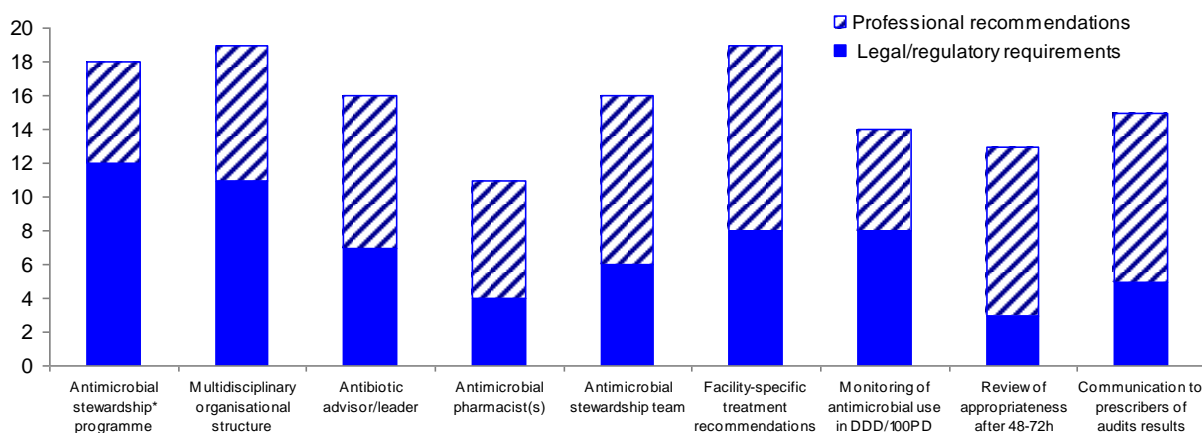
Guidelines on the prudent use of antimicrobial agents to limit the emergence of *C. difficile* existed in 16 countries.

Guidelines on the prudent use of antimicrobial agents were in place in nursing homes and other LTCFs in less than half (13) of the countries. Specific guidelines had been developed in four countries. In other countries, guidelines for ambulatory practice applied to nursing homes and other LTCFs.

4.9. Antimicrobial stewardship in hospitals

Hospitals were required to implement antimicrobial stewardship activities in 20 countries (69 %). The most common measures, in all countries but one, were to have in place a formal multidisciplinary organisational structure responsible for antimicrobial stewardship and the implementation of facility-specific treatment recommendations for common clinical conditions (Figure 6).

Figure 6: Antimicrobial stewardship measures required in hospitals (n = 20 countries)



Antibiotic advisor/leader = physician in charge of providing advice on antibiotic treatment to any prescriber, on request and identified as leader for antimicrobial stewardship activities.

Antimicrobial pharmacist = pharmacist responsible for ensuring appropriate antimicrobial use.

Antimicrobial stewardship team = multidisciplinary team comprising, for example, a medical doctor, a microbiologist, a pharmacist, etc.

DDD = defined daily dose, see <http://www.whocc.no>

PD = patient-days

NB: In CY, hospitals have access to a national team (comprising antimicrobial pharmacist and infectious diseases physician) appointed by the Ministry of Health

National mechanisms to encourage the implementation of these activities in hospitals were developed, even in the absence of legal or professional requirements, in 19 countries (16 with requirements) and were under preparation in four other countries (one country with requirements). The most used mechanism was mandatory reporting of indicators (nine countries). Binding regulation and inclusion in certification or accreditation process of hospitals were used in six and five countries, respectively.

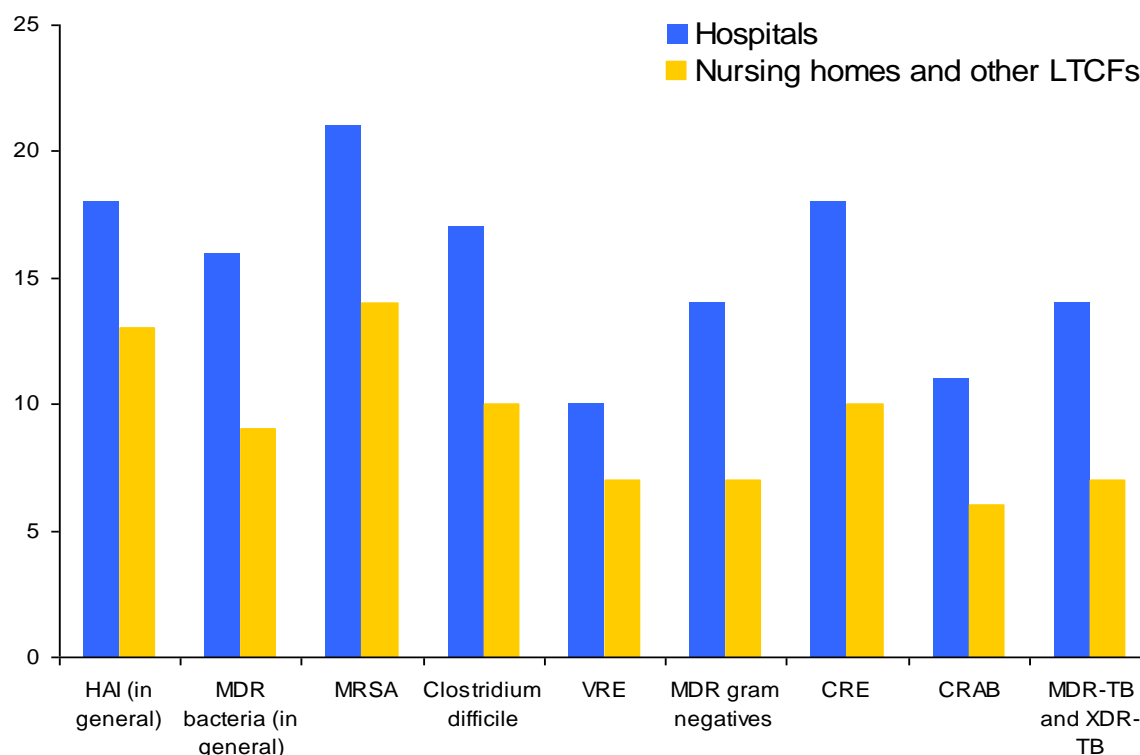
4.10. Infection control

Nineteen countries and UK-NI reported having nationally agreed ratios (15 countries via legal requirements and four plus UK-NI via professional guidelines*) to define the number of infection control and hospital hygiene (IC/HH) nurses (full-time equivalent (FTE)) needed in hospitals (e.g. number of FTE per number of beds or per admissions or other denominator taking into account the hospital activity). Fifteen countries and UK-NI reported having such ratios for IC/HH doctors (13 countries via legal requirements and two plus UK-NI via professional guidelines). Such ratios were also available for nursing homes and other LTCFs via legal requirement for IC/HH doctors in BE and for IC/HH nurses in HR and PT.

All countries but one (SE) detailed existing national guidelines for prevention and control in hospitals. All but four countries (EE, EL, LV, SE) stated they had such guidelines addressing nursing homes and other LTCFs. SE specified that national guidelines for basic hygiene existed. Prevention and control of MRSA was the most

common topic, addressed in 21 countries for hospitals and 14 countries for nursing homes and other LTCFs (Figure 7).

Figure 7: Availability of national guidelines for prevention and control of HAIs and specific antimicrobial-resistance bacteria in hospitals ($n = 28$ countries) and in nursing homes and other LTCFs ($n = 25$ countries)



HAI: healthcare-associated infection
MDR: multidrug-resistant
MRSA: methicillin-resistant *Staphylococcus aureus*
VRE: vancomycin-resistant enterococci
CRE: carbapenem-resistant Enterobacteriaceae^a
CRAB: carbapenem-resistant *Acinetobacter baumannii*
XDR: extensively drug-resistant
TB: *Mycobacterium tuberculosis*

In all the 18 countries (AT, BE, CZ, DE, EL, FI, FR, HR, HU, IE, IT, LU, MT, NL, NO, PL, SK, UK) with national guidelines for prevention and control of CRE, these guidelines provided information on identification and screening of patients at risk of carrying CRE and on dedicated staff and patient cohorting. In all countries but one (MT), the guidelines provided information on contact tracing.

National requirements to communicate on the infection status of a patient (i.e. information on infection by/carriage of communicable microorganism) when referred from one healthcare institution to another have been defined in 20 countries (69 %) for patient transfers within the same country but in only 11 countries (38 %) in case of cross-border transfer of patients.

Fourteen countries (AT, DK, EE, EL, FI, FR, HR, HU, IE, IS, LV, NL, SE, UK) reported that they had national requirements for hospitals to perform root-cause analysis of certain HAIs. The targeted HAIs were: MDR bacteria infections/bacteraemia (five countries); outbreaks (three); carbapenemase-producing Enterobacteriaceae infection or colonisation (two); VRE infection or colonisation (two); or other selected events.

Some countries specified that root-cause analyses were carried out on a voluntary basis.

Regarding evaluation, 22 countries had assessed the compliance of healthcare workers to the guidelines for hand hygiene. Less than half of the responding countries (13 countries and UK-NI) had assessed the impact of required infection control and hospital hygiene measures on the incidence of some infections in hospitals and less than a quarter of countries (six and UK-NI) had carried out such assessments in nursing homes and other LTCFs.

Comments

Achievements

- Antimicrobial stewardship activities in hospitals were implemented in 69 % of countries.
- Improvements in infection control measures since 2008 and 2011, when the first survey on the implementation of the 2009 Council recommendation was performed, were:
 - qualified resources — four additional countries reported having a ratio for the number of IC/HH nurses compared to 2008 (19 versus 15 in 2008 and 17 in 2011);
 - guidelines addressing nursing homes and other LTCFs developed by more countries (24 countries in 2015 versus 20 in 2011).

Room for improvement

- The number of countries where sales of antimicrobial agents without prescriptions accounted for more than 1 % of total sales (eight countries) was still substantial.
- Assessment of compliance with and the impact of guidelines on the prudent use of antimicrobial agents were rarely performed, even in the hospital sector.
- Guidelines on the prudent use of antimicrobial agents for nursing homes and other LTCFs were still rare (13/29 countries).
- Regarding infection control measures:
 - despite improvements, still one third to half of the countries had no legal requirements nor professionals guidelines for the number of infection control nurses and doctors in hospitals (respectively 19 and 15 countries versus 17 and 15 in 2011) and in nursing homes and other LTCFs (only three countries versus four in 2011);
 - the impact of infection control measures had only been assessed in hospitals in less than half of the countries;
 - guidelines for the prevention and control of CRE had been developed in only 18 countries (whereas a system for surveillance was reported by 26 countries), despite a technical report on this topic being issued by the ECDC in December 2014 ⁽¹⁷⁾.

⁽¹⁷⁾ European Centre for Disease prevention and Control, *Systematic review of the effectiveness of infection control measures to prevent the transmission of carbapenemase-producing Enterobacteriaceae through cross-border transfer of patients — Technical report*, December 2014. http://www.ecdc.europa.eu/en/publications/_layouts/forms/Publication_DispForm.aspx?List=4f55ad51-4aed-4d32-b960-af70113dbb90&ID=1224

4.11. Education and training of health professionals

The curriculum* of the healthcare professionals involved in the use of antimicrobial agents includes matters related to AMR and prudent use of antimicrobial agents in 72 % of countries for dentists, midwives and veterinarians, to 90 % of countries for medical doctors.

Appropriate use of antimicrobial agents was included in the continuing education in 2013/2014 mainly for medical doctors (76 % of countries versus 52 % of countries or less for other professions). Hygiene and infection control was included in the continuing education of nurses, medical doctors and midwives in more than 62 % of countries in 2013/2014.

Seventeen countries (59 %), plus UK-NI and UK-Sc, reported that it was mandatory for hospitals to have a system in place to provide training for all healthcare staff on entering into service. This training focused on hygiene and infection control in 16 countries. It addressed appropriate use of antimicrobial agents in only eight countries and covered vaccination programmes and their role in preventing infection in only seven countries.

Comments

Achievements

- The curriculum of medical doctors and of pharmacists included matters related to AMR and prudent use of antimicrobial agents in most countries.

Room for improvement

- The curriculum and continuing education requirements for professions other than medical doctors (in priority pharmacists and nurses) should include AMR and prudent use of antimicrobial agents to provide common and updated competencies to all healthcare professionals.
- Training on entering into services on relevant measures to contain AMR was required in less than two thirds of countries, although this measure could contribute to update healthcare workers on their knowledge of antimicrobial-resistant bacteria and their prevention and control.

4.12. Information and campaigns, General public and healthcare professionals

In 15 countries (BE, DE, EL, HR, HU, IE, IS, LT, MT, NL, PL, SE, SI, SK, UK), reports on the knowledge and/or perception of the general public (other than the 2013 Eurobarometer ⁽¹⁸⁾) had been issued in 2013/2014. These reports targeted the issue of AMR in 14 countries, inappropriate use of antimicrobial agents in 14 countries, vaccination programmes and their role in preventing infection in 12 countries and the importance of basic hygiene and its role in preventing infection in nine countries.

National campaigns had been performed in all but four countries (AT, LT, LV, SI) in 2013/2014, and the general public and medical doctors were the most common targets of these campaigns (Table 4). These campaigns had been designed based on

⁽¹⁸⁾ *Special Eurobarometer 407 – Antimicrobial resistance – Report*, 2013.
http://ec.europa.eu/health/antimicrobial_resistance/docs/ebs_407_en.pdf

results of behavioural research in seven countries. Their effectiveness in changing behaviour had been assessed in five countries, of which two used the results from Eurobarometer 2013 to this aim. In two countries, this assessment was in preparation.

Specific educational programmes on AMR and prudent use of antimicrobial agents targeting school children were reported in nine countries, including e-Bug (<http://www.e-bug.eu>) in six countries.

Table 4: Targeted audience and topics covered by national awareness campaigns in 25 countries^o

Targeted audience	Topic							
	Antimicrobial resistance		Inappropriate use of antimicrobial agents		Vaccination programmes and their role in preventing infection		Basic hygiene and its role in preventing infections	
	<i>n</i>	% ^o	<i>n</i>	% ^o	<i>n</i>	% ^o	<i>n</i>	% ^o
General public	19	66	20	69	19	66	16	55
Medical doctors	20	69	19	66	12	41	19	66
Pharmacists	14	48	14	48	8	28	7	24
Dentists	4	14	4	14	3	10	5	17
Nurses	5	17	5	17	9	31	16	55
Midwives	4	14	5	17	8	28	14	48
Veterinarians	10	34	10	34	7	24	9	31

^o The percentage of countries covering a topic for a specific audience was calculated using the total of 29 responding countries as denominator.

Comments

Achievements

- Awareness-raising campaigns had been carried out in more countries than reported in 2008 (24 versus 17). In some countries, these campaigns had been fostered by the launch in 2008 of the annual European Antibiotic Awareness Day.

Room for improvement

- Campaign design was based on behavioural research in only seven countries.
- Specific educational programmes for school children were reported by only nine countries, most of them referring to the e-Bug initiative. The 2012 resolution of the European Parliament recalled that comprehensive information in schools, starting at an early age, would contribute to raising awareness on the consequences of the inappropriate use of antimicrobials.

- Healthcare professionals other than medical doctors were still rarely targeted despite their role in containing AMR.

4.13. National research initiatives

Seventeen countries stated that they supported research on AMR by other means than the joint programming initiative on antimicrobial resistance ⁽¹⁹⁾. In less than half of the countries (11), the intersectoral mechanism or equivalent system was involved in the definition of priorities for research in the field of AMR and prudent use of antimicrobial agents.

5. Changes since the last report on implementation of the Council recommendation

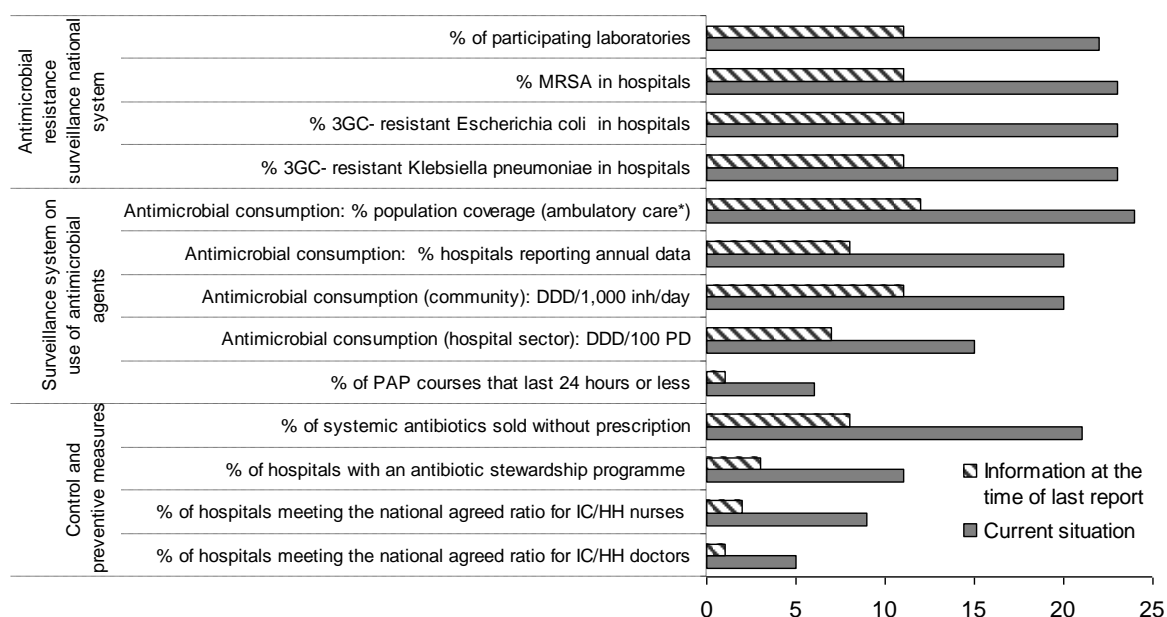
Countries were asked whether they used indicators to assess their situation in the past and at the time of the survey. The aim of this question was to assess whether countries could monitor their progress in containing AMR and promoting prudent use of antimicrobial agents.

All but three countries (AT, ES, RO) provided information on indicators at the time of the current report and/or at the time of last report on the implementation of Council recommendation 2002/77/EC (i.e. in 2008 or later) (Figure 8). Austria proposed that EARS-Net indicators should be used instead of this part of the questionnaire to have the same time points and statistical methods for all countries. Due to differences in answering this part of the questionnaire, the number of countries reporting data for each indicator rather than the distribution of the values of the indicators themselves is shown in Figure 8.

Indicators reported by countries were mainly those collected through surveillance systems on AMR and antimicrobial consumption.

⁽¹⁹⁾ Commission recommendation of 27 October 2011 on the research joint programming initiative 'The microbial challenge — an emerging threat to human health' (2011/C 315/01). http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.C_.2011.315.01.0001.01.ENG

Figure 8: Number of countries providing information on indicators available at the time of the last report on Council recommendation 2002/77/EC implementation and at the time of the current report



3GC: third-generation cephalosporins
 DDD: defined daily doses
 Inh: inhabitants
 PD: patient days
 PAP: perioperative antibiotic prophylaxis
 IC/HH: infection control and hospital hygiene

Countries were asked to comment on the measures that they thought had been the most effective in achieving positive results regarding prudent use of antimicrobial agents and on the three main challenges that they were facing in controlling AMR.

According to 19 countries, the most effective measures had been educational activities (six countries: CZ, EL, IS, NL, PL, SI) and awareness raising campaigns (five: BE, EL, FR, HR, MT). Other measures mentioned were: publication of national guidelines (four), antimicrobial stewardship (three), establishment of a surveillance system/access to data (three), targets for antibiotic prescription/performance-based reimbursement that encouraged decrease in antibiotic prescriptions (two) and infection control requirements (two).

Twenty-three countries commented on upcoming challenges. Nearly half of these countries (10/23: AT, BE, CY, DK, FR, HR, IE, PL, RO, UK) claimed that a major challenge is to increase public awareness and improve education and commitment of healthcare workers, four of which also reported that such activities had been effective in addressing AMR. Seven countries (DE, DK, EL, FR, MT, SI, SK) pointed out difficulties in curbing antimicrobial consumption in ambulatory care. Other challenges highlighted by the countries were: budgetary issues (six countries: AT, CY, CZ, FI, FR, PL), lack of qualified resources (six: CY, CZ, EE, HR, IE, PL), reinforcement of infection control measures (five: HU, MT, NL, SI, SK), better use of diagnostic tests (three: HU, NL, PL), improvement of surveillance systems in specific areas (hospitals (CZ), veterinary sector (EL, UK), alert (SI)), implementing the one health approach (two: BE, DE) and facing the threat of resistant microorganisms imported from other countries (two: DK, NO).

Comments

Achievements

- In 2015, more countries than in 2008 could report the value of some of the listed indicators (26 countries with at least one indicator versus 22 in 2008).
- Nineteen countries were able to identify effective measures that had been implemented in the country, and 22 countries were aware of upcoming challenges.

Room for improvement

- Raising awareness of the general public and/or healthcare professionals were still among challenges faced by 10 countries. Best use of social sciences could improve the situation.
- As budgetary issues and/or a lack of qualified resources and/or reinforcement of infection control measures are challenges reported by several countries, a system to collect indicators to monitor qualified resources for infection control and antimicrobial stewardship could be developed to inform the ICM and policymakers.
- Such a system should also enable the collection of indicators on practices according to national priorities (e.g. compliance with guidelines on surgical antibiotic prophylaxis) in addition to indicators collected through European surveillance networks.

6. Typology of countries' situations

Typology of countries' situations regarding implementation of the Council recommendation of 15 November 2001 (2002/77/EC) on the prudent use of antimicrobial agents in human medicine **Exploratory analysis**

To summarise information reported by Member States and EAA countries, characteristics of countries⁽²⁰⁾ were explored, based on the reported implementation of selected key measures in five areas of the Council recommendation: organisation and governance (definition of strategy and national action plan, establishment of an ICM with a written mandate and identification of a dedicated budget); surveillance systems (coverage of the national system and use of data); prevention (promotion of prudent use, qualified resources for infection control, guidelines, use of RDTs, educational activities and system set up for evaluation (Table A1). For each country, a score was calculated based on the number and type of measures implemented in each area.

Four clusters of countries could be delineated (Figure A1).

The first group of six countries (BE, FR, IE, NL, NO, UK) had implemented a comprehensive policy, comprising various activities in all areas covered by the Council recommendation. Their actions were based on national strategies and on national action plans developed over more than a decade (the median year of adoption of the first action plan was 2002). In all countries but one (NO), the national strategy was linked with the strategy for prevention and control of HAIs. In all countries, action plans covered the nursing homes and LTCFs sector. An ICM had been established in all

⁽²⁰⁾ Country situation refers to the governance of the national strategy and action plan and to the activities implemented.

countries but NO; 4/6 countries could identify a dedicated budget. Regarding preventive measures, all the countries in this cluster except the United Kingdom had requirements for the number of IC/HH professionals, all had developed guidelines to control CRE and the use of RDTs was common in ambulatory care (and was encouraged by the government in 3/6 countries). All countries had also set up a system for evaluation comprising the use of indicators. According to 2014 ESAC-Net data ⁽²¹⁾, antimicrobial consumption was equal to or above the median EU value in four countries in this cluster. This context may explain policymakers commitment to implement a broad range of actions.

Countries in the second cluster (DK, EL, HR, HU, IS, LT, PT, SE, SK) had developed (or were in the process of developing) strategies and action plans and had established an ICM. The median year of adoption of the first action plan was 2009. In 4/9 countries, the action plan did not cover the nursing homes and LTCFs sector; 3/9 countries could identify a dedicated budget. Countries in this second cluster had developed a system for surveillance and for evaluation. They differed in the number and type of activities implemented regarding prevention and education (for instance, 6/9 had requirements for the number of IC/HH professionals and 5/9 had developed guidelines to control CRE). The use of RDTs was common in ambulatory care in 4/9 countries and was encouraged by the government in 2/9 countries.

The third cluster comprised six countries (AT, CY, DE, LU, MT, SI) that had implemented activities in two or more areas. The median year of adoption of the first action plan was 2010. The strategy was linked to HAI strategy in 4/6 countries and the action plan covered nursing homes and LTCFs in 4/6.

The last cluster comprised eight countries where the overall level of implementation of the Council recommendation was rather low. Organisation and governance were highly variable depending on the country. This cluster included the three countries with no strategy or action plan, one country without an ICM and two countries with an ICM in preparation. Only three countries had developed a strategy and a national action plan (median year of adoption: 2014) and had established an ICM, resulting in an organisation and governance favourable to future progress (CZ, ES, LV). The other countries in this cluster had implemented activities in one main area (e.g. prevention in EE, FI, IT; education/information in PL). In 4/8 countries, antimicrobial agents sold without a prescription were assumed to account for more than 1 %.

Limitations of the above classification are inherent to the source of data (self-assessment by respondents) and to the subjective choice of criteria and areas used to assess the country situation. Another limitation is that national epidemiological data are not taken into account and neither is socioeconomic background, although these factors impact on policymakers' commitment to establish formal strategy and on the content of the action plan.

However, this exploratory attempt to identify clusters of countries suggested that having (1) clear organisation and governance, (2) sustainable surveillance system and use of data and (3) system for evaluation are associated with the implementation of a higher number of control and preventive measures and educational activities. Therefore, the above three characteristics may be considered as prerequisites for implementing sustainable and relevant measures to control AMR and ensure prudent use of antimicrobial agents.

⁽²¹⁾ *Summary of the latest data on antibiotic consumption in the European Union — ESAC-Net surveillance data, November 2015.* <http://ecdc.europa.eu/en/eaad/antibiotics-news/Documents/antimicrobial-consumption-ESAC-Net-summary-2015.pdf>

However, the fact that some countries in the first cluster are still facing high levels of antimicrobial consumption and increasing AMR rates highlight the need for new initiatives to promote change in behaviour, attitude and practice among healthcare professionals and the general public. Besides, better knowledge of measures' effectiveness in different healthcare systems could help in defining innovative measures and objectives to reach, taking into account epidemiological and socioeconomic background.

Table 5: Selected measures used to explore countries situation regarding the implementation of Council recommendation 2002/77/EC on the prudent use of antimicrobial agents in human medicine

Area	Question number	Measure
Organisation and governance	1.1	National strategy to contain antimicrobial resistance
	1.5	Action plan to contain antimicrobial resistance
	1.7	Action plan addressing nursing homes and other long-term care facilities (LCTFs)
	2.1	Intersectoral coordinating mechanism or equivalent system
	2.2 and 2.5	Intersectoral coordinating mechanism created by regulation or by governmental decision and written mandate to monitor the implementation of the strategy
	2.9	Dedicated budget for implementation of the action plan
Surveillance	3.14	System for alert and early reporting for specific multidrug-resistant bacteria of public health concern to health authorities
	3.2	Other surveillance system for antimicrobial resistance covering hospitals and other sector (ambulatory care and/or nursing homes and other LCTFs)
	3.6	National system for external quality assessment of antimicrobial susceptibility testing
	3.8	AMR data collated in an annual national report
	4.2.1	Surveillance systems for antimicrobial consumption other than ESAC-Net covering hospitals and other sector (ambulatory care and/or other LCTFs)
	4.5	Access to individual hospital antimicrobial consumption data by health authorities
	4.6.1	Antimicrobial prescribing data in ambulatory care available for the prescribers
	4.6.1.1	Antimicrobial prescribing data in ambulatory care available for the prescribers at the individual level
	4.6.1.2	Access to individual antimicrobial prescribing data in ambulatory care by health authorities

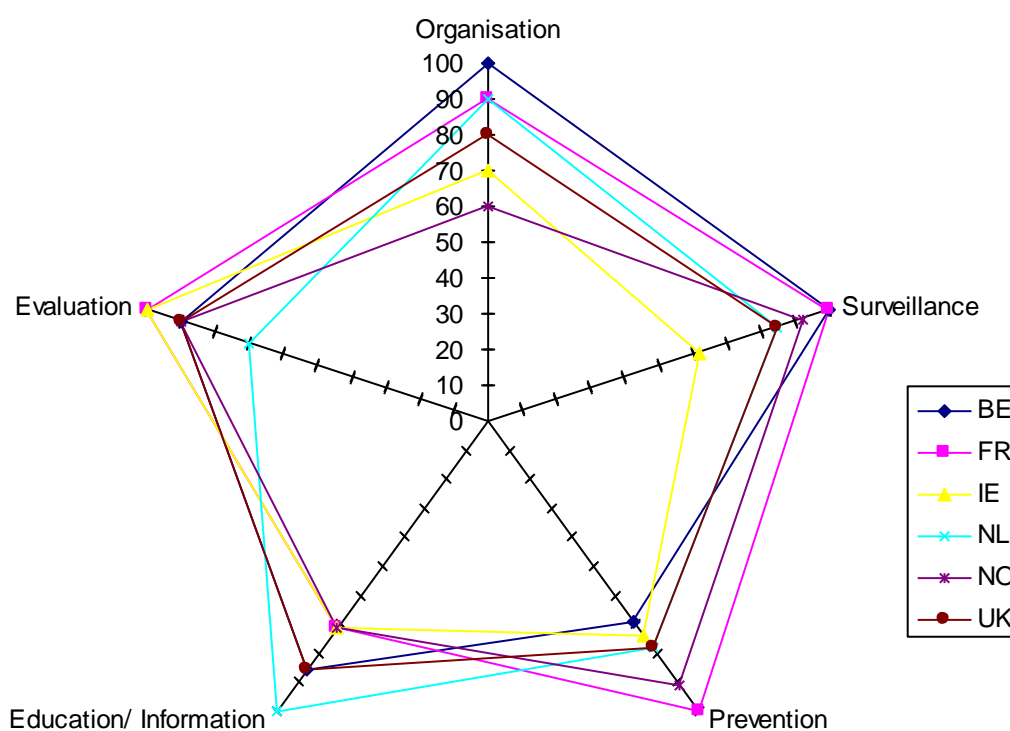
Prudent use of antimicrobial agents in human medicine:
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Area	Question number	Measure
Prevention	5.1	Percentage of antimicrobial agents for systemic use sold without a prescription in pharmacies < 1 %
	5.11	Guidelines for the prudent use of antimicrobial agents in specific indications, endorsed by health authorities
	5.11	Guidelines for the prudent use of antimicrobial agents in specific indications, endorsed by health authorities and compliance of the prescribers assessed or impact on antimicrobial prescribing practices assessed
	5.14	Antimicrobial stewardship activities required in hospitals
	5.15.1	Nationally agreed ratio for the number of infection control and hospital hygiene nurses in hospitals
	5.15.2	Nationally agreed ratio for the number of infection control and hospital hygiene doctors in hospitals
	5.16	National guidelines for prevention and control of HAI and/or MDR bacteria
	5.6	Electronic prescriptions routinely used to prescribe antimicrobial agents in hospitals and/or ambulatory care
	5.7.1	Government encouraging the use of RDTs
	5.8	Other tools to help prescribers to identify clinical situations for which antimicrobial agents are not needed
	5.16.1	Guidelines providing information on identification and screening patients at risk for carriage of CRE
	5.17	National requirements to communicate on the infection status of a patient within the same country and in case of cross-border transfer
	5.18	National requirements for hospitals to perform root cause analysis of some healthcare-associated infections
	Information/ Education	6.3
7.1		Reports on the knowledge and/or perception of the general public in 2013/2014
7.2		National campaign in the last 2 years
7.3		Specific educational programmes on antimicrobial resistance and prudent use of antimicrobial agents targeting young children
Evaluation	1.9	Indicators to assess the implementation and/or results of the action plan
	4.12	Indicators to monitor prescribing practices of antimicrobial agents in ambulatory care or in hospital or in nursing homes and others LCTFs
	5.14.2	National mechanisms to encourage the implementation of antimicrobial stewardship activities: mandatory reporting of indicators or inclusion in certification/accreditation process of

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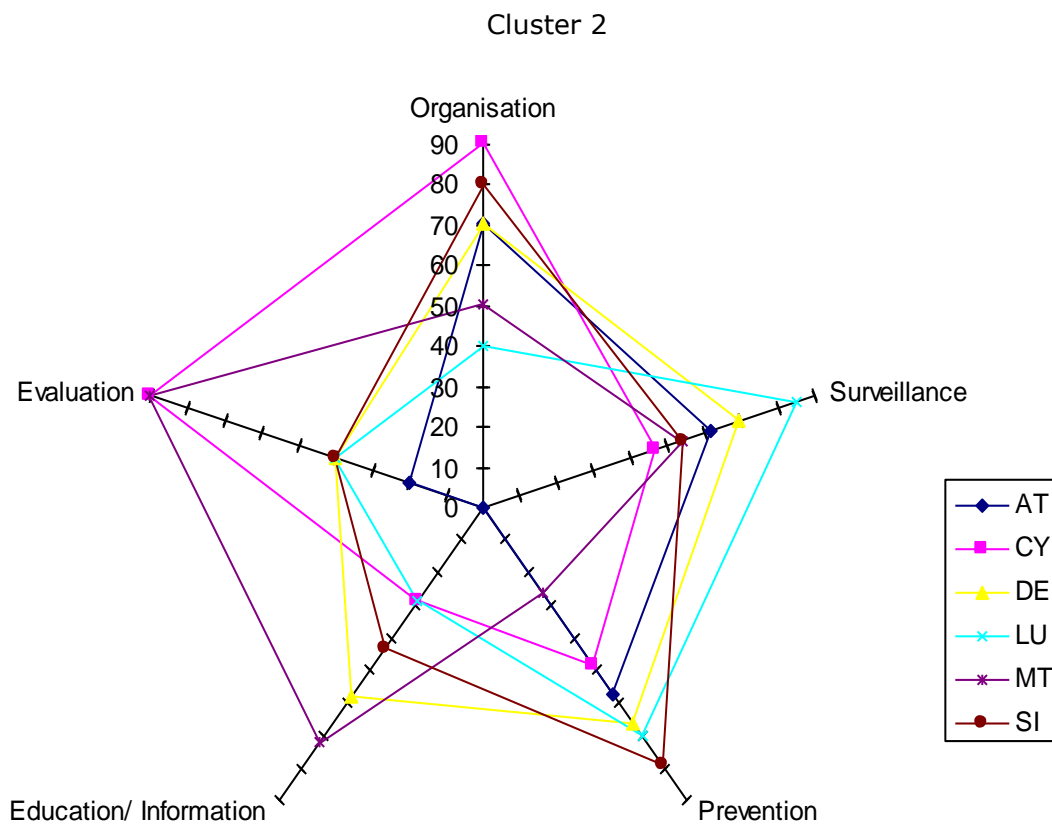
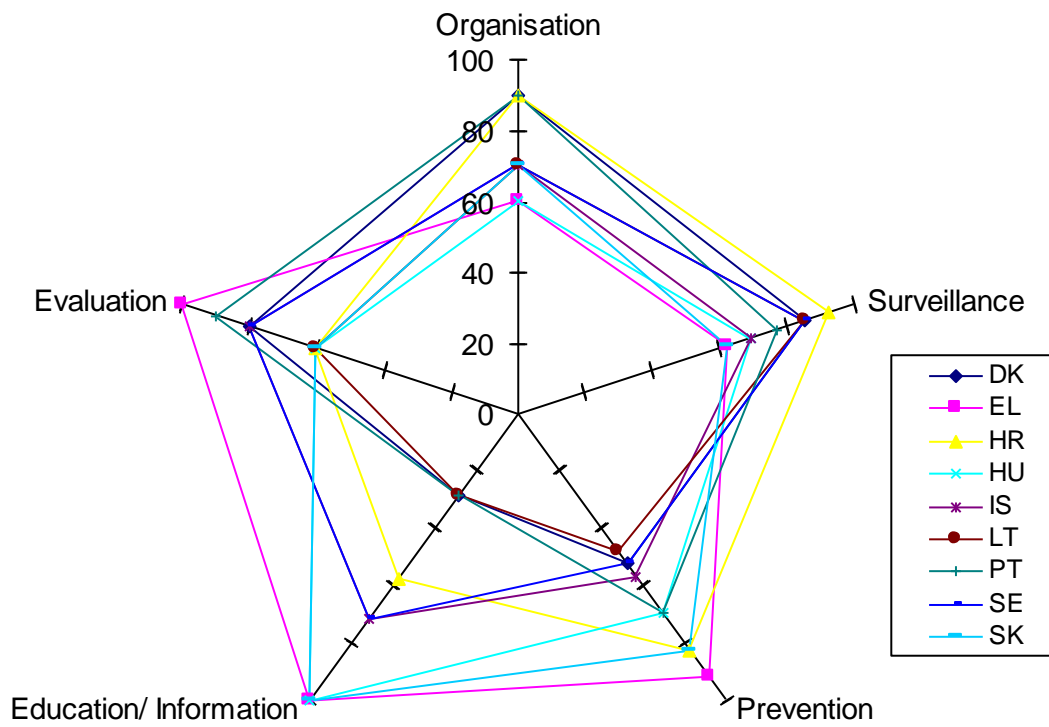
Area	Question number	Measure
		hospitals
	5.19	Assessment of healthcare workers' compliance with the guidelines for hand hygiene
	5.20	Assessment of infection control and hospital hygiene measures impact on incidence of some infections in hospitals
	9.1	Indicators to assess antimicrobial resistance
		Indicators to assess the use of antimicrobial agents
		Indicators to assess control and preventive measures

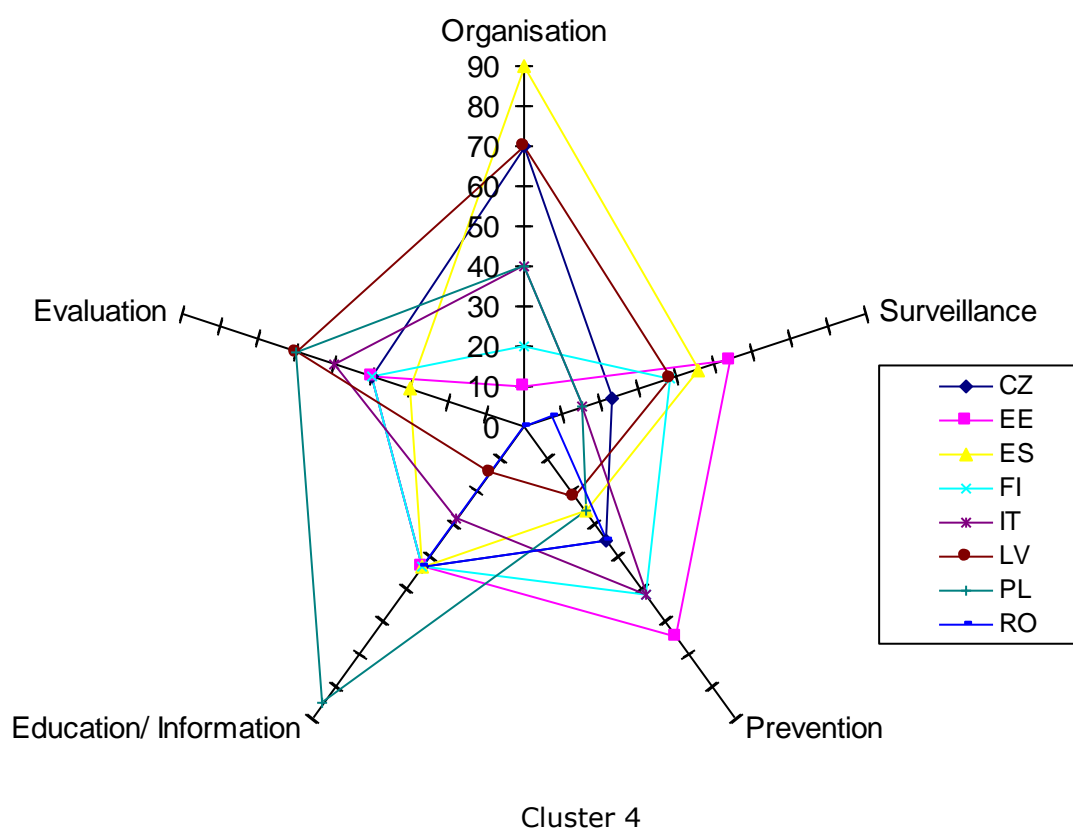
Figure 9: Level of implementation of selected key measures in five areas of Council recommendation 2002/77/EC on the prudent use of antimicrobial agents in human medicine (for each area, the percentage of the maximum score achieved by the country is represented on the radar chart)



Cluster 1

Prudent use of antimicrobial agents in human medicine:
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7. Discussion and conclusions

Twenty-nine Member States and EEA countries reported on the state of implementation of Council recommendation 2002/77/EC on the prudent use of antimicrobial agents in human medicine.

In interpreting this report it is important to be aware that the information is provided as part of a questionnaire completed by respondents in Member States. The questions may have been interpreted in different ways by respondents, reflecting the variety of national situations and practices. Despite these limitations affecting the comparability of data, this survey, carried out 14 years after the adoption of the recommendation, provides information on a number of successes and challenges reported by countries. It also highlights the need to consider additional initiatives in the context of statements by political leaders at the G7 Summit in October 2015⁽²²⁾ and by the World Health Assembly in May 2015 with the adoption of a global action plan on AMR⁽²³⁾.

Overall, countries had implemented a wide range of activities in line with the provisions of the Council recommendation. Since the last survey, improvements were obtained in several areas (including surveillance systems, the use of indicators and awareness campaigns). European surveillance networks and the organisation of the

⁽²²⁾ Declaration of the G7 health ministers, Berlin, 8-9 October 2015. http://www.bmg.bund.de/fileadmin/dateien/Downloads/G/G7-Ges.Minister_2015/G7_Health_Ministers_Declaration_AMR_and_EBOLA.pdf

⁽²³⁾ World Health Organisation, Global action plan on antimicrobial resistance, 2015. http://apps.who.int/iris/bitstream/10665/193736/1/9789241509763_eng.pdf?ua=1

European Antibiotic Awareness Day have certainly fostered these activities in Member States. The fact that half of the countries launched or updated their action plan in the two previous years, and that recent concerns regarding emerging MDR and XDR bacteria are addressed in most countries, might reflect mobilisation of decision-makers to contain AMR.

However, not all the provisions in the recommendation were adhered to, and there were still huge differences among countries in the governance of national strategies and action plans, in the number of activities developed and in the way they were implemented (see also : Typology of countries' situations). Many of the areas for improvement identified in the previous report (issued in 2010) are still valid. Besides, some countries that implemented comprehensive and structured strategies and action plans are still facing high levels of antimicrobial consumption and increasing AMR rates. Therefore, new initiatives are needed to promote changes in behaviour, attitude and practices among healthcare professionals and the general public. More information on the effectiveness of recommended measures in different healthcare systems could also help in defining objectives to reach, taking into account epidemiological and socioeconomic backgrounds. Future work should consider the following areas in line with the global action plan adopted by the WHO.

At Member State level

- **Governance of national strategies and national action plans to contain AMR**
 - Firm governmental commitment to: (1) establish an intersectoral coordinating committee, with a multidisciplinary and intersectoral composition, clear status and mandate; (2) adopt a national strategy then develop a national action plan, including targets to achieve; (3) ensure the availability of resources needed for the implementation of the action plan.
 - Undertaking analysis of barriers to the implementation of the provisions of the recommendation in order to overcome these barriers.
 - Ensuring that the national strategy and action plan covers all sectors (hospitals, nursing homes and other LTCFs, and ambulatory care) and is linked to the strategy/action plan for prevention and control of HAIs or for patient safety.
 - Assessment of the implementation of the action plan and of its effectiveness using a system of relevant indicators, including indicators on qualified resources and results (to enable appropriate adjustments to the measured situation).
- **Surveillance and evaluation systems**
 - Implementation of systems for alert and reporting to allow early detection of and responses to new AMR threats, namely those posing a cross-border issue.
 - Best use of surveillance data (AMR and antimicrobial use) at local level and involvement of all stakeholders (including patient groups) in defining measures tailored to the national and local situation.
 - Development of methods and systems to assess compliance with and the impact of guidelines and to ensure appropriate feedback to concerned healthcare professionals and health authorities.
- **Prevention and control measures – education of healthcare professionals and the general public**
 - Effective enforcement of regulation on 'prescription-only medicines' for antimicrobial agents for systemic use.

- Implementation of evidence-based guidelines, making the best use of ECDC reports and of the directory of online resources for prevention and control of AMR and HAIs ⁽²⁴⁾.
 - Promotion of multidisciplinary antimicrobial stewardship programmes in hospitals.
 - Promotion of the use of RDTs.
 - Availability and sustainability of qualified resources.
 - Extension of requirements regarding prudent use of antimicrobial agents and AMR containment to the curriculum and continuing education of all healthcare professionals — not only medical doctors.
 - Better use of behavioural sciences in implementing measures in ambulatory care and in designing awareness campaigns and education programmes.
- **Research**
 - National support for research in areas with national added value such as behavioural sciences, healthcare organisation and cost-effectiveness of recommended measures.
 - **International coordination and exchange**
 - Sharing tools and best practices for surveillance, communication and assessment (indicators to assess changes in key areas).

At EU level

Future developments need to build on achievements and gaps from this survey, together with the conclusions from similar surveys on veterinary issues, taking into account the results of the Commission action plan, the 'one health' approach and the global action plan on AMR (WHO). From the findings of this survey, and considering the success of European surveillance networks and of the European Antibiotic Awareness Day, the following areas could be highlighted.

- **Legislative action**
 - Updating of the Council recommendation, in line with the 'one health' approach, the Council recommendation on patient safety and the global action plan on AMR (WHO) to increase Member States' commitment to establishing appropriate strategies and governance informed by the relevant scientific and socioeconomic background.
 - Explore, together with the European Medicines Agency, better ways to inform healthcare professionals and the general public on the proper use of antimicrobial agents for systemic use and for local use (e.g. inclusion of a symbol ⁽²⁵⁾ or of a specific advice at the top of the leaflet/summary of product characteristics).
- **Support for countries**
 - Mechanisms to promote sharing of experiences.
 - With the ECDC and the WHO, promotion of tools/methods for European Antibiotic Awareness Day and World Antibiotic Awareness Week.

⁽²⁴⁾ http://ecdc.europa.eu/en/healthtopics/Healthcare-associated_infections/guidance-infection-prevention-control/Pages/guidance-prevention-control-infections-caused-by-multidrug-resistant-bacteria-and-healthcare-associated-infections.aspx

⁽²⁵⁾ For instance the black symbol according to Commission Implementing Regulation (EU) No 198/2013 on the selection of a symbol for the purpose of identifying medicinal products for human use that are subject to additional monitoring (<http://eur-lex.europa.eu/legal-content/EN/AUTO/?uri=celex:32013R0198>). This would come in addition to the statement intended for prescribers in part 4.1 of the summary of product characteristics: 'Consideration should be given to official guidance on the appropriate use of antibacterial agents'

- With the ECDC, development of methods for surveillance and for collection of indicators.
- Inclusion of more questions exploring the behavioural dimensions of antibiotic use in future Eurobarometer surveys.
- **Research**
 - Support projects and disseminate results regarding key areas, including:
 - understanding the drivers of the use of antimicrobial agents without prescription;
 - studies on the relevance and consistency of indicators;
 - promoting clinical studies regarding recommended antimicrobial stewardship measures (e.g. de-escalation in the context of different healthcare systems);
 - evaluation of the effectiveness of recommended measures in different healthcare systems, taking into account the epidemiological and socioeconomic context.

8. Key documents

Council recommendation of 15 November 2001 (2002/77/EC) on the prudent use of antimicrobial agents in human medicine (2002/77/EC). <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32002H0077&from=EN>

Council recommendation of 9 June 2009 on patient safety, including the prevention and control of healthcare associated infections (2009/C 151/01). [http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32009H0703\(01\)&from=EN](http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32009H0703(01)&from=EN)

European Commission, Communication from the Commission to the European Parliament and the Council — Action plan against the rising threats from antimicrobial resistance (COM(2011) 748), 2011. <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2011:0748:FIN:EN:PDF>

European Commission, *Action plan against the rising threats from antimicrobial resistance: road map*, updated November 2015, http://ec.europa.eu/health/antimicrobial_resistance/docs/roadmap_amr_en.pdf

European Parliament resolution of 11 December 2012 on the microbial challenge — Rising threats from antimicrobial resistance (2012/2041(INI)). <http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//NONSGML+TA+P7-TA-2012-0483+0+DOC+PDF+V0//EN>

Council conclusions on patient safety and quality of care, including the prevention and control of healthcare associated infections and antimicrobial resistance, Employment, Social Policy, Health and Consumer Affairs Council, Brussels, 1 December 2014. <http://www.consilium.europa.eu/en/workarea/downloadasset.aspx?id=40802192228>

Council conclusions on the impact of antimicrobial resistance in the human health sector and in the veterinary sector — a 'one health' perspective, 3177th Employment, Social policy, Health and Consumer affairs Council, Luxembourg, 22 June 2012. http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/lsa/131126.pdf

Council conclusions on antimicrobial resistance (AMR), 2876th Employment, Social Policy, Health and Consumer Affairs Council, Luxembourg, 10 June 2008. http://www.consilium.europa.eu/ueDocs/cms_Data/docs/pressData/en/lsa/101035.pdf

9. Glossary

Action plan: paper/statement giving directions about activities to implement, the role and responsibilities of actors at national/regional level and in healthcare institutions +/- budgetary issues and timelines.

Ambulatory care = community = primary care: terms opposite to hospitals and healthcare institutions.

Antimicrobial stewardship: refers to coordinated interventions designed to improve and measure the appropriate use of antimicrobial agents by promoting the selection of the optimal antimicrobial drug regimen including dosing, duration of therapy and route of administration. The major objectives of antimicrobial stewardship are to achieve best clinical outcomes related to antimicrobial use while minimising toxicity and other adverse events, thereby limiting the selective pressure on bacterial populations that drives the emergence of antimicrobial-resistant strains. Antimicrobial stewardship may also reduce excessive costs attributable to suboptimal antimicrobial use [1].

The term 'antimicrobial stewardship' is defined as an approach that 'embodies an organisational or healthcare-system-wide approach to promoting and monitoring judicious use of antimicrobials to preserve their future effectiveness' [2].

Community = ambulatory care = primary care: terms opposite to hospitals and healthcare institutions.

Continuing education: programme of training planned for the employees or the healthcare workers acting in their functions.

CRE: carbapenem-resistant Enterobacteriaceae.

Curriculum: academic programme defined by public authorities leading to graduation.

Electronic prescription (or electronic prescribing or e-prescribing): the electronic transmission of prescription information from the prescriber's computer to a pharmacy computer. It replaces a paper prescription that the patient would otherwise carry or fax to the pharmacy.

ESBL-E: extended-spectrum beta-lactamase-producing Enterobacteriaceae.

Extensively drug-resistant (XDR): non-susceptible to at least one agent in all but two or fewer antimicrobial categories (i.e. the isolate remains susceptible to only one or two categories) [3].

NB: A different definition applies to *Mycobacterium tuberculosis*, for which the isolate must be resistant to isoniazid and rifampin, plus any fluoroquinolone and at least one of three injectable second-line drugs (i.e. amikacin, kanamycin, or capreomycin) to be considered extensively drug resistant (XDR-TB) [4].

Guidelines: guidelines acknowledged at national/regional level, drawn up by national/regional expert groups, professional societies, public health institutes and/or agencies, independent from pharmaceutical and medical devices industry.

Indicator: quantitative or qualitative measure of how close we are to achieving a set goal (policy outcome). Indicators help analyse and compare performance across population groups or geographic areas, and can be useful for determining policy priorities.

Intersectoral coordinating mechanism: the Council recommends that Member States have in place an intersectoral mechanism or equivalent systems corresponding to the infrastructure in each Member State, for the coordinated implementation of the strategy as well as for the purposes of information exchange and coordination with the Commission and the other Member States. Such a mechanism or equivalent system should collaborate with, or be integrated into, the intersectoral mechanism as set up in accordance with the Council recommendation of 9 June 2009 on patient safety, including the prevention and control of healthcare associated infections (2009/C 151/01).

Long-term care facility (LTCF) [5]: Institution where elderly or disabled people are staying temporarily (long or short) or permanently.

The residents in these institutions:

- need constant supervision (24/24h);
- need 'high-skilled nursing care', i.e. more than 'basic' nursing care and assistance for daily living;

- are medically stable and don't need constant 'specialised medical care' (i.e. care administered by specialised physicians);
- do not need invasive medical procedures (e.g. ventilation).

Multidrug-resistant (MDR): non-susceptible to at least one agent in three or more antimicrobial categories [3].

Nursing home [5]: care facility where elderly people stay temporarily (long or short term) or permanently. The residents in these nursing homes need medical and/or skilled nursing care and supervision 24 hours a day. These LTCFs principally provide care to elderly people with severe illnesses or injuries.

Pandrug-resistant (PDR): non-susceptible to all agents in all antimicrobial categories (i.e. no agents tested as susceptible for that organism) [3].

Primary care = community = ambulatory care: terms opposite to hospitals and healthcare institutions.

Professional guidelines refer in the context of this questionnaire to guidelines drawn up by professional societies, universities or scientific institutions, independent from pharmaceutical and medical devices industry.

Region/regional: in some countries, region or *länder* or autonomous community may have a significant role in designing health plans or in tailoring strategies (for instance, in the United Kingdom or in Spain).

Strategy: in this context, a document/paper/statement indicating that AMR is a public health concern and designing a long-term programme to prevent and control AMR and to ensure prudent use of antimicrobial agents (list of main fields to cover and/or goals to achieve).

References for the glossary

1. Society for Healthcare Epidemiology of America, Infectious Diseases Society of America and Pediatric Infectious Diseases Society, 'Policy statement on antimicrobial stewardship by the Society for Healthcare Epidemiology of America (SHEA), the Infectious Diseases Society of America (IDSA), and the Pediatric Infectious Diseases Society (PIDS)', *Infection Control and Hospital Epidemiology*, Vol. 33, No 4, 2012, pp. 322-327.
2. National Institute for Health and Care Excellence, Medicines and Prescribing Centre, *Antimicrobial stewardship: systems and processes for effective antimicrobial medicine use*, draft for consultation, February 2015. <https://www.nice.org.uk/guidance/gid-antimicrobialstewardship/documents/antimicrobial-stewardship-guideline-consultation3>
3. Magiorakos, A. P., Srinivasan, A., Carey, R. B., Carmeli, Y., Falagas, M. E., Giske, C. G., Harbarth, S., Hindler, J. F., Kahlmeter, G., Olsson-Liljequist, B., Paterson, D. L., Rice, L. B., Stelling, J., Struelens, M. J., Vatopoulos, A., Weber, J. T., Monnet, D. L., 'Multidrug-resistant, extensively drug-resistant and pandrug-resistant bacteria: an international expert proposal for interim standard definitions for acquired resistance', *Clinical Microbiology and Infection*, Vol. 18, No 3, 2012, pp. 268-281.
4. European Centre for Disease Prevention and Control, 'Multidrug- and extensively drug-resistant tuberculosis'. <http://ecdc.europa.eu/en/healthtopics/Tuberculosis/Pages/mdr-xdr-tb.aspx>
5. European Centre for Disease Prevention and Control, *Surveillance report — Point prevalence survey of healthcare-associated infections and antimicrobial use in European long-term care facilities — April–May 2013*, Stockholm, 2014. <http://www.ecdc.europa.eu/en/publications/Publications/healthcare-associated-infections-point-prevalence-survey-long-term-care-facilities-2013.pdf>

**TEMPLATE FOR REPORTING OF MEMBER STATES
ON THE IMPLEMENTATION OF THE COUNCIL RECOMMENDATION OF 15 NOVEMBER 2001
(2002/77/EC) ON THE PRUDENT USE OF ANTIMICROBIAL AGENTS IN HUMAN MEDICINE**

Version 9 June 2015

Introduction

This questionnaire asks for information which will contribute to a report evaluating the implementation of the Council Recommendation of 15 November 2001 (2002/77/EC) on the prudent use of antimicrobial agents in human medicine (2002/77/EC).

Member State contact points are asked to arrange for the accompanying Microsoft Excel version of the questionnaire to be completed and returned by e-mail before 17 July 2015 to: sante-c3-hsc@ec.europa.eu; copy to catherine.dumartin@chu-bordeaux.fr

The responses will then be passed to Dr Catherine Dumartin, Bordeaux University hospital - FRANCE who has designed the questionnaire with input from ECDC and DG SANTE and who will carry out the analysis.

The questionnaire is based on the two previous reports on the implementation of this recommendation and also takes into account the Council recommendation of 9 June 2009 on patient safety, including the prevention and control of healthcare-associated infections (2009/C 151/01), and EU activities.

A glossary is provided (annex) to clarify the meaning of some of the terms used. These are indicated by a “*” in the questionnaire. Supporting documents can be provided as needed (e.g., law, regulation, decisions, national/regional publication, reports, etc.).

INSTRUCTIONS FOR COMPLETION

The questionnaire is provided as a pdf file for information and as an Excel file for completion.

The Excel file comprises 3 sheets: the first one with general information and instructions for use, the second one being the questionnaire and the third one the glossary.

Questions cover nine areas: national strategy and action plan; governance; surveillance of antimicrobial resistance; surveillance of antimicrobial agents use; control and preventives measures; education of health professionals; information and campaigns; research; changes since the last report.

This file can be filled out in one or multiple goes at your convenience: intermediate changes can be saved at any time.

- To answer each question, please tick boxes or select your answer(s) from drop-down lists.
- Additional information can be provided by writing free text in the boxes and by providing web links: you may either type directly in the boxes (press *Alt+Enter* to change line) or copy and paste text typed in a word file. Each area of the questionnaire ends with a text box for your comments and for information on specific activities you would like to mention.
- Supporting documents can be provided as needed and sent back in attachment. When available, documents and web pages in English will be appreciated in addition to documents in your own language.

If you have further queries or need additional information on the questionnaire, please contact:

Charles Price, DG Sante Commission Européenne - Luxembourg: charles.price@ec.europa.eu	Catherine Dumartin, consultant Bordeaux University hospital - France: catherine.dumartin@chu-bordeaux.fr
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Thank you for your cooperation.

**Template for reporting of Member states
on the implementation of the Council Recommendation of 15 November 2001 (2002/77/EC) on the
prudent use of antimicrobial agents in human medicine**

Contact details respondent 1:

Contact name: -----

Position / function of respondent: -----

Institute / affiliation: -----

Department: -----

Address: -----

City: -----Postcode: -----

Country/Region: -----

Phone: -----

E-mail: -----

Contact details respondent 2:

Contact name: -----

Position / function of respondent: -----

Institute / affiliation: -----

Department: -----

Address: -----

City: -----Postcode: -----

Country/Region: -----

Phone: -----

E-mail: -----

1. NATIONAL STRATEGY AND ACTION PLAN

1.1. Does your country have a national strategy* targeted to contain the problem of antimicrobial resistance and promote the prudent use of antimicrobial agents?

Yes No Under preparation

1.1.1. **If yes**, please, provide website link to the strategy*

1.2. Are there substantial differences among regions* in your country in the strategy* taken to contain the problem of antimicrobial resistance?

Yes No

If yes, please fill out a questionnaire for each region*

1.3. Is the strategy* to contain the problem of antimicrobial resistance and promote the prudent use of antimicrobial agents linked to another public health strategy*?

Yes, the strategy for prevention and control of healthcare-associated infections
 Yes, the strategy for patient safety
 Yes, other strategy, please specify:
 No

1.4. Is this strategy* intersectoral?

Yes, linked to the strategy for controlling antimicrobial resistance in animals (prudent use of antimicrobial agents in veterinary medicine and/or in food chain)
 Yes, it comprises actions regarding veterinary medicine and/or food chain
 No

1.5. Has your country elaborated an action plan* to contain the problem of antimicrobial resistance and promote the prudent use of antimicrobial agents?

Yes No

1.5.1. **If yes**, please provide website link to this action plan*

1.5.2. If yes, it is based on the strategy* described above

Yes No Not applicable

1.6. Does the action plan* covers the following topics:

<input type="checkbox"/> Surveillance of antimicrobial resistance	<input type="checkbox"/> Use of rapid diagnostic tests
<input type="checkbox"/> Surveillance of antimicrobial use	<input type="checkbox"/> Prevention policy
<input type="checkbox"/> Prudent use of antimicrobial agents	<input type="checkbox"/> Education and training of health professionals
<input type="checkbox"/> Detection and control of outbreaks	<input type="checkbox"/> Information of the general public
<input type="checkbox"/> Detection and control of emerging extensively drug-resistant* (XDR) and pandrug-resistant bacteria* (PDR)	<input type="checkbox"/> Research

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1.7. Is this action plan* addressing the following sectors:

- Hospitals
 Nursing homes* and other long-term care facilities (LTCFs)*
 Primary care

1.8. When was issued the national action plan* on the prudent use of antimicrobial agents?

Year of publication of first action plan:

Year of publication of last action plan:

1.9. Are there indicators* in place to assess the implementation and/or the results of the action plan*?

- Yes No

1.10. **If yes**, please list the main indicators* in ambulatory care, hospitals and nursing homes and other LTCFs and specify which of them are publicly available at the institution level (for hospitals and nursing homes and other LTCFs)

Indicators*	Ambulatory care sector	Hospitals	Nursing homes and other LTCFs
Outcome			
Antimicrobial resistance, MRSA ^a all types of infection, incidence	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes, not publicly available at hospital level <input type="checkbox"/> Yes, publicly available at hospital level <input type="checkbox"/> No	<input type="checkbox"/> Yes, not publicly available at facility level <input type="checkbox"/> Yes, publicly available at facility level <input type="checkbox"/> No
Antimicrobial resistance, MRSA ^a bacteraemia, incidence	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes, not publicly available at hospital level <input type="checkbox"/> Yes, publicly available at hospital level <input type="checkbox"/> No	<input type="checkbox"/> Yes, not publicly available at facility level <input type="checkbox"/> Yes, publicly available at facility level <input type="checkbox"/> No
Antimicrobial resistance, ESBL-E ^b incidence	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes, not publicly available at hospital level <input type="checkbox"/> Yes, publicly available at hospital level <input type="checkbox"/> No	<input type="checkbox"/> Yes, not publicly available at facility level <input type="checkbox"/> Yes, publicly available at facility level <input type="checkbox"/> No
Antimicrobial resistance, Other (please specify:)	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes, not publicly available at hospital level <input type="checkbox"/> Yes, publicly available at hospital level <input type="checkbox"/> No	<input type="checkbox"/> Yes, not publicly available at facility level <input type="checkbox"/> Yes, publicly available at facility level <input type="checkbox"/> No
<i>Clostridium difficile</i> infection, incidence	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes, not publicly available at hospital level <input type="checkbox"/> Yes, publicly available at hospital level <input type="checkbox"/> No	<input type="checkbox"/> Yes, not publicly available at facility level <input type="checkbox"/> Yes, publicly available at facility level <input type="checkbox"/> No
Antimicrobial consumption	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes, not publicly available at hospital level <input type="checkbox"/> Yes, publicly available at hospital level <input type="checkbox"/> No	<input type="checkbox"/> Yes, not publicly available at facility level <input type="checkbox"/> Yes, publicly available at facility level <input type="checkbox"/> No

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<i>Indicators*</i>	<i>Ambulatory care sector</i>	<i>Hospitals</i>	<i>Nursing homes and other LTCFs</i>
Outcome			
Other, specify	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes, not publicly available at hospital level <input type="checkbox"/> Yes, publicly available at hospital level <input type="checkbox"/> No	<input type="checkbox"/> Yes, not publicly available at facility level <input type="checkbox"/> Yes, publicly available at facility level <input type="checkbox"/> No
Structure & Process			
Volume of alcohol hand rub used per year/ 1000 beds (or other denominator, specify...)	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes, not publicly available at hospital level <input type="checkbox"/> Yes, publicly available at hospital level <input type="checkbox"/> No	<input type="checkbox"/> Yes, not publicly available at facility level <input type="checkbox"/> Yes, publicly available at facility level <input type="checkbox"/> No
Number of FTE ^c of IC/HH ^d professionals ^e / 1000 beds (or other denominator, specify...)		<input type="checkbox"/> Yes, not publicly available at hospital level <input type="checkbox"/> Yes, publicly available at hospital level <input type="checkbox"/> No	<input type="checkbox"/> Yes, not publicly available at facility level <input type="checkbox"/> Yes, publicly available at facility level <input type="checkbox"/> No
Annual report on implementation of antimicrobial stewardship* programmes		<input type="checkbox"/> Yes, not publicly available at hospital level <input type="checkbox"/> Yes, publicly available at hospital level <input type="checkbox"/> No	<input type="checkbox"/> Yes, not publicly available at facility level <input type="checkbox"/> Yes, publicly available at facility level <input type="checkbox"/> No
Other, specify...	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes, not publicly available at hospital level <input type="checkbox"/> Yes, publicly available at hospital level <input type="checkbox"/> No	<input type="checkbox"/> Yes, not publicly available at facility level <input type="checkbox"/> Yes, publicly available at facility level <input type="checkbox"/> No
Other, specify...	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes, not publicly available at hospital level <input type="checkbox"/> Yes, publicly available at hospital level <input type="checkbox"/> No	<input type="checkbox"/> Yes, not publicly available at facility level <input type="checkbox"/> Yes, publicly available at facility level <input type="checkbox"/> No

^a MRSA: meticillin-resistant *Staphylococcus aureus*

^b ESBL-E: Extended-spectrum beta-lactamase-producing Enterobacteriaceae

^c Full-time equivalent

^d Infection control and hospital hygiene

^e Nurses and doctors

1.11. **If yes**, please specify the targets fixed for any of these indicators* in the action plan* (e.g. “90% hospitals with antimicrobial stewardship reports in 2018”)

1.12. Specific comments on chapter 1:

2. INTERSECTORAL CO-ORDINATING MECHANISM (ICM) ON ANTIMICROBIAL RESISTANCE

2.1. Is an intersectoral co-ordinating mechanism* or equivalent system in place in your country?

Yes No Under preparation

If yes,

2.2. Was it created

by regulation (regulation must be understood as legal provision)
 by governmental decision (decision must be understood as a political commitment only)
 by another official text

Please provide a link to or attach a copy of this regulation / governmental decision / text

2.3. Since when? Year:

2.4. What is the name of the ICM in your language?

2.4.1. How would you translate the name of the ICM in English?

2.5. Does the ICM have a written mandate to monitor the implementation of the strategy* and to report to the Government?

Yes No

If yes, please provide a link to or attach a copy of this mandate

2.6. Is this ICM also in charge of:

the strategy for prevention and control of healthcare-associated infections
 the strategy for patient safety
 other strategy, please specify:

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2.7. How is the ICM composed?

If there are more than one committee, structure or system to coordinate the implementation of the strategy (e.g. one for hospitals, one for nursing homes, one for ambulatory care/community), please specify in the “comments” section and provide additional information on the legal basis, name and composition of these systems.*

Representatives from the following institutions	Plenary/ working parties ^a
Ministry of Health	<input type="checkbox"/> Yes <input type="checkbox"/> No
Medicines agency	<input type="checkbox"/> Yes <input type="checkbox"/> No
Health insurance	<input type="checkbox"/> Yes <input type="checkbox"/> No
Institute of epidemiology in charge of antimicrobial resistance	<input type="checkbox"/> Yes <input type="checkbox"/> No
Reference laboratories	<input type="checkbox"/> Yes <input type="checkbox"/> No
Competent authority / body responsible for patient safety ^b	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Hospital sector	<input type="checkbox"/> Yes <input type="checkbox"/> No
Ambulatory sector/primary care	<input type="checkbox"/> Yes <input type="checkbox"/> No
Nursing homes/elderly, long-term care	<input type="checkbox"/> Yes <input type="checkbox"/> No
Intersectoral mechanism coordinating the implementation of the strategy for prevention and control of healthcare-associated infections ^c	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Pharmacists	<input type="checkbox"/> Yes <input type="checkbox"/> No
Nurses	<input type="checkbox"/> Yes <input type="checkbox"/> No
Prevention sector	<input type="checkbox"/> Yes <input type="checkbox"/> No
Ministry of Education	<input type="checkbox"/> Yes <input type="checkbox"/> No
Ministry of Employment (if in charge of continuing education* for healthcare workers)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Animal health	<input type="checkbox"/> Yes <input type="checkbox"/> No
Food chain safety	<input type="checkbox"/> Yes <input type="checkbox"/> No
Ministry of Agriculture	<input type="checkbox"/> Yes <input type="checkbox"/> No
Ministry of Environment	<input type="checkbox"/> Yes <input type="checkbox"/> No
Ministry of Research	<input type="checkbox"/> Yes <input type="checkbox"/> No
Professional society / Medical specialists	<input type="checkbox"/> Yes <input type="checkbox"/> No
Patients groups	<input type="checkbox"/> Yes <input type="checkbox"/> No
Pharmaceutical industry	<input type="checkbox"/> Yes <input type="checkbox"/> No
Other, specify:	<input type="checkbox"/> Yes <input type="checkbox"/> No

NA: not applicable

^a If in the form of a committee, please list the representative participating in plenary committee and/or working parties

^b competent authority or authorities or any other competent body or bodies responsible for patient safety according to the Council recommendation of 9 June 2009 on patient safety, including the prevention and control of healthcare-associated infections

^c inter-sectoral mechanism or equivalent systems established for the coordinated implementation of strategy for the prevention and control of healthcare-associated infections

2.8. Management of the ICM

- Frequency of the meetings / year
- Is there a periodic report? Yes No
 - If yes: is it annual? Yes No
 - Year of last issue
 - Web link:

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2.9. Is there a dedicated budget for implementation of the national or regional action plan*?

Yes No Under preparation

2.9.1. If yes, please specify:

Budget from	Annual	Occasional
The Government	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Regional health authorities	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Other, please specify:	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No

2.9.2. If yes: total amount in 2014: euros

2.9.3. If possible, specify main activities funded in 2014:

(e.g. improvement of information technology support for surveillance, promotion of electronic prescribing, use of rapid diagnostic tests, education, awareness campaign ...)

2.10. Specific comments on chapter 2:

3. SURVEILLANCE SYSTEM FOR ANTIMICROBIAL RESISTANCE

3.1. Does your country participate in European Antimicrobial Resistance Surveillance Network (EARS-Net)?

Yes No

3.2. In your country, are there other surveillance systems for antimicrobial resistance that may provide additional information than those collected via EARS-Net?

Yes No

If yes, please specify:

3.2.1. Which sector is covered by the surveillance systems for antimicrobial resistance and the coverage:

	Sector covered	Coverage
Hospitals	<input type="checkbox"/> Yes <input type="checkbox"/> No	% hospital beds % laboratories
Ambulatory care*	<input type="checkbox"/> Yes <input type="checkbox"/> No	% laboratories
Nursing homes and other long-term care facilities	<input type="checkbox"/> Yes <input type="checkbox"/> No	% beds % laboratories

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3.2.2. Which micro-organisms are covered and in which settings?

	Hospitals	Ambulatory care*	Nursing homes and other long-term care facilities
Meticillin-resistant <i>Staphylococcus aureus</i> (MRSA)	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
ESBL-producing Enterobacteriaceae	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Carbapenem-resistant Enterobacteriaceae	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Penicillin-resistant/intermediate <i>Streptococcus pneumoniae</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Vancomycin-resistant enterococci	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Carbapenem-resistant <i>Pseudomonas aeruginosa</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Carbapenem-resistant <i>Acinetobacter baumannii</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<i>Clostridium difficile</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
MDR/XDR <i>Mycobacterium tuberculosis</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Other, please specify	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No

3.3. Are the antimicrobial resistance surveillance systems implemented:

- By the Government
- As part of research projects
- By independent scientific societies

3.4. Are the antimicrobial resistance surveillance systems implemented:

- Continuously
- Through specific projects

3.5. Does your country participate in the external quality assurance system conducted by EARS-Net (assessment performed by United Kingdom National External Quality Assessment Service, NEQAS)

- Yes No

3.6. Is there a national system for external quality assessment of antimicrobial susceptibility testing?

- Yes No Under preparation

3.7. Is there a system of reference laboratories in charge of characterisation of antimicrobial resistance mechanisms, e.g. extensively drug-resistant bacteria of public health concern?

- Yes No Under preparation

3.8. Are antimicrobial resistance data collated in national reports (in addition to EARS-Net report)?

- Yes No

3.8.1. If yes, is (are) this (these) report(s)

- Annual
- Other, please specify

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3.9. Are antimicrobial resistance data collated in an interactive database, available on the Internet?

Yes No

3.10. Do the health authorities have access to resistance data

Yes No

3.10.1. If yes, please specify

	What is the level of aggregation?	Are the data publicly available in a report or a website?
Country	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Region	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Hospital	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No

3.10.2. If the health authorities do not have access to resistance data, specify what are the obstacles:

- Legal status
- Budgetary reasons
- Surveillance system privately owned
- Information Technology (IT)-related reasons

3.11. Is the surveillance system used as a tool to support:

Disease control/Infection control? Yes No
 Outbreak investigation? Yes No

3.12. Is the surveillance system in human medicine compatible in terms of standardization of methods and interpretation with the surveillance systems for antimicrobial resistance in:

Food chain /veterinary medicine? Yes No
 Environnement? Yes No

3.13. Does your country participate in healthcare-associated infections (HAI) surveillance networks?

Yes No Under preparation

3.13.1. If yes, in which surveillance networks?

- Surveillance of HAI in intensive care units (ICUs)
- Surveillance of surgical site infections (SSIs)
- Point prevalence survey (PPS) of HAI and antimicrobial use in acute care hospitals

3.14. Is there a system for alert and early reporting for specific multidrug-resistant bacteria* of public health concern to health authorities/competent body for early warning and response?

Yes No Under preparation

3.14.1. If yes, which bacteria are to be reported?

- Enterococci resistant to vancomycin
- Carbapenem-resistant Enterobacteriaceae
- Other, please specify.....

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3.15. Have you used the Early Warning and Response System to notify other Member States and EU authorities a cross-border threat due to multidrug-resistant bacteria* of public health concern²⁶?

Yes No

3.16. Specific comments on chapter 3

4. SURVEILLANCE SYSTEM ON PRESCRIPTION AND USE OF ANTIMICROBIAL AGENTS

4.1. Does your country participate in European Surveillance of Antimicrobial Consumption Network (ESAC -Net)?

Yes No

4.1.1. If yes, does your country provide data for:

- ambulatory care* Yes No

- hospital sector Yes No

4.2. In your country, are there other surveillance systems for antimicrobial consumption that may provide additional information compared to those collected via ESAC-Net?

Yes No

4.2.1. **If yes**, please specify which sector is covered by the surveillance systems for antimicrobial consumption and how is the surveillance system implemented:

Sector covered		Implementation	
Hospitals	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> By the Government <input type="checkbox"/> As part of research projects <input type="checkbox"/> By independent scientific societies	<input type="checkbox"/> Continuously <input type="checkbox"/> Through specific projects
Ambulatory care*	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> By the Government <input type="checkbox"/> As part of research projects <input type="checkbox"/> By independent scientific societies	<input type="checkbox"/> Continuously <input type="checkbox"/> Through specific projects
Nursing homes and other long-term care facilities	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> By the Government <input type="checkbox"/> As part of research projects <input type="checkbox"/> By independent scientific societies	<input type="checkbox"/> Continuously <input type="checkbox"/> Through specific projects

4.3. Are antimicrobial consumption data collated in national reports (in addition to ESAC-Net report)?

Yes No

4.3.1. If yes, is this report

Annual

Other, please specify

²⁶ According to Decision No 1082/2013/EU of the European Parliament and of the Council of 22 October 2013 on serious cross-border threats to health and repealing Decision No 2119/98/EC

4.4. Are antimicrobial consumption data collated in an interactive database, available on the Internet?

Yes No

4.5. Consumption data in hospitals

4.5.1. If hospitals are collecting antimicrobial consumption data, do the health authorities have access to these individual hospital data?

Yes No

4.5.2. If the health authorities do not have access to these individual hospital consumption data, specify what are the obstacles:

- Legal status
- Budgetary reasons
- Surveillance system privately owned
- IT-related reasons

4.6. Consumption data in ambulatory care*

4.6.1. Are antimicrobial prescribing data in ambulatory care* available for the prescribers?

Yes No

4.6.1.1. If yes, at which level?

- National level Yes No
- Regional level Yes No
- Individual level, discussed via continuing education* groups Yes No
- Individual level with peer review comments Yes No
- Individual level Yes No

4.6.1.2. If antimicrobial prescribing data in the ambulatory care* are available for the prescribers, do the health authorities have access to individual prescribing data?

Yes No

4.6.1.3. If these data are available, but if the health authorities have no access to these individual prescribing data, specify what are the obstacles:

- Legal status
- Budgetary reasons
- Surveillance system privately owned
- IT-related reasons

4.7. Consumption data in nursing homes and other long-term care facilities

4.7.1. If nursing homes and other long-term care facilities are collecting antimicrobial consumption data, do the health authorities have access to these individual facilities data?

Yes No Not applicable

4.7.2. If the health authorities do not have access to these individual nursing homes and other long-term care facilities consumption data, specify what are the obstacles:

- Legal status
- Budgetary reasons

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- Surveillance system privately owned
- IT-related reasons

4.8. Can available data at the national level be broken down by indications?

- For total antibiotic consumption Yes No
- Separately for hospitals Yes No
- Separately for ambulatory care* Yes No
- Separately for nursing homes and other long-term care facilities Yes No

4.8.1. If yes, is it:

- Continuously as part of the surveillance system
- Through specific research projects

4.9. Can available data for hospitals be broken down by:

- Hospital Yes No
- Speciality or ward Yes No

4.9.1. If yes, is it:

- Continuously as part of the surveillance system
- Through specific research projects

4.10. Can surveillance data on antimicrobial consumption be linked to data on resistance?

- Yes No

4.10.1. If yes, is it:

- Continuously as part of the surveillance system
- Through specific research projects

4.11. Is your country co-ordinating actions for improvement in prescribing practices

- In ambulatory care*? Yes No
- In hospital? Yes No
- In nursing homes and other long-term care facilities Yes No

4.11.1. If yes, please give examples.....

4.12. Are indicators* to monitor prescribing practices of antimicrobial agents used?

- In ambulatory care*? Yes No
- In hospitals? Yes No
- In nursing homes and other long-term care facilities Yes No

4.12.1. If yes, please list the indicators* used and specify whether health authorities set targets for some of them

4.13. Antimicrobial consumption in animals:

4.13.1. Is there a surveillance system for antimicrobial consumption in animals in place?

Yes No

4.13.2. Are there actions for improvement of prescribing practices by veterinaries?

Yes No

4.14. Specific comments on chapter 4:

5. CONTROL AND PREVENTIVE MEASURES

5.1. What is the percentage of antimicrobial agents for systemic use sold in your country without a prescription in pharmacies (percentage of the total antimicrobial agents used in the ambulatory care*) including cases when prescription can be provided *a posteriori*?

- 0%
- Less than 1%
- 1-5%
- 6-10%.
- > 10%, please specify percentage:

5.2. Antimicrobial agents for systemic use are medicinal products subject to medical prescription (*see criteria listed in article 71 of Directive 2001/83/EC*): how did your country transpose this requirement into national legislation?

- General provisions on medicines, please provide link
- Specific provisions for antimicrobial agents, please provide link
- No transposition into national legislation

5.2.1. If a national legislation exists, is your country taking measures to enforce it?

Yes No

If yes,

5.2.2. Please, specify how (e.g. inspections of pharmacies, financial penalties if delivery without prescription...)

5.2.3. Are other healthcare professionals than medical doctors or dentists allowed to prescribe antimicrobial agents? (i.e. midwives, nurses, pharmacists...)

Yes No

If yes, please, specify

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5.2.4. Is it allowed to sell or buy antimicrobial agents online in your country, in accordance with directive 2011/62/EU²⁷ general provisions?

Yes No

5.3. Did your country take measures to restrict the use of certain antimicrobial agents for systemic use²⁸ in the last 5 years? (e.g. changes in the classification from conventional medical prescription to “special” or “restricted” medical prescription²⁹, promotion of delayed prescribing)

Yes No

If yes, please give examples and links to the description of measures

5.4. Are medicines containing antimicrobial agents for topical use (non systemic) subject to medical prescription in your country?

Yes, all

Yes, some of them. Please specify which medicines are not subject to prescription (e.g. ear-drops, eye-drops...)

No

5.5. Is it required to prescribe certain antimicrobial agents on a special form?

Yes No

5.5.1. If yes, please specify which one, in which sector

	Yes, all antimicrobial agents	Yes, some antimicrobial agents, specify:	No
Hospitals			
Ambulatory care*			
Nursing homes and other long-term care facilities			

5.6. Are electronic prescriptions* routinely used to prescribe antimicrobial agents in the following sectors?

Sector covered		If yes, percentage of beds or of population covered in the country
Hospitals	<input type="checkbox"/> Yes <input type="checkbox"/> No	% beds
Ambulatory care*	<input type="checkbox"/> Yes <input type="checkbox"/> No	% inhabitants
Nursing homes and other long-term care facilities	<input type="checkbox"/> Yes <input type="checkbox"/> No	% beds

²⁷ Directive 2011/62/EU of the European parliament and of the Council of 8 June 2011 amending Directive 2001/83/EC on the Community code relating to medicinal products for human use, as regards the prevention of the entry into the legal supply chain of falsified medicinal products

²⁸ For instance of some antibiotics characterized as « critically important » by WHO [Critically Important Antimicrobials for Human Medicine, WHO, 2011: http://apps.who.int/iris/bitstream/10665/77376/1/9789241504485_eng.pdf]

²⁹ Directive 2001/83/EC of the European Parliament and of the Council of 6 November 2001 on the Community code relating to medicinal products for human use (Consolidated version : 16/11/2012). – article 70 - http://ec.europa.eu/health/files/eudralex/vol-1/dir_2001_83_consol_2012/dir_2001_83_cons_2012_en.pdf

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5.6.1. If yes, are these electronic prescriptions* supplemented by electronic tools integrating aid to decision-making or local guidelines*?

Yes No

5.7. Are point-of-care rapid diagnostic tests (RDTs) used in ambulatory care*?

- Yes, routinely, specify which RDTs³⁰
 Yes, frequently, specify which RDTs⁸
 Yes, rarely, specify which RDTs⁸
 No

5.7.1. If yes, is the Government encouraging the use of RDTs?

Yes No

5.7.2. If yes, please specify how (e.g. Financial incentives for use, RDTs provided for free to primary care prescribers...)

5.7.3. If yes, has your country evaluated the impact of the use of RDTs on prescribing practices?

Yes No under preparation

5.7.4. If yes, please specify provide a link to main results

5.8. Has your country implemented other tools to help prescribers to identify clinical situations when antimicrobial agents are not needed? (for example: memo, non-prescription pad...)³¹

Yes No Under preparation

5.9. In ambulatory care*, is a clinical sample taken for culture to inform management of community-acquired urinary tract infections in patients that do not respond to initial treatment?

- Yes, routinely
 Yes, frequently
 Yes, rarely
 No

5.9.1. In ambulatory care*, is a clinical sample taken for culture to inform management of community-acquired urinary tract infections in other situations?

- Yes, specify which situations
 No

NB: This is to evaluate the practice of taking samples in different countries. Depending on the country, there might be different guidelines for management of community-acquired urinary tract infections.

³⁰ C-reactive protein, rapid diagnostic tests for Group A streptococcal pharyngitis, urine dipsticks, other...

³¹ These tools generally provide information on clinical symptoms and how to relieve them without antimicrobial agents.

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Guidelines* on appropriate use of antimicrobial agents

5.10. Is there general guidance on the prudent use of antimicrobial agents?

Yes No

5.11. Specific guidelines*

	Are there guidelines* on appropriate use of antimicrobial agents in	Are these guidelines* endorsed by the public health authorities ^a	Did you assess the compliance of the prescribers ^b to the guidelines*?	Did you evaluate the impact of the guidelines* on antimicrobial prescribing practices ^c ?
Ambulatory practice				
Otitis media	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Acute sinusitis	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Acute exacerbation of chronic sinusitis	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Tonsillopharyngitis	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Bronchiolitis among children	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Acute bronchitis	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Community-acquired pneumonia	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Acute exacerbation of chronic bronchitis	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Urinary tract infection	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Gastro-intestinal tract infection	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Other (specify):	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Other (specify):	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Hospital care				
Surgical prophylaxis	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Urinary tract infection	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Surgical site infection	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Blood stream infection	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Hospital-acquired pneumonia	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Other (specify):	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Other (specify):	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No

^a select "No" if guidelines endorsed by a scientific society but not by public health authorities (ministry of health, public health agencies)

^b for instance, survey to measure percentage of prescriptions made in accordance to the guidelines

^c for instance, survey to measure changes in prescribers' behaviour or changes in antimicrobial use after dissemination of guidelines

5.12. Are there guidelines* regarding the prudent use of antimicrobial agents to limit the emergence of *C. difficile*?

Yes No

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5.13. Are there guidelines* on prudent use of antimicrobial agents in place in nursing homes and other long-term care facilities?

- Yes, specific guidelines*
 Yes, guidelines* for ambulatory practices apply
 No

5.14. Are hospitals required to implement antimicrobial stewardship* activities?

- Yes No

If yes, including:	Yes, legal/regulatory requirements	Yes, professional recommendations	No
An antimicrobial stewardship* programme			
A formal multidisciplinary organisational structure responsible for antimicrobial stewardship*			
Qualified resources:			
- An antibiotic advisor/leader ^a			
- (An) antimicrobial pharmacist(s) ^b			
- An antimicrobial stewardship team ^c			
Facility-specific treatment recommendations for common clinical conditions			
Monitoring of antimicrobial use in number of defined daily doses (DDD ^d) per patient per day			
Review of appropriateness after 48-72h (post-prescription review)			
Communication directly to prescribers of the results of audits and reviews			
Other, specify			

^a physician in charge of providing advice on antibiotic treatment to any prescriber, on request and identified as leader for antimicrobial stewardship* activities.

^b pharmacist responsible for ensuring appropriate antimicrobial use

^c multidisciplinary team comprising for instance a medical doctor, a microbiologist, a pharmacist...

^d <http://www.whocc.no/>

5.14.1. Are there national mechanisms to encourage the implementation of these activities in hospitals?

- Yes No Under preparation

5.14.2. If yes, what are these mechanisms?

- Binding regulation
 Mandatory reporting of indicators* (structure, process, outcomes)
 Inclusion in certification or accreditation process of hospitals
 Other (please specify):

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Infection control

5.15. **Qualified personnel** with the task of implementing the infection prevention and control programme in healthcare settings

5.15.1. Is there a nationally agreed ratio for the number of infection control and hospital hygiene (IC/HH) nurses (Full Time Equivalent, FTE) according to healthcare institution activity (e.g. per number of hospital-beds or other denominator)?

In hospitals	<input type="checkbox"/> Yes, legal requirements <input type="checkbox"/> Yes, professional guidelines* <input type="checkbox"/> No	If yes: specify the ratio including the denominator
In nursing homes and other LTCFs	<input type="checkbox"/> Yes, legal requirements <input type="checkbox"/> Yes, professional guidelines* <input type="checkbox"/> No	If yes: specify the ratio including the denominator

5.15.2. Is there a nationally agreed ratio for the number of infection control and hospital hygiene (IC/HH) doctors (FTE) according to healthcare institution activity (e.g. per number of hospital-beds or other denominator)?

In hospitals	<input type="checkbox"/> Yes, legal requirements <input type="checkbox"/> Yes, professional guidelines* <input type="checkbox"/> No	If yes: specify the ratio including the denominator
In nursing homes and other LTCFs	<input type="checkbox"/> Yes, legal requirements <input type="checkbox"/> Yes, professional guidelines* <input type="checkbox"/> No	If yes: specify the ratio including the denominator

5.16. Do you have national guidelines* for prevention and control of?

	Hospitals	Nursing homes and other long-term care facilities
Healthcare-associated infections (in general)	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Multidrug-resistant (MDR) bacteria* (in general)	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Meticillin-resistant <i>Staphylococcus aureus</i> (MRSA)	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<i>Clostridium difficile</i> infections	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Vancomycin-resistant enterococci	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
MDR* Gram-negative bacteria (e.g., ESBL-producing Enterobacteriaceae)	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Carbapenem-resistant Enterobacteriaceae ^a	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Carbapenem-resistant <i>Acinetobacter baumannii</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
MDR/XDR <i>Mycobacterium tuberculosis</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No

^a If you have national guidelines* for prevention and control of carbapenem-resistant Enterobacteriaceae, do these guidelines* provide information on³²

5.16.1. how to identify and screen patients at risk for carriage of carbapenem-resistant Enterobacteriaceae? Yes No

5.16.2. contact tracing? Yes No

5.16.3. dedicated staff and patient cohorting? Yes No

³² European Centre for Disease Prevention and Control. Systematic review of the effectiveness of infection control measures to prevent the transmission of carbapenemase-producing Enterobacteriaceae through cross-border transfer of patients. Stockholm: ECDC; 2014.

http://www.ecdc.europa.eu/en/publications/_layouts/forms/Publication_DispForm.aspx?List=4f55ad51-4aed-4d32-b960-af70113dbb90&ID=1224

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5.17. Do you have national requirements to communicate on the infection status of a patient (i.e. information on infection by/carriage of communicable microorganism) when referred from a healthcare institution to another

within the same country?	<input type="checkbox"/> Yes <input type="checkbox"/> No
in case of cross-border transfer?	<input type="checkbox"/> Yes <input type="checkbox"/> No

5.18. Do you have national requirements for hospitals to perform root cause analysis of some healthcare-associated infections?

Yes No

If yes, please specify (e.g. healthcare-associated MRSA bacteraemia)

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5.19. Did you assess the compliance of the health care workers to the guidelines* for hand hygiene?

Yes No

5.20. Did you assess the impact of the infection control and hospital hygiene required measures on incidence of some infections in:

hospitals?	<input type="checkbox"/> Yes <input type="checkbox"/> No
nursing homes and other long-term care facilities?	<input type="checkbox"/> Yes <input type="checkbox"/> No

5.21. Specific comments on chapter 5:

6. EDUCATION AND TRAINING OF HEALTH PROFESSIONALS

6.1. Does the curriculum* of the following professions include matters related to antimicrobial resistance and prudent use of antimicrobial agents?

Medical doctors	<input type="checkbox"/> Yes <input type="checkbox"/> No
Pharmacists	<input type="checkbox"/> Yes <input type="checkbox"/> No
Dentists	<input type="checkbox"/> Yes <input type="checkbox"/> No
Nurses	<input type="checkbox"/> Yes <input type="checkbox"/> No
Midwives	<input type="checkbox"/> Yes <input type="checkbox"/> No
Veterinarians	<input type="checkbox"/> Yes <input type="checkbox"/> No

6.2. In 2013/2014 were the following included in the continuing education* of the following professions?

	Appropriate use of antimicrobial agents	Hygiene and infection control
Medical doctors	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Pharmacists	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Dentists	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Nurses	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Midwives	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Veterinarians	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No

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6.3. Is it mandatory for hospitals to have a system in place to provide training for all healthcare staff on entering into service?

Yes No

6.3.1. If yes, this training entering into service includes

- Hygiene and infection control
 Appropriate use of antimicrobial agents
 Vaccination programmes and their role in preventing infection

6.4. Specific comments on chapter 6

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7. INFORMATION AND CAMPAIGNS, GENERAL PUBLIC AND HEALTHCARE PROFESSIONALS

7.1. Have there been any reports in your country on the knowledge and/or perception of the general public in 2013/2014, other than the 2013 Eurobarometer³³, on the following topics:

the problem of antimicrobial resistance	<input type="checkbox"/> Yes <input type="checkbox"/> No
the inappropriate use of antimicrobial agents	<input type="checkbox"/> Yes <input type="checkbox"/> No
vaccination programmes and their role in preventing infection	<input type="checkbox"/> Yes <input type="checkbox"/> No
the importance of basic hygiene and its role in preventing infection	<input type="checkbox"/> Yes <input type="checkbox"/> No

7.2. Has there been, in the last 2 years, (a) national campaign(s) in your country, targeted to the general public and/ or healthcare professionals, to raise awareness on the following topics:

Topics	the problem of antimicrobial resistance	the inappropriate use of antimicrobial agents	vaccination programmes and their role in preventing infection	the importance of basic hygiene and its role in preventing infection
General Public	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Medical doctors	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Pharmacists	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Dentists	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Nurses	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Midwives	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Veterinarians	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No

7.2.1. If yes, was (were) this (ese) campaign(s) designed based on results of behavioural research?

Yes No Do not know

7.2.2. Has the effectiveness of this(ese) campaign(s) in changing behaviour been assessed?

Yes No Under preparation

If yes, please specify and provide link to the results

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³³ Special Eurobarometer 407. Antimicrobial resistance. Report, 2013.
http://ec.europa.eu/health/antimicrobial_resistance/docs/ebs_407_en.pdf

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7.3. Are there specific educational programmes on antimicrobial resistance and prudent use of antimicrobial agents targeting school children in your country?

Yes No Do not know

7.3.1. If yes, please specify

7.4. Specific comments on chapter 7:

8. NATIONAL RESEARCH INITIATIVES

8.1. Does your country support research on antimicrobial resistance by means other than the joint programming initiative on antimicrobial resistance³⁴?

Yes No

8.2. Is the Intersectoral mechanism or equivalent system involved in the definition of priorities for research in the field of AMR and prudent use of antimicrobial agents?

Yes No

8.3. Specific comments on chapter 8:

³⁴ Commission recommendation of 27 October 2011 on the research Joint Programming Initiative ‘The Microbial Challenge — An Emerging Threat to Human Health’ (2011/C 315/01). http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.C_.2011.315.01.0001.01.ENG

9. CHANGES SINCE THE LAST REPORT ON IMPLEMENTATION OF THE COUNCIL RECOMMENDATION

9.1. Use of indicators* to assess the situation

Item	Situation at the time of last report on implementation ^a	Current situation ^a
<u>Antimicrobial resistance surveillance national system:</u>		
— % of participating laboratories		
— % meticillin-resistant <i>Staphylococcus aureus</i> (MRSA) from clinical isolates in hospitals ^b		
— % third-generation cephalosporin-resistant <i>Escherichia coli</i> from clinical isolates in hospitals ^b	—	—
— % third-generation cephalosporin-resistant <i>Klebsiella pneumoniae</i> from clinical isolates in hospitals ^b		
<u>Surveillance system on use of antimicrobial agents:</u>		
— Surveillance of antimicrobial consumption: % population coverage (ambulatory care*)		
— Surveillance of antimicrobial consumption: % hospitals reporting annual data		
— Antimicrobial consumption (community): data expressed in defined daily doses (DDD) per 1,000 inhabitants per day		
— Antimicrobial consumption (hospital sector): data expressed in daily defined doses (DDD) per 100 patient-days		
— Compliance with discontinuation of perioperative antibiotic prophylaxis (PAP) within 24 hours after initiation of surgery (% of PAP courses that last 24 hours or less)		
<u>Control and preventive measures:</u>		
— % of systemic antibiotics sold without prescription		
— % of hospitals with an antibiotic stewardship programme		
— % of hospitals meeting the national agreed ratio for the number of IC/HH nurses (if this ratio exists, see question 5.15)		
— % of hospitals meeting the national agreed ratio for the number of IC/HH doctors (if this ratio exists, see question 5.15)		
— Other, please specify		

^a Please, indicate data and specify source and year of data collection and provide a weblink to results when available

^b Number of resistant isolates/ total number of isolates x 100

9.2. Which measure was the most effective to achieve positive results regarding prudent use of antimicrobial agents in your country?

9.3. What three main challenges is your country facing in controlling antimicrobial resistance?

9.4. Specific comments on chapter 9:

