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**Accompanying document to the**

**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**

**Detailed analysis of countries' reports on the implementation of the Council  
recommendation (2002/77/EC) on the prudent use of antimicrobial agents in human  
medicine**

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## INTRODUCTION

In November 2001, the Council adopted the ‘Council Recommendation on the prudent use of antimicrobial agents in human medicine’ (2002/77/EC)<sup>1</sup> This Recommendation asks Member States to put in place specific strategies on the prudent use of antimicrobial agents aiming at containing antimicrobial resistance. These strategies have to comprise measures in relation to surveillance of antimicrobial resistance, surveillance of antimicrobial use, control and preventive measures, education and training of health professionals, awareness raising for the general public and research.

Moreover, the Council recommended that each Member State should have in place an inter-sectoral co-coordinating mechanism (ICM) to ensure that these strategies are fully implemented. ICMs should also serve as platforms to exchange information, and should coordinate action with the Commission and other Member States.

Within two years of its adoption the Commission has summarized the main actions taken at Member State and European Union level in a report on the implementation of the Recommendation to the Council (COM (2005)684 final)<sup>2</sup>. The Report highlighted the areas of the Recommendation needing further attention.

In the Council Conclusions on Antimicrobial Resistance adopted on 10 June 2008 (2876th Employment, social policy, health and consumer affairs Council meeting),<sup>3</sup> the Council called upon the Member States to ensure that structures and resources to implement the Recommendation on the prudent use of antimicrobial agents in human medicine are in place. Member States were also encouraged to continue implementing specific strategies to contain antimicrobial resistance. It called upon the Commission to follow up the implementation of the Recommendation on the prudent use of antimicrobial agents in human medicine.

Following this request, the Commission asked the Member States and EEA countries in August 2008 to report on the state of implementation.

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<sup>1</sup> [http://europa.eu.int/comm/health/ph/others/antimicrob\\_resist/index\\_en.htm](http://europa.eu.int/comm/health/ph/others/antimicrob_resist/index_en.htm)

<sup>2</sup> [http://ec.europa.eu/health/ph\\_threats/com/mic\\_res/com684\\_en.pdf](http://ec.europa.eu/health/ph_threats/com/mic_res/com684_en.pdf).

<sup>3</sup> [http://www.consilium.europa.eu/ueDocs/cms\\_Data/docs/pressData/en/lisa/101035.pdf](http://www.consilium.europa.eu/ueDocs/cms_Data/docs/pressData/en/lisa/101035.pdf).

## **METHODS**

The template sent to the Member States and EEA Countries for the reports was based on the questionnaire used for the first report. However, it was slightly modified to take into account the recommendations made in the first report and suggestions from experts (project leaders of EU projects on antimicrobial resistance, antimicrobial consumption, and healthcare associated infections, experts from the European Centre for Disease Prevention and Control (ECDC), and from the network of national focal points (NFP) for antimicrobial resistance). This new questionnaire placed a strong emphasis on the use of indicators to follow up implementation of the action plan. As far as possible, the questionnaire was developed in a format conducive to producing a concise and comparable report to improve data collation and analysis.

The European Commission sent the questionnaire to the health attachés of the Member States' Permanent Representations to the EU for further distribution. The National focal points for antimicrobial resistance (AMR NFP) were also informed of the request and received a copy of the questionnaire. Following the first replies from the Member States and EEA Countries, the Commission collected and analysed the data and provided clarification on the questionnaire during the AMR NFP meeting in Paris in November 2008. The quality of returned questionnaires was checked by e-mail correspondence between the Commission and national respondents (e.g. missing data, confirming data for the report) and the preliminary findings were presented during the AMR NFP meeting in London on October 2009 for review and comments.

## **PARTICIPANTS**

The Commission received 28 responses:

- 27 Member States (MS);
- Norway

In the following text ‘Member States’ will be used when the nations referred to are all members of the EU, otherwise (when referring to a number of states including Norway), the term ‘Countries’ will be used.

Only the UK stated that there were regional differences and sent back four questionnaires (England, Wales, Scotland, and Northern Ireland). In the report, information is given for the UK as one country when all four regions gave similar answers; differences between regions are reported when relevant.

## RESULTS

### 1. NATIONAL STRATEGIES, ACTION PLANS AND INTERSECTORAL COORDINATING MECHANISMS (ICM)

#### 1a. National strategies and action plans

##### Main findings

Most countries had, or were about to have, a national strategy targeted to contain the problem of antimicrobial resistance, translated into an action plan:

- Fifteen (BE, BG, FI, FR, DE, EL, IE, LT, LU, MT, NL, SK, SI, SE and NO) countries and England, Northern Ireland, and Scotland had a strategy, translated into an action plan;
- Eight countries (AT, CZ, DK, IT, PL, ES and PT) and Wales reported that strategy was under preparation, and four gave indications on the content of the future action plan (AT, CZ, PL, ES and RO);
- By the end of 2008, four Member States replied that they did not have a strategy or national action plan, nor were they preparing one (CY, EE, HU and LV).

##### • Content of the action plans

Measures regarding the surveillance of antimicrobial use and prudent use of antimicrobial agents were included in all existing action plans. In addition to these topics, eight countries (FI, FR, DE, EL, IE, NL, SI, NO), England and Northern Ireland had an action plan covering all the other topics listed in the Council Recommendation: surveillance of antimicrobial resistance, detection and control of outbreaks, prevention policy, education and training of health professionals, general public information, and research.

For the remaining countries, the following topics were not addressed in the existing action plans were:

- research, in four countries (BG, LU, MT, SK);
- detection and control of outbreaks, in three countries (LT, SK, SE);
- prevention policy, in three countries (BE, LT, MT);
- general public information, in one country (SK) and in Scotland;
- surveillance of antimicrobial resistance in one country (BG);
- education and training of health professionals in one country (MT).

However it should be highlighted that some of the topics not covered by the action plan to contain antimicrobial resistance may be addressed in other sectors and action plans. For instance, the detection and control of outbreaks is included in another public health action plan or strategy in Sweden.

- Indicators

One question sought to collect the indicators used by countries to assess the implementation of their strategy.

Indicators are designed to measure, in a standardised way, a phenomenon or a situation and to monitor trends (often with a view of reaching a target). Using indicators requires the implementation of a system to collect and analyse data.

In the context of antimicrobial resistance, examples of outcome indicators include the value of antimicrobial consumption, appropriate prescription rates and antimicrobial resistance figures. Process indicators measure compliance with agreed activities, such as surveillance and standard operating procedures (hand hygiene for instance). Structure indicators refer to a resource, such as staff, infrastructure or committees (see the definitions laid down in the Council Recommendation on patient safety, including the prevention and control of healthcare associated infections: [http://ec.europa.eu/health/ph\\_systems/docs/patient\\_rec2009\\_en.pdf](http://ec.europa.eu/health/ph_systems/docs/patient_rec2009_en.pdf))

Twelve countries (AT, BE, FI, FR, DE, IE, IT, LT, LU, MT, NL, RO) and Scotland reported that they used indicators to monitor the implementation of the action plan. Of these, three (AT, IT, RO) had a strategy under preparation but had already defined indicators.

These indicators were:

a) Outcome indicators

- antimicrobial resistance indicators were used in ten countries and Scotland
- Five Member States gave a list of specific indicators, one with quantitative objectives for a decrease (France, for methicillin-resistant *Staphylococcus aureus* and for resistant *Streptococcus pneumoniae*).
- antimicrobial use or prescription indicators were used in nine countries and Scotland
- Antimicrobial use in the community was targeted by two countries (France gave an expected result of a 25 % decrease). Antimicrobial use in hospitals was mentioned twice;
- LT used qualitative indicators, with quantified objectives of improvement: to reduce self-medication to 10 %, antibiotic prescription for upper respiratory tract infections to 30 %, antibiotics prophylaxis for more than 3 days to 15 %;
- Healthcare associated infection indicators were mentioned by five countries and Scotland.
- The monitoring of surgical site infections was mentioned by Finland and the monitoring of *Clostridium difficile*-associated disease by Scotland. Ireland monitored methicillin-resistant *Staphylococcus aureus* (MRSA) bloodstream infections and MRSA in ICU. France specified objectives to decrease MRSA in hospitals.

b) Structure and process indicators at local or national level were reported by five countries:

- IE: volume of alcohol gel used – indicator for prevention of transmission;

- BE, IT, LT, RO: implementation of antibiotic management teams, education tools, guidelines, evaluation of compliance with guidelines, implementation of surveillance, expert groups, reference laboratories, control of drug sales, updated information on websites, number of research projects and continuing medical education activities.<sup>4</sup>

## Comments

- Twelve countries and Wales did not yet have an action plan to contain antimicrobial resistance. Eight of these countries and Wales reported having a strategy under preparation.
- With only eight countries having action plans covering all the topics listed in the Recommendation, the content of the action plans varied between countries. Based on the responses received, it appeared that actions that were not included in the specific action plan to contain antimicrobial resistance might be addressed in other national strategies. Therefore, it is important to coordinate the activities developed and implemented in different sectors and strategies on the issues listed in the Recommendation.
- As countries move from the development of strategies to implementation through action plans, the focus should shift to the development of specific indicators a) to assess implementation of the strategy and b) to assess its impact help target policies at national and regional level. Twelve countries and Scotland indicated that they have several types of indicators in place.

## Progress made since the first report

- In 2008, more countries had an action plan in place than in 2003. The situation had improved in eight Member States (DE, EL, IE, LT, LU, SK, SI, and SE).
- The use of indicators to follow up the implementation of strategies was not addressed in the first report.

### 1b. Intersectoral coordinating mechanisms (ICM)

#### Main findings

##### Implementation of ICMs

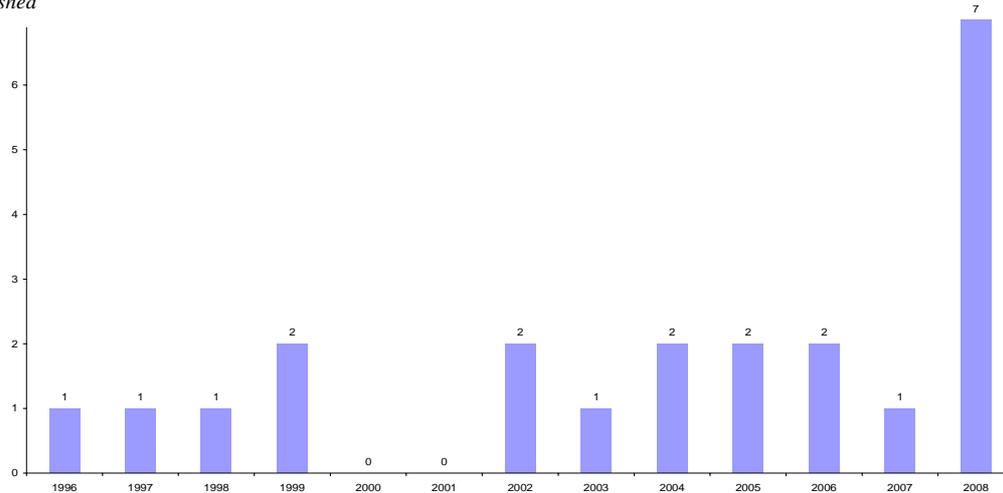
Nineteen (AT, BE, CY, FR, FI, DE, EL, HU, IE, LU, MT, NL, PL, PT, SK, SI, UK and NO) out of 28 countries have an ICM in place for the coordinated implementation of the above mentioned strategies (overall 22 ICMs in place taking into account the ICMs in England, Wales, Scotland and Northern Ireland).

By the end of 2008, seven countries were in the process of developing an ICM with completion planned for between the end of 2008 and 2010. Latvia and Estonia did not report any plans to establish an ICM to implement the strategy.

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<sup>4</sup> Due to differences in the interpretation of the question, it is possible that countries with outcome indicators also had process or structural indicators but did not mention them.

Number of ICM established



Year of establishment

**Figure 1: Year of establishment of an intersectoral mechanism.**

Out of the 19 countries with an ICM, 14 countries clearly defined the status of the ICM:

- by governmental decision in eight (CY, DE, LU, PL, PT, SI, UK, and NO);
- by regulation in six (BE, FR, EL, MT, NL, and SE).

Eight countries (BE, FR, EL, LU, MT, SI, SE, and PT) and England provided a copy of the text defining the legal status.

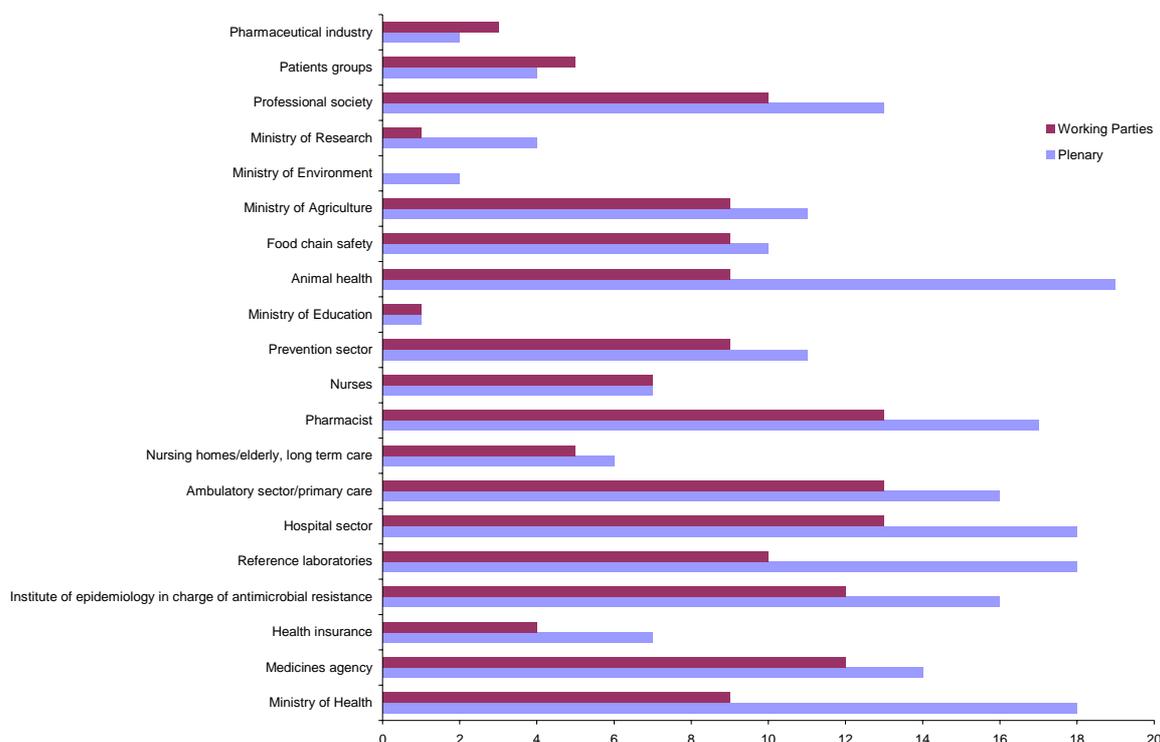
In addition, an ICM was created by a decision taken by the Chief Medical Officer in Hungary and was considered as an official working group in AT and IE. IE reported that, despite the lack of governmental text, the Ministry of Health strongly supported the work of the ICM.

- ICM Working parties (Wp) were created in 12 out of 19 countries. Working parties were more frequent in countries where an ICM was established earlier (the median year of implementation of ICM was 2002 in countries with a Wp and 2005 in countries with no Wp).
- The composition of ICMS was truly intersectoral in most countries (see figure 2). The median number of members involved in the plenary of the ICM was 17, ranging from six in Greece to 41 in France.
- In all countries except LU, a representative from the animal health sector participated in the plenary of the ICM or in its Working parties (DE, EL).
- Some institutions or organisations were less likely to participate in the ICM:
  - The Ministry of Employment was never represented in the plenary of the ICM nor in the ICM Wp (however the Ministry of Employment is not always responsible for lifelong education, as mentioned by some respondents),
  - The Ministry of Education was involved in the plenary group in DE only, and in the ICM Wp in France,

- The Ministry of Environment was present in plenary in DE and Scotland,
- The Ministry of Research only in DE, PL, Northern Ireland and Wales,
- The pharmaceutical industry was present in two plenary groups and in two additional countries through the ICM Wp,
- Nursing homes and representatives of the elderly and long-term care were involved in six countries and Wales (only in ICM Wp in DE),
- Nurses were represented in eight countries (in plenary group or ICM Wp) including the UK (Intensive Care (IC) — nurses in Luxembourg).

Patient groups were involved in the work of the ICM in FR (plenary), in IE, England and Northern Ireland (plenary and Wp), and in the ICM Wps in AT and DE.

The involvement of health insurance representatives also varied. They were involved in the plenary of the ICM in BE, FI, FR, HU, LU, PL, SK and in the work of the WP in AT, DE, and EL.



**Figure 2: Composition of the Plenary ICM (N=22) and ICM working parties (N= 15)**

- The median number of annual meetings was 3 in 16 countries, varying from one to 24 in Malta. Generally, in countries where the ICM plenary met only once a year, working parties were in place (SK, DE).
- Minutes of the ICM were available in 18 out of 19 countries or in 21 out of 22 existing ICMs. Half of the ICMs (11/22) issued an annual report.
- A written mandate existed for 14 out of 22 ICMs (no mandate in CY, FI, HU, SI, SE, or Wales, England, Northern Ireland).

- The mandate covered all topics listed in the Council Recommendation in IE and NO.
- The topics not addressed in the other mandates included:
  - the detection of outbreaks in 8 /14;
  - prevention policy in 6/14;
  - the development of guidelines in 4/14;
  - research in 7/14.

It should be noted, however, that these activities could be part of the remits of other groups or committees — for instance a group in charge of healthcare-associated infections or a medicine agency. In some countries, the ICM also had additional tasks. In Scotland, the ICM was also responsible for infection management guidance. SE indicated that its ICM had no mandate to coordinate action as this was the remit of the national board of health.

- ICMs had the mandate to cooperate with MS and the EC in 11 countries and Scotland and Wales. As indicated earlier, cooperation may also be part of the remits of other structures (e.g. Ministry of Health, Board of Health).
- Nine countries and Scotland reported that the ICM managed a budget for its activities. In Belgium, annual and occasional budget came from health insurance while in all other countries, the government allocated budget (on an annual and/or occasional basis). In two countries, budget was only occasional. PL indicated that occasional funding might come from the pharmaceutical industry. France and Ireland reported that the Ministry of Health had a budget and allocated it directly to relevant projects or institutions.

### **Comments**

- All countries but two had an ICM in place or under preparation. The status of the ICM was well defined in most countries (14/19 with ICM), and written mandate exists for 14/22 ICM meaning that the ICM should have clear responsibilities and power.
- All but one existing ICMs were truly intersectoral and had links with veterinary / animal health sectors. Nurses and representatives of institutions for long-term care, such as nursing homes/homes for elderly, were involved in less than half of the ICMs, even though these institutions are important in containing the development and transfer of antimicrobial resistance.
- An annual report was issued by only 11/22 ICMs, although it may be useful to provide health authorities and the public with such a document (with indicators) to communicate the achievements made and what remains to be done.
- ICMs did not always have a defined budget for their operations, but entities such as the Ministry of Health or National Institute for Epidemiology/Public Health may manage the budget reserved for operations of the ICM.

### **Progress made since the first report**

- Major improvements have been made regarding the status of ICMs (in 2003, eight countries stated that ICM had been established by ministerial order or legislation and in most countries, the ICM was part of the government or department of health).
- Regarding the composition of ICMs, true collaboration with the animal health sector has been established. In 2008 the animal health was represented in all but one ICM. On the other hand, the involvement of patient groups had not improved much (only in five countries in 2008, up from three in 2003).
- Some ICMs had been established fairly recently or were still under preparation, even in countries where an ICM was reported to exist in 2003. This may mean that former structure had evolved or that a new structure was set up to better fulfil the recommendation (for instance, countries where the ICM was a part of the department of health or an advisory body).

## 2. SURVEILLANCE SYSTEMS FOR ANTIMICROBIAL RESISTANCE

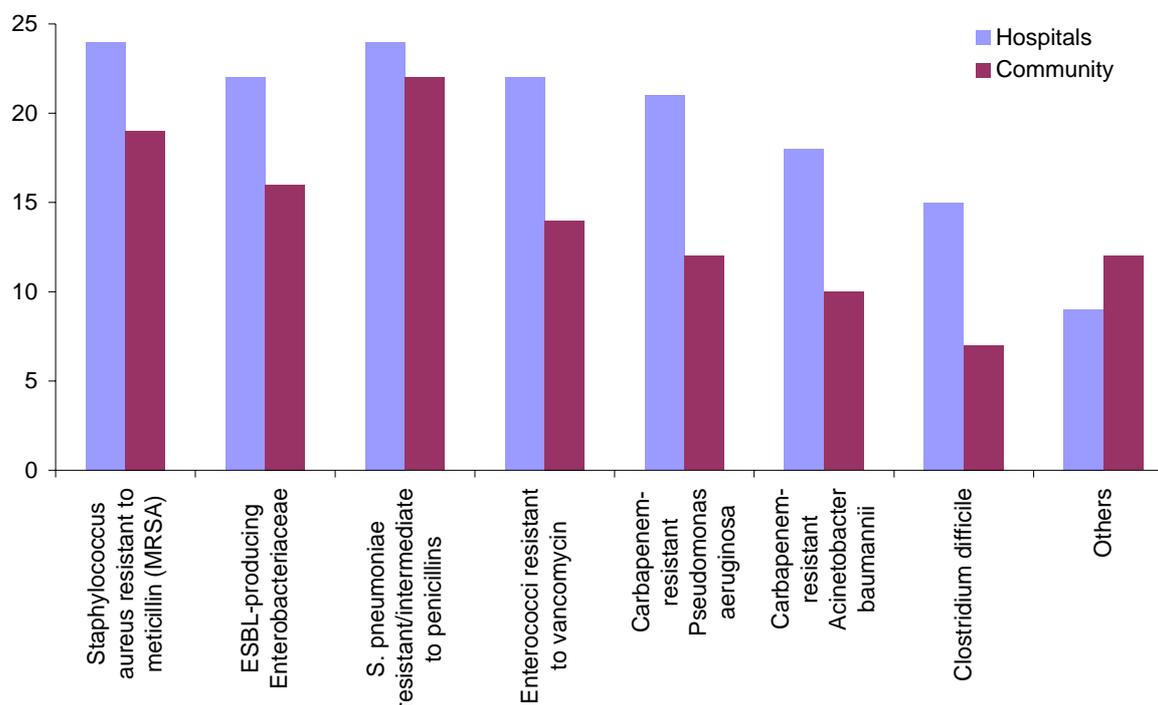
### Main findings

- All countries had implemented a surveillance system for antimicrobial resistance. All but SK participated in the European Antimicrobial Resistance Surveillance System (EARSS). All but CY, EL, and LU had an additional national system to monitor antimicrobial resistance. This additional national system collected information on antimicrobial resistance in the community (AT, CZ), in hospitals (EE, IT, MT, SI) or in both (18 countries: BE, BG, DK, FI, FR, DE, HU, IE, LV, LT, NL, PL, RO, SK, ES, SE, UK and NO).
- At least 80% of hospital laboratories were involved in the surveillance system in 11 countries, and in Scotland and Wales.
- At least 80% of community laboratories were involved in the surveillance system in six countries and in Scotland, Wales, and Northern Ireland.
- Micro-organisms covered by the surveillance system (Figure 3)
  - Most surveillance systems covered *S. pneumoniae*, followed by methicillin-resistant *Staphylococcus aureus* (MRSA); *Enterobacteriaceae* producing extended-spectrum betalactamases (ESBL); *Enterococci* resistant to vancomycin (VRE); and *Acinetobacter baumannii* resistant to carbapenems.
  - *Clostridium difficile* was surveyed in 12 countries (BE, DK, EE, FI, FR, DE, IE, MT, NL, RO, ES and UK) of which eight had described outbreaks due to a new, highly virulent strain of *C. difficile* PCR ribotype 027.<sup>5</sup>

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<sup>5</sup> Kuijper EJ and al. update of *Clostridium difficile* infection due to PCR ribotype 027 in Europe, 2008. Euro Surveill. 2008; 13(31):pii=18942. Available online: <http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=18942>

- Fifteen countries reported that they also surveyed resistance in other micro-organisms. The most common types of bacteria specified were Haemophilus influenzae, Neisseria meningitidis and pathogens causing food-borne infections.



**Figure 3: Micro-organisms covered by the surveillance of AMR in hospitals and in the community (27 respondents (24 countries) with surveillance system)**

- In most countries, the structure of the antimicrobial resistance surveillance system was governmental and continuously implemented (18 out of 23). Surveillance was carried out through research projects only in AT, IT, PT and SI. In BG, CZ and EL, surveillance was carried out by independent scientific societies. In RO, surveillance was organised through research projects and by an independent scientific society.
- An external quality assurance (EQA) system was in place in all countries but Slovenia (missing data). Three countries mentioned only a national system for EQA, and all countries but BG, EE and SK (that did not participate in EARSS) mentioned the National External Quality Assessment Service (NEQAS), which is provided by the UK to the laboratories participating in the EARSS. NEQAS was the only EQA in 12 countries.
- Health authorities had access to antimicrobial resistance surveillance data in all but two countries (LT, PT). In these two countries, the stated obstacles were legal status, budget shortage, and poor information technology support. In other countries (BE, CZ, DK, FR, LU, NL and SI) and in England and Northern Ireland, data were available but respondents listed obstacles which prevent rapid and easy access to more detailed data, such as ownership, poor information technology support, legal status and budget.
- National data on antimicrobial resistance were publicly available in all but six countries. In three of these six countries, data were available for the ICM (LU, MT and SI).
- More detailed data were available in 14 countries:

- Regional and, in some cases, sub-regional data in 12 countries: AT, BE, FI, FR, IT, NL (access for ICM only), RO, SK, ES, SE, UK and NO.
- Hospital data on antimicrobial resistance were publicly available in eleven: AT, BE, CY, EE, FI, IE, IT, PL, RO, SK, NO and Wales. In EL, MT, NL, and Scotland hospital data could be accessed by ICM.
- Overall, more than half of the countries reported that hospital data were available. Most of the countries that indicated that hospital data could not be accessed also mentioned that health authorities were facing obstacles regarding access to antimicrobial resistance surveillance data (see above for list of obstacles in CZ, FR, LT, LU, NL, PT, SI and the UK).
- Most countries had an operational link between antimicrobial resistance surveillance services and those in charge of disease control/infection control (22/28) and outbreak investigation (21/27). Half of the respondents had implemented operational links with veterinary surveillance for antimicrobial resistance (16/28). In 2008, only a few countries had established a link with environmental surveillance.
- National reports on antimicrobial resistance were issued in seventeen countries with the last publication being released between 2007 and 2008 in most countries where information was available.

### **Comments**

- In ten countries there were still no sustainable national systems for antimicrobial resistance surveillance, supported by the government in addition to EARSS. As regards external quality control of laboratories, many countries appeared to rely on the system provided to laboratories participating in the EARSS project without having a national EQA system in place (12 countries).
- Data on antimicrobial resistance were not yet available at regional or local levels, including hospitals, although these levels are useful to better steer policies.
- Not all countries issued national reports on antimicrobial resistance, although they may be helpful for policy-makers and public information.
- Links with veterinary surveillance systems for antimicrobial resistance and with environment sector were not well established in all countries.

### **Progress made since the first report**

As regards the structure of the surveillance system, national reports, and operational links with antimicrobial resistance surveillance in animals, minimal progress appears to have been made between these two reports. In 2008, government support for surveillance existed in 18/28 countries (19/28 in 2003), 17 countries had issued national reports (16 in 2003), 16 had established links with surveillance in animals (13 in 2003). There have been improvements in access to surveillance data, as in 2003, 14 countries reported obstacles to access (in 2008 10 countries, of which only two reported no access to surveillance data)

### 3. SURVEILLANCE SYSTEMS FOR THE PRESCRIPTION AND USE OF ANTIMICROBIAL AGENTS

#### Main findings

- All countries participated in the European Surveillance of Antimicrobial Consumption project (ESAC). In addition, another system for surveying antimicrobial use was in place in more than half of the countries (BE, BG, DK, FI, FR, DE, IE, LT, LU, NL, PL, RO, SI, SE, SK, ES, UK and NO).
- Seventeen countries issued national annual reports on antimicrobial use; the date of last publication was 2008 in most countries where information was provided.
- Hospitals collected antimicrobial consumption data in almost all countries (24, no collection in BG, HU, LT, no data for PT). Greece reported that it had not implemented regular data collection. In 7 countries and Northern Ireland, health authorities do not have access to individual hospital data. The obstacles mentioned were weak legal status (mentioned in 4 countries), private ownership (in 4 countries) and poor information technology support (in 1 country). Other limits mentioned included the poor quality of data (expressed in cost (CZ), not representative and not in a standardised format (AT)) and the fact that hospitals are the owners of the data (NL). In addition, France mentioned that the weak legal status and insufficient information technology support prevented health authorities from having detailed and comprehensive data.
- In 20 countries, prescription data in the community were available for prescribers (data not available in BG, CZ, EE, EL, HU, IT, MT, missing data for PT). Access was possible at national level in general. Individual data were available in 13 countries (BE, DK, FR, DE, IE, PL, RO, SK, SI, ES, SE, UK, and NO). Data are used for continuing education in eight countries and in Scotland.
- Health authorities in 12 countries could access these individual data (BE, CY, DK, FR, IE, LT, NL, PL, RO, ES, SE and UK). Obstacles to access listed by five out of seven countries where data could not be accessed were legal status, ownership, information technology, resources, and concern over data security. Even countries where data could be accessed reported difficulties. Norway specified that health authorities could not access individual but only anonymous data. In addition, France stated that information technology support did not allow access to individual data by health authorities.
- Data on antimicrobial consumption could be broken down by indication in 13 countries (including the UK, except Scotland), mainly for ambulatory care (12 including the UK, except Scotland) and less often for hospitals (seven and Wales). In half of the cases, this was carried out by research projects (five countries and Wales) and on a continuous basis in only seven countries, England and Northern Ireland.
- Hospital data on antimicrobial consumption could be broken down to hospital level in most countries: 18 and in England, Wales, and Northern Ireland. They could be accessed at speciality or ward level in 12 countries and in Wales. This surveillance in hospitals was carried out by research projects in seven countries, was continuous in 9, and England, Wales, and Northern Ireland, and mixed in two (DE, ES).

- Resistance data could be linked to consumption data in 14 countries and in Wales, half of which did this through research projects (seven). It was continuous in seven countries and in Wales (along with research projects in four countries and Wales). A regional level for this analysis was mentioned by AT, FI and Wales.
- Prescription practice indicators existed in 15 countries and Wales, mainly for hospitals (12 and Wales). Measures to improve prescription practices were carried out in most countries (19/28) and they addressed both community and hospital practices, except in NL and MT where only hospital practices were concerned.
- Action regarding AMR and veterinary issues:
  - Fourteen countries plus England, Wales and Scotland also had surveillance in place for antimicrobial consumption in animals.
  - Actions to improve the prescription practices of veterinarians were carried out in 16 countries.

### **Comments**

- Information on antimicrobial consumption is collated in a national report in 17/27 countries. To provide appropriate feedback for prescribers and hospitals more detailed data would be useful. Less than half of the countries were able, on a continuous basis, to break down data to individual level, to hospital ward, or by indication.
- Countries reported that the collection of comprehensive data on antimicrobial consumption and prescription practices was hindered by the weak legal status of data (including the issue of ownership) and problems with information technology systems.
- Indicators to monitor prescribing practices were still underdeveloped in several countries.

### **Progress made since the first report**

The following improvements can be noted:

- Obstacles to obtain antimicrobial consumption data, in particular financial ones, have been largely overcome ;
- Improved collection of broken-down data by indication, hospital ward and speciality;
- Improved links of antimicrobial resistance data to antibiotic consumption data: no country had a sustainable system in place for this purpose in 2003;
- The use of indicators to monitor prescribing practices doubled from 2003 to 2008.

## **4. CONTROL AND PREVENTIVE MEASURES**

### **Main findings**

- In 2008, 11 countries (FI, FR, DE, HU, IE, LU, SK, SI, SE and NO) indicated that no antibiotics were sold without prescription. In addition, seven countries (AT, BE, CZ, EE,

IT, NL and UK) reported that such sales might contribute to less than 1 % of total sales of antibiotics. This gave 18 countries where sales without prescription were not considered as a significant source of misuse of antibiotics. The percentage of antibiotics sold without prescription was assumed to be between 1 and 5 percent in five countries (BG, CY, LV, LT, PL), between 5 and 10 percent in three countries (MT, RO and ES) and more than 15 percent in Greece (data missing for PT).

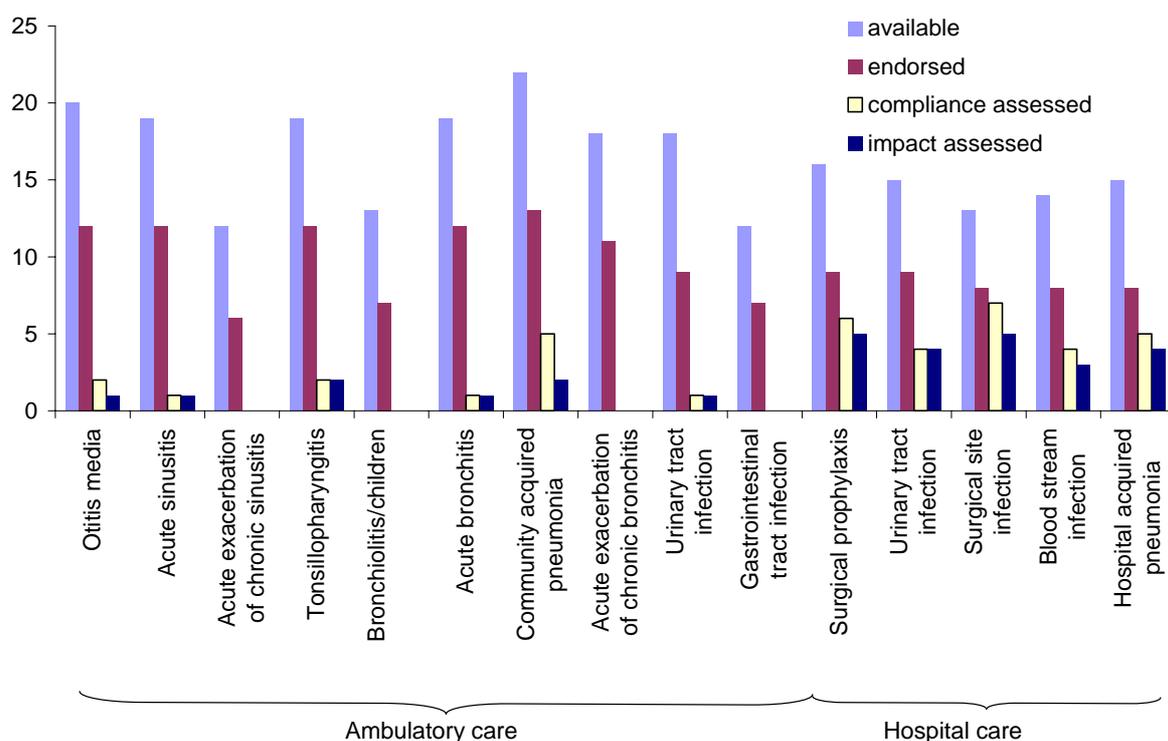
- Among countries where sales were assumed to differ from zero, all but Estonia, Greece, Latvia, Poland and the Netherlands indicated that they were taking measures to enforce the law on prescription-only use for antibiotics.
- Topical antibiotic marketing authorisation had been assessed in five countries. Regarding regulations on advertising, only Wales mentioned a national regulation that goes further than European rules.

### **Guidelines on the appropriate use of antimicrobials<sup>6</sup>**

- All but four countries (CY, EE, LV and ES) and Wales had national guidelines on the appropriate use of antimicrobials. Spain responded that guidelines had been issued by several medical societies (e.g. infectious disease specialists, paediatricians, general practitioners). Four countries and Northern Ireland had guidelines only in the community and two other countries only in hospitals.
- The most common guidelines were for community-acquired pneumonia, which were issued in 20 countries, England and Scotland. Guidelines for otitis media, acute bronchitis, tonsillopharyngitis, acute exacerbation of chronic bronchitis, and urinary tract infections were issued in more than half of the countries. Seven countries and Scotland had guidelines on each type of infection listed. Some countries also reported guidelines in ambulatory care addressing skin infections and sexually transmitted infections.
- In hospitals, guidelines were less frequent and existed in half of the countries. Ten countries and Scotland have a comprehensive set of guidelines — for each type of infection listed. Other hospitals guidelines were for the treatment of endocarditis, meningitis and, in some countries, a variety of infections.
- Countries reported that it was common practice to have guidelines endorsed by national health authorities.
- It was still rare to assess whether prescribing doctors comply with national guidelines, or the impact of guidance on prescription practices. However, there were some assessments regarding the impact of guidelines in the treatment of community-acquired pneumonia. These kinds of evaluations were more frequent in hospitals.

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<sup>6</sup> Only guidelines made or validated by scientific panels or medical societies were to be reported. Guidelines sponsored by the pharmaceutical industry would not be considered. According to this, Belgium emphasised in its answer the fact that only guidelines developed by the ICM (not sponsored by the pharmaceutical industry) were taken into account and not additional guidelines developed by different Belgian scientific organisations, often sponsored by the pharmaceutical industry.



**Figure 4: Number and status of guidelines (N=25 incl. 4 responses for the UK)**

### Guidelines for hand hygiene

- All responding countries (27) except two had guidelines for hand hygiene. The compliance of healthcare workers with these guidelines had been assessed in more than half of the countries.

### National programme for hospital hygiene and infection control

A national programme for hospital hygiene and infection control was in place in 22 out of 27 responding countries. CZ, EE, HU, MT and PL lack a national programme.

The impact of the required hygiene and infection control measures on the incidence of some defined infections had been assessed in hospitals in 13 countries and in Scotland and Wales. Among these countries, MT did not have an infection control programme, but guidelines for hand hygiene. In nursing homes,<sup>7</sup> this kind of evaluation is rare and has only been performed in BE, DK, IE, SE and Scotland.

### National or regional networks to survey healthcare associated infections

- All but four countries had regional or national networks to survey healthcare associated infections (no network in CY, EE, LV and PL; no data for PT). Networks were mainly national, with some additional regional networks. In DK, the only network was regional. Most of the existing networks monitored bloodstream infections. Nine countries had a network to survey surgical site infections (SSI), infections in intensive care units (ICU), bloodstream infections, and hospital wide surveillance. In addition, three countries had a network to monitor SSI, infections in ICU, and bloodstream infections. This could be

<sup>7</sup> Despite a definition in the questionnaire, characteristics of nursing homes may vary among countries.

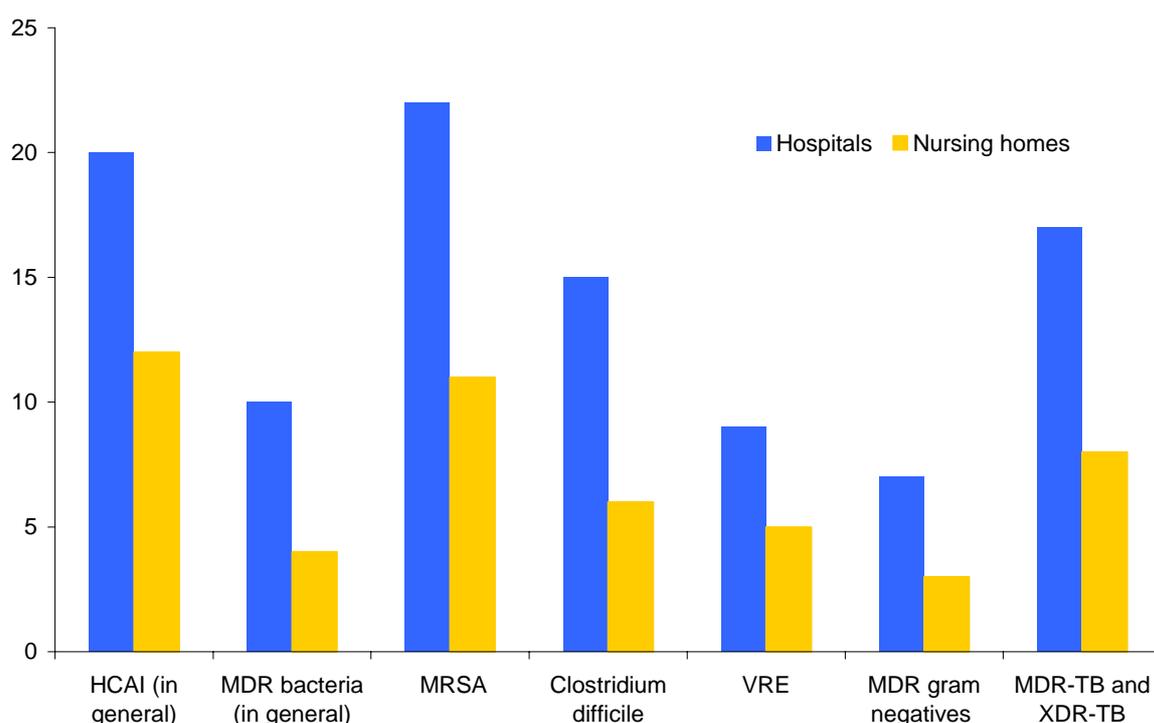
interpreted as 12 countries having relatively comprehensive system for the surveillance of healthcare-associated infections.

### Infection control committee and infection control nurses

- In most countries, it was mandatory to have an infection control committee in hospitals (20 countries and Wales, Scotland, and Northern Ireland). However, this requirement was valid for nursing homes in only three countries (IE, RO, and NO).
- Where there was an infection control committee, management of the institution participates in the committee, except in EE, LU, NO (hospitals and nursing homes), and in RO for nursing homes (no data for Spain).
- More than half of the respondent countries (15 countries and Wales) had legal requirements or national recommendations for the numbers of infection control nurses needed in hospitals. These requirements or recommendations did not exist for nursing homes in any country.

### National guidelines for the prevention and control of healthcare associated infections

- Guidelines for the prevention and control of healthcare associated infections were available in all but three responding countries (EE, SK and ES – no data for PT). MRSA was the topic most often addressed in the guidelines. Guidelines on MDR bacteria in general always came in addition to specific guidelines on MRSA and frequently in addition to guidelines on gram-negatives.
- Guidelines were half as frequent in nursing homes as in hospitals. The most frequent guidelines in nursing homes are for healthcare-associated infections in general and MRSA. Prevention and control of *C. difficile* infections in nursing homes was addressed in six countries.



## **Figure 5: Number of guidelines for the prevention and control of healthcare-associated infections (HCAI) and microorganisms (N= 27 responses, 4 responses for UK)**

### ***Streptococcus pneumoniae***

Most countries issued recommendations on vaccination against *Streptococcus pneumoniae* infections, addressing both children and the elderly in most cases. The trends of invasive pneumococcal infections were monitored in most countries.

### **Comments**

- In nine countries, sales of systemic antimicrobials without prescription were assumed to represent a potential source of misuse. Whatever their situation, most countries were implementing measures to better enforce European regulations on prescription-only use of systemic antimicrobials.
- National scientific guidelines on the appropriate use of antimicrobials are available and endorsed by public health authorities in 16 countries and in the UK, except Wales. Assessments of compliance with guidelines and evaluation of their impact are still rare.
- 15 countries, Scotland and Wales assessed the impact of guidelines for hand hygiene and/or of hygiene measures.
- 13 countries and Wales had requirements for infection control (IC) committee committees and the required numbers of IC nurses in hospitals (19, Northern Ireland, Scotland and Wales have requirements for IC committees and/or the required numbers of IC nurses in hospitals); however, requirements regarding infection control committees in nursing homes exist in only three countries.
- Most countries have developed guidelines for hand hygiene, a national programme for infection control, networks to survey healthcare-associated infections and measures to prevent and assess invasive infections due to *S. pneumoniae*.

### **Progress made since the first report**

- Most countries which in 2003 reported that antimicrobials sold without prescription were believed to be a relevant source of inappropriate use still faced this problem in 2008 (BG, CY, EL, LT, MT and ES).
- More countries reported that they assessed guidelines for appropriate use of antimicrobials (12 countries and Scotland versus 6 in 2003).
- National programmes and requirements regarding infection control committees and infection control nurses in hospital existed for most countries in 2003. However, in 2008 two countries, (CZ and HU) lacked a national programme and requirements for hospital hygiene. Malta and Poland reported having a national programme for infection control/hospital hygiene in 2003 and not in 2008.

## **5. EDUCATION AND TRAINING OF HEALTH PROFESSIONALS**

### **Main findings**

- In all but two countries, the curriculum of healthcare professionals includes matters related to antimicrobial resistance such as hygiene and infection control, appropriate use of antimicrobials, vaccination programmes and antimicrobial resistance. In Belgium, requirements only cover medicine and pharmacy. In EE and EL, requirements only cover medicine.
- Twelve countries had no requirement in 2006/2007 for non-sponsored lifelong education. Where they existed, requirements concerned hygiene and infection control more often than any other issues. In NO, continuing medical education was mandatory for specialists only. PL indicated that they were working on a proposal to include infection control topics in post-graduate training in medicine, dentistry and nursing. ES reported that the Ministry of Health had provided funding to autonomous regions for training on rational use of drugs, including antibiotics.
- More than half of the countries (16/28,) implemented awareness raising campaigns on antimicrobial resistance for healthcare professionals in 2006/2007. In most countries, the campaigns targeted medical doctors (in all countries but DK, NL and Wales), pharmacists (10 countries and England, Wales, and Northern Ireland), nurses (seven countries, England and Northern Ireland) and veterinarians (six countries, Scotland and Wales). Campaigns targeting dentists were rare (BG, IE, ES and Scotland). DK and NL conducted campaigns targeting veterinarians only.

### **Comments**

- Almost all countries had established undergraduate training for healthcare professionals on issues related to antimicrobial resistance.
- Non-sponsored continuing education was required in 15 countries but did not concern all healthcare professions nor did it cover the problem of inappropriate use of antimicrobials in every country.

### **Progress made since the first report**

- In 2003, almost all countries reported that initial education covered the appropriate use of antimicrobials and that non-sponsored lifelong education was available for prescribers. Due to differences in the questions between 2003 and 2008, direct comparisons may not be relevant.

## **6. INFORMATION FOR THE PUBLIC**

### **Main findings**

- Reports on the public's knowledge and/or perception of antimicrobial resistance, inappropriate use of antimicrobials, vaccination programmes, and their role in preventing infection or the importance of hygiene were issued in 2006/2007 in 13 countries (including the UK, except Wales,).
- During the last two years, 17 countries implemented awareness raising campaigns on antimicrobial resistance, inappropriate use of antimicrobials, vaccination programmes and their role in preventing infections, and the importance of hygiene. They were targeted to the general public rather than to a specific audience, such as patient associations or

patients. Only Sweden reported that it had implemented campaigns specifically targeting patient associations (vaccinations) and patients (vaccinations and hygiene).

- Topics addressed in public campaigns were vaccination programmes (regardless of the target), followed by the importance of hygiene and inappropriate use of antimicrobials. The problem of antimicrobial resistance, certainly more complex, was addressed less often.
- Thirteen countries had launched campaigns for health professionals and for non-professionals.

### **Comments**

Reports on public awareness were available in less than half of the countries. Seventeen countries had implemented awareness raising campaigns on the problem of antimicrobial resistance and the appropriate use of antimicrobials. Most campaigns included messages on hygiene and vaccination.

### **Progress made since the first report**

- While 12 countries reported having implemented awareness raising campaigns in 2003, they were seventeen countries in 2008. As in 2003 the most common topic addressed was vaccinations in 2008.

## **7. NATIONAL RESEARCH INITIATIVES**

### **Main findings**

- Six countries and Northern Ireland reported having a national plan for research into antimicrobial resistance. The ICM was involved in developing this plan in three countries and Northern Ireland.
- Several countries stated that research into antimicrobial resistance covered topics listed in the Recommendation, and was conducted under the auspices of Ministry of Health (NO), Ministry of Research (DE), reference laboratories (NO, FR), Institute for Epidemiology or other Public Health Institute (FR, DK, FI), depending on the country. Some countries gave a list of projects or topics covered.

### **Comments**

- In addition to the list of European funded projects, a mechanism could be implemented to collect and disseminate information on national projects to fulfil the recommendation regarding information and communication on national research initiatives in the field of antimicrobial resistance.

### **Progress made since the first report:**

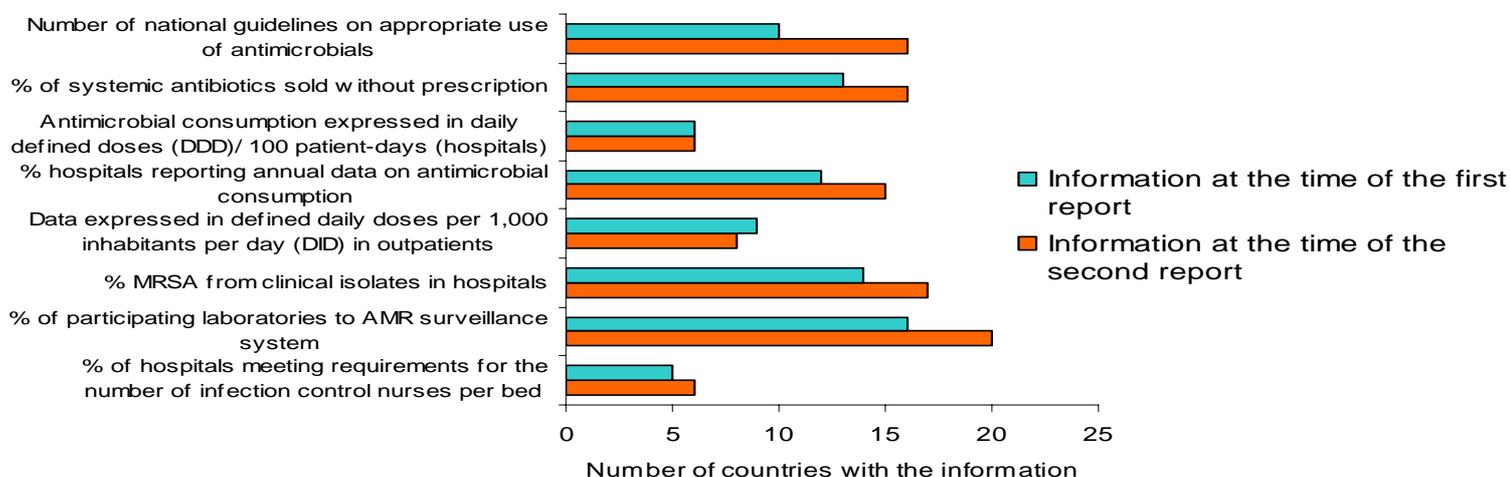
- As replies to the question regarding research varied greatly, comparisons are not relevant.

## 8. USE OF INDICATORS TO ASSESS PROGRESS MADE SINCE THE FIRST REPORT ON IMPLEMENTATION OF THE COUNCIL RECOMMENDATION:

The aim of this question was to assess the way countries use indicators to monitor their situation regarding prevention and control of antimicrobial resistance. Countries were asked to report figures for some indicators at the time of the first report and at the time they answered this survey.

Twenty-two countries and Wales provided information on indicators for the current situation at the time of the survey, and nineteen and Wales (no information provided by EE, EL, IT, PT, England, Northern Ireland and Scotland) for the situation five years before. The most frequently used indicators were linked to antimicrobial resistance. Six countries followed-up the requirement regarding the number of infection control nurses in hospitals (BG, CY, FR, LU, PL, and SI).

The year of data collection for indicators reflecting the situation at the time of the first report varied from 1999 (IE) to 2005 (and even 2006 for Wales). Indicators reflecting the situation at the time of the survey were based on data from 2006 (FR and SK) or later. Many countries found questions regarding the value of resistance indicators for *S. aureus* and antibiotic consumption difficult and asked for clarification. As these questions were also included in the questionnaire for the first time, responses should be considered as preliminary information, and interpreted with caution. This is the reason why figure 6 shows the number of countries that provided the information and not the value of indicators. Data used for antimicrobial resistance and antimicrobial consumption were mostly collected through EARSS and ESAC and not via national systems.



**Figure 6: Number of countries reporting a value for the listed indicators**

## **DISCUSSION**

Despite the short timeframe to respond, most countries returned their questionnaires on time. Some of the questions left room for different interpretations, which can hamper the comparability of answers. This questionnaire was a self-assessment exercise rather than an external evaluation, hence natural variations between countries regarding the practical implementation of recommendations and the effectiveness of measures implemented could not be addressed. Nevertheless, these results give a relatively clear picture of the state of implementation of the Council Recommendation and the areas in which greater focus and further measures are needed.

As some countries are still developing their action plans, they could benefit from the experience of other countries (during NFP meetings for instance) regarding existing systems for developing indicators, implementing data collection, and their use. There are also ongoing European research projects on indicators, e.g. for patient safety, and their results should be disseminated more widely.

As the Commission has established stronger links between AMR, patient safety and healthcare associated infections, future work must encompass the impact of these developments and the need to involve and inform the public and patients.