



Joint Action  
Antimicrobial Resistance and  
Healthcare-Associated Infections

## Deliverable 8.1

# Awareness Raising and Communication Plan

“A Social Behaviour Change Communication strategy  
to tackle AMR and reduce HCAs in Europe”

WP8 | Awareness Raising and Communication

Leader acronym | AEMPS

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# List of Acronyms

<b>AMR</b>	Antimicrobial Resistance
<b>ATB</b>	Antibiotic
<b>BCC</b>	Behaviour Change Communication
<b>DDD</b>	Defined Daily Dose
<b>EU-JAMRAI</b>	European Union Joint Action on Antimicrobial Resistance and Healthcare Associated Infections
<b>FAO</b>	Food and Agriculture Organization
<b>GAP</b>	Global Action Plan
<b>HCAI</b>	Healthcare Associated Infections
<b>JA</b>	Joint Action
<b>NAP</b>	National Action Plan
<b>OIE</b>	World Organization for Animal Health
<b>PCU</b>	Population Correction Unit
<b>SBCC</b>	Social and Behaviour Change Communication
<b>SMART</b>	Specific, Measurable, Appropriate, Realistic and Time-Bound
<b>SMP</b>	Social Media Promotion
<b>WHO</b>	World Health Organization
<b>WP</b>	Work Package

# 1 Situation Analysis

## 1.1 On the edge of a post-antimicrobial era

Life-saving antibiotics revolutionized our society and economy curing previously deadly diseases and making surgeries, cancer treatments, neonatal care and organ transplants increasingly viable. This major achievement is now at risk, mainly due to the excessive and often inappropriate use of antibiotics. Today, antimicrobial resistance (AMR) is a worldwide public health threat. The increase of bacteria resistant to multiple antibiotics, even to last resort drugs, in combination with the lack of new antibiotics is increasingly resulting in cases where doctors are facing major difficulties to treat infections. AMR is responsible for thousands of deaths each year<sup>1</sup>. Only in 2007, multiresistant bacteria infections caused 25,000 deaths and 2.5 million extra hospital days across Europe<sup>2</sup>. AMR does not recognize geographic borders and is currently present in every country of the world. If we do not react on time, the combined resistance to multiple antibiotics might become the greatest world killer by 2050<sup>3</sup>.

## 1.2 Key data on antibiotic consumption and the behaviours that contribute to antibiotic misuse in the Human Sector

### 1.2.1 Antibiotic consumption in the community: ESAC-Net data<sup>4</sup>

The data on antibiotic consumption in the community are presented for 2016. Two indicators are presented.

- The number of DDD per 1,000 inhabitants per day based on the anatomical therapeutic chemical (ATC) classification and the DDD (defined daily dose) measurement unit. This indicator takes into account the number of antibiotic doses consumed and its potential ecological effect on the development of AMR.
- Consumption of antibiotics in the hospital sector. Consumption of antibiotics for systemic use in the hospital sector in EU/EEA countries in 2016 expressed in DDD per 1,000 inhabitants per day.

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<sup>1</sup> O'Neill J. Tackling drug-resistant infections globally: Final report and recommendations. Review on Antimicrobial Resistance. London; 2016. Available from: [http://amrreview.org/sites/default/files/160518\\_Final%20paper\\_with%20cover.pdf](http://amrreview.org/sites/default/files/160518_Final%20paper_with%20cover.pdf)

<sup>2</sup> European Centre for Disease Prevention and Control (ECDC) and European Medicine Agency (EMA). The bacterial challenge: time to react. Technical report. Stockholm: ECDC; 2009. Available from: [http://ecdc.europa.eu/en/publications/Publications/0909\\_TER\\_The\\_Bacterial\\_Challenge\\_Time\\_to\\_React.pdf](http://ecdc.europa.eu/en/publications/Publications/0909_TER_The_Bacterial_Challenge_Time_to_React.pdf)

<sup>3</sup> O'Neill J. Tackling drug-resistant infections globally: Final report and recommendations. Review on Antimicrobial Resistance. London; 2016. Available from:

[http://amrreview.org/sites/default/files/160518\\_Final%20paper\\_with%20cover.pdf](http://amrreview.org/sites/default/files/160518_Final%20paper_with%20cover.pdf)

<sup>4</sup> Summary of the latest data on antibiotic consumption in the European Union ESAC-Net surveillance data November 2017

### 1.2.1.1 DDD/1,000 inhabitants/day: Consumption of antibiotics for systemic use at community level in EU/EEA countries in 2016 expressed in DDD per 1,000 inhabitants per day

In 2016, EU/EEA population-weighted mean consumption of antibiotics for systemic use in the community (i.e. outside hospitals) was 21.9 DDD per 1,000 inhabitants per day, ranging from 10.4 in the Netherlands to 36.3 in Greece.

As in previous years, penicillins were the most frequently used antibiotics in all countries, ranging from 33% (Germany) to 67% (Slovenia) of the total consumption in the community. The proportion of other antibiotic groups varied more widely between countries - e.g. cephalosporins and other beta-lactams, from 0.2% (Denmark) to 22% (Germany); macrolides, lincosamides and streptogramins, from 5% (Sweden) to 23% (Slovakia); and quinolones, from 2% (United Kingdom) to 21% (Cyprus).

Trends in antibiotic consumption in the community for 2012-2016 are presented in Table 1. The EU/EEA population-weighted mean consumption increased from 21.7 to 21.9 DDD per 1,000 inhabitants per day during this period, but the trend was not statistically significant. During 2012-2016, Greece and Spain showed an increasing trend while a decreasing trend was observed for Finland, Luxembourg, Norway and Sweden.

Table 1: Trends in consumption of antibiotics for systemic use in the community, EU/EEA countries, 2012-2016 (expressed as DDD per 1,000 inhabitants per day)

Country	2012	2013	2014	2015	2016	Trends in antimicrobial consumption, 2012-2016	Average annual change 2012-2016	Statistically significant trend
Netherlands	11.3	10.8	10.6	10.7	10.4		-0.19	
Estonia	11.7	11.7	11.7	12.0	12.0		0.07	
Sweden	14.1	13.0	13.0	12.3	12.0		-0.48	↓
Latvia	13.0	13.5	12.6	13.3	13.2		0.01	
Austria	14.0	16.3	13.9	14.0	13.3		-0.37	
Slovenia	14.3	14.5	14.2	14.5	13.9		-0.08	
Germany	14.8	15.7	14.6	14.3	14.1		-0.27	
Norway	16.9	16.2	15.9	15.8	15.2		-0.38	↓
Hungary	15.0	15.5	16.2	17.0	15.4		0.23	
Denmark	16.4	16.4	15.9	16.1	15.9		-0.13	
Malta	22.5	23.8	23.7	22.2	16.4		-1.37	
Finland	19.5	18.3	18.1	17.2	16.5		-0.71	↓
Lithuania	16.2	18.5	16.0	16.7	16.9		-0.03	
United Kingdom	20.1	20.6	20.8	20.1	19.6		-0.15	
Bulgaria	18.5	19.9	21.2	21.4	19.8		0.42	
Croatia	21.7	21.1	21.4	21.8	20.7		-0.12	
Iceland	22.1*	21.9*	19.3*	19.9	21.0		N/A	
Portugal	22.7	19.6†	20.3†	21.3†	21.6†		N/A	
EU/EEA	21.7	22.3	21.9	22.4	21.9		0.05	
Spain	19.7†	20.3†	21.6†	22.2†	23.0†		0.86	↑
Slovakia	20.0*	23.6	20.9	24.5	23.6		N/A	
Poland	22.9	23.6	22.8	26.2	24.0		0.47	
Ireland	23.0	23.8	23.1	25.6	24.2		0.42	
Luxembourg	27.7	27.7	25.8	26.3	25.5		-0.57	↓
Italy	27.5	28.6	27.8	27.5	26.9		-0.24	
Belgium	29.8	29.6	28.5	29.3	27.5		-0.48	
Romania	30.4*	31.6*	31.2*	33.3*	29.5*		0.00	
France	29.7	30.1	29.0	29.9	30.3		0.11	
Cyprus	29.7*	28.3*	26.1*	31.1*	33.0*		0.95	
Greece	32.5	32.2	35.1	36.1	36.3		1.15	↑
Czech Republic	17.5	18.9	19.1	19.5			N/A	

\* Total care data, including the hospital sector.

† Reimbursement data (i.e. not including consumption without a prescription or other non-reimbursed courses).

N/A = not applicable; linear regression was not applied due to missing data, changes in the type of data or changes of sector for which data were reported (community versus total care data) between 2012 and 2016. The symbols ↑ and ↓ indicate significant increasing and decreasing trends, respectively.

EU/EEA refers to the corresponding population-weighted mean consumption.

### **1.2.1.2 Consumption of antibiotics in the hospital sector**

In 2016, the EU/EEA population-weighted mean consumption of antibiotics for systemic use in the hospital sector was 2.0 DDD per 1,000 inhabitants per day, ranging from 1.0 in the Netherlands to 2.9 in Malta.

In contrast to prescribing practices in the community, penicillins were not the most frequently prescribed antibiotic group in the hospital sector for all countries. The proportions of cephalosporins, other beta-lactams (including carbapenems), and other groups of antibiotics were generally higher than in the community. However, substantial variations were reported across countries: consumption of cephalosporins and other beta-lactams including carbapenems ranged from 6% in the United Kingdom to 60% in Bulgaria; consumption of macrolides, lincosamides and streptogramins from 4% in Sweden to 14% in Ireland, and consumption of quinolones from 4% in Norway to 18% in Hungary.

The EU/EEA population-weighted mean consumption did not show any statistically significant trend during the period 2012–2016. An increasing trend was observed for Greece, Malta and Slovenia, and a decreasing trend for Estonia, Finland and Luxembourg.

### **1.2.1.3 Key findings on ESAC-Net data**

- Provision of reliable and comparable national antibiotic consumption data is a prerequisite for understanding the epidemiology of antibiotic resistance in Europe, since antibiotic use is one of the main factors responsible for antibiotic resistance.
- Although most courses of antibiotics are consumed in the community (outside hospitals), antibiotic use in hospitals is a major driver of the emergence of multidrug-resistant bacteria responsible for healthcare-associated infections.
- During 2012-2016, antibiotic consumption at community level within the European Union/European Economic Area (EU/EEA) (expressed as defined daily doses (DDD) per 1,000 inhabitants per day) showed no significant trend overall, although some countries showed significant decreasing or increasing trends. The large inter-country variation in antibiotic consumption remained.
- During 2012-2016, antibiotic consumption in the EU/EEA hospital sector (expressed as DDD per 1,000 inhabitants per day) showed no significant trend overall. However, statistically significant increases or decreases were observed for several countries. There was also no significant trend observed in the consumption of antibiotics to treat patients infected with serious multidrug-resistant bacteria during this period at EU level.

### **1.2.2 Eurobarometer data**

Descriptive analyses as reported in the 2013 and 2016 Eurobarometer reports on AMR are presented. These include:

- The percentage of respondents using an antibiotic in 2013 and 2016;
- The percentage of respondents using the antibiotic with or without a prescription in 2013 and 2016;
- The percentage of respondents using non-prescription oral antibiotics in 2013 and 2016, divided by the source from which the antibiotic was obtained.

### **1.2.2.1 Respondents who used an antibiotic<sup>5</sup>**

Both in 2013 and 2016, about 35 % of EU inhabitants who were interviewed reported using at least one oral antibiotic during the last 12 months<sup>6</sup>. The observed variation between EU Member States is considerable, reflecting the same variation as shown with the outpatient antibiotic consumption data from ESAC-Net. In 2016, a 2.7-fold difference in use was found between Sweden, the Member State with the lowest proportion of people who reported taking at least one antibiotic (18 %), and Malta, with the highest proportion of people (48 %). This difference is higher than in 2013 when a twofold difference between Malta (highest use, 48 %) and Sweden (lowest use, 24 %) was observed.

The percentage of respondents who reported using an antibiotic in 2016 was lower compared to 2013 in 15 Member States: Belgium, Cyprus, Denmark, Finland, France, Germany, Latvia, Lithuania, Luxembourg, the Netherlands, Portugal, Romania, Slovenia, Sweden and the United Kingdom. However, there are also six Member States for which an increase of at least 2 % in the number of respondents who reported having used an antibiotic was observed: Bulgaria, Greece, Hungary, Italy, Poland and Spain. The largest increase was observed for Spain (+ 9 %), Italy (+ 7 %) and Hungary (+ 5 %). Decreases in the number of respondents who reported having used an antibiotic were, for example, found for Romania (- 9 %) and Cyprus (- 6 %).

### **1.2.2.2 Respondents who used prescribed antibiotics<sup>7</sup>**

The Eurobarometer data also include self-reported information on patients' sources of antibiotics. The percentage of patients who reported that the antibiotics that they took were prescribed, expressed as a percentage of all those who used an antibiotic. In all EU Member States, the vast majority of antibiotics were obtained with a prescription. And yet, differences between Member States can still be observed. In Greece, 79 % of respondents reported that the antibiotics used in 2016 were prescribed, while in Sweden this figure was 98 % in both 2013 and 2016. Member States other than Greece with relatively low levels of prescribed antibiotics included Romania, Cyprus and Latvia. There was a slight decrease in the percentage of respondents who had obtained antibiotics without a prescription. In the 2016 Eurobarometer report it was stated that these changes were likely caused by a slight change in the way the question was asked.

### **1.2.2.3 Use of antibiotics without a prescription<sup>8</sup>**

The Eurobarometer provides additional information on the use of antibiotics without a medical prescription (x). There is a wide variation between Member States in the self-reported use of non-prescription antibiotics. The highest use can be found in Romania (in 2013, 20 % of all users of an antibiotic in the last 12 months used non-prescription antibiotics; in 2016, 16 %) and Greece (in 2013, 16 %; in 2016, 20 %). For the following

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<sup>5</sup> ANTIMICROBIAL RESISTANCE and causes of non-prudent use of antibiotics in human medicine in the EU ; John Paget (NIVEL); Dominique Lescure (NIVEL); Ann Versporten (University of Antwerp); Herman Goossens (University of Antwerp); François Schellevis (NIVEL); Liset van Dijk (NIVEL).

<sup>6</sup> 8. TNS opinion & social, Special Eurobarometer 445 – Antimicrobial resistance, Brussels, 2016.

<sup>7</sup> ANTIMICROBIAL RESISTANCE and causes of non-prudent use of antibiotics in human medicine in the EU ; John Paget (NIVEL); Dominique Lescure (NIVEL); Ann Versporten (University of Antwerp); Herman Goossens (University of Antwerp); François Schellevis (NIVEL); Liset van Dijk (NIVEL).

<sup>8</sup> ANTIMICROBIAL RESISTANCE and causes of non-prudent use of antibiotics in human medicine in the EU ; John Paget (NIVEL); Dominique Lescure (NIVEL); Ann Versporten (University of Antwerp); Herman Goossens (University of Antwerp); François Schellevis (NIVEL); Liset van Dijk (NIVEL).

Member States an increase in the use of antibiotics without a prescription between 2013 and 2016 was observed: Bulgaria, Cyprus, Croatia, Finland, Germany, Latvia, Lithuania, and Poland<sup>9</sup>.

Both the 2013 and 2016 Eurobarometer surveys also contain self-reported information about how non-prescription oral antibiotics were obtained, firstly from a pharmacy, secondly from elsewhere or thirdly where the respondent had some pills left over from a previous course. In most Member States with a relatively high level of use of antibiotics without a prescription, the prevailing source for obtaining antibiotics was the pharmacy. This group of Member States includes Bulgaria, Croatia, Cyprus, Estonia, Greece, Hungary, Ireland (2013), Latvia (2016), Portugal (2016) and Romania. This implies that allowing OTC sales or not enforcing the law on OTC sales of antibiotics is a major driver for the use of antibiotics without a prescription. Also, in the United Kingdom, although it has a lower use of antibiotics without a prescription, OTC sales are the main source. Although the Eurobarometer asks for oral antibiotics, respondents who used, for example, eye drops, which are freely available in a number of Member States, such as the United Kingdom, may have answered they used an antibiotic without a prescription. It is not clear to what extent respondents could have included topical use of antibiotics, which could have distorted the results obtained. This may apply to the results from Denmark, where a high proportion of non-prescription use obtained without a prescription is classified as 'from elsewhere'. Also, in Lithuania the proportion of antibiotics obtained without a prescription from elsewhere is higher than in other Member States. As the Eurobarometer reports do not specify what these other sources are, it is hard to elaborate on the reasons why Denmark and Lithuania have higher percentages than other Member States.

There are also Member States where the use of antibiotics' leftovers contribute to the use of antibiotics without a prescription. A Member State with a relatively high use in 2013 where leftover antibiotics contributed more to the non-prescription of antibiotics is Spain. This is in line with data suggesting that fewer antibiotic treatments or prescriptions have been issued but at higher doses (see ESAC-Net results; the difference in the two indicators: number of DDD/1,000 inhabitants/day and the number of packages/1,000 inhabitants/day). These figures are also consistent with the possibility that Spanish patients often do not finish their antibiotic courses, resulting in antibiotic medication remaining that can be consumed at a later time. A similar pattern, where the use of leftover antibiotics is the prevailing source of non prescription use, is also seen in Italy and several other Member States (e.g. Austria, Slovakia, The Netherlands).

#### **1.2.2.4 Key findings of Eurobarometer data<sup>10</sup>**

##### **A third of Europeans have taken antibiotics in the last year**

- Around a third (34%) of respondents say that they have taken antibiotics in oral form at any time in the last 12 months, very similar to the figure obtained in the last survey in 2013 (35%).
- Usage varies by country: the highest usage levels are in Malta (48%) and Spain (47%), and the lowest in Sweden (18%) and the Netherlands (20%).

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<sup>9</sup> 8. TNS opinion & social, Special Eurobarometer 445 – Antimicrobial resistance, Brussels, 2016.

<sup>10</sup> Special Eurobarometer 445\_Report\_Antimicrobial Resistance\_Fieldwork April 2016 Publication June 2016 (Survey requested by the European Commission, Directorate-General for Health and Food Safety and coordinated by the Directorate-General for Communication)



- Women are more likely to take antibiotics than men, and use is higher among those with low levels of education and those who have more difficulties paying bills.
- The vast majority of Europeans obtain antibiotics from their healthcare provider.
- Bronchitis, flu and a sore throat are the most commonly cited reasons for taking antibiotics.

#### **Knowledge of antibiotics has remained constant since 2013**

- Only around a quarter (24%) of Europeans gives the correct answer to four questions about antibiotics, and the European average of correct answers is 2.5 out of 4. These figures are similar to those recorded in 2013.
- Most Europeans (84%) know that unnecessary use of antibiotics makes them become ineffective, and a similar percentage (82%) know that you should only stop taking antibiotics after finishing the prescribed dose as directed.
- However, less than half (43%) of Europeans know that antibiotics are ineffective against viruses, and just over half (56%) know that they are ineffective against colds and flu.

#### **A third of Europeans receive information about the right use of antibiotics**

- Only a third (33%) of respondents recalls receiving information about not taking antibiotics unnecessarily in the last 12 months, the same percentage reported in 2013.
- This proportion ranges from 68% in Finland to 15% in Italy.
- Respondents are most likely to say that they received the information from a doctor (32%), a television advertisement (27%) or the television news (26%).
- Around a third (34%) of the respondents who received information about the misuse of antibiotics says that the information changed their views on antibiotics, slightly lower than in the 2013 survey (36%).
- Two thirds (67%) of the respondents whose views were changed by information on antibiotics say that, as a result, they will always consult a doctor about the need to take antibiotics.
- Europeans express interest in receiving (more) information on a range of topics, such as information on the medical conditions for which antibiotics are used, how to use antibiotics, antimicrobial resistance, and the links between the human health, animals and the environment.
- Respondents see doctors (84%) as the most trustworthy source of information on antibiotics.

#### **Europeans support action at all levels to tackle antibiotic resistance**

- Europeans are aware that action is needed at all levels, with 35% in favour of action at global and EU level. 28% think that action should be taken at national/regional level, whereas 19% consider it should be tackled at the individual level or within the family.

#### **Just over a third is aware of the EU ban on the use of antibiotics on farm animals to stimulate growth**

- More than half of Europeans (56%) agrees that sick animals should be treated with antibiotics if this is the most appropriate treatment, while a third (34%) disagrees.
- Just over a third of Europeans (37%) says that they were aware that the use of antibiotics to stimulate growth in farm animals is banned in the EU.



### 1.2.3 Conclusions<sup>11</sup>

In the Eurobarometer survey, a third (34%) of Europeans says that they took antibiotics in the previous 12 months. **The use of antibiotics has remained at a similar level to the level reported in 2013 survey**, after a marked decline between 2009 and 2013 (from 40% to 35%). Use of antibiotics varies considerably by country and between different socio-demographic groups.

The overwhelming majority of respondents obtain antibiotics from their healthcare provider, but there remains a persistent minority (**5%** of those taking antibiotics) who **use antibiotics without prescription although** all antibiotics in the EU Member States should be dispensed on prescription only.

**Overall knowledge of antibiotics remains rather low:** around a quarter (24%) of Europeans is able to give the correct answer to four questions on this topic, similar to the 2013 survey. In particular, less than half (43%) of Europeans know that antibiotics are ineffective against viruses, and only just over half (56%) know that they are ineffective against colds and flu. Indeed, **flu remains one of the most commonly cited reasons for taking antibiotics**, with one in six users of antibiotics doing so (16%).

There is a link between knowledge and use of antibiotics: **those with greater knowledge are less likely to use them**. This can be seen in the variations by country and by socio-demographic groups. Knowledge is generally lower among those with low levels of education and worse economic circumstances and these groups are more likely to use antibiotics.

Only a third (33%) of respondents recalls **receiving information** about not taking antibiotics unnecessarily in the last 12 months, the **same proportion as in 2013**. Once again, there are large variations by country and by socio-demographic groups, reflecting the same patterns as seen above for use and knowledge.

Those who have been exposed to information of any kind are generally more likely to have better knowledge about antibiotics than those who have not been. However, **only a third (34%) of those Europeans who have received information say that the information they received** - from whichever source - **has led them to reconsider their use of antibiotics**.

Overall, the challenge remains in the ability to provide effective information to Europeans who currently have low knowledge and awareness - and who are also more likely to use antibiotics and to use them incorrectly. **The lack of change since the 2013 survey suggests that renewed effort will be needed to change public awareness and behaviour**.

Europeans know that action to tackle antimicrobial resistance is needed at all levels, with 35% in favour of action at global and EU level, 28% at national or regional level, whereas 19% consider it should be tackled at the individual level or within the family.

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<sup>11</sup> Special Eurobarometer 445\_Report\_Antimicrobial Resistance\_Fieldwork April 2016 Publication June 2016 (Survey requested by the European Commission, Directorate-General for Health and Food Safety and coordinated by the Directorate-General for Communication)

## 1.3 Key data on antibiotic consumption in the Animal Sector: ESVAC Report<sup>12</sup>

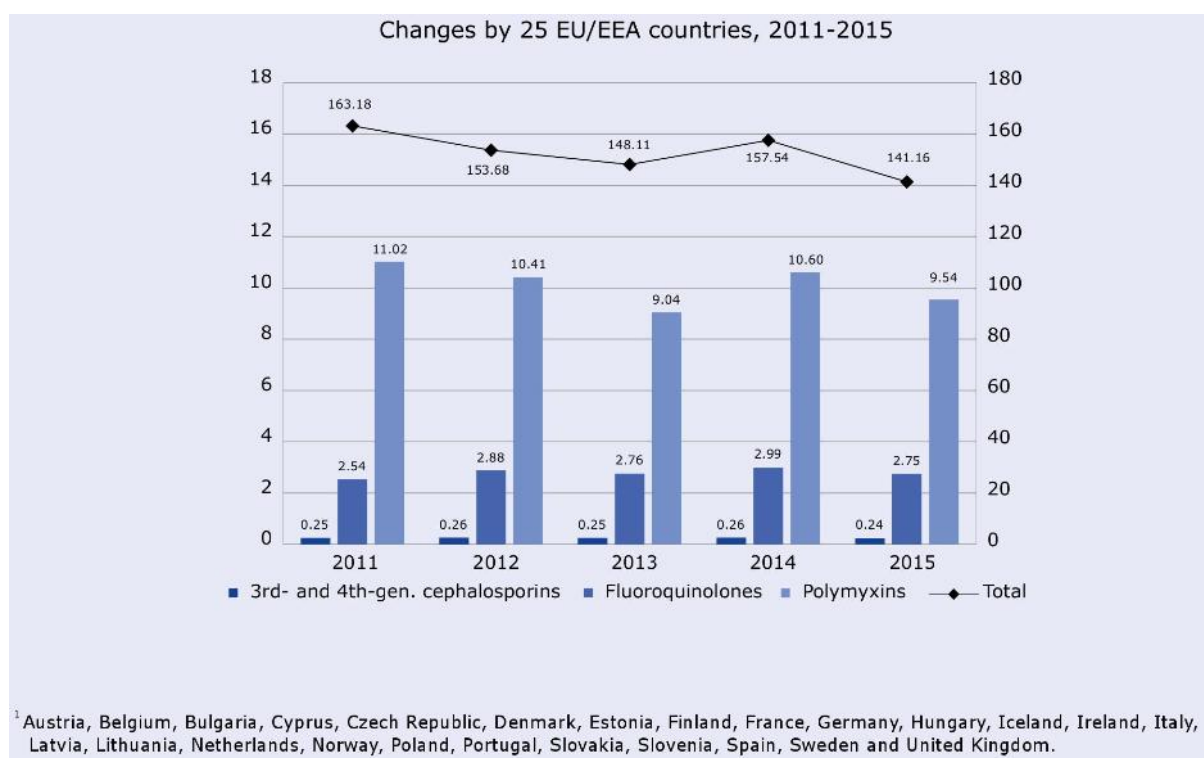
### 1.3.1 Changes in sales (mg/PCU) across 2011-2015 aggregated by 25 countries

For the 25 countries reporting sales data to ESVAC for all the years from 2011 to 2015, an overall decrease of 13.4 % in sales (mg/PCU) was observed. The sales were 163 mg/PCU, 154 mg/PCU, 148 mg/PCU, 158 mg/PCU and 141 mg/PCU in 2011, 2012, 2013, 2014 and 2015, respectively (Figure 1).

For the period 2011 to 2015, a drop in sales (in mg/PCU) of more than 5 % was observed for 15 of the 25 countries. For the same period, there was an increase in sales of over 5 % in eight of the 25 countries.

During 2011-2015, the sales (mg/PCU) of 3rd- and 4th-generation cephalosporins remained stable, while an 8 % increase in the sales of fluoroquinolones was observed, and sales of polymyxins decreased by 13 %.

**Table 2: Changes in total sales and sales of fluoroquinolones, 3rd- and 4th-generation cephalosporins and polymyxins**



### 1.3.2 ESVAC Conclusions

In 25 countries reporting sales data to ESVAC for the years 2011-2015, there was an overall decrease in the sales (mg/PCU) of 13.4 %. The sales were 163 mg/PCU, 154 mg/PCU, 148 mg/PCU, 158 mg/PCU and 141 mg/PCU in 2011, 2012, 2013, 2014 and 2015, respectively.

<sup>12</sup> ESVAC Report: Sales of veterinary antimicrobial agents in the European countries in 2015. 16 October 2017 EMA/184855/2017. Veterinary Medicines Division

The PCU was stable over these years; only 0.8 % reduction of PCU was observed for the 25 countries, while the reduction in tonnes sold was 14.5 %.

The sales (mg/PCU) of 3rd- and 4th-generation cephalosporins in the 25 countries, that provided data for the years 2011-2015, remained stable within the study period, while an increase of 8 % was observed for the fluoroquinolones. The sales (mg/PCU) of polymyxins (mostly colistin; from 2013 no sales of polymyxin B reported) in these 25 countries decreased by 13 % (Figure 1).

From 2011 to 2015, a drop of more than 5 % (range 7 % to 54 %) in the sales (mg/PCU) was observed for 15 countries<sup>13</sup>. An increase of more than 5 % was observed (range 6.5 % to 32 %) for eight countries.

Tentative explanations provided by some of the countries for the decline in sales include, among others:

- The implementation of responsible-use campaigns
- Changes in animal demographics
- Restrictions on use
- Increased awareness of the threat of antimicrobial resistance
- And/or the setting of targets

**The reduced sales of veterinary antimicrobials in some countries indicate that there is potential for a reduction in other countries, too.**

A large difference in the sales, expressed as mg/PCU, was observed between the most- and least-selling countries. This is partially due to differences in the composition of the animal population in the various countries (e.g. more pigs than cattle). Furthermore, differences in the production system may play an important role. Amongst other factors, there is also considerable variation in terms of daily dosage and length of treatment between the various antimicrobial agents and formulations used, while other factors must also be considered. Differences in the selection of data source – i.e. prescriptions, sales data or purchase data – may have an impact, although this is considered to be low.

In 2015, prescribing patterns for the various veterinary antimicrobial classes, expressed as mg/PCU, varied substantially between the countries. Notable variations were observed between different countries in the proportion of sales accounted for by the CIAs with the highest priority for human medicine – 3rd- and 4th-generation cephalosporins, fluoroquinolones, other quinolones, polymyxins and macrolides.

Overall, in the 30 countries, the sales (mg/PCU) of 3rd- and 4th-generation cephalosporins, fluoroquinolones, other quinolones, polymyxins (only colistin) and macrolides accounted for 0.2 %, 2.1 %, 0.4 %, 6.8 % and 7.2 %, respectively, of the total sales of antimicrobial VMPs in 2015.

Variations in both the sales patterns and magnitudes of sales may be due to differences between the countries in the relative proportion of the various food-producing animal species, the availability of veterinary antimicrobial products on the market, prices, animal-production systems, and the general situation with regard to infectious diseases.

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<sup>13</sup> Table 8. Annual sales of veterinary antimicrobial agents for food-producing species, in mg/PCU, for 30 European countries, from 2010 to 2015\_ ESVAC Report: Sales of veterinary antimicrobial agents in the European countries in 2015. 16 October 2017. EMA/184855/2017. Veterinary Medicines Division

However, these factors cannot fully explain the differences. **Other influences, such as the focus on disease prevention by management, vaccines, or implementation of responsible-use campaigns in some countries may also have impacted sales patterns.**

Another important finding was that total sales, both in tonnes and in mg/PCU, of veterinary antimicrobial agents in the 30 European countries were mainly accounted for by pharmaceutical forms that can be used for mass treatment (premixes) or group treatment (oral powder and oral solution). However, this varies significantly between the countries.

Of the total number of product presentations (i.e. product name, form, strength and pack size) of antimicrobial VMPs applicable to food-producing animals (tablets excluded) sold in 2015, 80.9 % contained only one active ingredient, 16.7 % contained two active ingredients, and 2.1 % contained three active ingredients; in addition, 0.2 % (n=21) of the product presentations contained four active ingredients. Sales of products with three active ingredients were almost solely accounted for by products for individual treatment (intramammary and intrauterine preparations), and sales of products containing four ingredients were only accounted for by intramammary preparations.

Considerable variations were observed between the sales and sales patterns, expressed in tonnes, of veterinary antimicrobial agents as tablets used assigned as sold for use in (for companion animals). This is particularly the case for the sales of tablets containing combinations of penicillins + beta-lactamase inhibitors (sales of clavulanic acid are not included in the data), which varied between 0 % and 100 % of the total sales of penicillin tablets. It must be noted that human medicinal products and injectable veterinary products can also be used in companion animals, thus the data on sales of tablets should be interpreted with great care.

## 1.4 Awareness raising campaigns analysis

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### 1.4.1 Key findings

After a desk review of relevant **literature in awareness raising campaigns** analysis during the past years, we present the following key findings:

#### **Human sector:**

- It seems essential to build campaigns messages over rigorous scientific evidence and behavioural change concepts, while taking into consideration the particularities of each country.
- There is good evidence that public campaigns promoting responsible use of antibiotics may be associated with significant reduction of the use of antimicrobials in the community. The individual impact of various public campaigns in Europe between 1997 and 2007 has been estimated to be equivalent to a 6.5-28.3% drop in the overall level antibiotic use.<sup>14</sup>

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<sup>14</sup> Filippini M, Ortiz LG, Masiero G. Assessing the impact of national antibiotic campaigns in Europe. Eur. J. Health Econ. 2013;14:587-599. doi: 10.1007/s10198-012-0404-9

- A survey promoted by the WHO<sup>15</sup> which addressed campaigns developed around the globe, reveals that both human and financial constraints have hindered the implementation of campaigns and thus a substantial clinical or public health impact. A lack of political support and dissociation between common practices and suggested actions, represent major obstacles in achieving concrete results through the campaigns.
- Scientific literature suggests that targeting specific population and healthcare professionals subgroups could increase the impact of campaigns; for instance, focusing on patients seeking advice from general practitioners and the way they interact during their consultations.<sup>16</sup>
- In the future, the EU Commission aims to develop more effective antibiotic campaigns targeting those individuals who lack knowledge, prescribers and pharmacists who have a key role in changing views and behaviours.<sup>17</sup>
- Embedding knowledge within young people's academic education could also be a successful approach.<sup>18/19</sup> However, this field requires larger investments, as not even a third of the surveyed campaigns focus on school-age children and adolescents. Additionally, medical and veterinary schools can also be central targets for awareness-raising activities.<sup>20</sup>
- Other issues such as over-the-counter sale of antibiotics, medicines advertisement or supplier-induced use may also jeopardize the effects of any public awareness activity. In this respect, a recent study revealed that having a national Ministry of Health unit specialized in promoting a sensible use of medicines, a national and local drug information centre, as well as hospital and therapeutic drugs committees, were statistically decisive factors to reduce unnecessary antibiotic use.<sup>21/22</sup>
- The most effective messages and actions remain unclear. The lack of thorough evaluation, the absence of prospectively determined control groups and the multifaceted nature of most campaigns make difficult to reach any formal conclusions. It seems, however, that some campaigns were associated with a decrease in overall antibiotic use.

<sup>15</sup> Report prepared by Mirko Saam, Benedikt Huttner and Stephan Harbarth<sup>1</sup> for World Health Organization Expert Committee on the Selection and Use of Essential Medicines Policy, Access and Use (PAU)

<sup>16</sup> McNulty AMC, Nichols T, Boyle PJ et al. The English antibiotic awareness campaigns: did they change the public's knowledge of and attitudes to antibiotic use? *J. Antimicrob. Chemother.* 2010;65:1526-1533. doi: 10.1093/jac/dkq126

<sup>17</sup> European Commission. Progress report on the Action plan against the rising threats from Antimicrobial Resistance. Commission Staff Working Document. 26.2.2015

<sup>18</sup> Lecky DM, Hawking MKD, Verlander NQ et al. Using Interactive Family Science Shows to Improve Public Knowledge on Antibiotic Resistance: Does It Work? *PLoS One* 2014;9:e104556. doi: 10.1371/journal.pone.0104556

<sup>19</sup> World Bank. 2016. "Drug-Resistant Infections: A Threat to Our Economic Future (Discussion Draft)." Washington, DC: World Bank. 19

<sup>20</sup> Wellcome Trust. Evidence for action on antimicrobial resistance. Proceedings of the meeting 'Integrating Science and Policy for Decisive Action on Antimicrobial Resistance', London, UK, 26-27 April 2016.

<sup>21</sup> Huttner B, Goossens H, Verheij T et al. CHAMP consortium. Characteristics and outcomes of public campaigns aimed at improving the use of antibiotics in outpatients in high-income countries. *Lancet Infect Dis.* 2010;10:17-31. doi: 10.1016/S1473-3099(09)70305-6

<sup>22</sup> Local Campaign on Antibiotics Alliance (LOCAAL) study group. Doctors and local media: a synergy for public health information? A controlled trial to evaluate the effects of a multifaceted campaign on antibiotic prescribing (protocol). *BMC Public Health* 2011;11:816. doi: 10.1186/1471-2458-11-816

## **Animal Sector:**

Awareness campaigns play also an important role in the animal sector, and need to be regularly repeated and updated:

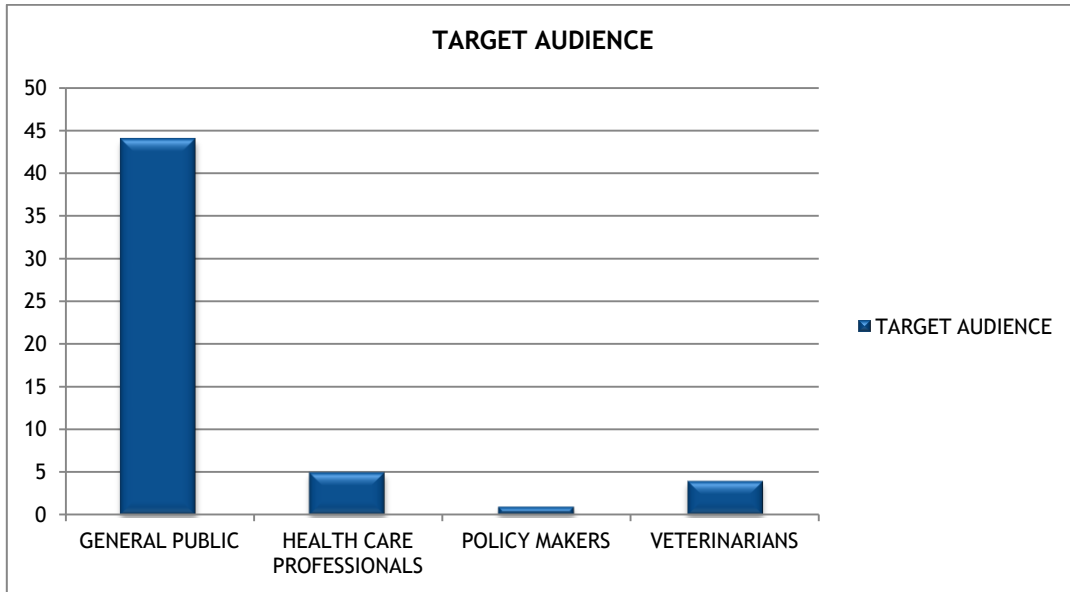
- Prudent use campaigns in the veterinary sector can be targeted at specific groups, in particular farmers, veterinarians, other professionals involved in animal production and pet owners. These campaigns may include a number of approaches, for example, providing sectoral guidelines on good practice, holding seminars and displaying posters in veterinary practices.
- Relevant networks and stakeholder organisations play an important role in the success of such campaigns and they should also be supported by the competent authorities. Guidelines should not be limited to information on minimal legal requirements, but should also provide practical tools for implementation and should encourage the parties concerned to be proactive in taking steps to reduce the threat of AMR.
- National guidelines and education programmes should promote best practices, including correct treatment, measures to prevent and reduce the transmission of pathogens, infection control and hygiene measures.
- Campaigns aimed at pet owners, designed to increase their awareness of the importance of prudent use of antimicrobials and of hygiene, are also encouraged.
- Campaigns may also be targeted at consumers, to encourage them to demand food that is produced in accordance with standards which require the amount of antimicrobial agents used to be kept as low as possible. Positive examples of best practice in animal husbandry can strengthen consumer confidence and increase public demand for food produced with minimal use of antimicrobials.

### **1.4.2 Campaigns analysis across Europe**

EU-JAMRAI communication team asked all partners to send the AMR awareness campaigns developed in their countries during the last years (10% of them sent national examples). Those campaigns have been included in the analysis, in addition to those that were extracted from a search through social networks and those carried out on the occasion of the EAAD. A total of 54 European campaigns developed during the last 10 years have been analyzed.

80% of the campaigns are focused on the general public, without trying to target more specific audiences. Only an 8% (of the campaigns analysed) was dedicated to the veterinary sector.

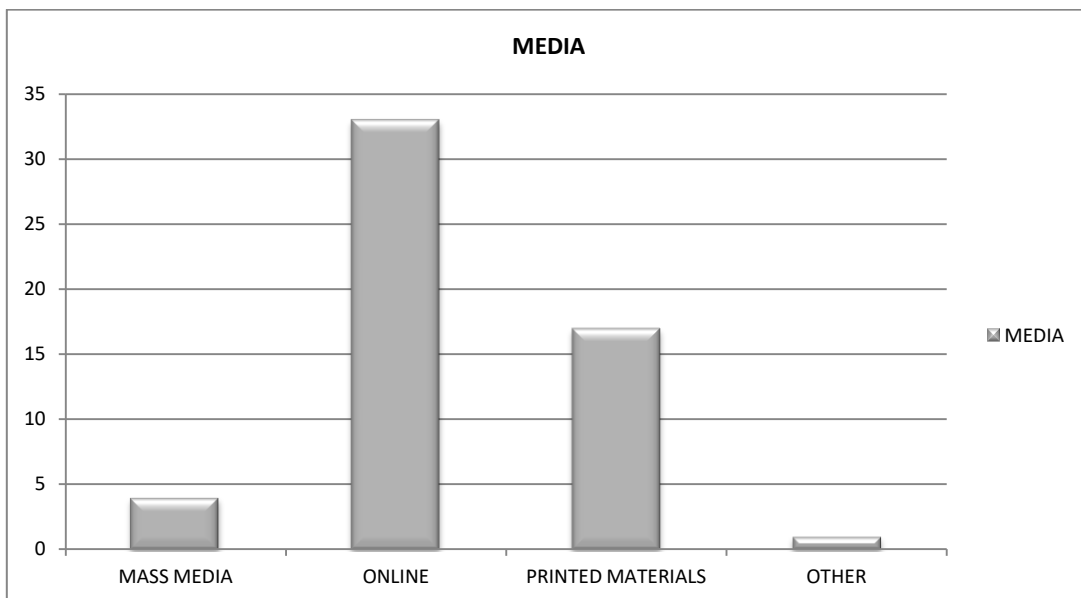
Figure 1: Target Audiences



Almost all campaigns are available online. Even those that have been disseminated in mass media and printed materials (posters, brochures, guideline, etc.) have also been made available online.

It has been detected that many of the videos, in spite of having an easy access online, have not been reinforced with good dissemination through social media networks, newsletters, etc. Sometimes good materials have a low impact due to insufficient diffusion.

Figure 2: Media



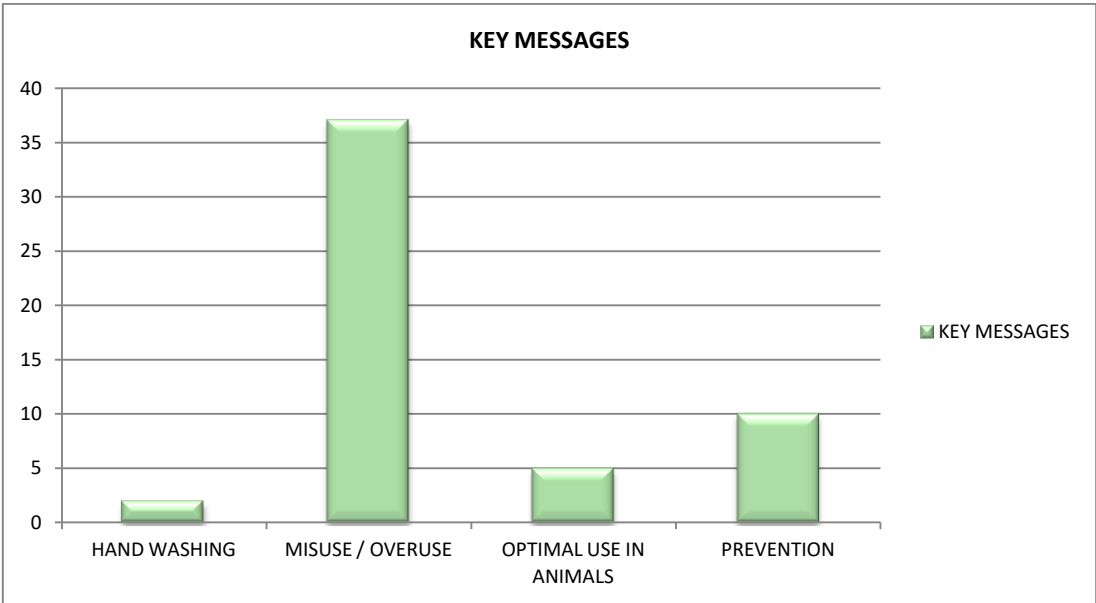


Most campaigns try to explain very diverse messages in only one video/poster/etc., instead of adapting different materials with specific key messages for each target audience.

More than half of the campaigns analyzed (69%) are focused on the appropriate use of antibiotics (follow the recommendation of the doctor, antibiotics are not indicated for cold or flu, do not share your antibiotics, etc.).A 20% concentrate the effort on explaining how bacteria become resistant; the rest reinforces hand washing messages and appropriate use in animals.

It seems that all the materials include global messages, instead of adapting it to the national situation (for example, reinforcing and focusing messages on the critical infections of each country; developing more campaigns/materials for those key audiences that are less aware of the AMR problem, etc).

Figure 3: Key Messages



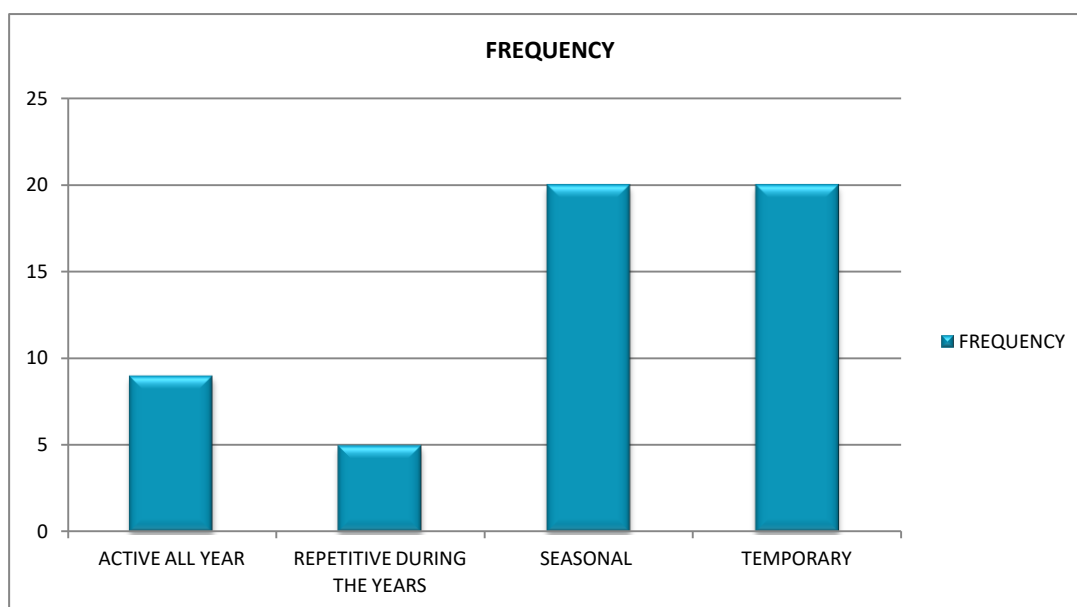
In all the countries campaigns are adapted to the local language. In the recent years, international organizations developing campaigns on the occasion of the EAAD are trying to do the same by translating each campaign into as many European languages as possible (not only in English).

Almost three quarters of the campaigns (70%) are developed temporarily or seasonally (due to the EAAD or the time of colds and flu). Only 30% of campaigns remain active throughout the year or are repeated year after year.

The analysis of antibiotics consumption after a Nationwide Campaign developed in France between 2002 and 2007 (Antibiotiques pas automatiques) showed an overall 26.5% reduction of winter antibiotic prescriptions in France; the reduction was consistent across all age groups and all 22 regions, as well as across the most frequently used therapeutic classes. The initial objective of the “Keep Antibiotics Working” program to reduce

antibiotic use in the community by 25% was reached in 5 years.<sup>23</sup> The French campaign and the yearly campaigns on the occasion of the EAAD and WAAW, show that the repetition of the same key messages over time leads to better results.

Figure 4: Frequency



Evaluation of the campaigns is a key factor to know which messages, communication materials, and activities are working better to raise awareness of the population and achieve appropriate use of antibiotics.

(See [APPENDIX 1](#): Table awareness raising campaigns analysis)

### 1.4.3 Recommendations

Finding ways to drastically alter the perception of antibiotics from the general population seem of high-priority. Messages and interventions must convey the idea that these unique molecules are a “non-renewable” resource for modern medicine - as they potentially lose some of their power every time we make use of them - implying long term consequences for the individual patient and the entire population.

The main factors to achieve successful awareness campaigns (in the human sector, animal sector and following the One Health approach) include:

- An essential characteristic of effective awareness-raising campaigns on health is **deliberate and careful targeting**. Awareness raising campaigns, which had clearly defined target groups are more effective<sup>24</sup>.
- **Tailoring the message according to country’s specific profile and the attitudes of the selected target group** is another feature of a successful awareness raising campaign. An effective campaign includes contents, which captures the target

<sup>23</sup> Significant Reduction of Antibiotic Use in the Community after a Nationwide Campaign in France, 2002-2007 Elifsu Sabuncu1,2, Julie David1,2, Claire Berne`de-Bauduin1,2, Sophie Pe´pin3, Michel Leroy4, Pierre-Yves Boe`lle5,6, Laurence Watier7,8, Didier Guillemot1,2,9,10\*

<sup>24</sup> Robertson, R. (2008). Using information to promote healthy behaviours. King’s Fund.

audience's attention through **simple key messages** and suggest reasonable and acceptable solutions to address the issue. Knowing what contents of the message would be influential to the target group before launching a campaign and comprehensive formative research could help to ensure this.

- Evidence shows that a **combination of different channels** when spreading a message brings better results than using only one specific channel<sup>25</sup>. For example, there is some evidence that sustained, focused media and educational campaigns, using multiple channels focused on reducing consumption of specific unhealthy foods can be effective<sup>26</sup>.
- **Engaging physicians and other healthcare professionals early in the campaign** and designing the key messages with them will help the campaigns fit perfectly with the target audiences, ensuring that the messages contain rigorous scientific evidence<sup>27</sup>.
- Experiences from other public health campaigns show that repeated **exposure of the targeted audience to key messages over long periods of time** is often necessary to exert a sustained effect in the long term<sup>28,29</sup>. It has been observed that often campaigns on health have been funded on short time-scales and have tended to be defined rather narrowly and to have an unrealistic focus on short-term behaviour change<sup>30</sup>. Many such campaigns have ended if they failed to demonstrate short-term behaviour changes. To achieve behaviour change, longer term strategies are needed. Social norms, individual behaviours and various social issues (HIV, smoking, teenage pregnancy) do not change overnight. Therefore, a strategy which invests in change commensurate with the defined needs and time-frames required for change should be developed<sup>31</sup>.
- Campaigns should constantly evolve to reflect the changes in legislation and general public misconceptions. Moreover, the **enforcement of laws and regulations** is necessary to ensure the **sustainability of behavioural change**<sup>32</sup>, for example the prohibition of antibiotic use for growth promotion in the veterinary sector.
- It would also be crucial to include an evaluation audit on each campaign, for example, measuring the public knowledge before and after any intervention.

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<sup>25</sup> Robertson, R. (2008). Using information to promote healthy behaviours. King's Fund.

<sup>26</sup> Robertson, R. (2008). Using information to promote healthy behaviours. King's Fund; Wakefield, M, Loken, B. Hornik R.C. (2010). Use of mass media campaigns to change health behaviour. *Lancet* 2010, 376: 1261-71; 5; Hawkes, C. (2013). Promoting healthy diets through nutrition education and changes in the food environment: an international review of actions and their effectiveness. Rome: Nutrition Education and Consumer Awareness Group, Food and Agriculture Organization of the United Nations. Retrieved <4 March 2015>, [www.fao.org/ag/humannutrition/nutritioneducation/69725/en/](http://www.fao.org/ag/humannutrition/nutritioneducation/69725/en/)

<sup>27</sup> Report prepared by Mirko Saam, Benedikt Huttner and Stephan Harbarth<sup>1</sup> for World Health Organization Expert Committee on the Selection and Use of Essential Medicines Policy, Access and Use (PAU)

<sup>28</sup> Hornik R, Kelly B. Communication and diet: an overview of experience and principles. *J. Nutr. Educ. Behav.* 2007;39:5-12.

<sup>29</sup> Bala M, Strzeszynski L, Cahill K. Mass media interventions for smoking cessation in adults. *Cochrane Database Syst. Rev.* 2008;1:CD004704.7 Harbarth S, Balkhy HH, Goossens H et al. Antimicrobial

<sup>30</sup> Hawkes, C. (2013). Promoting healthy diets through nutrition education and changes in the food environment: an international review of actions and their effectiveness. Rome: Nutrition Education and Consumer Awareness Group, Food and Agriculture Organization of the United Nations. Retrieved <4 March 2015>, [www.fao.org/ag/humannutrition/nutritioneducation/69725/en/](http://www.fao.org/ag/humannutrition/nutritioneducation/69725/en/)

<sup>31</sup> Wakefield, M, Loken, B. Hornik R.C. (2010). Use of mass media campaigns to change health behaviour. *Lancet* 2010, 376: 1261-71.

<sup>32</sup> ANTIMICROBIAL RESISTANCE and causes of non-prudent use of antibiotics in human medicine in the EU ; John Paget (NIVEL); Dominique Lescure (NIVEL); Ann Versporten (University of Antwerp); Herman Goossens (University of Antwerp); François Schellevis (NIVEL); Liset van Dijk (NIVEL).

## 1.5 Social media listening

### 1.5.1 What is Social Media Listening?

Social listening is the process of tracking conversations around specific topics, keywords, phrases, brands or industries, and leveraging your insights to discover opportunities or create content for those audiences. It's more than watching @mentions and comments poured through your social profiles, mobile apps or blogs.<sup>33</sup>

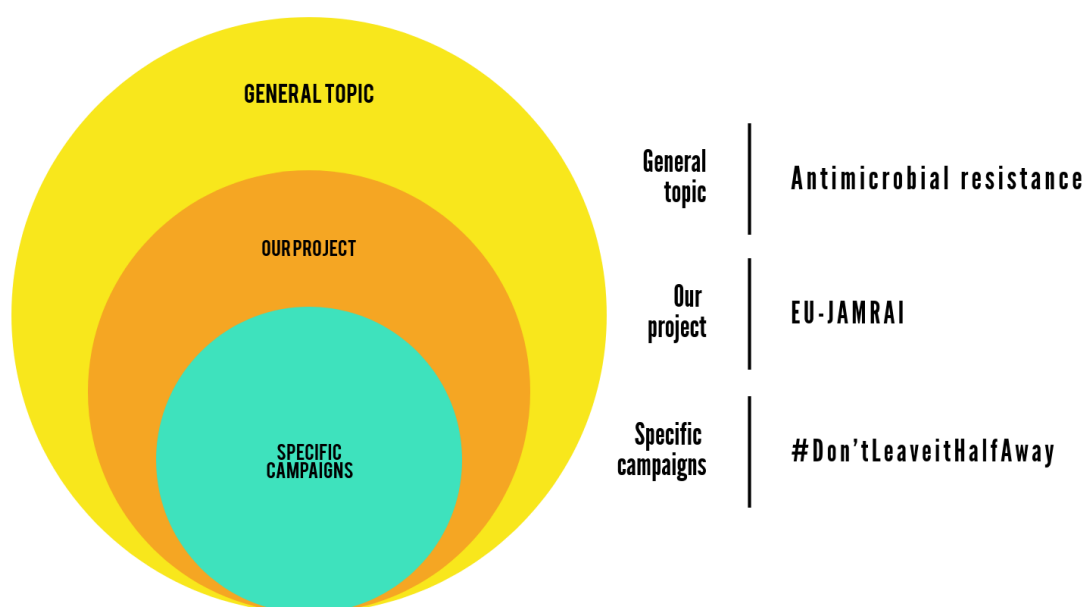
Listening requires analysis and reflection that allows you:

- To track overall project health
- To create content your audience craves
- To generate ideas for communication campaigns
- To improve your followers experience
- To drive strategic project decisions

Listening has the aim to understand not only to reply comments. That is why before starting to write the Social Behaviour Communication Strategy, we have run a two months Social Media Listening campaign. We needed to learn about what is been said about antimicrobial resistance in the internet and who are the main actors for making up a picture representing the general perception of society. We wanted to know our audience to make an intelligent and effective evidence based strategic plan.

This first social media campaign represents the yellow circle in *Figure 5*. We have created a universe representing the antimicrobial resistance conversations, key words and influencers. After that, and once the strategic plan is been implemented, we are willing to run other analyses getting in deeper layers.

Figure 5: Layers of Social Media Analytics



<sup>33</sup> Jackson, Dominique. Sprout Social: What Is Social Listening & Why Is It Important? <https://sproutsocial.com/insights/social-listening/>

### 1.5.2 How have we done it?

Oraquo (<http://www.oraquo.com/>) is the application that has been used to get the data from the internet.

After analyzing and comparing different social media listening tools, the communication leaders decided that Oraquo provides the best price-quality ratio. Oraquo has helped us to:

- Reach, collect and process huge amount of data
- Manage and listen all kind of sources in real time
- Get automatic qualitative analysis
- Collect and analyse the context of conversations

### 1.5.3 Identify Influencers

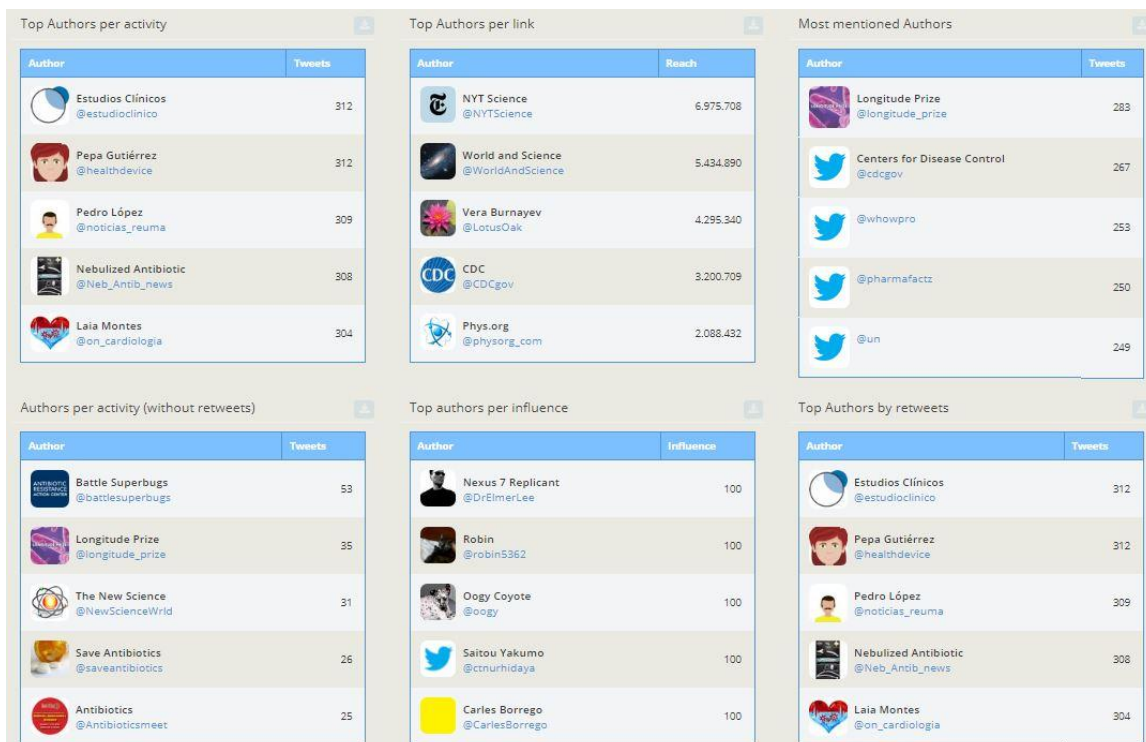
When we find relevant conversations to joint, influencers can be recognized. They are people making a lot of noise and they can:

- Share our project content
- Create unique content
- Extend our project reach
- Share their experiences
- “Sell” our messages
- Increase engagement

In short, they are people with a great influence and a large number of followers, who can help a big audience understand the importance of using antibiotics properly.

With social media listening we can determine who is most engaged on relevant antimicrobial resistance (*Figure 6*) or who is already an advocate for our mission.

Figure 6: Twitter influencers on Antimicrobial Resistance



### 1.5.4 Create content aligned with the audience

Identifying trends or emerging conversations can help the communication team to tailor content aligned with those topics. For this purpose, an active monitoring of the social media on regular basis is needed, staying continuously on top of the research.

We wanted to see what types of conversations were happening regarding antimicrobial resistance. Using Oraquo we identified a list of key words that people use when mentioning *antibiotics* (Figure 7). This analysis gave us a clue about the key messages that we should use in our communication actions, and so we did.

Figure 7: Listening and reaction. Words listened and an infographic created for our Social Media



You wanna go  
to the party  
but you are  
feeling sick...



antibiotics  
— don't —  
work on colds  
and flu

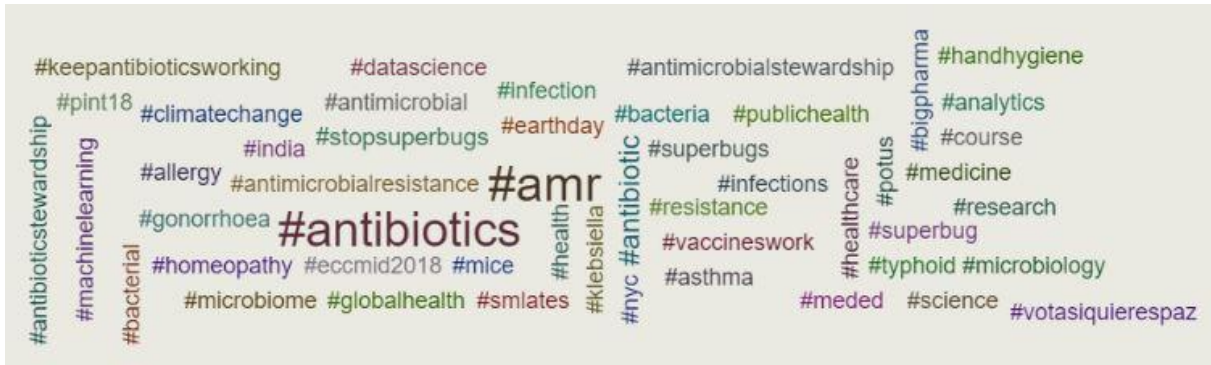


### 1.5.5 Get involved in conversations

The most popular hashtags that people are using when talking about a specific topic are easily identified by using a social media listening tool. The hashtags #antibiotics and #amr are used frequently when people are talking about antibiotic resistance. Having this knowledge, we can tag our content aligned with the most used terms. It is important taking into account that especial events will have their own hashtag, and it is vital to keep track of them. One example is #eccmid2018, the European Congress of Clinical Microbiology and Infectious Diseases that took place in Madrid, Spain, from 21 - 24 April 2018. The promoted hashtag was very relevant during these days for talking about antimicrobial resistance. Other examples are the European Antibiotics Awareness Day (#EAAD) and the World Antibiotic Awareness Week (#WAAW) which generate every year important conversations around antibiotic resistance.



Figure 8: Most popular hashtags related to antimicrobial resistance



### 1.5.6 The main sources

Besides being aware of the content, knowing the sources that our audience is using to communicate is crucial to focus our efforts on the right direction. Oraquo has allowed us to know that Twitter is the main source where antimicrobial resistance topic is discussed.

Figure 9: Sources by type



### 1.5.7 How social media listening can help me with my communication strategy?

Listening should be the first step that every communication team takes before they create their social strategies. Listening is the right tool to start building more effective social campaigns.

- To identify public target
- To get inspiration for creating new content
- To find influencers and increase engagement in our project
- To measure the engagement of our social media campaigns
- To find the best channels to spread our messages
- To publish the key messages in the best way to engage our target audiences

### 1.5.8 Social Media Listening Report’s main conclusions

- Europe is a mosaic of cultures and languages; this situation makes difficult to monitor all the conversations in the continent. The analysis has been done in English and this is a barrier for most of the countries. With this selection of language, United Kingdom leads the conversation about antibiotic resistance in Europe followed by Spain.



- Several initiatives against antibiotic resistance are being developed in United Kingdom and are very active in the social media. Examples include *Longitud Prize*, *Antibiotic Research UK* and *Antibiotic Action*. The British newspaper *The Guardian* is also very active publishing online news related to antimicrobial resistance.
- A very active group of tweeters from Spain (mainly based in Barcelona) is sharing content from English original sources making this country one of the most engaged countries in the AMR conversation in social media worldwide.
- United States is leading the worldwide conversation but it is remarkable that United Kingdom and Spain occupy the second and third positions, even ahead of Canada whose official language is English.
- The main initiatives and institutions leading the AMR conversations worldwide are World Health Organization (WHO), Centre Disease Control (CDC) and New York Times Science.
- According to their biographies on Tweeter, people involved in AMR conversation are dedicated to health, research, science and university.
- Regarding the terms more used within the ‘antibiotic resistance’ conversation, it has been found that *bacteria*, *antibiotics*, *health* and *use* are the most common.
- Regarding the hashtags used: *#antibiotic*, *#antibioticresistance* and *#antimicrobialresistance* are the most common ones.
- It is critical that ‘One health’ is not being used within the conversation, neither the term nor the hashtag (in Europe and in the world).
- The most used hashtags and terms are linked to the real-time content. Scientific papers with original and new information boost the conversation and can trigger new trends. An example: the paper published in Nature Climate Change *Antibiotic resistance increases with local temperature*, generated a new trending topic: the link between climate change and antimicrobial resistance.
- International days generate a lot of content, specific hashtags and derived hashtags. An example: during the World Hand Hygiene Day, the special hashtag was *#handhygiene* and there were some derivatives such as *#hospitalspharmacists*. It is very important to get involved within these conversations. It is a very unique opportunity to get known by other users and to find new initiatives and influencers to follow.
- Especial events, such as the European Congress of Clinical Microbiology and Infectious Diseases (ECCMID 2018), also generate a lot of content in the social media and it is a key moment to get involved within the conversation. A special hashtag was also created *#eccmid18*.
- Regarding the best time to publish content, it looks like the middle of the week is just the right moment. Tuesdays’ evenings and Wednesdays’ afternoons got more activity than the average for the period.
- Regarding the European comparative among countries, Spain was leader on May ahead of United Kingdom. The reason might be behind the high level of retweets of: WHO’s first global report on AMR that was published on April 30<sup>th</sup>; The report *Bacteria may be powerful weapon against antibiotic resistance* published on May 3<sup>th</sup> by Terence Croft from Washington University; The news *Antibiotic Resistance crisis worsening because of collapse in supply*, published by The Guardian on May 31<sup>th</sup>; and the scientific paper *Antibiotic resistance increases with local temperature*, published by Nature Climate Change on May 21<sup>st</sup>.

(See [APPENDIX 2](#): Social media listening report)

## 2 About EU-JAMRAI

### 2.1 How does EU-JAMRAI emerge?

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The European Union Joint Action on Antimicrobial Resistance and Healthcare-Associated Infections (EU-JAMRAI) brings European Union member countries together to foster synergies and contribute to the global movement against microbial resistance to antibiotics. EU-JAMRAI started in September 2017 and its implementation will last for 36 months. Being the first European Joint Action in the field, it will capitalize on existing initiatives and propose concrete steps to lessen the burden of Antimicrobial Resistance (AMR) and reduce Healthcare-Associated Infections (HCAI).

Coordinated by France, EU-JAMRAI brings together 44 European associate partners and more than 30 stakeholders to ensure that the Joint Action is strategically connected to the global challenges and developments in the AMR field.

This Joint Action is co-funded by the Health Programme of the European Union and by the participating countries. All the partners are already involved in the field of AMR and HCAI and have the capacity to run the activities foreseen in this Joint Action. The partners are not only Ministries but also research institutes, clinical centres, public health agencies and universities. EU-JAMRAI will cover all the national specificities of AMR and HCAI in Europe as it gathers all European countries as beneficiaries or collaborating stakeholders.

#### 2.1.1 A global challenge requires a coordinated global response

AMR is a major health threat, that decision-makers are well aware of, and which has gained a high priority among public health challenges. The multiplication of national, European and international initiatives against AMR over the last decade reflects a shared commitment to actively tackle this issue. To this end, the World Health Organization (WHO) - in collaboration with FAO and OIE - has elaborated a Global Action Plan (GAP)<sup>34</sup>. The GAP sets five major objectives and emphasizes the *One Health* approach, a holistic and multisectorial perspective which recognizes that human health, animal health and environment are interconnected. Pathogens are transmitted from humans to animals and vice versa and must therefore be tackled in both sectors. Endorsing the WHO initiative, countries committed themselves to draft and implement national strategies aligned with the GAP by mid-2017.

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<sup>34</sup> World Health Organization. Global action plan on antimicrobial resistance. Geneva: WHO; 2015. Available from: <http://www.who.int/antimicrobial-resistance/global-action-plan/en>

In June 2016, the European Union adopted ambitious Council Conclusions on the next steps under a *One Health* approach to combat antimicrobial resistance committing to set up a *One Health* network across member states<sup>35</sup>. In June 2017, the European Union published the European *One Health* Action Plan on Antimicrobial Resistance<sup>36</sup>, which comprises three pillars: i) making the EU a best practice region; ii) boosting research, development and innovation, and iii) intensifying EU efforts to shape the global agenda on AMR. The EU-JAMRAI clearly belongs to the first pillar of the European action plan.

### 2.1.2 EU-JAMRAI objectives and added value

The overarching objective of EU-JAMRAI is to foster synergies among European Union Member States by developing and implementing effective *One Health* policies to combat AMR and reduce HCAI<sup>37</sup>. Through appropriate involvement of each group within the different planned actions, the Joint Action will strengthen the existing public health policies both at national and European level and contribute to achieve the objectives of the WHO Global Action Plan on AMR, the Council Conclusions on AMR and the EU Action Plan on AMR.

EU-JAMRAI has 9 work packages (WP), each of them with specific objectives. All the working areas will involve the different EU-JAMRAI partners and take into account the specific social, cultural, economic and political contexts and the national AMR and HCAI status.

- WP1 - Coordination (France)
- WP2 - Dissemination (Spain)
- WP3 - Evaluation (Italy)
- WP4 - Integration in national policies and sustainability (France)
- WP5 - Implementation of *One Health* national strategies and national action plans for AMR (Netherlands)
- WP6 - Policies for prevention of HCAs and their implementation (Greece and Sweden)
- WP7 - Appropriate use of antimicrobials in humans and animals (Norway and Spain)
- WP8 - Awareness raising and communication (Spain)
- WP9 - Prioritizing and implementing research and innovation for public health needs (Norway and France)

This Plan has been developed by **WP8 lead by the AEMPS - Spain** (herein after referred as the **Joint Action communication team**) and should be implemented from July 2018 to August 2020.

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<sup>35</sup> Council Conclusions 2016/C 269/05 of 23 July 2016 on the next steps under a One Health approach to combat antimicrobial resistance. Available from: [http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.C\\_.2016.269.01.0026.01.ENG&toc=OJ:C:2016:269:TOC](http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.C_.2016.269.01.0026.01.ENG&toc=OJ:C:2016:269:TOC)

<sup>36</sup> A European One Health Action Plan against Antimicrobial Resistance (AMR). EU; 2017. Available from: [https://ec.europa.eu/health/amr/sites/amr/files/amr\\_action\\_plan\\_2017\\_en.pdf](https://ec.europa.eu/health/amr/sites/amr/files/amr_action_plan_2017_en.pdf)

<sup>37</sup> EU-JAMRAI Vision/Mission. 2018. Available from: <https://eu-jamrai.eu/vision-mision-statement/>

## 3 About this Strategy

### 3.1 EU-JAMRAI Work Package 8: Awareness raising and communication

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Keeping in mind EU-JAMRAI motto “Europe fostering synergies to keep antibiotics working”, the main objective of WP8 is increasing awareness on antimicrobial resistance and healthcare associated infections, promoting the responsible use of antibiotics and encouraging best practices among different target audiences.

This Plan entitled “A Social Behaviour Change Communication Strategy to tackle AMR and reduce HCAs in Europe” will be the main tool to guide the work developed by WP8 ensuring that all the implemented activities are part of a well designed behaviour change strategy:

- Based on evidence
- Based on participation: shared and fed with inputs from partners and stakeholders
- With a clear vision
- With defined and SMART (Specific, Measurable, Appropriate, Realistic and Time-Bound) objectives
- With clear priorities and adapted to the available resources
- With well planned activities to be implemented in coordination with other work packages
- With sustainable results even after the end of the Joint Action

### 3.2 The approach for this Strategy: Social and Behaviour Change Communication

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“Social and Behaviour Change Communication (SBCC) for health is a research-based, consultative process that uses communication to promote and facilitate behaviour change and support the requisite social change for the purpose of improving health outcomes [...]. SBCC is guided by a comprehensive ecological theory that incorporates both individual level change and change at broader environmental and structural levels. Thus, it works at one or more levels: the behaviour or action of an individual, and collective actions taken by groups, social and cultural structures, and the enabling environment.

The addition of an “S” to BCC intends to signify that individuals and their immediate social relationships are dependent on the larger structural and environmental systems: gender, power, culture, community, organisation and political and economic environments. Unlike other terms, SBCC explicitly encompasses social change perspectives that foster processes of community dialogue and action.”<sup>38</sup>

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<sup>38</sup> Defining Social and Behavior Change Communication (SBCC) and other essential health communication terms. USA: The Manoff Group; 2012. Available from: <https://www.manoffgroup.com/wp-content/uploads/DefiningSBCC.pdf>

Social and behaviour change communication (SBCC) is evidence based and uses science, data as well as creative ideas to focus on:

- Changing or positively influencing social norms in support of long-term, sustainable behaviour change at the population level.
- Fostering long-term, normative shifts in behaviour in support of increasing the practice of healthy behaviours improving health services provider-client interactions.
- Strengthening community responses to issues.
- Influencing decision-makers and family and peer networks.
- Increasing correct use of health services and products.
- Influencing policy.
- Encouraging an increased capacity for local planning and implementation of health improvement efforts.<sup>39</sup>

### 3.3 The shared vision for this Strategy

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With the statement below we intend to clarify what is important and illustrate what we want to happen in the future. It is important to differentiate vision from objectives. While objectives should be SMART (Specific, Measurable, Appropriate, Realistic and Time-Bound), the vision represents the dream goal that anchors the strategy and guides its design and implementation process.

#### VISION

The European Union will be a best practice region where:

- Citizens are aware of the gravity of AMR and the risks associated to inappropriate consumption of medicines.
- Antibiotics are prudently prescribed and correctly used only when needed.
- Infection prevention and infection control measures are effectively implemented.

### 3.4 Core challenge and root causes addressed by this Strategy

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#### 3.4.1 Core challenge

The core challenge is the key constraint that is blocking the achievement of our vision. Most challenges have several underlying causes but it is important to identify the primary reasons or root causes to help us understand why we are at the current situation. Once we have made this exercise, we will be able to identify different impacts and effects and explore how to address them.

For this strategy we have chosen the root cause analysis tool Problem Tree<sup>40</sup> (*Figure 10*) to visually capture the root causes of our challenge and the relationships between them.

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<sup>39</sup> Designing a Social and Behavior Change Communication Strategy. USA: Johns Hopkins University; 2018.

<sup>40</sup> Nonformal Education Manual. USA: Peace Corps; 1989.

The core challenge and root causes of this SBCC strategy have been identified through a participatory process involving different partners and stakeholders working in the AMR field and a team of communication experts.

### **Core challenge**

*Antibiotic resistance is increasing*

#### **3.4.2 List of root causes**

All challenges can have several root causes and therefore several solutions. The Problem Tree tool challenges us to answer the question “Why?” as we identify each cause. Defining the challenge and analyzing and prioritizing its causes, we understand why the current situation exists and can explore how to address this root cause through our choice of solutions.

The root causes identified by this SBCC strategy are listed below and also represented in the Problem Tree (*Figure 10*). This Problem Tree does not pretend to include all the causes of antimicrobial resistance but identify the most important ones addressable with a SBCC strategy. Most of them include the groups involved and affected by each root cause to advance the target audiences identification. They have also been grouped by sector (Human, Animal & Environment).

#### **HUMAN**

- Patients not taking antibiotics (ATBs) as prescribed.
  - Interrupting ATB treatment too early or too late.
  - Consuming a higher or lower dose than the one prescribed.
- Patients practicing self-medication.
  - Trying to buy ATBs without prescription.
  - Using and/or sharing ATB leftovers.
- Lack of rapid laboratory tests + Lack or poor ATB stewardship programmes.
  - Diagnostic uncertainty.
    - ATBs prescribed unnecessarily.
    - ATB prescription (dose, frequency & duration) is insufficient or excessive.
    - Spectrum of ATB therapy either too narrow or too broad.
    - ATB prescription delayed in critically ill patients.
- Lack or poor ATB stewardship programmes.
  - Poor monitoring/follow-up of ATB treatment.
    - Administration inaccuracies (dose, route, frequency, duration).
    - ATB therapy not streamlined when needed.

## HUMAN AND ANIMAL

- Poor infection prevention
  - Poor infection control standard precautions in healthcare
  - Poor individual hygiene and sanitation practices
  - Vaccination policies not adequate
  - Biosecurity measures in farms not sufficient

## ANIMAL

- Lack of rapid laboratory tests + Lack or poor ATB stewardship programmes.
  - Diagnostic uncertainty.
    - ATBs unnecessarily prescribed to animals used for food production.
      - In some countries (outside EU) ATBs are used as growth promoters for faster animal growth.
      - ATBs are used as prophylaxis to prevent diseases from spreading.
    - ATBs unnecessarily prescribed to companion animals/pets.
    - Critically important ATBs used to treat animals (colistin, etc.).
- ATBs not given to animals as prescribed.
  - Interrupting ATB treatment too early or too late.
  - Given animals a higher or lower dose than the one prescribed.
- Farmers/Owners medicating their animals.
  - Buying ATBs without prescription.
  - Giving ATB leftovers.
  - Giving their animals ATBs for human use.

## ENVIRONMENT

- ATBs spread throughout the environment.
- ATBs and fungicides applied to agricultural crops and overused in agro-industries.
- ATBs excreted un-metabolized in human & animal waste.
- Environment polluted by factories throwing out raw materials used to produce ATBs.
- Individuals throwing out ATB leftovers instead of disposing them in safe containers for medical waste.

## PRIMARY ROOT CAUSES

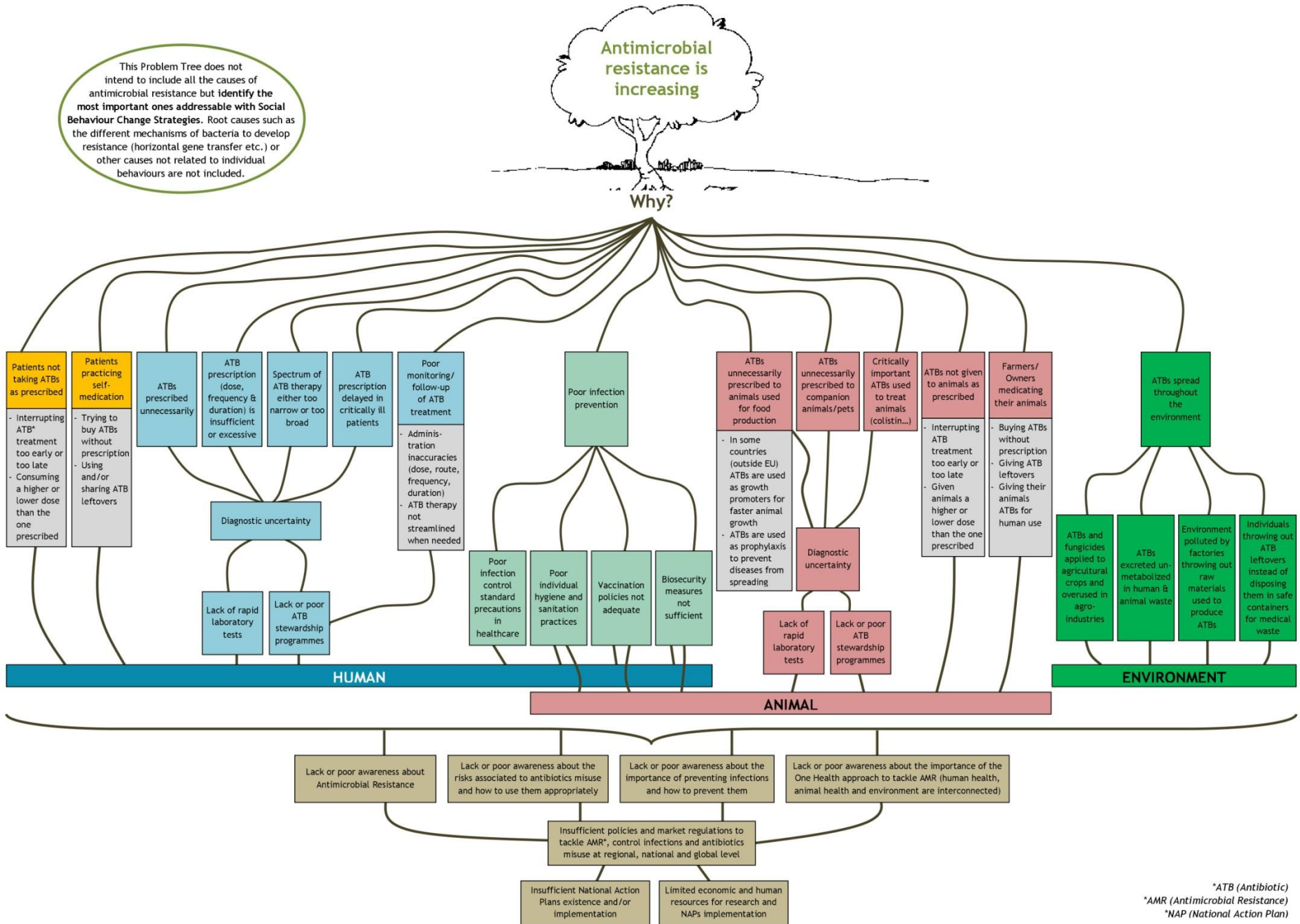
- Lack or poor awareness about Antimicrobial Resistance (AMR)
- Lack or poor awareness about the risks associated to antibiotics misuse and how to use them appropriately.
- Lack or poor awareness about the importance of preventing infections and how to prevent them.
- Lack or poor awareness about the importance of the *One Health* approach to tackle AMR (human health, animal health and environment are interconnected).
- Insufficient policies and market regulations to tackle AMR, control infections and antibiotics misuse at regional, national and global level.
- Insufficient National Action Plans (NAPs) existence and/or implementation + Limited economic and human resources for research and NAPs implementation.



### 3.4.3 Difference between the core challenge and the shared vision

<b>Shared Vision</b>	<p>The European Union will be a best practice region where:</p> <ul style="list-style-type: none"> <li>• Citizens are aware of the gravity of AMR and the risks associated to inappropriate consumption of medicines.</li> <li>• Antibiotics are prudently prescribed and correctly used only when needed.</li> <li>• Infection prevention and infection control measures are effectively implemented.</li> </ul>
<b>Current Situation</b>	<p>Antimicrobial resistance is increasing in Europe and globally, mainly due to the excessive and often inappropriate use of antibiotics. Today, antimicrobial resistance (AMR) is a worldwide public health threat. The increase of bacteria resistant to multiple antibiotics, even to last resort drugs, in combination with the lack of new antibiotics is increasingly resulting in cases where doctors are facing major difficulties to treat infections.</p>
<b>Differences between vision and situation</b>	<p>If we do not react, AMR might become the greatest world killer by 2050 killing 10 million people per year. Prudent use of antibiotics is imperative to lessen the burden of antimicrobial resistance and reduce healthcare associated infections</p>
<b>Core Challenge Statement</b>	<p>Antimicrobial resistance is increasing</p>

Figure 10: Problem Tree



## 3.5 Context of the core challenge

### 3.5.1 The Social Ecological Model applied to the AMR threat

The Social Ecological Model focuses on how interconnected influences of family, peers, community and society can hinder or help in decision-making and in changing behaviours. “The Social Ecological Model recognizes that behaviours take place within a complex web of social and cultural influences. This perspective views individuals as nested within a system of socio-cultural relationships—families, social networks, communities, nations—that are influenced by and have influence on their physical environments. Within the Social Ecological Model, individuals’ decisions and behaviours are understood to depend on their own characteristics, as well as the social and environmental contexts within which they live. The social and environmental contexts therefore influence individual behaviours relating to the identified challenge and root causes.”<sup>41</sup>

Figure 11: Social Ecological Model

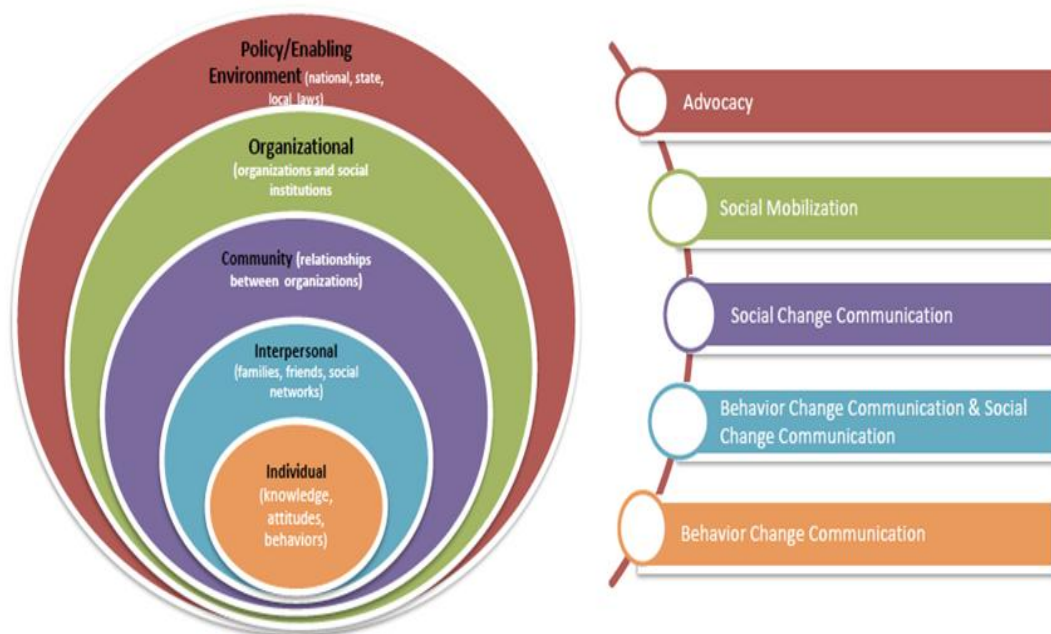


Figure 11 shows the different social and environmental contexts, their interdependency and the best approach to address the core challenge at each level. This model has guided the identification of the target audiences (*Chapter 4*), the strategic approaches selection (*Chapter 6*) and the communication activities design (*Chapters 7 and 8*).

<sup>41</sup> Designing a Social and Behavior Change Communication Strategy. USA: Johns Hopkins University; 2018.

### 3.6 Communication needs and resources assessment

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In this section we assess the potential and available resources to carry out this SBCC strategy:

- *What communication resources and tools are available? How effective are the resources and tools in reaching priority groups?*  
Considering the projects resources it will not be possible to focus on mass media or printed materials distribution at European level, so the Joint Action communication efforts should concentrate in digital media.
- *Are journalists currently reporting on the challenge? How is the priority group portrayed?*  
Yes, AMR is beginning to have a strong presence in journals but, too often, the focus is not adequate and does not promote sustainable behavioural change.
- *Who are the key people in the priority group's social networks who could introduce information and encourage behaviour or social change?*  
The social media listening and other networking efforts are helping us to build a strong database of influencers.
- *Are there media-use surveys of the priority group?*  
No, but thanks to the social media listening we will have more information about the social networks (See APENDIX 2).

Kinds of communication activities that are currently being implemented to address the challenge:

- *What communication efforts are on-going and through what communication approaches?*  
A lot of communication efforts →at national level, international organisations, etc. However there is evidence that proves that key messages are not reaching the audiences adequately (see 1.3 Awareness raising campaigns analysis)
- *How are these communication efforts perceived by the intended audience?*  
The Eurobarometer shows that behaviour in Europe has changed/improved very little between 2013 and 2016.
- *How successful are/were the communication efforts in reaching the intended audience?*  
(See [1.3 Awareness raising campaigns analysis](#))

### 3.6.1 SWOT Analysis

An analysis of *strengths*, *weaknesses*, *opportunities* and *threats* (SWOT) within the current environment helps to structure the answers above.

<p><b>Strengths</b></p>	<p><i>What are your program’s strengths? What gives you an advantage over other programs? What do you do best? What communication and institutional resources do you have?</i></p> <ul style="list-style-type: none"> <li>• First Joint action in the field.</li> <li>• European countries working together and joining forces.</li> <li>• 44 partners already involved in the field of AMR and HCAI.</li> <li>• More than 30 stakeholders supporting the Joint Action.</li> <li>• Key international organizations in the fight against AMR such as WHO, OECD, OIE and FAO.</li> <li>• Principle of inclusiveness: not only policy makers but also representatives from healthcare professionals, patients, students and industry are part of this JA.</li> <li>• Involvement of stakeholders such as association of patients and farmers representatives can contribute to the sustainability of the communication work.</li> <li>• Synergy between the JA and other programs.</li> </ul>
<p><b>Weaknesses</b></p>	<p><i>In what areas (geographical, approaches, reach) are you weak? What makes you less capable than other programs? What resources do you lack?</i></p> <ul style="list-style-type: none"> <li>• Limited budget.</li> <li>• Sort implementation period. Behaviour change takes time.</li> <li>• Need to select and prioritize communication objectives and activities (some relevant activities have to be put aside).</li> <li>• Too many target audiences (AMR affects everybody).</li> <li>• Large number of different cultures and languages in Europe. Translation and adaptation of the materials to the national contexts depend on the partners’ support.</li> <li>• Important differences in the epidemiology of AMR and organization of infection control activities across European countries.</li> <li>• Different behaviours and knowledge related to AMR and different use of antibiotics across European countries.</li> <li>• Lack of resources to develop in depth evaluation of each communication effort.</li> </ul>
<p><b>Opportunities</b></p>	<p><i>What opportunities (other related communication programs, popular media venues) are available to you? What opportunities could you take advantage of? What external elements could help you reach your vision?</i></p> <ul style="list-style-type: none"> <li>• AMR is global and not related to one specific disease. It can affect everyone and we should all be concerned about it.</li> <li>• We have partners and collaborating stakeholders in all EU</li> </ul>

	<p>countries that can give us support disseminating the activities nationwide.</p> <ul style="list-style-type: none"> <li>• There are national initiatives in each country already implementing communication campaigns around AMR: <ul style="list-style-type: none"> <li>○ AMR is not a new subject.</li> <li>○ There is opportunity to capitalize on what already exists at national and European levels</li> </ul> </li> <li>• Stakeholders can help us: <ul style="list-style-type: none"> <li>○ Ensuring consistency with ongoing initiatives.</li> <li>○ Making sure that the JA communication activities are strategically connected to the global challenges and developments in the AMR field.</li> </ul> </li> <li>• Key international organizations (WHO, OECD, OIE and FAO) can support the JA communication efforts giving their expert advice and disseminating our initiatives through their networks.</li> <li>• The recent multiplication of AMR initiatives at global and national levels shows that AMR is in the heart of the political agenda.</li> </ul>
<p><b>Threats</b></p>	<p><i>What might cause problems? What obstacles exist? What external elements could keep you from reaching your vision?</i></p> <ul style="list-style-type: none"> <li>• AMR is global and not related to one specific disease. It can affect everyone making the target audience very wide.</li> <li>• Lack of awareness of AMR and antibiotics misuse is extended through the whole society.</li> <li>• AMR is a complex subject. It is not easy to explain that antibiotics are a social drug and that individual misuse has a global impact.</li> <li>• Resistance to change wrong beliefs and harmful behaviours.</li> <li>• If the message does not reach the audiences effectively, they might develop resistance to treat or be treated with antibiotics even when needed (example: anti-vaccines movement).</li> <li>• Coordination challenges between so many partners and stakeholders.</li> <li>• Duplication of efforts.</li> <li>• Possibility of lack of commitment from partners and stakeholders.</li> <li>• Difficulty to ensure the sustainability of the impact of the different communication activities beyond the Joint Action end.</li> </ul>



## 4 Target Audiences

### 4.1 Potential Audience Segmentation

The EU-JAMRAI communication strategy is based on a ‘glocal’ approach, which means presenting global knowledge within a local context. The term ‘glocal’ is a combination of the words global and local, and it encapsulates the concept ‘Think globally, act locally’. The main objective is to take a global issue and make it meaningful to society at a local level, and this is precisely what EU-JAMRAI communication team is willing to do with the Antimicrobial Resistance and Healthcare Associated Infections threat.

For doing so, the support of the **partners** is crucial and that makes them our **primary target audience**. The communication team will propose them a diversity of activities within the 2 years execution period of this SBCC strategy and will support them to implement them at a local level (for more details please see sections 5.2 and 8.4).

	<b>Demographic Characteristics</b> <i>(Age, gender, education)</i>	<b>Geographic Characteristics</b> <i>(Region, urban or rural, area of conflict)</i>	<b>Socio-Cultural Characteristics</b> <i>(Language, culture, religion, place in society, ethnicity)</i>	<b>Behavioural Characteristics</b> <i>(Behaviours that affect or impact the challenge)</i>	<b>Psychographic Characteristics</b> <i>(Personality, values, attitudes, interests, lifestyle)</i>	<b>Ideational Characteristics*</b>
<b>EU-JAMRAI partners</b>	<ul style="list-style-type: none"> <li>-From 27 to 60 years old</li> <li>-University education (different specialties)</li> <li>-All gender</li> </ul>	<ul style="list-style-type: none"> <li>-European people from urban areas from 28 countries</li> <li>-Working in urban areas</li> <li>-No conflicts</li> </ul>	<ul style="list-style-type: none"> <li>-23 National languages</li> <li>-English as common language</li> <li>-Different cultures</li> <li>- Middle/High social and economic status</li> </ul>	<ul style="list-style-type: none"> <li>-Lack of time to dedicate to public communication and outreach</li> <li>-Lack of time to assist to all congresses and meetings related to AMR (dissemination)</li> <li>-With heavy workloads and not dedicated full time to the Joint Action</li> </ul>	<ul style="list-style-type: none"> <li>-Committed to tackle AMR problem</li> <li>-All personalities</li> <li>-Mixed lifestyles</li> </ul>	<ul style="list-style-type: none"> <li>-Recognize the importance of communication, outreach and dissemination</li> <li>-Willing to support the Joint Action communication team</li> <li>-Willing to implement the JA Social Behaviour Change Communication strategy.</li> <li>-Participate in dissemination and public communication events</li> <li>-Proactive in communication and dissemination matters</li> <li>-Always use the brand image as an umbrella for all actions made on behalf of the JA.</li> </ul>



The activities that will be proposed to the partners can have the following target audiences:

	<b>Demographic Characteristics</b> <i>(Age, gender, education)</i>	<b>Geographic Characteristics</b> <i>(Region, urban or rural, area of conflict)</i>	<b>Socio-Cultural Characteristics</b> <i>(Language, culture, religion, place in society, ethnicity)</i>	<b>Behavioural Characteristics</b> <i>(Behaviours that affect or impact the challenge)</i>	<b>Psychographic Characteristics</b> <i>(Personality, values, attitudes, interests, lifestyle)</i>	<b>Ideational Characteristics*</b>
<b>Politicians</b>	<ul style="list-style-type: none"> <li>-From 30 to 65 years old</li> <li>-University education</li> <li>-All gender</li> </ul>	<ul style="list-style-type: none"> <li>-European people from urban areas from 28 countries</li> <li>-Working in urban areas (mostly)</li> <li>-No conflicts area</li> </ul>	<ul style="list-style-type: none"> <li>-23 national languages</li> <li>-Different cultures</li> <li>-High social and economic status</li> </ul>	<ul style="list-style-type: none"> <li>-Lack of information about AMR</li> <li>-Agenda full of hot topics</li> <li>-Lack of economic resources to invest in AMR research</li> <li>-Surrounded by people with little understand about AMR</li> <li>-Lack of interest in science</li> <li>-Need a fast return on investment and they believe that science doesn't have it</li> </ul>	<ul style="list-style-type: none"> <li>-Committed to lead countries at all levels (local, regional, national)</li> <li>-Have the power and are the decision makers</li> <li>-Self-confident</li> <li>-High standing lifestyle</li> </ul>	<ul style="list-style-type: none"> <li>-To include the AMR threat in their agenda</li> <li>-Willing to listen to the problem from experts and look for solutions</li> <li>- To implement the solutions agreed taking into account the <i>One Health</i> approach</li> <li>- To invest in research and innovation related to AMR projects</li> <li>-International collaboration related to AMR threat</li> <li>-To include AMR in education curricula</li> </ul>
<b>Patients and families</b>	<ul style="list-style-type: none"> <li>All gender, all ages, all education</li> </ul>	<ul style="list-style-type: none"> <li>-European people from urban and rural areas from 28 countries.</li> <li>-No conflicts area</li> <li>-Easy access to public health</li> <li>-Easy access to public education</li> <li>-Easy access to news</li> </ul>	<ul style="list-style-type: none"> <li>-23 National languages</li> <li>-Different cultures</li> <li>-Different places in society</li> </ul>	<ul style="list-style-type: none"> <li>-Lack of awareness about the importance of preventing infections and how to prevent them</li> <li>-Lack of awareness about AMR</li> <li>-Lack of awareness about how antibiotics work</li> <li>-Misuse &amp; overuse</li> <li>-Self-medication</li> <li>-Stop the treatment sooner or later than recommended</li> <li>-Antibiotic treatments are not questioned (do not ask why?)</li> </ul>	<ul style="list-style-type: none"> <li>-All personalities</li> <li>-Mixed lifestyles</li> <li>-All attitudes and interests</li> </ul>	<ul style="list-style-type: none"> <li>-Eager to learn about infection prevention and antibiotic use</li> <li>-Willing to implement the knowledge acquired</li> <li>-Share the information</li> <li>-Meet the doctor's prescription</li> <li>-Ask to the doctor why antibiotics are prescribed</li> <li>-Don't ask for antibiotics without a prescription</li> </ul>

	Demographic Characteristics	Geographic Characteristics	Socio-Cultural Characteristics	Behavioural Characteristics	Psychographic Characteristics	Ideational Characteristics*
<b>Healthcare workers</b>	<ul style="list-style-type: none"> <li>-From 22 to 65 years old</li> <li>-University education</li> <li>-All gender</li> </ul>	<ul style="list-style-type: none"> <li>-European people from urban and rural areas from 28 countries</li> <li>-Working in urban and rural areas</li> <li>-No conflicts area</li> </ul>	<ul style="list-style-type: none"> <li>-23 National languages</li> <li>-Different cultures</li> <li>-Middle-high social and economic status</li> </ul>	<ul style="list-style-type: none"> <li>-Lack of awareness about the gravity of AMR</li> <li>-Not being proactive on creating antimicrobial stewardship programmes and infection and prevention control programmes</li> <li>-Not aware of the importance and the benefits of antimicrobial stewardship programmes' implementation.</li> <li>- Not aware of the importance and benefits of prevention and infection control programmes.</li> <li>-Prescribing inaccuracies (unnecessary, incorrect, overprescribing, under prescribing) and difficulties are common because often microbiology data is not available and prescribers do not know which bacteria is causing the infection</li> <li>- Lack of rapid laboratory tests</li> <li>-Administration inaccuracies (dose, route, frequency, duration)</li> <li>-Feeling pressure from patients</li> </ul>	<ul style="list-style-type: none"> <li>-Responsible and committed to health care</li> <li>-All personalities</li> <li>-Mixed lifestyles</li> </ul>	<ul style="list-style-type: none"> <li>-Motivated to learn about and implement antimicrobial stewardship programmes</li> <li>-Willing to follow prevention and infection control protocols</li> <li>-Willing to share new knowledge inside and outside healthcare settings</li> <li>-Willing to teach patients about antibiotics prudent use</li> <li>-Staying up-to-date in latest news and discoveries</li> <li>- Prescribing antibiotics correctly (right class, frequency, dose and duration) only when necessary</li> </ul>

	Demographic Characteristics	Geographic Characteristics	Socio-Cultural Characteristics	Behavioural Characteristics	Psychographic Characteristics	Ideational Characteristics*
<b>Healthcare students (human and animal sectors)</b>	<ul style="list-style-type: none"> <li>- From 18 to 30 years old</li> <li>- University education</li> <li>- All gender</li> </ul>	<ul style="list-style-type: none"> <li>-European people from urban and rural areas from 28 countries</li> <li>-Studying in urban areas</li> <li>-No conflicts area</li> </ul>	<ul style="list-style-type: none"> <li>-23 National languages</li> <li>-Different cultures</li> <li>-Middle social and economic status</li> </ul>	<ul style="list-style-type: none"> <li>- Lack of awareness about the gravity of AMR</li> <li>- Not aware of the importance and benefits of the prevention and infection control programmes</li> <li>-Not aware of the importance and the benefits of antimicrobial stewardship programmes' implementation</li> </ul>	<ul style="list-style-type: none"> <li>-Responsible and committed to health care</li> <li>- Interested in new technologies</li> <li>-All personalities</li> <li>-Student lifestyle</li> </ul>	<ul style="list-style-type: none"> <li>-Eager to learn about antibiotic use</li> <li>-Willing to implement the knowledge acquired</li> <li>-Share the information through social media channels, congresses, workshops, public events, etc.</li> </ul>
<b>Farmers</b>	<ul style="list-style-type: none"> <li>-From 18 to 65 years old</li> <li>-Not university education required</li> <li>-All gender (most males)</li> </ul>	<ul style="list-style-type: none"> <li>-European people from rural areas from 28 countries</li> <li>-Working in rural areas</li> <li>-No conflicts area</li> <li>-Easy access to public education</li> </ul>	<ul style="list-style-type: none"> <li>-23 National languages</li> <li>-Different cultures</li> <li>-Low/Middle social and economic status</li> </ul>	<ul style="list-style-type: none"> <li>-Lack of awareness about how antibiotics work</li> <li>-Lack of infection and prevention control protocols</li> <li>-Misuse &amp; overuse</li> <li>-Animal medication without prescription</li> <li>-Stop the treatment sooner or later than recommended</li> <li>-Antibiotics used as prophylaxis</li> <li>-Last line antibiotics used before needed</li> </ul>	<ul style="list-style-type: none"> <li>-Committed to animal care and first line of food production</li> <li>-Rural lifestyle</li> </ul>	<ul style="list-style-type: none"> <li>-Tight and trustful relationship with veterinarians</li> <li>-Follow vet recommendations and prescriptions</li> <li>-Follow a prevention and control infection protocol (biosecurity measures and vaccines)</li> <li>-Willing to know about prudent antibiotic use</li> <li>-Willing to share new knowledge</li> </ul>

	Demographic Characteristics	Geographic Characteristics	Socio-Cultural Characteristics	Behavioural Characteristics	Psychographic Characteristics	Ideational Characteristics*
<b>Veterinarians</b>	<ul style="list-style-type: none"> <li>-From 22 to 65 years old</li> <li>-University education</li> <li>-All gender</li> </ul>	<ul style="list-style-type: none"> <li>-European people from urban areas from 28 countries</li> <li>-Working in urban and rural areas</li> <li>-No conflicts area</li> </ul>	<ul style="list-style-type: none"> <li>-23 National languages</li> <li>-Different cultures</li> <li>-Middle-high social and economic status</li> </ul>	<ul style="list-style-type: none"> <li>-Lack of awareness about AMR</li> <li>-Not aware of the importance and the benefits of antimicrobial stewardship programmes' implementation.</li> <li>- Not aware of the importance and benefits prevention and infection control programmes.</li> <li>-Prescribing inaccuracies (unnecessary, incorrect, overprescribing, under prescribing) and difficulties are common because often microbiology data is not available and prescribers do not know which bacteria is causing the infection.</li> <li>- Lack of rapid laboratory tests</li> <li>-Feeling pressure from farmers and animals' owners</li> </ul>	<ul style="list-style-type: none"> <li>-Committed to animal health care</li> <li>-All personalities</li> <li>-Mixed lifestyles</li> </ul>	<ul style="list-style-type: none"> <li>-Motivated to learn about and implement antimicrobial stewardship programmes</li> <li>-Promoting among farmers prevention and infection control protocols</li> <li>-Willing to share new knowledge</li> <li>-Willing to teach animals' owners about antibiotics prudent use</li> <li>-Staying up-to-date in latest news and discoveries</li> <li>- Prescribing antibiotics correctly (right class, frequency, dose and duration) and only when necessary</li> </ul>
<b>Food industry (decision makers)</b>	<ul style="list-style-type: none"> <li>-From 30 to 65 years old</li> <li>-University education</li> <li>-All gender</li> </ul>	<ul style="list-style-type: none"> <li>-European people from urban areas from 28 countries</li> <li>-Working in urban and rural areas</li> <li>-No conflicts area</li> </ul>	<ul style="list-style-type: none"> <li>-23 National languages</li> <li>-Different cultures</li> <li>-Middle-high social and economic status</li> </ul>	<ul style="list-style-type: none"> <li>-Economic benefits ahead of human and animal health and the environment</li> <li>-Overuse of antibiotics to increase food production</li> <li>-Antibiotics used as prophylaxis</li> <li>-Last line antibiotics used before needed</li> <li>-Lack of knowledge about AMR problem</li> </ul>	<ul style="list-style-type: none"> <li>-Committed to benefit industry interests</li> <li>-All personalities</li> <li>-Mixed lifestyles</li> </ul>	<ul style="list-style-type: none"> <li>-Willing to balance benefits/environment, human and animal care</li> <li>-Eager to know about AMR problem and implement solutions from it sector</li> </ul>

	Demographic Characteristics	Geographic Characteristics	Socio-Cultural Characteristics	Behavioural Characteristics	Psychographic Characteristics	Ideational Characteristics*
<b>Pharmaceutical sector</b>	<ul style="list-style-type: none"> <li>-From 30 to 65 years old</li> <li>-University education</li> <li>-All gender</li> </ul>	<ul style="list-style-type: none"> <li>-European people from urban areas from 28 countries</li> <li>-Working in urban and rural areas</li> <li>-No conflicts area</li> </ul>	<ul style="list-style-type: none"> <li>-23 National languages</li> <li>-Different cultures</li> <li>-Middle-high social and economic status</li> </ul>	<ul style="list-style-type: none"> <li>-Economics benefits ahead of human and animal health and the environment</li> <li>-Lack of knowledge about AMR problem</li> <li>-No investment in research &amp; innovation related to antibiotics</li> <li>-Sell antibiotics without prescription</li> <li>-Blisters do not meet antibiotic prescription guidelines</li> <li>-Poison the environment with raw materials leftovers</li> </ul>	<ul style="list-style-type: none"> <li>-Committed to benefit industry interests</li> <li>-All personalities</li> <li>-Mixed lifestyles</li> </ul>	<ul style="list-style-type: none"> <li>-Willing to invest in research &amp; innovation related to AMR</li> <li>-Stop selling antibiotics without prescription</li> <li>-Adapt blisters to antibiotic prescription guidelines</li> <li>-Eager to learn and share knowledge about AMR</li> <li>-Willing to follow a 'clean environmental' protocol for waste</li> </ul>
<b>Educators</b>	<ul style="list-style-type: none"> <li>-From 23 to 60 years old</li> <li>-University education</li> <li>-All gender</li> </ul>	<ul style="list-style-type: none"> <li>-European people from urban areas from 28 countries</li> <li>-Working in urban and rural areas</li> <li>-No conflicts</li> </ul>	<ul style="list-style-type: none"> <li>-23 National languages</li> <li>-Different cultures</li> <li>-Middle social and economic status</li> </ul>	<ul style="list-style-type: none"> <li>-Not aware of the importance of including AMR in educational curricula</li> <li>-Lack of prevention and infection control protocols in schools</li> <li>-Lack of knowledge about AMR</li> </ul>	<ul style="list-style-type: none"> <li>-Committed to a better education to society</li> <li>-All personalities</li> <li>-Mixed lifestyles</li> </ul>	<ul style="list-style-type: none"> <li>-To create and implement prevention and infection control protocols in schools</li> <li>-To learn about AMR and teach students through working groups</li> <li>-To create workshops where parents are involved</li> <li>-To contribute to the inclusion of AMR in educational curricula</li> </ul>
<b>Journalists</b>	<ul style="list-style-type: none"> <li>-From 20 to 65 years old</li> <li>-University education</li> <li>-All gender</li> </ul>	<ul style="list-style-type: none"> <li>-European people from urban areas from 28 countries</li> <li>-Working in urban areas</li> <li>-No conflicts</li> </ul>	<ul style="list-style-type: none"> <li>-23 National languages</li> <li>-Different cultures</li> <li>-Middle social and economic status</li> </ul>	<ul style="list-style-type: none"> <li>-Most of them are not specialized in health communication</li> <li>-Agenda full of hot topics</li> <li>-Lack of time to invest in deep reports or interviews related to AMR</li> <li>-Influenced by political and economic decisions</li> </ul>	<ul style="list-style-type: none"> <li>-Committed to inform and disseminate truthful information</li> <li>-All personalities</li> <li>-Mixed lifestyles</li> </ul>	<ul style="list-style-type: none"> <li>-Willing to publish relevant information about AMR (interviews, reports, audiovisuals, etc.)</li> <li>-Willing to assist to communication workshops related to AMR problem</li> </ul>

	Demographic Characteristics	Geographic Characteristics	Socio-Cultural Characteristics	Behavioural Characteristics	Psychographic Characteristics	Ideational Characteristics*
<b>General public</b>	All gender, all ages, all education	<ul style="list-style-type: none"> <li>-European people from urban areas from 28 countries</li> <li>-Working in urban and rural areas</li> <li>-No conflicts</li> <li>-Easy access to public education</li> <li>-Easy access to information</li> </ul>	<ul style="list-style-type: none"> <li>-23 National languages</li> <li>-Different cultures</li> <li>-Low/Middle/High social and economic status</li> </ul>	<ul style="list-style-type: none"> <li>-Lack of awareness about how antibiotics work</li> <li>-Lack of information about AMR</li> <li>-Lack of actions related to infection prevention</li> <li>-Bad praxis in antibiotics preservation</li> <li>-Other important issues in their life (employment, mortgage, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>-Committed to tackle their own problems</li> <li>-All personalities</li> <li>-Mixed lifestyles</li> </ul>	<ul style="list-style-type: none"> <li>-Willing to learn about AMR through the news, audiovisual projects, Social Media channels, etc.</li> <li>-Share the knowledge with family and friends (spread the word)</li> <li>-Willing to become <i>prosumers</i>, people who contribute to create actions against AMR, getting involve into the problem</li> </ul>

\*(May include knowledge, beliefs, attitudes, perceived risk, self-efficacy, social support and influence, environmental supports and constraints, emotions, norms, perceived risk, self-image)

## 4.2 Primary Audiences

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The primary audiences are these groups of people we want to reach with our messages. They might be the people who are directly affected by the challenge or who are most at risk; or they might be those who are best able to address the challenge or who can make decisions on behalf of those affected<sup>42</sup>.

As it has been mentioned in the previous section, EU-JAMRAI communication strategy is based on a ‘glocal’ approach, which means **partners** are our main audience. All the actions proposed in this document will be developed with the aim to be implemented locally by each partner in their own countries. Each of these actions has its own audience. As a result of the social media listening report, the meetings and teleconferences with the stakeholders, the analysis of the successful campaigns already implemented worldwide and the audiences they have targeted, the primary audiences for the activities proposed by this SBCC strategy will be:

- General Public
- Educators
- Students
- Journalists

### Why?

1. The European Centre for Disease Prevention and Control (ECDC) is designing the next European Awareness Antibiotic Day (EAAD) campaigns to reach healthcare professionals. ECDC is developing new key messages and coordinating several actions and activities at European level specifically targeted at this group. Since resources are limited and, more importantly, the communication team does not want to overlap other initiatives or duplicate efforts we prefer to focus in other audiences.
2. The social media listening report proves that the people involved in the AMR conversation are already engaged with the topic. General public need to be reached and the EU-JAMRAI communication team offers activities to get to them.
3. According to the Eurobarometer data<sup>43</sup>, only the 24% of responders gave correct answers to four questions they were asked related to the use of antibiotics. This data shows that the message needs to be reinforced within the general public.
4. Embedding knowledge within young people’s academic education could also be a successful approach.<sup>44/45</sup> EU-JAMRAI communication team has created

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<sup>42</sup> Designing a Social and Behavior Change Communication Strategy. USA: Johns Hopkins University; 2018.

<sup>43</sup> Special Eurobarometer 445\_Report\_Antimicrobial Resistance\_Fieldwork April 2016 Publication June 2016 (Survey requested by the European Commission, Directorate-General for Health and Food Safety and co-ordinated by the Directorate-General for Communication)

<sup>44</sup> Lecky DM, Hawking MKD, Verlander NQ et al. Using Interactive Family Science Shows to Improve Public Knowledge on Antibiotic Resistance: Does It Work? PLoS One 2014;9:e104556. doi: 10.1371/journal.pone.0104556

<sup>45</sup> World Bank. 2016. “Drug-Resistant Infections: A Threat to Our Economic Future (Discussion Draft).” Washington, DC: World Bank. 19



activities to bring the AMR message to the educators and the students in order to create awareness in the education field and try to help in building a more consciousness generation.

5. The available resources have been taken into account to put a greater focus on the audiences that could be effectively reached. The selection has also been made taking into account the available economic and human resources, and the support that the partners and stakeholders are able to give us.

### 4.3 Secondary Audiences

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Secondary target audiences include groups more difficult to reach with the project resources. However EU-JAMRAI will still develop some actions focused on them:

- Healthcare professionals
- Healthcare students (human and animal sectors)
- Politicians
- Veterinary and farmers

### 4.4 Influencer Audience Ideal Profiles

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Influencing groups are people who influence the primary audience, either directly or indirectly. Influencing audiences can include family members and people in the community such as service providers, community leaders, and teachers but can also include people who shape social norms, influence policies, or influence how people think about the challenge<sup>46</sup>.

#### 4.4.1 Patients and families

Misuse and overuse of antibiotics have contributed to the antimicrobial resistance development in all countries no matter their economic development. Effects might be different (lower income countries suffer critical diseases that rarely exist in middle or higher income such as malaria) but the future looks bleak for everybody: without effective antibiotics any infection will be a very scary problem for every patient, and routine surgical operations are threatened.

It is vital that patients and families learn what antibiotics work for and how and when to take them. For that reason, key messages for this potential group are: *follow your doctor's prescription; antibiotics don't work on flu; don't interrupt the prescription; don't overdose; don't share your pills, etc.*

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<sup>46</sup> Designing a Social and Behavior Change Communication Strategy. USA: Johns Hopkins University; 2018.

## Daphne Deckers



*She is a Dutch author, television host and actor who campaigns to raise awareness about antibiotic resistance following her personal experience with an E.coli superbug infection. She started to feel ill and the doctors prescribed her antibiotic for a blood infection treatment. After finishing the treatment, the pain and tiredness were still there. She was prescribed with another round of antibiotic but again the symptoms were still there. It was a recurrent infection and it was then when the doctor told her that her bacteria were resistant. E.coli can be treated with eight different antibiotics but in her case seven of them didn't work. Happily, the number eight did work.*

## Jonathan\*

*Jonathan was a patient of Dr. Kullar who now tells his story to encourage general public to take action against AMR. Jonathan was 27 years old and just married. Just back from his honeymoon in the Cayman Island he broke his left femur. During his stay at the hospital he enthusiastically shared all the experiences lived during the trip with his doctor. His operation went well but few days later he woke up into severe pain in his left hip; the diagnosis was a blood extreme infection. Although doctors started to treat Jonathan with antibiotics, they also ordered a microbiology lab report to make sure which antibiotic would respond better and adjust the treatment in necessary. The doctor thought he was young enough to go through it and make it. However, Jonathan was feeling that his entire body was deteriorating. Jonathan's infection spread to his brain and the lab report came back with the worst news: 'R' from resistance was next to every antibiotic, meaning that bacteria would not respond to any of the antibiotics. Jonathan never made it to his one year anniversary.*

*\*Although Jonathan does not belong to the influencing audiences group it helps to understand the reality of AMR threat and the motivation to change*

### 4.4.2 Healthcare workers

Right prescription of antibiotics and correct treatment monitoring are vital to preserve the efficiency of these medicines. At the same time, hygiene and infection control in healthcare settings are crucial to prevent the spreading of avoidable infections and reduce antibiotic consumption. Healthcare workers have direct contact with patients so they will have to teach them the right way to use of antibiotics, which requires them to be up-to-date in the latest information about antibiotic treatments.

### *Dr. Ravina Kullar*



*One defining moment fundamentally changed the course of Dr. Kullar's personal and professional life. It was the pivotal moment that led her into specializing in infectious diseases and taking action in the fight against antibiotic resistance. He was Jonathan's doctor when she was at her first year of residency. She is an infectious diseases global expert and researcher, has published over 30 research papers and has been invited to participate in the worldwide effort to help tackle this global threat. Dr. Kullar wants to empower everyone in the world to be a part of the solution, by arming them with the information they need to take action. Having run over 10 marathons, she equates long-distance running to the fight against antibiotic resistance. "Just like a marathon," she says, "the fight against antibiotic resistance isn't just a race; it's a journey that requires us to get past our comfort zones, because that's when and where the magic starts to happen".*

#### **4.4.3 Farmers**

This group is threatened by the exposure to animals carrying resistant bacteria. Hygiene and infection control guidelines are crucial to minimize the risks farmers are exposed to. On the other hand, overuse of antibiotics in animals is contributing to grow drug resistance in human, so changing behaviours in farmers will help regulate animal treatments reducing antibiotic consumption.

### *Eric Van Den Heuvel*



*He is a Dutch pig farmer. His daughter, Evelin, was born with a heart defect and in 2003 she needed an urgent surgery. The doctor said she was MRSA positive, so she couldn't be operated. When Eric discovered that the MRSA had come from his pigs, he made a total change in his farm hygiene system, which considerably reduced the use of antibiotics in his animals. Other farmers joint his initiative having a very positive impact at a national level. This reduction of antibiotic consumption turned into a reduction of antimicrobial resistance in the country showing politicians that these interventions have a real effect on public health.*

*Vets and farmers worked out the best way to keep the pigs healthy without antibiotics. With the new techniques the pigs got healthier, the mortality drop down, the production was better and it was easier. These techniques are now implemented by the Dutch government. Antibiotics use in animals has gone down by 65%.*

#### **4.4.4 Veterinarians**

Promoting prudent use of antimicrobials in animals is also on veterinarians' hands. They are directly connected to farmers and they will provide them scientific recommendations on the use of specific antimicrobials in animals. Veterinarians are also linked to companion animals' owners and giving the right prescription, as well as infection prevention guidelines, is crucial for the AMR control.

*John Fishwick*



*John Fishwick is the President of the British Veterinary Association. Vets work in many areas: clinical practitioners, specialists, researchers and teachers. He represents 17.000 vets in UK, the half of the total of the country, and he is very concerned about the AMR global threat. "As a planet we are facing AMR. If we fail, we are going to a dark era". He supports the One Health approach, reinforces David Cameron commitment in AMR and spreads the word about Jim O'Neill's review and recommendations. He thinks doctors and vets have to be on the same truck and don't blame each other.*

#### 4.4.5 Food industry

One of the ways resistant bacteria can be transited is food. Keep protecting the European law related to animals' antibiotic treatments is decisive to maintain this control point in AMR. International relations have to be taken very seriously since outside Europe laws in this matter are more lax and meat containing antibiotic residues can be sold at the market for human consumption.

##### *Foster Farms*



*Foster Farms is the family-owned company largest producer of USA certified organic and antibiotic-free chicken in the Western United States. As part of Foster Farms' commitment to responsible production and continuous advancement, the company has tripled its production of chicken raised without any antibiotics since 2014. Foster Farms has already eliminated antibiotics that are critical to human medicine in all of its chicken production companywide and is working to eliminate the use of all human antibiotics. Its practices will be independently audited to ensure compliance with the stated objectives of its antibiotic stewardship policy.*

##### *In-N-Out*



*The burger chain is joining a small group of fast food restaurants committing to using antibiotic-free meat. "Our company is committed to beef that is not raised with antibiotics important to human medicine and we've asked our suppliers to accelerate their progress toward establishing antibiotic alternatives," Keith Brazeau, In-N-Out Burger's vice president of quality.*



## WHAT MAKES OUR BEEF THE TOP 1%?

Our beef is **Never** exposed to steroids, antibiotics, growth hormones, chemicals, or additives - **Ever**.

BurgerFi utilizes certified American black Angus beef.

Cattle that are a part of the "**Never-Ever**" program are free-range, humanely-treated, and raised on vegetarian diets.

Only about 1% of the beef produced in the United States meets the strict BurgerFi standard.

*The Florida-based chain with 67 national locations that serves completely antibiotics-free meat.*

### 4.4.6 Politicians

Policies to assure the quality and effectiveness of medicines and regulate the right distribution and use of antibiotics in human and animal health are necessary. Politicians should create incentives for the pharmaceutical sector to promote research and investment on AMR and promote global coordination against AMR. It is in their hands too including AMR in educational curricula.

*David Cameron*



*"If we fail to act, we are looking at an almost unthinkable scenario where antibiotics no longer work and we are cast back into the dark ages of medicine where treatable infections and injuries will kill once again [...]. We need to fix globally the overuse of antibiotics that have increased the resistance" Prime Minister David Cameron (2014). Economist Jim O'Neill will lead a panel including experts from science, finance, industry, and global health that would analyse three key issues: the increase in drug-resistant strains of bacteria, the "market failure" which has seen no new classes of antibiotics for more than 25 years, and the over-use of antibiotics globally.*



#### 4.4.7 Pharmaceutical sector

Pharmaceutical sector commitment to invest in research and development and to improve access to high quality antibiotics and vaccines is crucial to contribute to the long-term effort against antimicrobial resistance. Sustained investment is needed and cooperation among pharmaceutical industry, governments, global institutions, and other potential group is required to inspire this industry to develop and implement new solutions.

#### AMR Industry Alliance



*The AMR Industry Alliance is one of the largest private sector coalitions set up to provide sustainable solutions to curb antimicrobial resistance, with over 100 biotech, diagnostics, generics and research-based pharmaceutical companies and associations joining forces.*

#### 4.4.8 Educators

Raising awareness in antimicrobial resistance and promoting behavioural change is key to manage the AMR global threat. New generations will be responsible for improving the use of antibiotics, as well as practicing good actions guided to the prevention. Knowledge is the base for changing the world and it just starts on school and high school. Inclusion of the antimicrobial resistance topic in the school curricula will promote better understanding and awareness from an early age with more possibility of success in behaviour change.

Creating and offering training to the human, veterinary and agriculture sectors will contribute to maintain professionals up-to-date in antimicrobial resistance issues.

#### Carlos Elías



#### 4.2. Defensas artificiales

Son los medicamentos y las técnicas médico-quirúrgicas utilizados para evitar la enfermedad, disminuir sus efectos negativos o eliminarla.

En este grupo destacan los medicamentos, la cirugía y los trasplantes.

##### A. Medicamentos

Son sustancias utilizadas por la medicina para prevenir la enfermedad, combatirla y aliviar sus efectos. También se usan como instrumento de diagnóstico. De la gran variedad de medicamentos existentes, los antibióticos y las vacunas son los que han supuesto un mayor avance en la lucha contra la enfermedad.

##### • Los antibióticos

Son sustancias que destruyen bacterias o impiden su crecimiento. Actúan sobre el metabolismo de células procariontas (las bacterias) y no afectan a nuestras células (por ser eucariotas). Tampoco tienen efecto sobre los virus, ya que carecen de metabolismo. El éxito radica en su acción selectiva.

Originalmente son sintetizados por organismos vivos (hongos y bacterias), como mecanismo de defensa frente a sus competidores. En la actualidad, pueden sintetizarse en el laboratorio, donde se persigue hacerlos cada vez más efectivos frente a bacterias resistentes. En este sentido, hay una lucha constante entre la ciencia, con nuevos antibióticos, y las bacterias, con nuevas resistencias.

##### RECUERDA

Hay una gran variedad de fármacos que tienen diferentes utilidades: citotóxicos (para el cáncer); analgésicos, antipiréticos, antiinflamatorios y relajantes musculares (para diversos síntomas molestos, como el dolor, la fiebre, la inflamación, las contracturas); anticonceptivos, cardiotónicos; anestésicos, entre otros.



##### APRENDEMOS A SER CIENTÍFICOS

Elección del antibiótico

2

El antibiograma sirve para medir in vitro la sensibilidad de las bacterias a los distintos antibióticos. Se debe seleccionar la bacteria responsable de la infección.

##### ¿SABÍAS QUE...?

El primer antibiótico fue la penicilina, descubierta por Alexander Fleming.

*Carlos Elías is a Professor of Journalism at the Carlos III University of Madrid since 2010. He has been coordinator and co-author of the book of secondary education in "Sciences*



for the contemporary world” (McGraw-Hill, 2008, 2010, 2012, 2014). A new edition was published in 2017 where emphasis on antibiotics has been placed. He also has participated in an edition of a new book for younger students. Both books have a potential audience of more than 700,000 students between 14 and 17 years old.

#### 4.4.9 Journalists

Mass media should be allied to all organizations that are fighting against antimicrobial resistance. Millions of people read or watch the news to keep informed and accurate information is crucial to get people involved in campaigns and sharing the messages we need to.

*Maryn McKenna*



*Maryn McKenna is an independent journalist and author who specializes in public health, global health and food policy. She is a Senior Fellow at the Schuster Institute for Investigative Journalism at Brandeis University and the author of the 2017 bestseller ‘Big Chicken: The Incredible Story of How Antibiotics Created Modern Agriculture and Changed the Way the World Eats’ (National Geographic Books, Sept. 2017), named a Best Book of 2017 by Amazon, Science News, Smithsonian Magazine, Civil Eats, the Atlanta Journal-Constitution and the Toronto Globe and Mail, as well as an Essential Science Read by Wired. Her 2015 TED Talk, [“What do we do when antibiotics don’t work anymore?”](#), has been viewed by more than 1.5 million times and translated into 33 languages.*

#### 4.4.10 General public

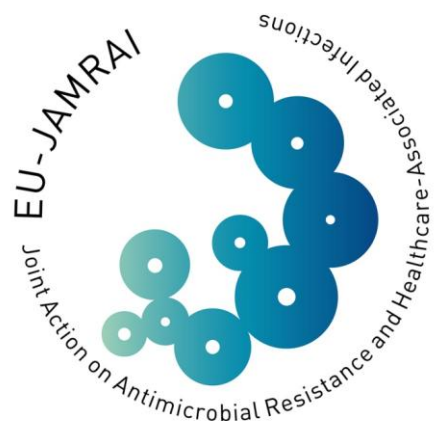
Everybody has a role to play in the battle against antimicrobial resistance. General public is a huge mass of people whose behaviour change related to antibiotic consumption might impact in the future of antimicrobial resistance. More information will mean more care about this topic and a possible change in the next generation.

*We all are general public*



#### 4.4.11 EU-JAMRAI partners

Coherence among European institutions working in AMR in order to get to a public target with specific messages needs to be improved. It is important to work on the same direction and to spread the same ideas repetitively. The repetition of the same message is a technique used since the 1930s by publicists and politicians, and it is scientifically proven that the formulation of the message through the so-called Neurolinguistic Programming manages to change the perception of the interlocutor on specific aspects. EU-JAMRAI partners are committed to fight this battle all together.



## 5 Communication Objectives

### 5.1 About SMART objectives

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To keep SBCC efforts focused and on track, this strategy identifies SMART communication objectives linked to indicators in order to track progress and demonstrate impact. SMART objectives are:

- **Specific:** Does the objective say who or what is the focus of the effort? Does it say what type of change is intended? Does it cover only one challenge?
- **Measurable:** Can your objective be measured in some way? Does the objective include a verifiable amount or proportion of change expected?
- **Appropriate:** Is the objective sensitive to audience needs and preferences? Is the objective sensitive to societal norms and expectations?
- **Realistic:** Can you realistically achieve the objective with the time and resources available? Is the degree of expected change reasonable given these conditions?
- **Time-bound:** Does the objective state the time period for achieving change? Use this style for Bulleted Lists (please find it in the Styles menu).

### 5.2 Main objective of this SBCC Strategy and the ‘Glocal’ approach

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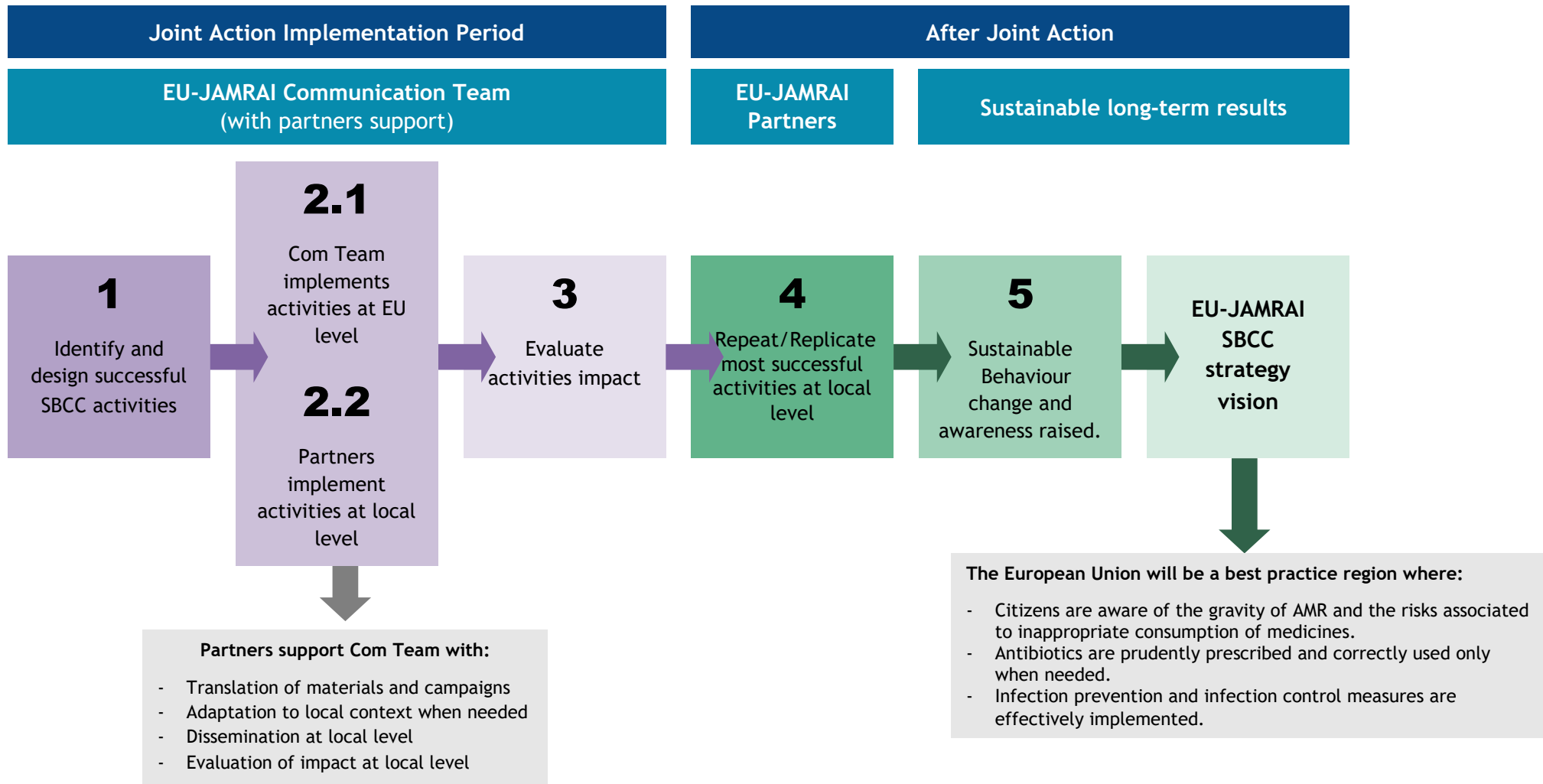
The main objective of this Social Behaviour Change Communication Strategy is to offer EU-JAMRAI partners key actions to approach the selected priority audiences ensuring the sustainability of the results even after the end of the Joint Action.

In order to achieve this objective we need to empower EU-JAMRAI partners and count on their support for the local implementation of the different activities.

As previously explained in section 4.1, EU-JAMRAI SBCC strategy is based on a ‘glocal’ approach, which means presenting global knowledge within a local context. The term ‘glocal’ is a combination of the words global and local, and it encapsulates the concept ‘Think globally, act locally’. The main objective is to take a global issue, make it meaningful to society at a local level and adapt messages and strategies to local contexts and needs.

In the particular case of EU-JAMRAI, the communication team will plan and design activities (each of them with specific communication objectives and targeted at different audiences), implement them at EU level in English and offer them to the different partners for local adaptation and implementation. Please see *Figure 12* for a visual representation of this approach and section 5.1.2 for the table of specific communication objectives.

Figure 12: 'Glocal' approach and sustainability of SBCC strategy after Joint Action



### 5.2.1 Specific communication objectives table

The following table shows the specific communication objectives for each audience segment and analyses the desired changes and the barriers to change.

After taking into account the priority segmentation exercise result (section 4.2) and considering the available human and economic resources of the project, it has been decided that Pharmaceutical and Food Industries audiences will not be directly addressed by this SBCC strategy.

Audience Segment	Desired Change	How to measure the change?	Barriers to Change	Final Communication Objective	Does objective address barriers?
<b>Patients and families</b>	<ul style="list-style-type: none"> <li>- They know what is AMR</li> <li>- They know that ATBs should only be used for bacterial infections and if prescribed by a doctor</li> <li>- They follow doctors' instructions</li> <li>- They know how to prevent and control the spread of avoidable infections</li> <li>- They are aware of the importance of their role to reduce AMR</li> </ul>	Through all the indicator contained in the point 8.3 of the Evaluation Plan (WP3), that will evaluate the interactions in social media, and the contest. Also through the different social media listening developed during the project.	<ul style="list-style-type: none"> <li>1- Not enough and not consistent information</li> <li>2- Wrong beliefs about ATB usage</li> <li>3- Wrong storage of antibiotics leftovers</li> <li>4- Access to antibiotics without prescription</li> </ul>	-To enhance correct antibiotics use to change individual behaviours	<ul style="list-style-type: none"> <li>1</li> <li>2</li> <li>3</li> </ul>
<b>Healthcare workers</b>	<ul style="list-style-type: none"> <li>- They know that AMR threat is serious</li> <li>- They prescribe ATBs correctly and only when necessary</li> <li>- They know the importance to preserve critically important ATBs</li> <li>- They monitor ATB treatment correctly</li> <li>- They implement prevention and infection control measures</li> </ul>	Through the analysis of their interactions in Social media where the infographics designed for this audience will be published	<ul style="list-style-type: none"> <li>1- Not enough and not consistent information</li> <li>2- Not enough tools to communicate effectively with patients</li> <li>3- Not enough training programmes</li> <li>4- Lack of human, economic, technological and</li> </ul>	-To enhance correct antibiotics use to change individual behaviours	<ul style="list-style-type: none"> <li>1</li> <li>2</li> </ul>

Audience Segment	Desired Change	How to measure the change?	Barriers to Change	Final Communication Objective	Does objective address barriers?
	<ul style="list-style-type: none"> <li>- They are aware of the importance of their role to reduce AMR</li> </ul>		infrastructural resources 5- Stewardship programmes not in place or not effective 6- Prevention and infection control programmes not in place or not effective		
<b>Educators</b>	<ul style="list-style-type: none"> <li>- They know what is AMR and the importance of including it in educational curricula</li> <li>- They know the importance of preventing and controlling the spread of avoidable infections in educational settings</li> <li>- They are aware of the importance of their role to reduce AMR</li> </ul>	Through the indicator 8.3.3 of the Evaluation Plan (WP3) that will be a report about the Competition with Students.	1- Educational curricula are politicized 2- Lack of time to teach specific topics that are out of the educational curricula	- To advocate for the inclusion of the antimicrobial resistance subject in science educational curricula to change social behaviours	1 2
<b>General Public</b>	<ul style="list-style-type: none"> <li>- They know what is AMR</li> <li>- They know that ATB should only be used for bacterial infections and if prescribed by a doctor</li> <li>- They know how to prevent and control the spread of avoidable infections</li> <li>- They are aware of the importance of their role to reduce AMR</li> </ul>	Through all the indicators contained in the point 8.3 of the Evaluation Plan (WP3), that will evaluate the interactions in social media, and the contest. Also through the different social media listening developed during the project.	1- Not enough and not consistent information 2- Wrong beliefs about ATB usage 3- Wrong storage of antibiotics leftovers 4- Access to antibiotics without prescription	-To enhance correct antibiotics use to change individual behaviours	1 2 3

Audience Segment	Desired Change	How to measure the change?	Barriers to Change	Final Communication Objective	Does objective address barriers?
<b>Farmers</b>	<ul style="list-style-type: none"> <li>- They know what is AMR</li> <li>- They know that ATBs should only be used for bacterial infections and if prescribed by a veterinarian</li> <li>- They follow veterinarians' instructions</li> <li>- They know how to prevent and control the spread of infections (biosecurity)</li> <li>- They are aware of the importance of their role to reduce AMR</li> </ul>	Through the evaluation of the Postcards and Infographics that will be developed for this audience (number of interactions in social media). More information in point 8.2 of the Plan.	<ul style="list-style-type: none"> <li>1- Not enough and not consistent information</li> <li>2- Wrong beliefs about ATB usage</li> <li>3- Wrong storage of antibiotics leftovers</li> <li>4- Access to antibiotics without prescription</li> <li>5- Lack of human, economic, technological and infrastructural resources</li> </ul>	- To enhance correct antibiotics use in agriculture to change individual behaviours	<ul style="list-style-type: none"> <li>1</li> <li>2</li> <li>3</li> </ul>
<b>Veterinarians</b>	<ul style="list-style-type: none"> <li>- They know that AMR threat is serious</li> <li>- They prescribe ATBs correctly and only when necessary</li> <li>- They know the importance to preserve critically important ATBs</li> <li>- They monitor ATB treatment correctly</li> <li>- They encourage the implementation of prevention and infection control measures (biosecurity)</li> <li>- They are aware of the importance of their role to reduce AMR</li> </ul>	Through the evaluation of the Postcards and Infographics that will be developed for this audience (number of interactions in social media). More information in point 8.2 of the Plan.	<ul style="list-style-type: none"> <li>1- Not enough and not consistent information</li> <li>2- Not enough tools to communicate effectively with farmers</li> <li>3- Not enough training programmes</li> <li>4- Lack of human, economic, technological and infrastructural resources</li> <li>5- Stewardship programmes not in place or not effective</li> <li>6- Prevention and infection control programmes (biosecurity measures)not in place or not effective</li> </ul>	-To enhance correct antibiotics use to change individual behaviours	<ul style="list-style-type: none"> <li>1</li> <li>2</li> </ul>



Audience Segment	Desired Change	How to measure the change?	Barriers to Change	Final Communication Objective	Does objective address barriers?
<b>Politicians</b>	<ul style="list-style-type: none"> <li>- They know what AMR is and that it is a serious global threat</li> <li>- They include AMR in the heart of their agendas</li> <li>- They invest economic resources in research and innovation related to AMR projects</li> <li>- They regulate the pharma industry to ensure that ATB production meets prescription guidelines</li> <li>- They encourage international collaboration related to AMR threat</li> <li>- They include AMR in education curricula</li> </ul>	<p>Through the indicators contained in point 8.4.2 of the evaluation plan (WP3) that will measure the attendance and involvement of the stakeholders and representatives at political level. (8.4.2-1-2-3-4)</p>	<ul style="list-style-type: none"> <li>1- An agenda full of hot topics</li> <li>2- Lack of interest in science matter</li> <li>3- Economic benefits ahead of healthcare and social actions</li> </ul>	<ul style="list-style-type: none"> <li>- To advocate for better policies design and better policies implementation</li> <li>- To advocate for more economic and human resources investment in the important fight against AMR</li> </ul>	<ul style="list-style-type: none"> <li>1</li> <li>2</li> <li>3</li> </ul>
<b>Journalists</b>	<ul style="list-style-type: none"> <li>- They know what AMR is</li> <li>- They know that ATB should only be used for bacterial infections and if prescribed by a doctor</li> <li>- They publish relevant information about correct ATB use and AMR (interviews, reports, audio-visuals etc.)</li> <li>- They assist to communication workshops related to AMR problem</li> </ul>	<p>Through the indicator related to Database of Health communicators and the webinar, measuring their satisfaction ( 8.2.3)</p>	<ul style="list-style-type: none"> <li>1-Most of them are not specialized in health communication</li> <li>2-Agenda full of hot topics</li> <li>3-Lack of time to invest in deep reports or interviews related to AMR</li> <li>4-Influenced by political and economic decisions</li> </ul>	<ul style="list-style-type: none"> <li>- To change social behaviours and mobilize society thanks to the wide publication of quality information of correct ATB use and AMR</li> </ul>	<ul style="list-style-type: none"> <li>1</li> <li>2</li> </ul>

## 6 Strategic framework

### 6.1 Strategic approaches descriptions

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The strategic approaches describe how the objectives will be achieved. They guide the development and implementation of activities and determine the vehicles, tools and media mix that will be used. Within each approach, there are multiple vehicles and various tools. Normally, SBCC strategies use a mix of approaches to communicate to the different audiences.

The following strategic approaches descriptions have been extracted from the toolkit “Designing a Social and Behaviour Change Communication Strategy”.<sup>47</sup>

**Advocacy** operates at the political, social and individual levels and works to mobilize resources and political and social commitment for social change and/or policy change. Resources can include political will and leadership as well as money to fund the implementation of policies or programs. Advocacy aims to create an enabling environment at any level, including the community level (i.e. traditional government or local religious endorsement), to ask for greater resources, encourage allocating resources equitably and remove barriers to policy implementation.

**Community-based media** reach communities through locally-established outlets. Such outlets include local radio stations and community newsletters/newspapers as well as activities such as rallies, public meetings, folk dramas and sporting events.

**Community mobilization** is a capacity-building process through which community individuals, groups or organizations plan, carry out and evaluate activities on a participatory and sustained basis to improve their lives, either on their own initiative or stimulated by others. A successful community mobilization effort not only works to solve problems at the community-level but also aims to increase the capacity of a community to successfully identify and address its own needs.

**Counselling** is based on one-to-one communication and is often done with a trusted and influential communicator such as a counsellor, teacher or health provider. Counselling tools or job aids are usually also produced to help clients and counsellors improve their interactions, with service providers trained to use the tools and aids.

**Distance learning** provides a learning platform that does not require attendance at a specific location. Rather, the students access the course content either through a radio or via the internet and interact with their teacher and fellow classmates through letters, telephone calls, SMS texts, chat rooms or Internet sites. Distance learning courses can focus on training communication specialists, community mobilizers, health educators and service providers.

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<sup>47</sup> Designing a Social and Behavior Change Communication Strategy. USA: Johns Hopkins University; 2018.

**Information and Communication Technology (ICT)** is the fastest growing and evolving approach, with an increasing reach throughout the world. This approach includes digital media such as web sites, e-mails, listservs, Internet news feeds, chat rooms, virtual learning and eLearning, eToolkits and message boards. Digital media is unique in being able to disseminate highly tailored messages to the intended audience while also receiving feedback from them and encouraging real-time conversations, combining mass communication and interpersonal interaction. Interactive digital media providing such tailored health information can be effective in helping people manage diseases, access health services, and obtain social support or provide assistance in changing behaviours. Through such media, the audience can generate and share information and ideas. Social media is a sub-set of digital media, and examples include Facebook, Twitter, Linked In, blogs, eForums, and chat rooms.

**Interpersonal Communication (IPC)/Peer Communication** are based on one-to-one communication. This could be parent-child communication, peer-to-peer communication or communication with a community leader or religious leader.

**Mass media** can reach large audiences cost-effectively through the formats of radio, television and newspapers. According to a review, mass media campaigns that follow the principles of effective campaign design and are well-executed can have small to moderate effect size not only on health knowledge, beliefs, and attitudes, but on behaviours as well. Given the wide reach of mass media and the potential to reach thousands of people, a small to moderate effect size will have a greater impact on public health than would an approach that has a large effect size but only reaches a small number of people. Thus mass media can have a major public health impact given its wide reach.

**Social mobilization** brings relevant sectors such as organizations, policy makers, networks and communities together to raise awareness, empower individuals and groups for action, and work towards creating an enabling environment and effecting positive behaviour and/or social change.

**Support Media/Mid-Media's** reach is less than that of mass media and includes posters, brochures and billboards.

# 7 Positioning

## 7.1 Positioning statement

With this positioning effort we intend to present the determined strategic approaches in a way that is both persuasive and appealing to our intended audiences. Aiming at developing a memorable identity, the positioning statement below will guide the development of key messages and ensure that they all have a consistent voice and that all planned activities reinforce each other for a cumulative effect.

### Positioning statement

Europe fostering synergies to keep antibiotics working

## 7.2 Key promise

The key promise is the benefit that comes with the changed proposed by this SBCC strategy. Changes in behaviour, policies, and social norms are made only because there is a perceived benefit to those changes. We have to show our audiences that the benefit outweighs the personal cost of the change.

List of possible benefits that would persuade our audience to change:

- If you use antibiotics properly:
  - You will save humanity from a post-antibiotic era
  - You will keep antibiotics effectiveness against dangerous diseases
  - Routine and lifesaving surgeries will still be feasible in the future
  - Organ transplants, cancer treatments and neonatal care will still be possible in the future
  - You will leave a better world for our children

### Key promise

*If you use antibiotics properly they will continue saving lives*

### 7.3 Support statement. Why should the audience believe the key promise?

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#### Support statement

*If we continue misusing antibiotics the combined resistance to multiple antibiotics will keep increasing and might become the greatest world killer by 2050<sup>48</sup>*

### 7.4 Overall impression statement

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What will the audience retain after seeing or hearing the messages? What should they feel?

#### Overall impression statement

*My actions are vital to fight against antimicrobial resistance*

*I also have a role to play in the antimicrobial resistance battle*

*The way I use antibiotics has consequences for the entire world population*

### 7.5 Messages key points

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When all approaches communicate the same key message points, effectiveness increases. The list below outlines the core information that will be conveyed in all messages and activities.

- Use/prescribe antibiotics correctly to keep them working.
- Antibiotics only work on bacterial infections.
- Only use antibiotics if prescribed by your doctor or veterinarian.
- Everyone has a role to play on the antimicrobial resistance battle.

All the key messages that will be defined when designing each activity will be based on this core information.

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<sup>48</sup> O'Neill J. Tackling drug-resistant infections globally: Final report and recommendations. Review on Antimicrobial Resistance. London; 2016. Available from: [http://amrreview.org/sites/default/files/160518\\_Final%20paper\\_with%20cover.pdf](http://amrreview.org/sites/default/files/160518_Final%20paper_with%20cover.pdf)

## 8 Implementation plan

### 8.1 Activities outline

First and second columns include (between brackets) references to the Joint Action project document.

#	What	Who	When	Target Audience	How	Strategic Approach	Tools and Materials
1 (8.2.2)	<b>European Webinar for journalists</b>	Leader: AEMPS Supporting partners (tbd)	M17 (Jan 2019)	Journalists (General media and health-specialized journalists)	Online (Europe)	Information and Communication Technology (ICT) - Virtual learning	Communication Tool Kit
2 (8.2.2)	<b>Famelab</b> -1 <sup>st</sup> year: test in Spain and Italy -2 <sup>nd</sup> and 3 <sup>rd</sup> years: in other countries (Carry out 1 or 2 conferences - similar to TED Conferences)	Leader: AEMPS Scientists from EU-JAMRAI partners	M6 (Feb 2018) M18 (Feb 2019)	General Public	Face-to-face talk Online streaming (Europe)	Community-based media	Scientific monologues
3 (8.2.2)	<b>Pint of Science</b> -1 <sup>st</sup> year: test in Spain -2 <sup>nd</sup> and 3 <sup>rd</sup> years: in other countries (Carry out 1 or 2 conferences - similar to TED Conferences)	Leader: AEMPS Scientists from EU-JAMRAI partners	M9 (May 2018) M21 (May 2019)	General Public	Face-to-face talk	Community-based media	Informal presentations
4 (8.2.2)	<b>European research night</b> -2 <sup>nd</sup> year: test in Spain (Carry out 1 or 2 conferences - similar to TED Conferences)	Leader: AEMPS Scientists from EU-JAMRAI partners	M25 (Sept 2019)	General Public	Science fair	Community-based media	Informal presentations

#	What	Who	When	Target Audience	How	Strategic Approach	Tools and Materials
5 (8.3)	<b>Daily activity in social media</b>	Leader: AEMPS	Daily until end of Joint Action	All	Online worldwide	Information and Communication Technology (ICT) - Social Media	Original content: -Infographics -Videos -News/Events -Calls to action (surveys...) -Public project results -Celebration of relevant international days (hand washing day, women and girls in science...)  Forwarding relevant content from other organizations
6 (8.3)	<b>Social media promotions actions</b>	Leader: AEMPS	1 <sup>st</sup> , 2 <sup>nd</sup> and 3 <sup>rd</sup> year, when releasing special project activities	All	Online (Europe)	Information and Communication Technology (ICT) - Social Media	The specific activity to be promoted
7 (8.3)	<b>Award: symbol to best represent the fight against AMR</b> <i>(Award for the best European article or best video about antibiotic use)</i>	Leader: AEMPS Supporting partners: All Supporting stakeholders: ECDC, WHO	M19-M22 (March- June 2019)  (in project deliverable is for M27-Nov 2019)	General audience (designers and artists)	Online (Europe)	Information and Communication Technology (ICT) - Social Media Mass media Social mobilization	Contest instructions Contest award
8 (8.3)	<b>Video game for students</b> <i>(Award for a European competition with University students)</i>	Leader: AEMPS Supporting partners: All Supporting stakeholders: All	M26 (Oct 2019)  (in project deliverable is for M32-Abril 2020)	Educators General audience (Primary and high school students)	Online (Europe)	Information and Communication Technology (ICT)	Video game



#	What	Who	When	Target Audience	How	Strategic Approach	Tools and Materials
9 (8.3)	<b>Audiovisual materials.</b> <b>Video series I &amp; II:</b> - <i>Don't leave it half way</i> - <i>One Health Approach</i> <b>Sketch video series</b>	Leader: AEMPS Supporting partners: WP8 participants	1 <sup>st</sup> series M15 (Nov 2018) 2 <sup>nd</sup> series M27 (Nov 2019)	All	Online (worldwide)	Information and Communication Technology (ICT) - Social media - Videoblog	Script Video
10 (8.3)	<b>Postcards and Infographics (digital and printable)</b> <i>(Leaflets/posters will be distributed among hospitals and medical centres and in professional congress)</i>	Leader: AEMPS Supporting partners: WP8 participants	At least 1 infographic per month	Patients and families Healthcare workers Veterinarians Farmers* General audience	Online (Europe)	Information and Communication Technology (ICT) - Social media	Postcards Infographics
11 (8.3)	<b>Interview management with key national spokesperson</b>	Leader: AEMPS Supporting partners (tbd)	At least 1 interview per quarter	Politicians	Online (Europe)	Information and Communication Technology (ICT) - Social media - Videoblog	Interviews
12 (8.4)	<b>High Level Awareness and Communication Meeting</b>	AEMPS INSERM MoH	M34 (June 2020)	Politicians Healthcare professionals Veterinarians	Face-to-face meeting	Advocacy	Results report Recommendations

## 8.2 List of activities for this Strategy

1. European Webinar for journalists	
Description	EU-JAMRAI will organize a training webinar on AMR lead by physicians and veterinarians
Target audience	General media and health-specialized journalists
Communication objective	One of the purposes of this webinar is to provide clear and accurate scientific information about this problem so journalists are able to correctly inform the audience about AMR consequences.
Key message(s)	TBD when designing the activity
Implementation strategy	The webinar will involve health-specialized journalists from as many countries in Europe as possible and will provide a toolkit to these journalists to adequately disseminate the AMR topic.
Sustainability strategy	The main results of this activity will serve to recommend, through the National authorities, Continuing Professional Development activities (CPD) on AMR led by physicians and veterinarians.
Monitoring and evaluation	<p>WP3 indicator(s):</p> <ul style="list-style-type: none"> <li>• 8.2.3.1</li> <li>• 8.2.3.2</li> </ul> <p>Other:</p> <ul style="list-style-type: none"> <li>• Survey: Develop a survey before and after the webinar to know if they have increased their knowledge</li> <li>• Consult after 6 months if they have written any article related to AMR.</li> </ul>
2. Famelab	
Description	<p>FameLab is the world's leading science communication competition. Participants have just three minutes to win over the judges and crowd with a scientific talk that excels for its content, clarity and charisma. Currently, 30 countries worldwide participate in Famelab.</p> <p>Two EU-JAMRAI partners participated in the 2018 edition: Italy and Spain. Both experiences were a success, particularly the Spanish one because its candidate reached the national final.</p> <p>These tests at national level aim to encourage the rest of the EU-JAMRAI partners to participate in their national contest along the next editions.</p>
Target audience	General Public

Communication objective	To enhance correct antibiotics use to change individual behaviours
Key message(s)	TBD when designing the activity
Implementation strategy	The Communication team will talk to EU-JAMRAI partners in those countries where Famelab takes place to propose their participation in the 2019 and 2020 editions. The Communication team will give them support to be a candidate, prepare the monologues and give visibility in our social media channels.
Sustainability strategy	The experiences of the partners participating in the 2019 edition will be analyzed in order to be able to extrapolate them to the rest of the countries and encourage their participation in future editions of Famelab or other similar science events that would take place in their countries.
Monitoring and evaluation	<ul style="list-style-type: none"> <li>Number of countries that participate during the 2nd and 3rd years.</li> </ul>

### 3. Pint of Science

Description	<p>The Pint of Science festival aims to deliver interesting and relevant talks on the latest science research in an accessible format to the public mainly across bars and pubs. The format chosen to do so is 20 minutes face-to-face talks. Currently, Pint of Science is celebrated in 18 countries worldwide.</p> <p>EU-JAMRAI participated in the 2018 Spanish edition. This test at national level aims to encourage the rest of the EU-JAMRAI partners to participate in their national contest along the next editions.</p>
Target audience	General Public
Communication objective	To enhance correct antibiotics use to change individual behaviours
Key message(s)	TBD when designing the activity
Implementation strategy	The Communication team will talk with EU-JAMRAI partners in those countries where Pint of science takes place to propose their participation in the 2019 and 2020 editions, give them support to be a candidate, prepare the presentations and give them communicational support.
Sustainability strategy	The experiences of the partners participating in the 2019 edition will be analyzed in order to be able to extrapolate them to the rest of the countries and encourage their participation in future editions of Pint of Science or other similar science events that would take place in their countries.
Monitoring and evaluation	<ul style="list-style-type: none"> <li>Number of countries that participate during the 2nd and 3rd years.</li> </ul>

#### 4. European research night

Description	<p>The European Researcher's Night is a Europe-wide public event dedicated to popular science and fun learning. It takes place each year on the last Friday of September. Around 30 countries and over 300 cities are involved.</p> <p>EU-JAMRAI plans to participate in the 2019 Spanish edition with two activities:</p> <p>1. Hands-on experiment: Watch out! Wash your hands!</p> <p>Watch out! Wash your hands! is a hands-on experiment for promoting behaviour change in both kids and adults. The kids' hands will be spread with fluorescein and put under an ultraviolet light, letting them see all the dirt. After that, AEMPS' researcher will show how to wash hands correctly and the ultraviolet light will evidence if they did it right or not. A drawing for colouring with little information about Antimicrobial Resistance will be given to them.</p> <p>2. Public Talks: "Superbugs vs Humans: a battle that we have to fight"</p> <p>"Superbugs vs Human: a battle that we have to fight" is a 30-minute public talk about the threat of Antimicrobial Resistance. An AEMPS' specialist researcher will share, in a dynamic and clear way, scientific information to promote the responsible use of these medicines.</p>
Target audience	General Public
Communication objective	<p>To enhance proper hand washing in order to prevent infections and avoid the use of antibiotics</p> <p>To enhance correct antibiotics use to change individual behaviours</p>
Key message(s)	Prevention is better than cure. Prevention is the first step to fight antimicrobial resistance. Washing hands properly is a very easy action that contributes to prevent infections.
Implementation strategy	EU-JAMRAI plans to participate in one of the 2019 edition with two activities: Hands-on experiment: Watch out! Wash your hands!, Public Talks: "Superbugs vs Humans: a battle that we have to fight"
Sustainability strategy	Depending on the result, this test at national level could be replicated in the rest of the EU-JAMRAI partners' countries along the next editions after the project ends.
Monitoring and evaluation	<ul style="list-style-type: none"> <li>• Number of countries that participate during the 2nd and 3rd years.</li> </ul>

## 5. Daily activity in social media

Description	<p>Twitter, Facebook, Flickr and Instagram are used by millions of people every day. EU-JAMRAI already has profiles in three of the mentioned platform with daily updated content, and is planning to open the Instagram channel to get another way of communicating with younger target audiences.</p> <p>The communication team will continue developing original specific content about the project and also sharing information related to AMR from reliable sources.</p>
Target audience	All
Communication objective	To enhance correct antibiotics use to change individual behaviours in the human, animal and environmental sector.
Key message(s)	TBD when designing the activity
Implementation strategy	The social media profiles were created in the first months of the beginning of the project. Depending on each profile, it has daily, weekly or monthly activity. The social network strategy involves trying to reach as many people as possible with the messages of the project to inform and thus achieve a change in behaviour in different sectors of the population (patients, health providers, veterinarians, politicians, etc.)
Sustainability strategy	EU-JAMRAI communication team will prepare regular social media reports to provide a global overview to the partners about which network is most appropriate depending on the target audience they would like to reach, and the best way to adjust the messages to each of them.
Monitoring and evaluation	<p>WP3 indicator(s):</p> <p>8.3.1.1</p> <p>8.3.1.2</p> <p>8.3.1.3</p> <p>8.3.1.4</p> <p>Other:</p> <ul style="list-style-type: none"> <li>• Social Media Listening</li> <li>• Social Media statistics and analytics</li> </ul>

## 6. Social Media Promotions

Description	<p>Social media promotions will be carried out in strategic moments of the project to increase the number of followers and reach more audiences. The audiovisual campaigns, the AMR symbol contest or the videogame are perfect candidates to be boosted through social media promotions at European Level.</p> <p>Paid media promotions in Facebook or Twitter will also help the EU-JAMRAI project to get more exposure on internet and drive searchers to our website, increasing not only traffic but also conversations.</p>
Target audience	All
Communication objective	To enhance correct antibiotics use to change individual behaviours in the human, animal and environmental sector.
Key message(s)	TBD when designing the activity
Implementation strategy	<p>Social Media Promotions (SMP) will be carried out in the following strategic moments:</p> <ul style="list-style-type: none"> <li>- 15/11/2018: First Video Series launch</li> <li>- 01/03/2019: AMR Symbol Contest launch</li> <li>- 01/06/2019: AMR Symbol award</li> <li>- 01/10/2019: Video Game launch</li> <li>- 15/11/2019: Second Video Series launch</li> <li>- 01/04/2020: Video Game Award</li> </ul> <p>* The dates are approximate and the SMP may vary depending on the date on which each of these activities is finally carried out.</p>
Sustainability strategy	Analyzing the impact of the different social media promotions, it will be possible to recommend the partners to carry out this type of actions when they have some relevant information to communicate focused on behaviour change.
Monitoring and evaluation	<p>WP3 indicator(s):</p> <p>8.3.1.6</p> <p>8.3.1.7</p> <p>Other:</p> <ul style="list-style-type: none"> <li>• Number of interactions and new followers generated as a result of these promotional actions.</li> </ul>

## 7. Award: symbol to best represent the fight against AMR

Description	<p>European artists and designers will be called and mobilized to participate in a contest award for the best symbol of the battle against AMR. This symbol pretends to raise awareness about AMR and the importance of using antibiotics correctly, the same way that the red ribbon turned into a universal symbol to support people living with HIV.</p> <p>Instructions and requirements to participate in the contest will be prepared and disseminated through different channels with the support of all partners and stakeholders.</p> <p>In order to ensure that the winning symbol becomes well known and widely used, it will be imperative that all partners and stakeholders endorse the idea and support the communication team disseminating it and using it.</p> <p>Identifying a famous ambassador willing to wear the AMR symbol (like Elizabeth Taylor wore the red ribbon) would also increase the impact of this activity.</p>
Target audience	<p>General audience (designers and artists)</p>
Communication objective	<p>To enhance correct antibiotics use to change individual behaviours in the human, animal and environmental sector.</p>
Key message(s)	<p>Having a common symbol for AMR reinforces the link among all sectors that are involved in the fight, and boost the visibility of the threat.</p>
Implementation strategy	<p>The bases of the contest will be distributed at European level with the support of all the partners. The focus will be on sectors where designers, artists, etc. are located.</p>
Sustainability strategy	<p>We will focus on making all international organisations and all our partners and stakeholders (working in the field of AMR) embrace the winning symbol as the future symbol that represents the fight against Antibiotic Resistance.</p>
Monitoring and evaluation	<p>WP3 indicator(s):</p> <p>8.3.2</p> <p>Other:</p> <ul style="list-style-type: none"> <li>• Number of European countries that participate in the contest</li> <li>• Number of partners that support the dissemination of the activity</li> </ul>



## 8. Video game for students

Description	<p>This activity consists in designing a video game focused on school and high school students. The main objective is to include information about AMR and the appropriate use of antibiotics in students' subjects.</p> <p>This activity will evaluate if it is possible to increase the knowledge about AMR, and promote a change of the student's behaviour, through the educational system.</p> <p>A survey will be conducted before they start playing with the video game. Then, all the European students will start playing during a few months. The video game will have information about AMR and the consequences of the misuse of antibiotics, and it will allow us to extract statistics from different countries.</p> <p>After a few months, a new survey will be carried out in order to evaluate the change in students' knowledge.</p> <p>Once this process is finished, EU-JAMRAI communication team will prepare a report with country statistics, results, and recommendations.</p> <p>We will try to reach the highest participation of European students through the support of our partners.</p>
Target audience	<p>Educators</p> <p>General audience</p> <p>(Primary and high school students)</p>
Communication objective	<ul style="list-style-type: none"> <li>- To advocate for the inclusion of the antimicrobial resistance subject in science educational curricula to change social behaviours</li> <li>- To enhance correct antibiotics use to change individual behaviours.</li> </ul>
Key message(s)	<p>TBD when designing the activity</p>
Implementation strategy	<p>The bases of the contest will be distributed at European level with the support of all the partners. A survey will be conducted among the students to know their prior knowledge before playing the video game. There will be a period of 3 months where students from all over Europe will be able to participate. At the end of the video game, another survey will be conducted to learn about the changes in students' AMR knowledge. The award will be given in April 2020.</p>
Sustainability strategy	<p>As a result of this game, it will be shown to the member countries if the incorporation of AMR as part of the science subjects is a good option in raising awareness among the population about the appropriate use of antibiotics.</p>
Monitoring and evaluation	<p>WP3 indicator(s):</p> <p>8.3.3</p> <p>Other:</p> <ul style="list-style-type: none"> <li>• Survey: Develop a survey before and after the webinar to know if they have increased their knowledge</li> </ul>

## 9. Audiovisual materials

Description	<p><u>Video series:</u></p> <p>Don't leave it halfway and Antibiotics forever (provisional title) are documentaries series of five chapters/announcements, each lasting one minute, where the general public, patients, health professionals, veterinarians and politicians are called to action to work on addressing the problem of resistance to antibiotics from all sectors of society.</p> <p>The aesthetics of the episodes will be cinematographic and five stories will be offered, with fictional characters. At the end of each episode, a motto will appear. Regarding Don't leave it halfway, the motto will be: Would you leave it halfway? Well, the medical prescription of antibiotics either. Resistance to antibiotics could be the first cause of death in 2050. Remember, take antibiotics only when prescribed by a doctor and follow the doctor's advice on how to take the antibiotics so that they can stay effective also in the future. More info: eu-jamrai.eu.</p> <p>Examples of some stories for Don't leave it halfway are: A surgeon in the operating room who leaves the intervention halfway; a birthday party ends just when the birthday girl is about to blow the candles; an old man who is helped to cross the street but is left in the middle of the pedestrian way; a dog at the hairdresser whose hairstyle is halfway.</p> <p>During the following year these video series will focus on the One Health that needs to be reinforced both at European and global level (see <a href="#">APENDIX 2: Social Media Listening</a> conclusions )</p>
Target audience	All
Communication objective	To enhance correct antibiotics use to change individual behaviours in the human, animal and environmental sector.
Key message(s)	TBD when designing the activity
Implementation strategy	Both video series will be launched on the occasion of the EAAD, a celebration that gives AMR a great presence in the media and social networks, and that therefore will provide great visibility for this series.
Sustainability strategy	These videos will help us introduce new topics in the conversation (topics that the Social Media Listening detected that were not being dealt so much at European level, and that nevertheless they are of great importance in the fight against antibiotic resistance). In this way we will help our partners to continue with the conversation in the future, and they can also continue with the video series.
Monitoring and evaluation	<ul style="list-style-type: none"> <li>• Number of reproductions in YouTube &amp; social media.</li> </ul>

## 10. Postcards and Infographics (digital and printable)

Description	<p>Social media analytics demonstrate that images and infographics are the tools with the highest impact and reactions in social media.</p> <p>Several postcards and infographics with attractive images and different short key messages targeting each audience will be designed, translated to different languages and widely disseminated through social media networks (twitter, instagram and facebook) to reach the youngest audiences.</p> <p>Although intended to be digital these postcards and infographics will also be printable.</p>
Target audience	<p>Patients and families</p> <p>Healthcare workers</p> <p>Veterinarians</p> <p>Farmers</p> <p>General audience</p>
Communication objective	To enhance correct antibiotics use with a One Health Approach.
Key message(s)	TBD when designing the activity
Implementation strategy	Postcards and Infographics will be designed every month trying to reach different key audiences within the One Health approach and with messages that will accompany topics that are being addressed during those months. A big amount of this infographics will be focused in the One Health approach.
Sustainability strategy	We will analyze if these tools will allow our partners to reach target audiences (that previously were not reached) without the need to invest large amount of resources.
Monitoring and evaluation	<ul style="list-style-type: none"> <li>Number of interactions in social media when publishing infographics</li> </ul>

## 11. Interview management with key national spokesperson

Description	<p>Key national spokespersons, representatives of international organizations, relevant scientists and policy makers will be interviewed to raise awareness about AMR and the importance of using antibiotics correctly.</p> <p>They might be paper or video interviews but always widely disseminated through EU-JAMRAI website, videoblog and social media channels. As they will have a more technical approach and language, these interviews will target politicians, veterinarians and healthcare professionals.</p>
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Target audience	Politicians
Communication objective	<ul style="list-style-type: none"> <li>- To advocate for better policies design and better policies implementation</li> <li>- To advocate for more economic and human resources investment in the important fight against AMR</li> </ul>
Key message(s)	TBD when designing the activity
Implementation strategy	The communication team will launch at least one interview per quarter, which will be carried out by key spokespersons in the field of AMR.
Sustainability strategy	If these interviews achieve the desired objectives, and partners and stakeholders continue to do the same once the project ends, changes could be achieved such as better policies implementation and the allocation of more resources in the fight against AMR.
Monitoring and evaluation	<ul style="list-style-type: none"> <li>• At least one interview per quarter</li> </ul>

## 12. High Level Awareness and Communication Meeting

Description	<p>EU-JAMRAI will organize a High Level European Meeting in the last year focusing on governments (Health Authorities), relevant institutional organizations at regional and national level, stakeholders and international organizations (e.g. ECDC, OIE, FAO, DG SANTE, OECD, WHO, JPI AMR, etc.).</p> <p>This High Level European Meeting could be organized within the context of the ECDC's European Antibiotic Awareness Day or at the European Parliament.</p> <p>There will be scientific and healthcare professional communicators and JA representatives (WP leaders) as speakers. It will be organized as a workshop, presenting the main results and conclusions of the project, aimed to communicate the risks of misusing antibiotics and the need for commitment to fight AMR coming from different stakeholders.</p> <p>The main topics will focus on highlighting the threat of not facing this problem from several perspectives (political, scientific and economical) in order to change different behaviours. This meeting is intended to set up a conclusion document that could work as a road map/call to action to be signed (supported) by different stakeholders.</p>
Target audience	<p>Politicians</p> <p>Healthcare professionals</p> <p>Veterinarians</p>
Communication objective	<ul style="list-style-type: none"> <li>• To enhance correct antibiotics use with a One Health Approach.</li> <li>• To advocate for better policies design and better policies</li> </ul>

	<p>implementation</p> <ul style="list-style-type: none"> <li>To advocate for more economic and human resources investment in the important fight against AMR</li> </ul>
Key message(s)	The main topics will focus on highlighting the threat of not facing this problem from several perspectives (political, scientific and economical) in order to change different behaviours. This meeting is intended to set up a conclusion document that could work as a road map/call to action to be signed (supported) by different stakeholders.
Implementation strategy	The High Level Awareness and Communication Meeting will be carried out at the end of the project, possibly during the month of July 2020.
Sustainability strategy	NA
Monitoring and evaluation	<p>WP3 indicator(s):</p> <p>8.4.2.1</p> <p>8.4.2.2</p> <p>8.4.2.3</p> <p>8.4.2.4</p> <p>Other:</p> <ul style="list-style-type: none"> <li>At least one interview per quarter</li> </ul>

### Other desirable activities:

If the communication team have enough resources and the necessary support during the project, we propose other alternative activities that could be developed.

#### Sketch drawing videos:

Sketch drawing videos are growing on internet. They are usually 7 minutes long and explain an economic, historic, social or scientific event in a very easy language. The explanation is visually helped by a drawing that is being done in real time.

A sketch drawing video compiling causes of AMR and recommendations for all target audiences will be developed by the communication team and spread through social media channels with the aim of making it viral.

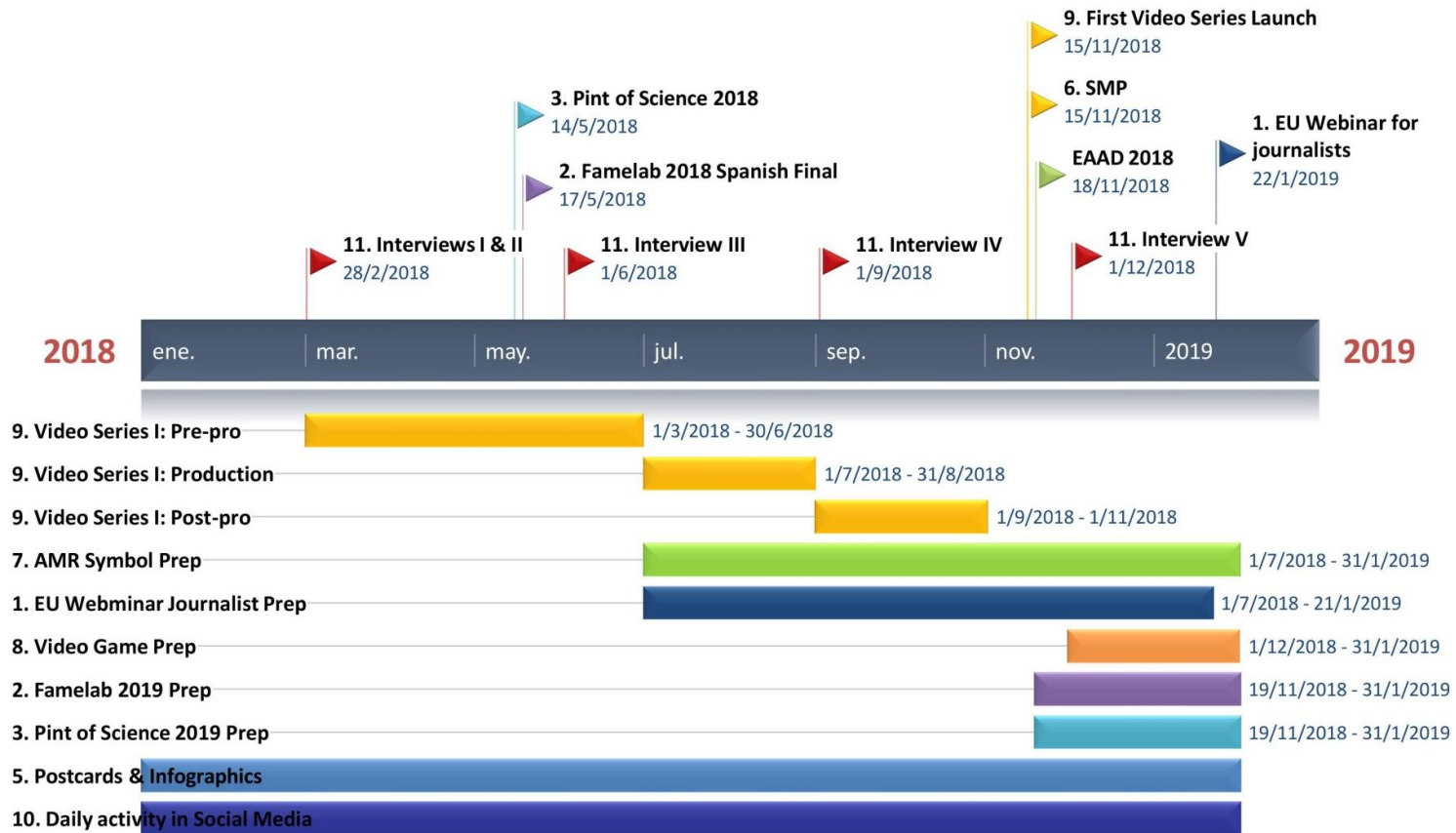
#### TEDx Talks:

TEDx was created in the spirit of TED's mission, "ideas worth spreading", to help communities, organizations and individuals to spark conversation and connection through local TED-like experiences. At TEDx events, a screening of TED Talks videos – or a combination of live presenters and TED Talks videos – sparks deep conversation and connections at the local level. TEDx events are planned and coordinated independently, under a free license granted by TED. EU-JAMRAI Com team is looking at the possibility of organizing TEDx talks in different EU cities.

### 8.3 Timeline

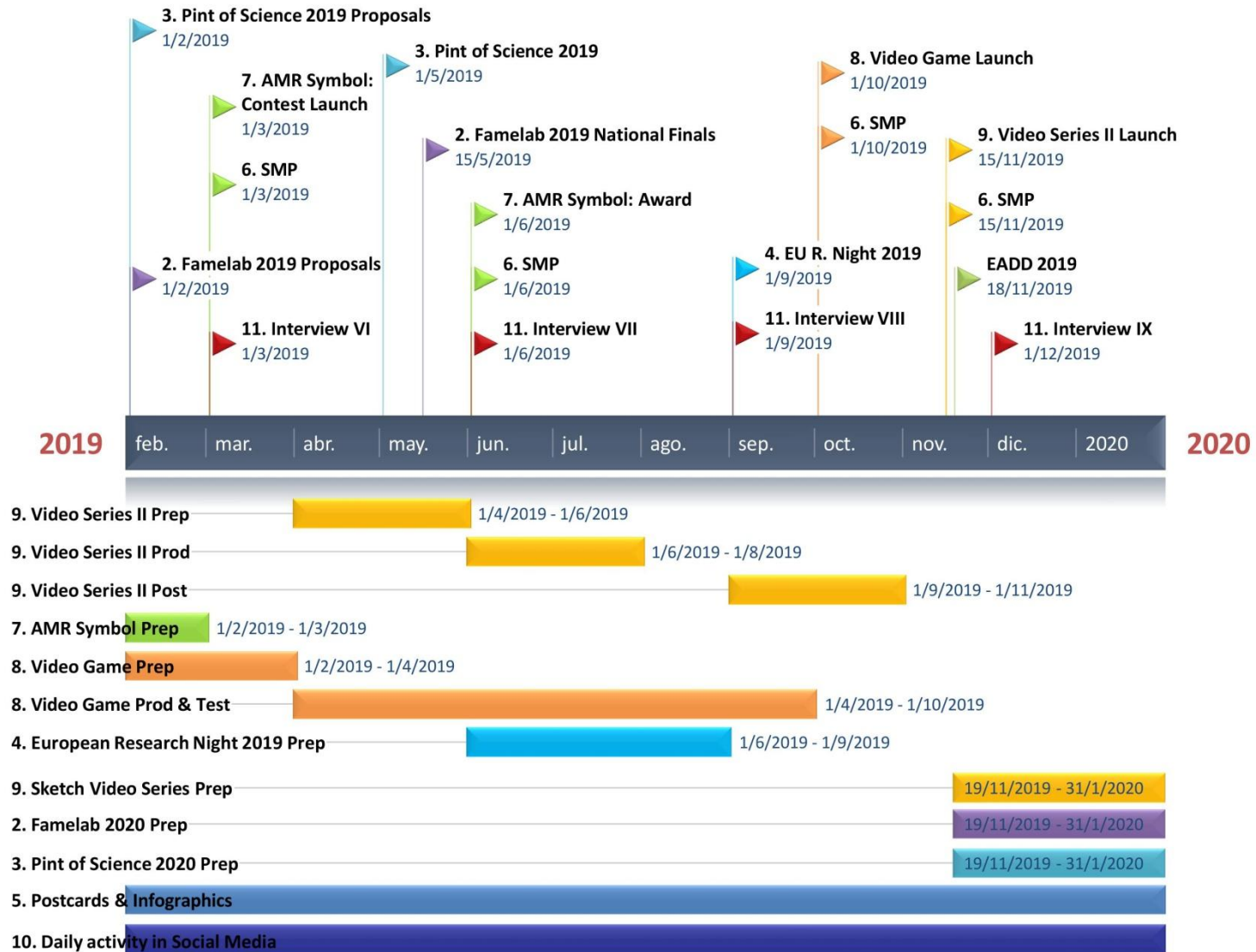
The following figures show visually the implementation period and deadline for each of the activities. Dates are approximate and might be changed depending on availability of resources and partners' involvement and commitment.

Figure 13: Implementation timeline January 2018 - January 2019



\*SMP: Social Media Promotion

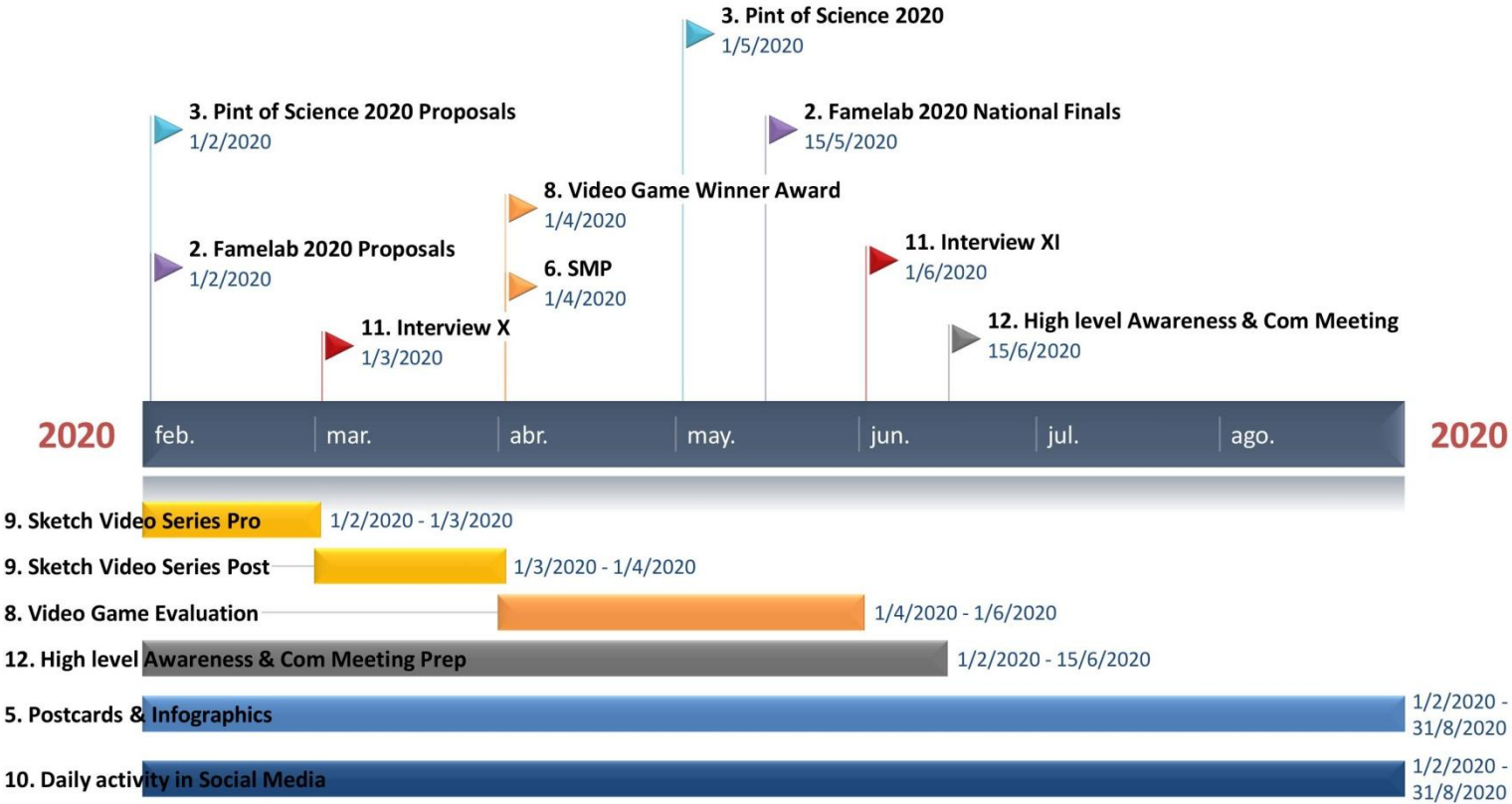
Figure 14: Implementation timeline February 2019 - January 2020



\*SMP: Social Media Promotion



Figure 15: Implementation timeline February 2020 - August 2020



\*SMP: Social Media Promotion

## 8.4 Participation analysis

### 8.4.1 Partners participation based on the ‘glocal’ approach

As previously explained in section 5.2 the main objective of this Social Behaviour Change Communication Strategy is to offer EU-JAMRAI partners key actions to target the selected priority audiences ensuring the sustainability of the results even after the end of the Joint Action.

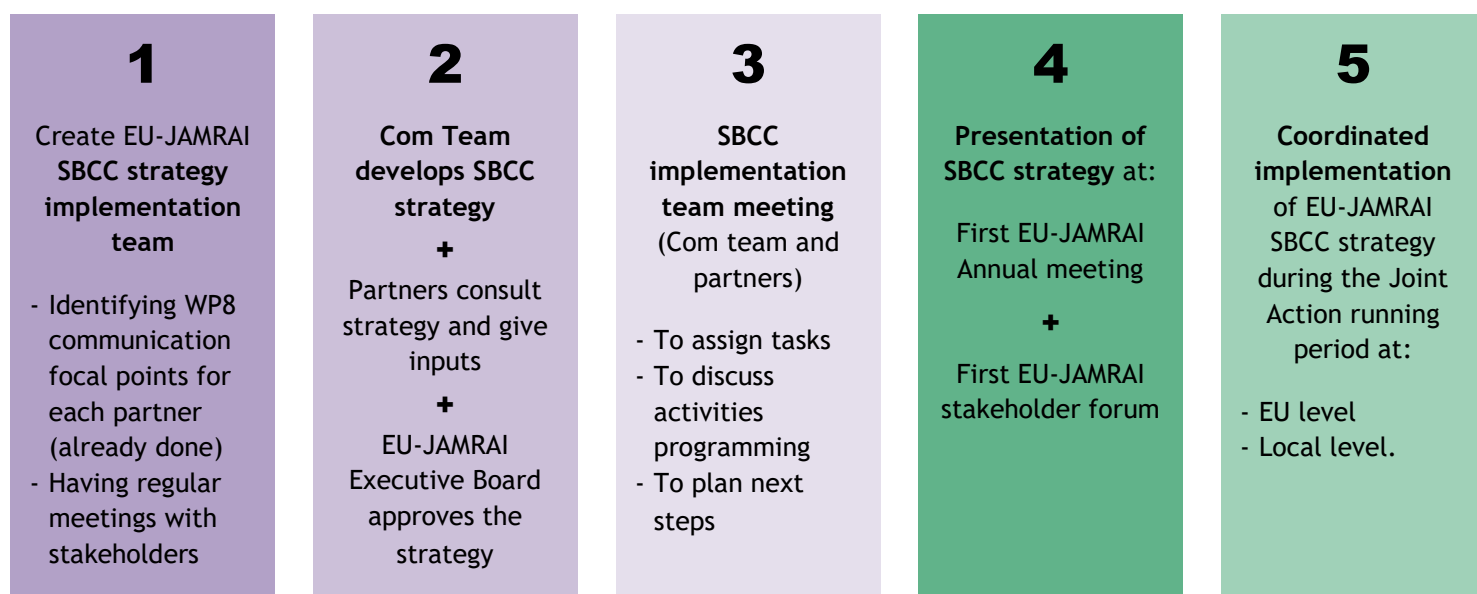
Figure 12 (section 5.2) represents the ‘glocal’ approach that will be used to achieve this objective. If we really want to change individual behaviours and ensure sustainable results, activities should also be implemented at local level and adapted to local languages and needs.

EU-JAMRAI partners’ support will be crucial for the successful implementation of this SBCC strategy. The table of section 8.4.3 summarizes the skills and the resources that will be required from partners. Once all WP8 participating partners have consulted this strategy and given their inputs, the communication team will organize a meeting (or teleconference) with the communication focal points of each partner to assign tasks (filling the table of Appendix 4) and discuss the activities programming and the next steps (please see Figure 16).

### 8.4.2 EU-JAMRAI Stakeholder Forum support

More than 30 stakeholders provide strategic advice to EU-JAMRAI to ensure that the Joint Action is strategically connected to the global challenges and developments in the AMR field. Key international organizations such as WHO, OECD, OIE and FAO are part of the stakeholder forum of this Joint Action driving the debate with their expertise and ensuring consistency with ongoing initiatives. Additionally, representatives from healthcare professionals, patients, students and industry will play an important role as EU-JAMRAI is founded on the principle of inclusiveness and the belief that AMR cannot be tackled by only policy makers. Their support during the implementation of this SBCC strategy will be key for the success of WP8 work.

Figure 16: EU-JAMRAI partners and Stakeholder Forum participation analysis



### 8.4.3 What skills and resources will be needed from EU-JAMRAI partners?

Act. #	Activity Title	Skills, tasks and resources required from EU-JAMRAI partners	Support, materials and tools provided by the Communication Team	Stakeholder Forum support
1	European Webinar for journalists	<ul style="list-style-type: none"> <li>Identify relevant journalists in their countries.</li> <li>Share with Com Team relevant journalists contact details and/or share with them the invitation.</li> <li>Share with Com Team articles/content published by these local journalists after their participation in the webinar.</li> </ul>	<ul style="list-style-type: none"> <li>Organise the webinar</li> <li>Share event organisation details (invitation, agenda etc.).</li> <li>Share final list of participants.</li> <li>Share video of webinar.</li> </ul>	<ul style="list-style-type: none"> <li>Identify relevant journalists in their countries.</li> <li>Share with Com Team relevant journalists contact details and/or share with them the invitation.</li> <li>Participate as tutors.</li> </ul>
2	Famelab (2018, 2019)	<ul style="list-style-type: none"> <li>Identify monologist.</li> <li>Translate monologue and adapt it to the local context.</li> <li>Present application to the Famelab organizers in their countries (paper work + monologue video).</li> <li>If applicant is accepted, promote locally the event, the monologue topic and the candidate (social media, local press etc.).</li> <li>Inform the Com Team of the status of the process and share pictures of the different phases.</li> </ul>	<ul style="list-style-type: none"> <li>Prepare monologue in English.</li> <li>Identify and share contact of local Famelab organizers of each country.</li> <li>Promote the event, the monologue topic and the candidate in EU-JAMRAI channels (social media, videoblog, website etc.).</li> </ul>	<ul style="list-style-type: none"> <li>Promote the different events throughout their networks and channels.</li> </ul>
3	Pint of Science (2018, 2019)	<ul style="list-style-type: none"> <li>Identify presenter(s).</li> <li>Translate presentation and adapt it to the local context.</li> <li>Present application to the Pint of Science organizers in their countries.</li> <li>If applicant is accepted, promote locally the event, the presentation topic and the candidate (social media, local press etc.).</li> <li>Inform the Com Team of the status of the process and share pictures of the event.</li> </ul>	<ul style="list-style-type: none"> <li>Prepare presentation in English.</li> <li>Identify and share contact of local Pint of Science organizers of each country.</li> <li>Promote the event, the presentation topic and the presenters in EU-JAMRAI channels (social media, videoblog, website etc.).</li> </ul>	<ul style="list-style-type: none"> <li>Promote the different events throughout their networks and channels.</li> </ul>

Act. #	Activity Title	Skills, tasks and resources required from EU-JAMRAI partners	Support, materials and tools provided by the Communication Team	Stakeholder Forum support
4	European research night	<ul style="list-style-type: none"> <li>Read conclusions of Spanish test and analyze the possibility of implement the activity locally in Sept. 2020.</li> </ul>	<ul style="list-style-type: none"> <li>Share conclusions of test in Spain.</li> </ul>	<ul style="list-style-type: none"> <li>Promote the event throughout their networks and channels.</li> </ul>
5	Daily activity in social media	<ul style="list-style-type: none"> <li>Follow EU-JAMRAI activity in social media.</li> <li>Share and re-tweet content developed by EU-JAMRAI.</li> </ul>	<ul style="list-style-type: none"> <li>Inform in advance about the most important campaigns and/or activities that will be promoted through social media.</li> </ul>	<ul style="list-style-type: none"> <li>Follow EU-JAMRAI activity in social media.</li> <li>Share and re-tweet content developed by EU-JAMRAI.</li> </ul>
6	Social media promotion actions	No need to be involved	<ul style="list-style-type: none"> <li>Share results of the social media promotion efforts.</li> </ul>	No need to be involved
7	Award: symbol to best represent the fight against AMR	<ul style="list-style-type: none"> <li>Translate bases of the contest and calendar of the activity.</li> <li>Share bases of the contest locally throughout relevant audiences.</li> <li>Promote contest locally (social media, partner websites, local press etc.).</li> <li>Use and promote winner AMR symbol.</li> </ul>	<ul style="list-style-type: none"> <li>Organise the contest.</li> <li>Share bases of the contest and calendar of the activity in English.</li> <li>Share winner symbol.</li> <li>Promote contest in EU-JAMRAI channels (social media, website etc.).</li> </ul>	<ul style="list-style-type: none"> <li>Endorse initiative.</li> <li>Give technical advice.</li> <li>Be part of the jury.</li> <li>Use and promote winner AMR symbol.</li> </ul>
8	Video game for students	<ul style="list-style-type: none"> <li>Translate bases of the video game and calendar of the activity.</li> <li>Translate video game content.</li> <li>Share bases of the contest locally throughout relevant audiences (Education Ministries, schools, local congresses etc.) and ensure local participation</li> <li>Promote video game locally (social media, partner websites, local press etc.).</li> </ul>	<ul style="list-style-type: none"> <li>Develop the contents of the videogame and coordinate the production with the company selected.</li> <li>Share bases of the video game and calendar of the activity in English.</li> <li>Share video game content in English.</li> <li>Developed video game in the available languages (3-5).</li> <li>Promote video game in EU-JAMRAI channels (social media, website etc.) and through other networks (international organizations working on AMR, professional associations, congresses etc.).</li> </ul>	<ul style="list-style-type: none"> <li>Review content and give technical advice.</li> <li>Promote the video game throughout their networks and channels.</li> </ul>

Act. #	Activity Title	Skills, tasks and resources required from EU-JAMRAI partners	Support, materials and tools provided by the Communication Team	Stakeholder Forum support
9	Audiovisual materials: - Video series I - Video series II	<ul style="list-style-type: none"> <li>Translate video content.</li> <li>Disseminate video locally (social media, local public TV stations, partner websites etc.).</li> </ul>	<ul style="list-style-type: none"> <li>Coordinate the recording of the video series.</li> <li>Share video content in English.</li> <li>Developed video in the available languages.</li> <li>Disseminate video in EU-JAMRAI channels (social media, video blog, website etc.).</li> </ul>	<ul style="list-style-type: none"> <li>Review content/script and give technical advice.</li> <li>Promote the videos throughout their networks and channels.</li> </ul>
10	Postcards and Infographics (digital and printable)	<ul style="list-style-type: none"> <li>Translate postcards/infographics content.</li> <li>Disseminate postcards/infographics locally (social media, partner websites etc.).</li> </ul>	<ul style="list-style-type: none"> <li>Design postcards/infographics in the available languages.</li> <li>Share postcards/infographics in English.</li> <li>Disseminate postcards/infographics in EU-JAMRAI channels (social media, website etc.).</li> </ul>	<ul style="list-style-type: none"> <li>Disseminate postcards/infographics throughout their networks and channels.</li> </ul>
11	Interview management with key national spokesperson	<ul style="list-style-type: none"> <li>To identify key national spokesperson that will speak in the name of EU-JAMRAI in the interviews.</li> </ul>	<ul style="list-style-type: none"> <li>Prepare the interviews and produce them.</li> <li>Share interviews in English.</li> </ul>	<ul style="list-style-type: none"> <li>Disseminate interviews throughout their networks and channels.</li> </ul>
12	High Level Awareness and Communication Meeting	To be defined	To be defined	To be defined

## Appendix 1: Awareness raising campaigns analysis

CAMPAIGNS	URL	ORGANISATION	YEAR	COUNTRY	LANGUAGES		Target	Frequency	Media	Key Messages	Materials	Contains One Health components
					Adapted to local language	Produced in English						
NAP-AMR: Der österreichische Nationale Aktionsplan zur Antibiotikaresistenz	<a href="#">Link</a>	Ministerium Frauen Gesundheit	2013	Austria	yes	yes	General public	Temporary	Mass Media	Misuse/overuse	Video	NO
ANTIBIOTICS: USE THEM CORRECTLY AND ONLY WHEN NECESSARY!	<a href="#">Link</a>	BAPCOC	2017	Belgium	yes	yes	General public	Temporary	Online	Misuse/overuse	Webpage, Comic and radio	NO
Europski dan svjesnosti o antibioticima	<a href="#">Link</a>	Croatian society of clinical microbiology	2017	Croatia	yes	no	General public	Temporary	Online	Misuse/overuse	Video	NO
Croatian National Guidelines	<a href="#">Link</a>	ISKRA, Antimicrobial Resistance Surveillance in Human Medicine	2017	Croatia	yes	yes	Health care professionals	Active all year	Online	Prevention	Guidelines	NO

CAMPAIGNS	URL	ORGANISATION	YEAR	COUNTRY	LANGUAGES		Target	Frequency	Media	Key Messages	Materials	Contains One Health components
					Adapted to local language	Produced in English						
Vaer med i kampen mod antibiotikaresistens	<a href="#">Link</a>	Health and Old Age Affairs, Danish College of Physicians, Health Medical Association, Danish regions, the Danish Medicines Agency, the Danish Pharmaceutical Association and the Statens Serum Institut	2017	Denmark	yes	no	General public	Temporary	Printed materials	Misuse/overuse	Posters, video, brochure	NO
Antibiootikumad:Küsi arstilt nõu: sümptomeid võivad leevendada muud ravimid.	<a href="#">Link</a>	Terviseamet Health Board	2017	Estonia	yes	no	General public	Temporary	Printed materials	Misuse/overuse	Poster	NO
Antibiootikumiresistentsuse alased uuringud Eestis	<a href="#">Link</a>	Eesti Teadusagentuur	2017	Estonia	yes	no	Health care professionals	Temporary	Online	Prevention	Video Series	NO
Vacciner les animaux pour réduire l'utilisation des antibiotiques	<a href="#">Link</a>	Agriculture Ministry	2016	France	yes	No	Veterinarians	Temporary	Online	Optimal use in animals	Video, poster, brochure	NO
Journée européenne d'information sur les antibiotiques	<a href="#">Link</a>	Ministère des solidarités et de la Santé	2016	France	yes	yes	General public	Temporary	Online	Misuse/overuse	Video, poster, brochure	NO



CAMPAIGNS	URL	ORGANISATION	YEAR	COUNTRY	LANGUAGES		Target	Frequency	Media	Key Messages	Materials	Contains One Health components
					Adapted to local language	Produced in English						
Quand les antibiotiques sont-ils utilisés à tort ?	<a href="#">Link</a>	Lásurance Maladi	2018	France	yes	no	General public	Temporary	Online	Misuse/overuse	Video and website to give advise	NO
Antibiotiques pas automatiques	<a href="#">Link</a>	Ministère des solidarités et de la Santé	2002-2007	France	yes	no	General public	Repetitive during the years	Mass Media	Misuse/overuse	Video	NO
Alle Reden von Antibiotika-Resistenzen	<a href="#">Link</a>	Bundeszentrale für gesundheitliche Aufklärung	2015	Germany	yes	no	General public	Temporary	Printed materials	Misuse/overuse	Brochure	NO
Αντιβιοτικά & Ανθεκτικότητα: Όσα πρέπει να γνωρίζετε σε 2 λεπτά	<a href="#">Link</a>	Pharma Scribe	2018	Grece	yes	no	General public	Active all year	Online	Prevention	Video	YES
Vírus és baktérium: Mi a különbség, és kit érdekel egyáltalán? - csak egyszerűen	<a href="#">Link</a>	Zallatorvos	2016	Hungary	yes	no	General public	Active all year	Online	Misuse/overuse	Video	YES
Gyógyulj antibiotikum nélkül avagy a torokfájás, megfázás és influenza helyes kezelésének módja	<a href="#">Link</a>	GRIP - The Global Respiratory Infection Partnership	2015	Hungary	yes	no	General public	Active all year	Online	Misuse/overuse	Video	NO
Antibiotic prescribing	<a href="#">Link</a>	Health Service Executive	2018	Ireland	yes	yes	Health care professionals	Active all year	Online	Misuse/overuse	other	NO
Vai rokas nomazgaji ?	<a href="#">Link</a>	Slimibu Profilakses un Kontroles Centrs	2015	Latvia	yes	no	General public	Temporary	Printed materials	Hand washing	Poster	NO

CAMPAIGNS	URL	ORGANISATION	YEAR	COUNTRY	LANGUAGES		Target	Frequency	Media	Key Messages	Materials	Contains One Health components
					Adapted to local language	Produced in English						
Antimikrobinis atsparumas	<a href="#">Link</a>	Lietuvos Respublikos sveikatos apsaugos ministerija	2016	Lithuania	yes	yes	General public	Seasonal	Online	Misuse/overuse	Video	NO
Les antibiotiques ne son pas de bonbons	<a href="#">Link</a>	Le Ministre de la Santé	2017	Luxembourg	yes	no	General public	Seasonal	Printed materials	Misuse/overuse	Poster	NO
Exhibition of Museum Boerhaave	<a href="#">Link</a>	Museum Boerhaave	2017	Netherlands	yes	no	General public	Active all year	Other	Prevention	AMR Travelling exhibition in a car	NO
How to prevent the spread of resistant bacteria	<a href="#">Link</a>	RIVM	2015	Netherlands	yes	yes	General public	Seasonal	Online	Prevention	Video	YES
Spot Europejskiego Dnia Wiedzy o Antybiotykach - Mucha	<a href="#">Link</a>	Narodowy Program	2014	Poland	yes	no	General public	Seasonal	Online	Misuse/overuse	Video	NO
Dia Mundial da Higiene das Mãos 2018	<a href="#">Link</a>	SNS - DGS	2018	Portugal	yes	yes	General public	Seasonal	Printed materials	Hand washing	Posters, video, brochure	NO
Administrația antibioticelor cumaximă prudentă	<a href="#">Link</a>	CNEPSS	2017	Romania	yes	no	General public	Seasonal	Printed materials	Misuse/overuse	Posters, video, brochure	NO
Sme na prahu priepasti postantibiotickej éry.	<a href="#">Link</a>	zivotbezantibiotik	2017	Slovakia	yes	yes	General public	Seasonal	Printed materials	Misuse/overuse	Info-graphics	YES

CAMPAIGNS	URL	ORGANISATION	YEAR	COUNTRY	LANGUAGES		Target	Frequency	Media	Key Messages	Materials	Contains One Health components
					Adapted to local language	Produced in English						
Kako se siri odpornost proti antibiotikom	<a href="#">Link</a>	NIJZ	2017	Slovenia	yes	yes	General public	Seasonal	Printed materials	Misuse/overuse	Poster	YES
Antibióticos: tómatelos en serio	<a href="#">Link</a>	Plan Nacional de Resistencia a los Antibióticos (AMPS)	2017	Spain	yes	yes	General public	Seasonal	Mass Media	Misuse/overuse	Video	YES
Superheroes Against Superbugs: Antimicrobial Resistance	<a href="#">Link</a>	IS Global	2017	Spain	yes	yes	General public	Temporary	Printed materials	Misuse/overuse	other	NO
Hotet mot antibiotikan – skyddaantibiotikan.se	<a href="#">Link</a>	Folkhälsomyndigheten Sverige	2017	Sweden	yes	no	General public	Seasonal	Online	Prevention	Video	YES
FEELING UNDER THE WEATHER?	<a href="#">Link</a>	Health Service Executive	2018	UK	yes	yes	General public	Active all year	Online	Misuse/overuse	Video and website to give advise	NO
Antibiotic awareness resources: 2017	<a href="#">Link</a>	Public Health England	2017	UK	yes	yes	Health care professionals	Seasonal	Online	Prevention	Video, Brochures, Leaflets	NO
#AntibioticGuardian	<a href="#">Link</a>	Public Health England	2017	UK	yes	yes	General public	Active all year	Online	Misuse/overuse	Other	NO
E-bug	<a href="#">Link</a>	Public Health England	2016	UK	yes	yes	General public	Active all year	Online	Misuse/overuse	Other	NO
Awareness of Antimicrobial Resistance (AMR) Animation	<a href="#">Link</a>	Health Education England (NHS)	2016	UK	yes	yes	General public	Temporary	Online	Prevention	Video	NO

CAMPAIGNS	URL	ORGANISATION	YEAR	COUNTRY	LANGUAGES		Target	Frequency	Media	Key Messages	Materials	Contains One Health components
					Adapted to local language	Produced in English						
European Antibiotic Awareness Day - The Hedgehog Animation TV Spot	<a href="#">Link</a>	ECDC	2012	Europe	yes	yes	General public	Seasonal	Online	Misuse/overuse	Video, Brochures, Leaflets	NO
European Antibiotic Awareness Day - Sneezing Panda	<a href="#">Link</a>	ECDC	2009	Europe	No	yes	General public	Seasonal	Online	Misuse/overuse	Video, Brochures, Leaflets	NO
Communication toolkit for professionals in hospitals and other healthcare settings	<a href="#">Link</a>	ECDC	2016	Europe	no	yes	Health care professionals	Seasonal	Printed materials	Prevention	Guidelines	NO
Antibiotics -- handle with care	<a href="#">Link</a>	WHO	2017	Europe	yes	yes	General public	Seasonal	Online	Misuse/overuse	Video	YES
Antibiotics -- handle with care	<a href="#">Link</a>	WHO	2017	Europe	yes	yes	General public	Seasonal	Printed materials	Misuse/overuse	Poster	NO
Antibiotics -- handle with care	<a href="#">Link</a>	WHO	2016	Europe	yes	yes	Veterinarians	Seasonal	Printed materials	Optimal use in animals	Poster	YES
Antibiotics -- handle with care	<a href="#">Link</a>	WHO	2016	Europe	yes	yes	General public	Seasonal	Printed materials	Misuse/overuse	Infographics	YES
Antibiotic resistance, from farm to you	<a href="#">Link</a>	The European Consumer Organisation	2017	Europe	no	yes	General public	Temporary	Online	Optimal use in animals	Infographics	YES

CAMPAIGNS	URL	ORGANISATION	YEAR	COUNTRY	LANGUAGES		Target	Frequency	Media	Key Messages	Materials	Contains One Health components
					Adapted to local language	Produced in English						
Antibiotici. È un peccato usarli male	<a href="#">Link</a>	Emilia Romagna regional Health Authority	2017-2018	Italy	yes	no	General public	Temporary	Online	Misuse/overuse	Video	NO
Non abusare di antibiotici, senza regole non funzionano	<a href="#">Link</a>	Brindisi (Apulia region) Local Health Unit	2018	Italy	yes	no	General public	Temporary	Printed materials	Misuse/overuse	Poster	NO
Antibiotici – La nostra difesa numero 1	<a href="#">Link</a>	Società Italiana Terapia Antinfettiva (SITA)	2018	Italy	yes	no	General public	Temporary	Online	Misuse/overuse	Video	NO
Ci salvano la vita, ma usiamoli bene	<a href="#">Link</a>	Società Italiana di Malattie Infettive e Tropicali (SIMIT), Italian Ministry of Health (MoH)	2017	Italy	yes	no	General public	Temporary	Online	Misuse/overuse	Video	NO
Abbiamo bisogno di te utilizza gli antimicrobici con cura	<a href="#">Link</a>	MoH	2017	Italy	yes	No	Veterinarians	Seasonal	Printed materials	Optimal use in animals	Poster	NO
Settimana mondiale per l'uso prudente degli antibiotici - Policy makers what can you do?	<a href="#">Link</a>	MoH	2016	Italy	yes	no	Policy makers	Seasonal	Online	Prevention	Poster and video	YES
Uso corretto degli antibiotici negli animali da compagnia	<a href="#">Link</a>	MoH	2015	Italy	yes	No	Veterinarians	Temporary	Printed materials	Optimal use in animals	Brochure	NO

CAMPAIGNS	URL	ORGANISATION	YEAR	COUNTRY	LANGUAGES		Target	Frequency	Media	Key Messages	Materials	Contains One Health components
					Adapted to local language	Produced in English						
Senza regole gli Antibiotici non funzionano	<a href="#">Link</a>	Italian Medicines Agency (AIFA), MoH	2014-2015	Italy	yes	no	General public	Temporary	Mass Media	Misuse/overuse	Video, radio and poster	NO
Antibiotici? Usali solo quando necessario	<a href="#">Link</a>	AIFA, MoH	2012	Italy	yes	no	General public	Repetitive during the years	Online	Misuse/overuse	Web y poster	NO
Antibiotici. Difendi la tua difesa. Usali con cautela	<a href="#">Link</a>	AIFA, MoH, National Institute of Health (ISS)	2010	Italy	yes	no	General public	Repetitive during the years	Online	Misuse/overuse	Web y poster	NO
Antibiotici? Usali con cautela	<a href="#">Link</a>	AIFA, MoH, National Institute of Health (ISS)	2009	Italy	yes	no	General public	Repetitive during the years	Online	Misuse/overuse	Web y poster	NO
Antibiotici sì, ma con cautela	<a href="#">Link</a>	AIFA, ISS, Italian Ministry of Labour and Social Policies	2008	Italy	yes	no	General public	Repetitive during the years	Online	Misuse/overuse	Web y poster	NO

## Appendix 2: Social Media Listening



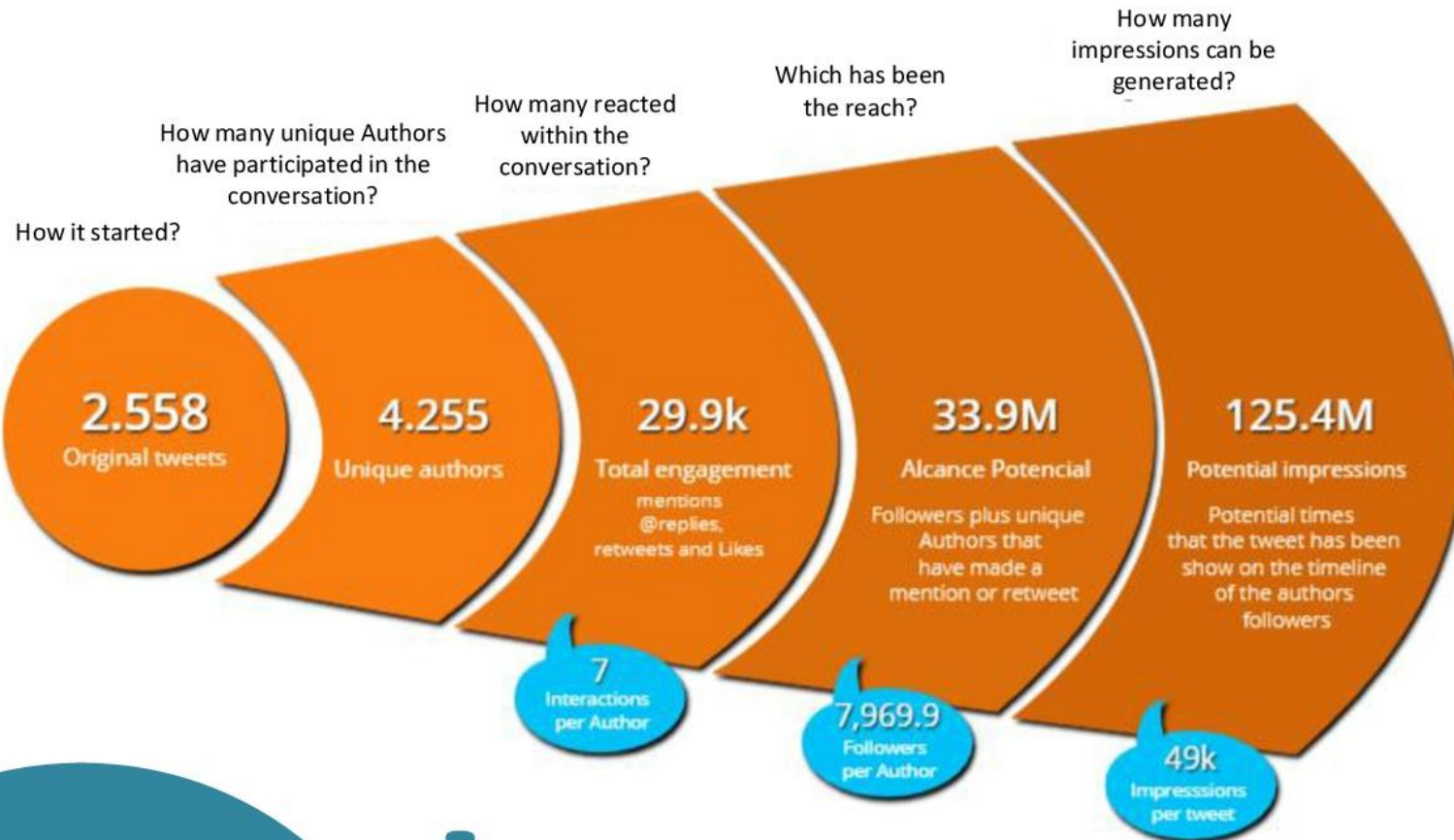
# Social Media Listening Report

Period: From April 15th to June 30th  
Universe: Antibiotic Resistance  
Language: English  
Tool used: Oraquo





Europe

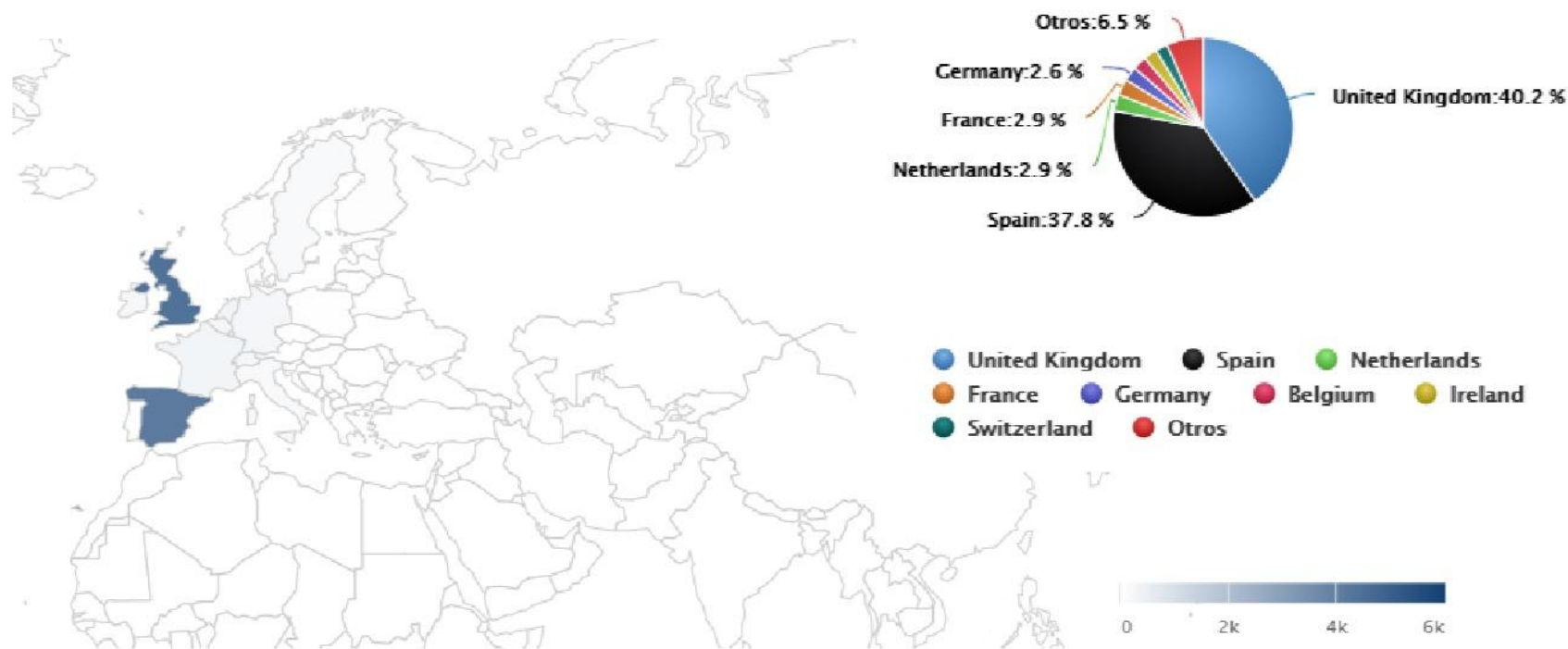


125.4 Million potential impressions have been generated from 2.558 original tweets

! Impressions = number of times that the tweet has been shown on the timeline of the authors followers

## Distribution by countries

## Europe



With a total of 4.422 mentions, **United Kingdom** is where most of the conversation comes from, which 40.2% of total mentions.

Spanish people retweet a lot of content related to AMR from English sources

### Relevant keywords in the conversation

### Europe

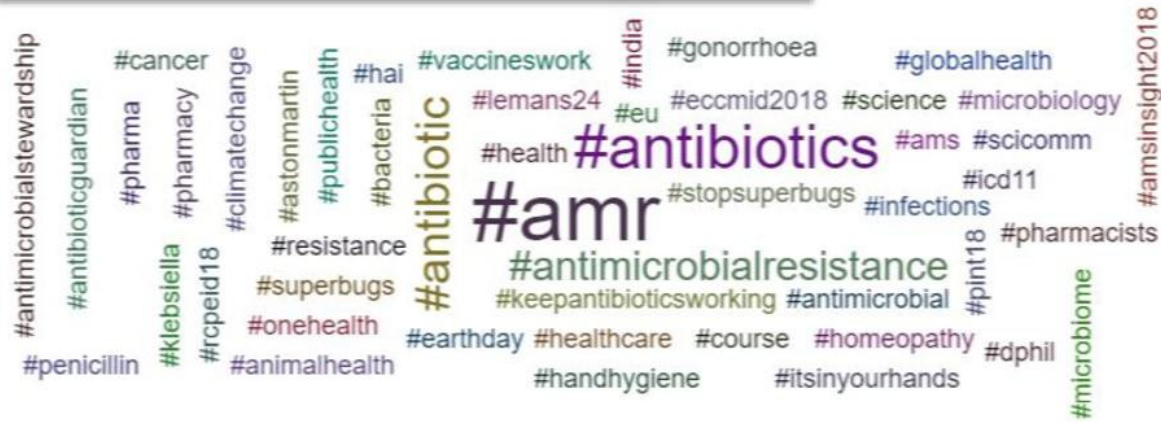


Most relevant term

*new* is the most relevant term in the conversation, following by these terms in order of relevance:

- ✓ antibiotics
- ✓ use
- ✓ bacteria
- ✓ health

### Relevant hashtags in the conversation



Most relevant hashtag

*#amr* is the most relevant hashtag in this conversation, the following are (in relevance order):

- ✓ #antibiotics
- ✓ #antibioticresistance
- ✓ #antibiotic
- ✓ #antimicrobialresistance

## Relevant keyword map by source type

Europe



Most relevant keywords by source type



! In Europe, the AMR conversation happens on Twitter








# Top Authors

# Europe






Top Authors per activity

Author	Tweets
 <b>Nebulized Antibiotic</b> @Neb_Antib_news	444
 <b>eClinicalTrial</b> @eClinicalTrial	435
 <b>biotechIT</b> @biotechIT	409
 <b>Pedro López</b> @noticias_reuma	312
 <b>Lidia Campos</b> @on_deporte	304






Top Authors per link

Author	Reach
 <b>World Health Organization (WHO)</b> @WHO	27.271.872
 <b>The Guardian</b> @guardian	14.436.806
 <b>Guardian Science</b> @guardianscience	2.184.550
 <b>Science Museum</b> @sciencemuseum	2.017.632
 <b>NRDC</b> @NRDC	1.181.964



Most mentioned Authors

Author	Tweets
 <b>Longitude Prize</b> @longitude_prize	134
 <b>@theurgentneed</b>	87
 <b>World Health Organization</b> @who	80
 <b>Rich Davis</b> @richdavisphd	78
 <b>Science Museum</b> @sciencemuseum	75

Authors per activity (without retweets)

Author	Tweets
 <b>Antibiotic Research UK</b> @1Anruk	41
 <b>Spectromics</b> @Spectromics	35
 <b>Antibiotic Action</b> @TheUrgentNeed	26
 <b>AMR Ireland</b> @AMR_Ireland	18
 <b>Antibiotic Resistance</b> @AntibioticResis	17

Top authors per influence

Author	Influence
 <b>Carles Borrego</b> @CarlesBorrego	100
 <b>Andrew Singer</b> @OxonAndrew	100
 <b>World Health Organization (WHO)</b> @WHO	100
 <b>Niki</b> @TheZwitterion	100
 <b>Harry Frasier</b> @FrasierHarry	100

Top Authors by retweets

Author	Tweets
 <b>Nebulized Antibiotic</b> @Neb_Antib_news	444
 <b>eClinicalTrial</b> @eClinicalTrial	435

Besides WHO, initiatives from UK lead the authors and publication section.

The activity of individual authors is lead by Spain.

# Authors Bio – Map of relevant terms

Europe

health		research			science		university		news
world	global	life	interested	medical	food	resistance	public	nhs	
student	working	microbiology	scientist	love	human	medicine	innovation	amr	biology
		researcher	clinical	twitter	business	healthcare	official	account	group
tweets	care	social	people	professor	uni	european	politics		

Most relevant term

*health is the most relevant term in the conversation, following by these terms in order of relevance:*

- ✓ research
- ✓ science
- ✓ university
- ✓ news



People who are talking about AMR are engaged in the following sectors:

Health  
Research  
Science  
University



# Activity

# Europe



**10.909**  
Mentions



**8.383**  
Retweets



**184**  
Replies



**9.067**  
With Like



**1.072**  
Multimedia

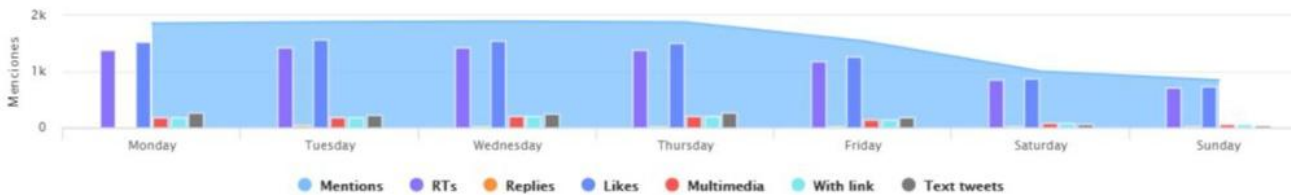
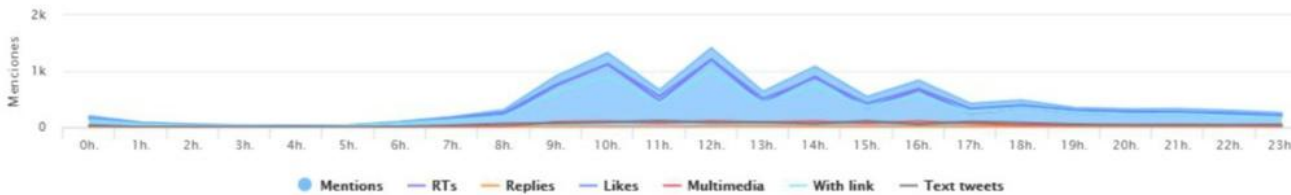
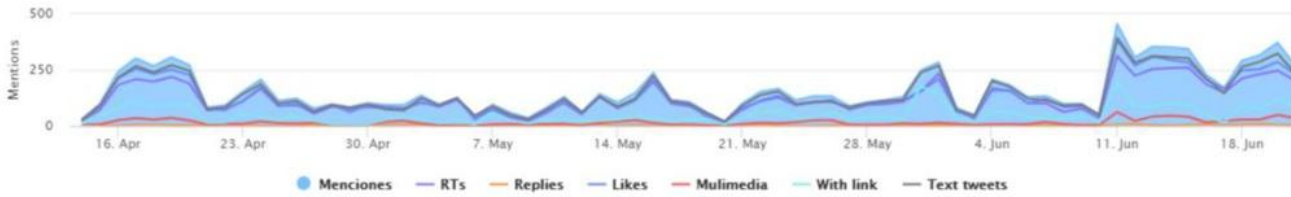


**3.390**  
With link



**9.837**  
Text tweets

Activity per day



Day with most activity

**11 Jun. 2018**

**186.7%** most activity than the daily average in the selected period

Day with most activity

**12h.**

**225.4%** more activity than the average of the period

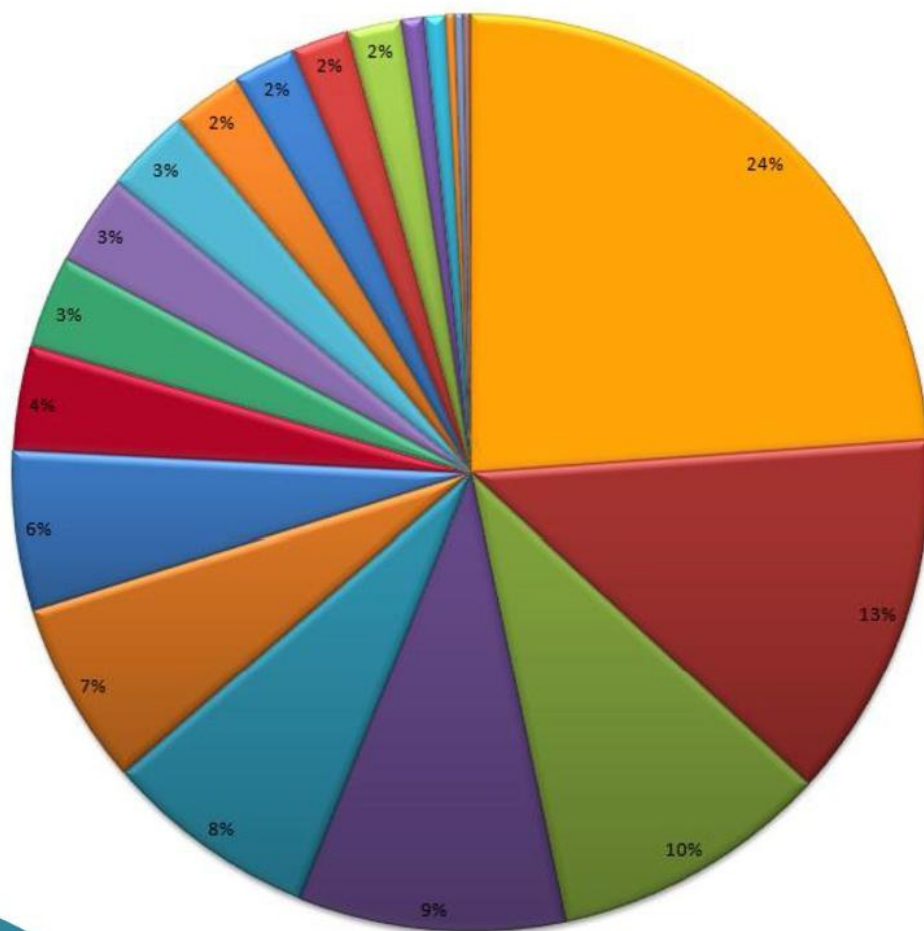
Day of the week with most activity

**Wednesday**

**27.4%** more activity than the average of the period

**!** The conversation is more active on **Wednesdays' afternoon**

## Terms linked to Antibiotic Resistance



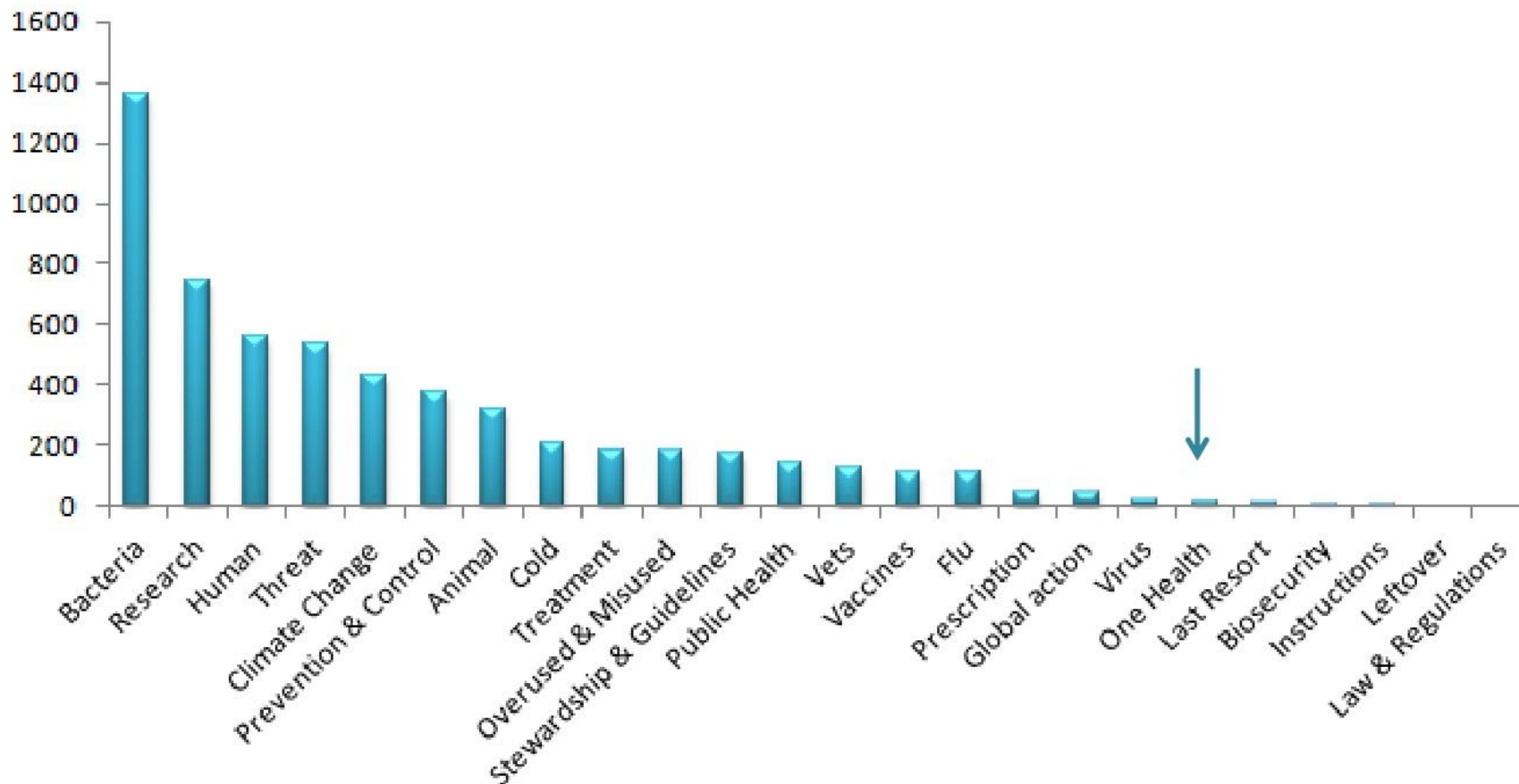
## Europe

- Bacteria
- Research
- Human
- Threat
- Climate Change
- Prevention & Control
- Animal
- Cold
- Treatment
- Overused & Misused
- Stewardship & Guidelines
- Public Health
- Vets
- Vaccines
- Flu
- Prescription
- Global action
- Virus
- One Health
- Last Resort
- Biosecurity
- Instructions
- Leftover
- Law & Regulations



**One Health**  
is barely mentioned within  
the conversation about  
AMR





## The most shared content

Europe

plos.org

**PLOS** PATHOGENS

Browse Publish About

OPEN ACCESS

PEARLS

### Antibiotic interceptors: Creating safe spaces for bacteria

Akshay Sabnis Elizabeth V. K. Ledger Vera Pader Andrew M. Edwards

Published: April 19, 2018 • <https://doi.org/10.1371/journal.ppat.1006924>

Article Authors Metrics Comments Related Content

UNIVERSAL-SCI



May 3, 2018

## BACTERIA MAY BE POWERFUL WEAPON AGAINST ANTIBIOTIC RESISTANCE

WORLD ECONOMIC FORUM

Agenda Initiatives Reports Events About

TopLink Q

Global Agenda Global Health Future of Health and Healthcare Biotechnology

### A possible solution to antibiotic resistance? Reprogramme bacteria, don't kill them



## The Guardian

International edition

### Antibiotic resistance could be countered by anti-bacterial viruses

Research found some patients had lower E coli levels after being given cocktail of 'phages'

### Antibiotic resistance crisis worsening because of collapse in supply

Patients given wrong dose, wrong type, or poor quality medicines because supply is waning



bioRxiv

THE PREPRINT SERVER FOR BIOLOGY

HOME | AB

Search

New Results

### Precise prediction of antibiotic resistance in Escherichia coli from full genome sequences

Danesh Moradigaravand, Martin Palm, Anne Farewell, Ville Mustonen, Jonas Warringer, Leopold Parts  
doi: <https://doi.org/10.1101/338194>

This article is a preprint and has not been peer-reviewed [what does this mean?].

Abstract

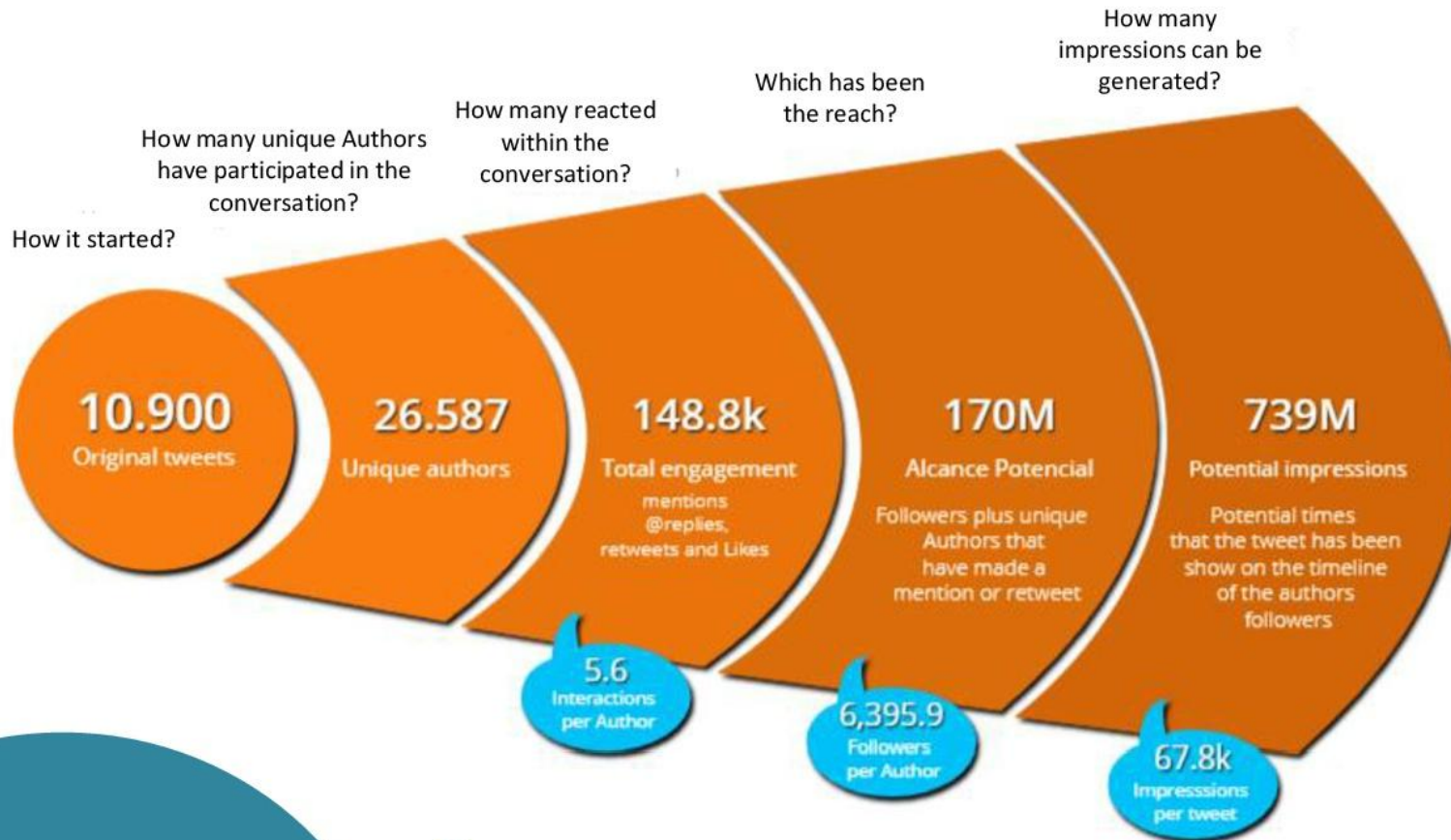
Info/History

Metrics

Preview PDF







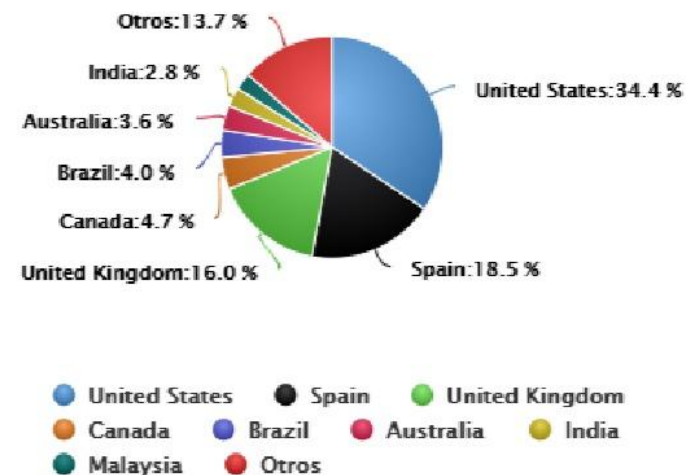
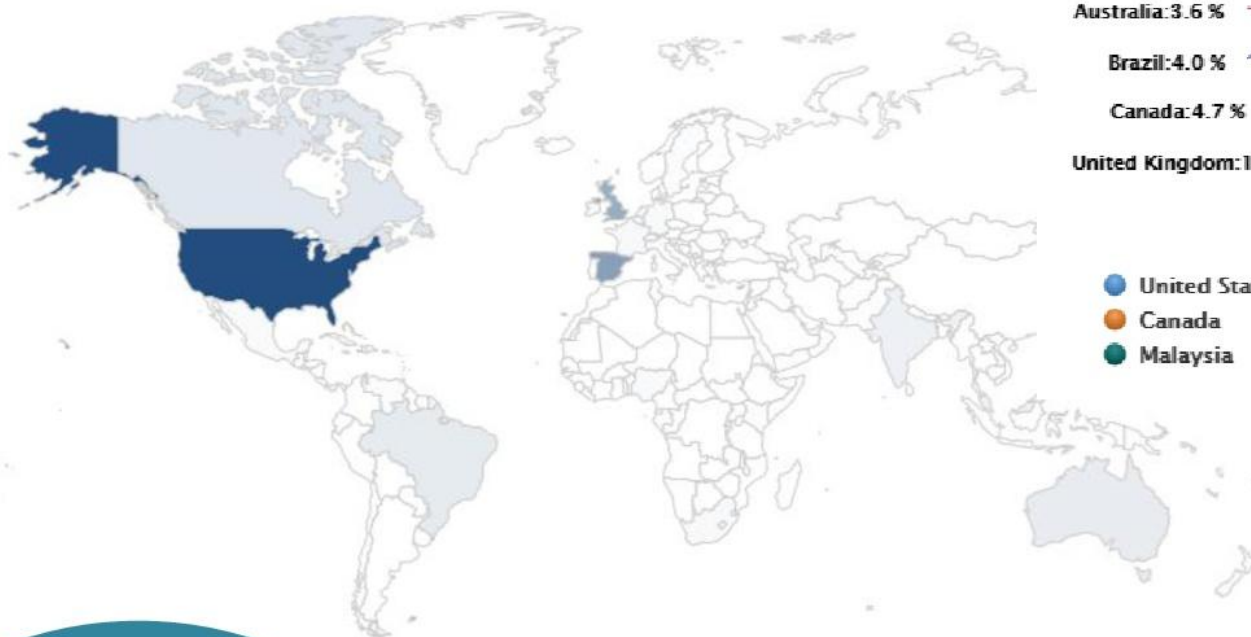
739 Million potential impressions have been generated from 10.900 original tweets



**Impressions** = number of times that the tweet has been shown on the timeline of the authors followers

## Distribution by countries

World



With a total of 6.978 mentions, United States is where most of the conversation comes from, which 20.6% of total mentions.

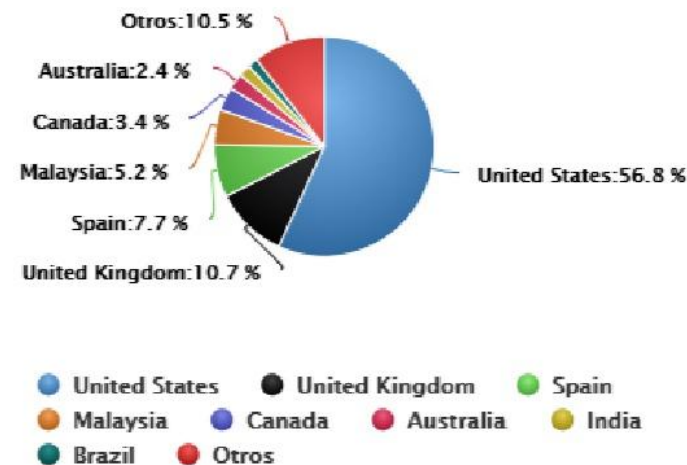
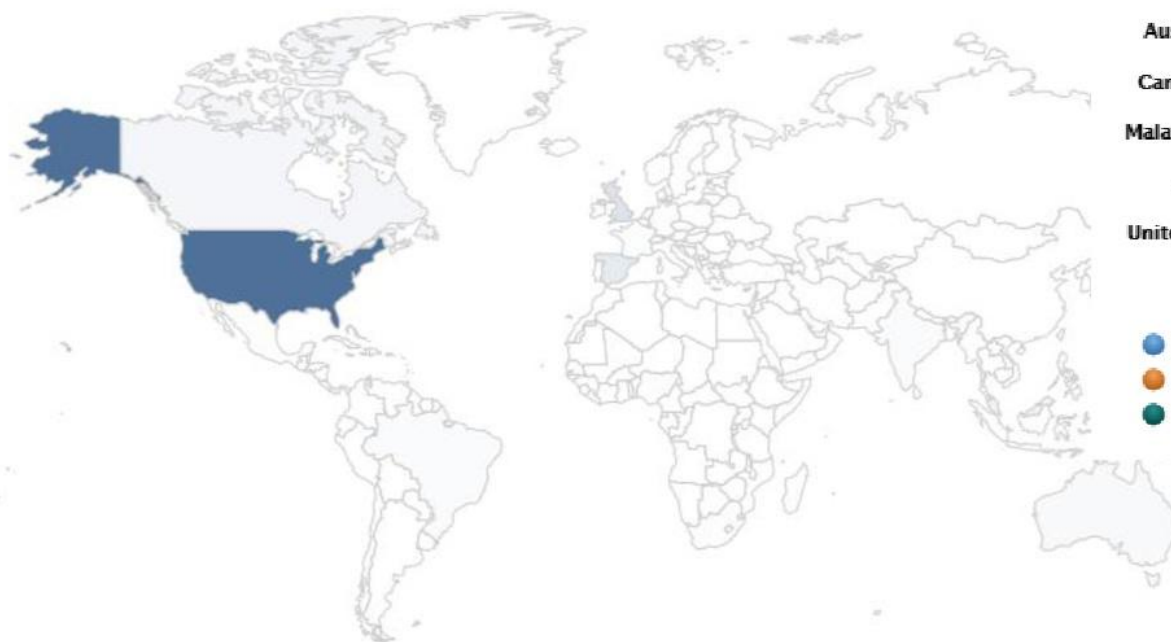
Skipping the term *AMR* from the research, positions worldwide are: United States, Spain and United Kingdom

#AMR in EEUU = Andrea Mitchell Reports (American journalist with 1.7M followers)



## Distribution by countries

## World



With a total of 13.916 mentions, United States is where most of the conversation comes from, which 27.5% of total mentions.

Taking into account the term *AMR*, positions change and UK generates more tweets than Spain



#AMR in EEUU = Andrea Mitchell Reports (American journalist with 1.7M followers)



# Relevant keyword map by source type

World



Most relevant keywords by source type



! Twitter is the main source, but AMR is also generating news and conversations in other websites, blogs and forums

# Top Authors

# World


Top Authors per activity

Author	Tweets
 <b>Pepa Gutiérrez</b> @healthdevice	483
 <b>Estudios Clínicos</b> @estudioclinico	482
 <b>Nebulized Antibiotic</b> @Neb_Antib_news	479
 <b>Pedro López</b> @noticias_reuma	479
 <b>Laia Montes</b> @on_cardiologia	477






Authors per activity (without retweets)

Author	Tweets
 <b>Battle Superbugs</b> @battlesuperbugs	104
 <b>MRSA aid</b> @MRSAaid	45
 <b>Longitude Prize</b> @longitude_prize	42
 <b>Save Antibiotics</b> @saveantibiotics	42
 <b>AntibioticResearchUK</b> @1Antruk	41

Top Authors per link

Author	Reach
 <b>World Health Organization (WHO)</b> @WHO	27.271.872
 <b>NYT Science</b> @NYTScience	6.975.708
 <b>CDC</b> @CDCgov	4.313.696
 <b>Phys.org</b> @physorg_com	3.496.190
 <b>Global News Center</b> @GNews_Center	1.760.335

Top authors per influence

Author	Influence
 <b>Nexus 7 Replicant</b> @DrElmerLee	100
 <b>Robin</b> @robin5362	100
 <b>Oogy Coyote</b> @oogy	100
 <b>Siti N.</b> @ctnurhidaya	10
 <b>Carles Borrego</b> @CarlesBorrego	10

Most mentioned Authors

Author	Tweets
 <b>@liyanamohtar</b>	1.235
 <b>World Health Organization</b> @who	432
 <b>Centers for Disease Control</b> @cdcgov	412
 <b>Rich Davis</b> @richdavisphd	390
 <b>@whowpro</b>	368

Top Authors by retweets

Author	Tweets
	

WHO, NYT Science and CDC are the most relevant institutions worldwide.

The activity of individual authors is lead by Spanish people.

UK initiatives appear in the top authors too.



## Authors Bio – Map of relevant terms

World



Most relevant term

*health* is the most relevant term in the conversation, following by these terms in order of relevance:

- ✓ science
- ✓ research
- ✓ news
- ✓ life

People who are talking about AMR are engaged in the following sectors:

Health  
Research  
Science  
University

# Activity

# World



**50.639**  
Mentions



**39.739**  
Retweets



**1.064**  
Replies



**42.670**  
With Like



**4.127**  
Multimedia

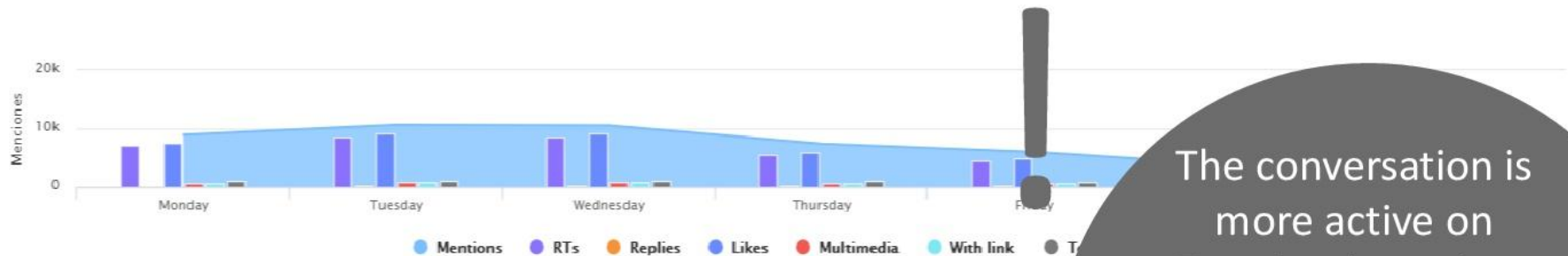
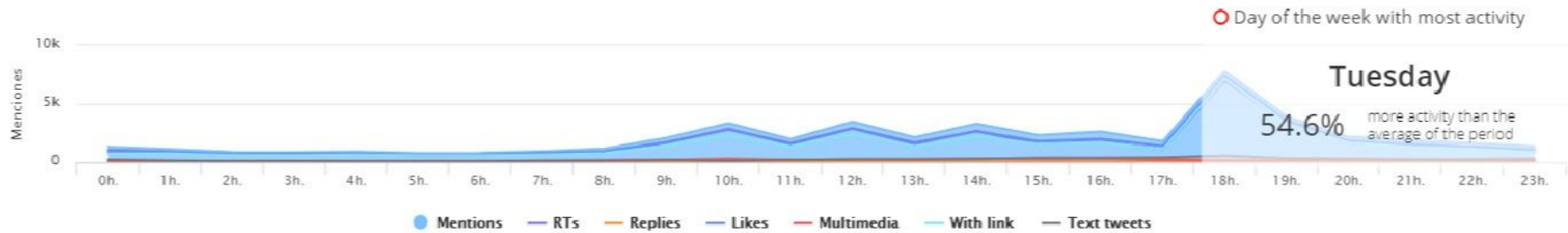
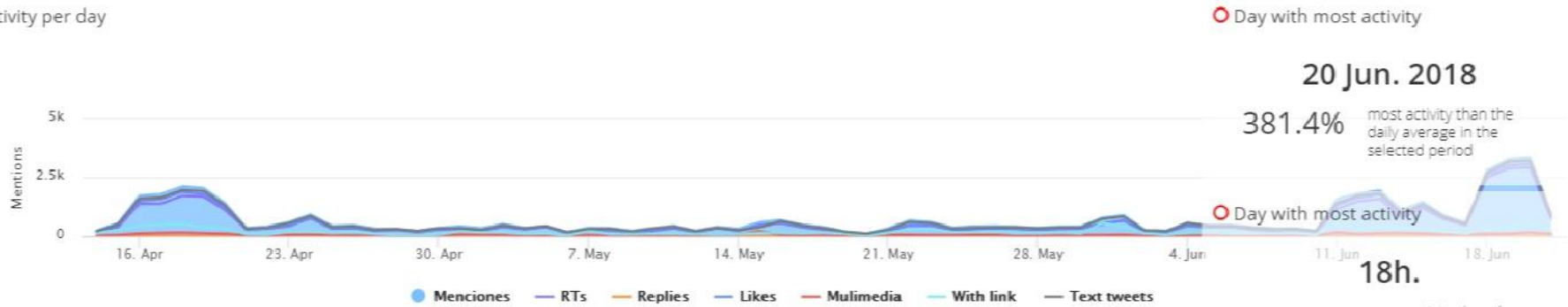


**13.642**  
With link



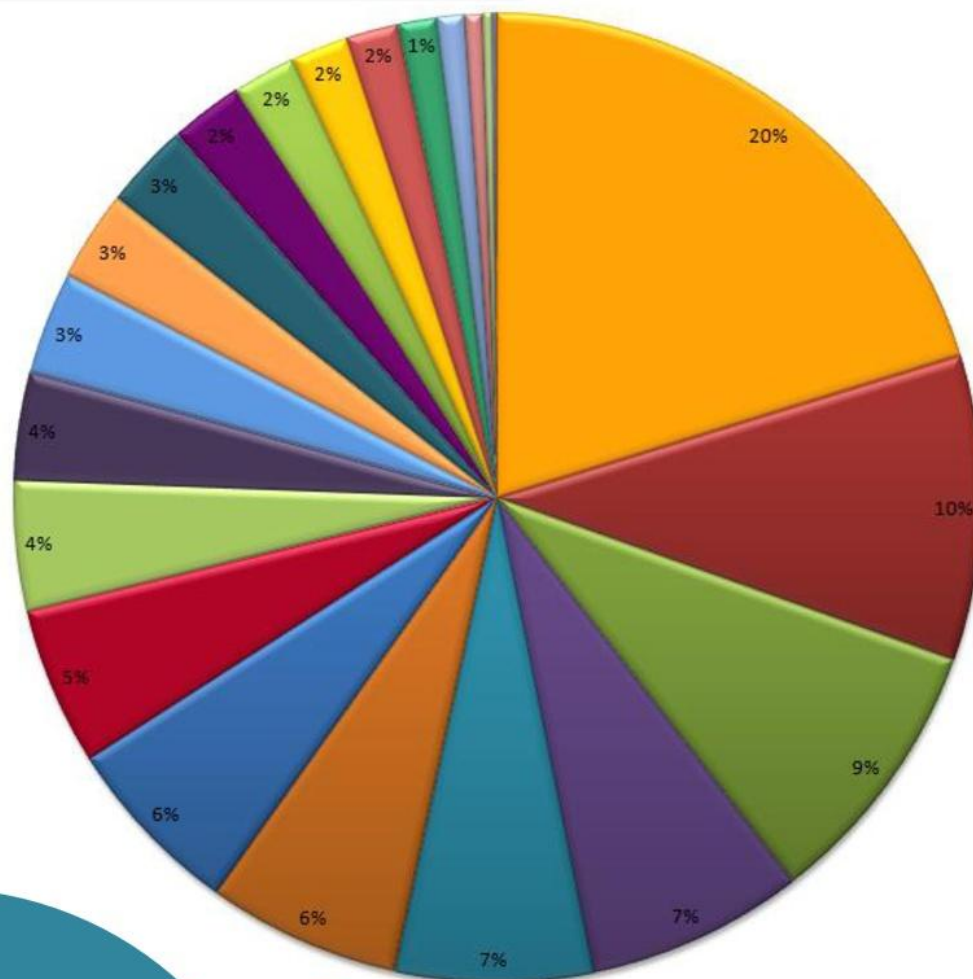
**46.512**  
Text tweets

Activity per day



The conversation is more active on Tuesdays' evenings

## Terms linked to Antibiotic Resistance



## World

- Bacteria
- Research
- Human
- Prevention & Control
- Threat
- Treatment
- Cold
- Animal
- Climate Change
- Public Health
- Flu
- Overused & Misused
- Law & Regulations
- Vaccines
- Prescription
- Virus
- Vets
- Stewardship & Guidelines
- Global action
- Last Resort
- One Health
- Biosecurity
- Leftover
- Instructions

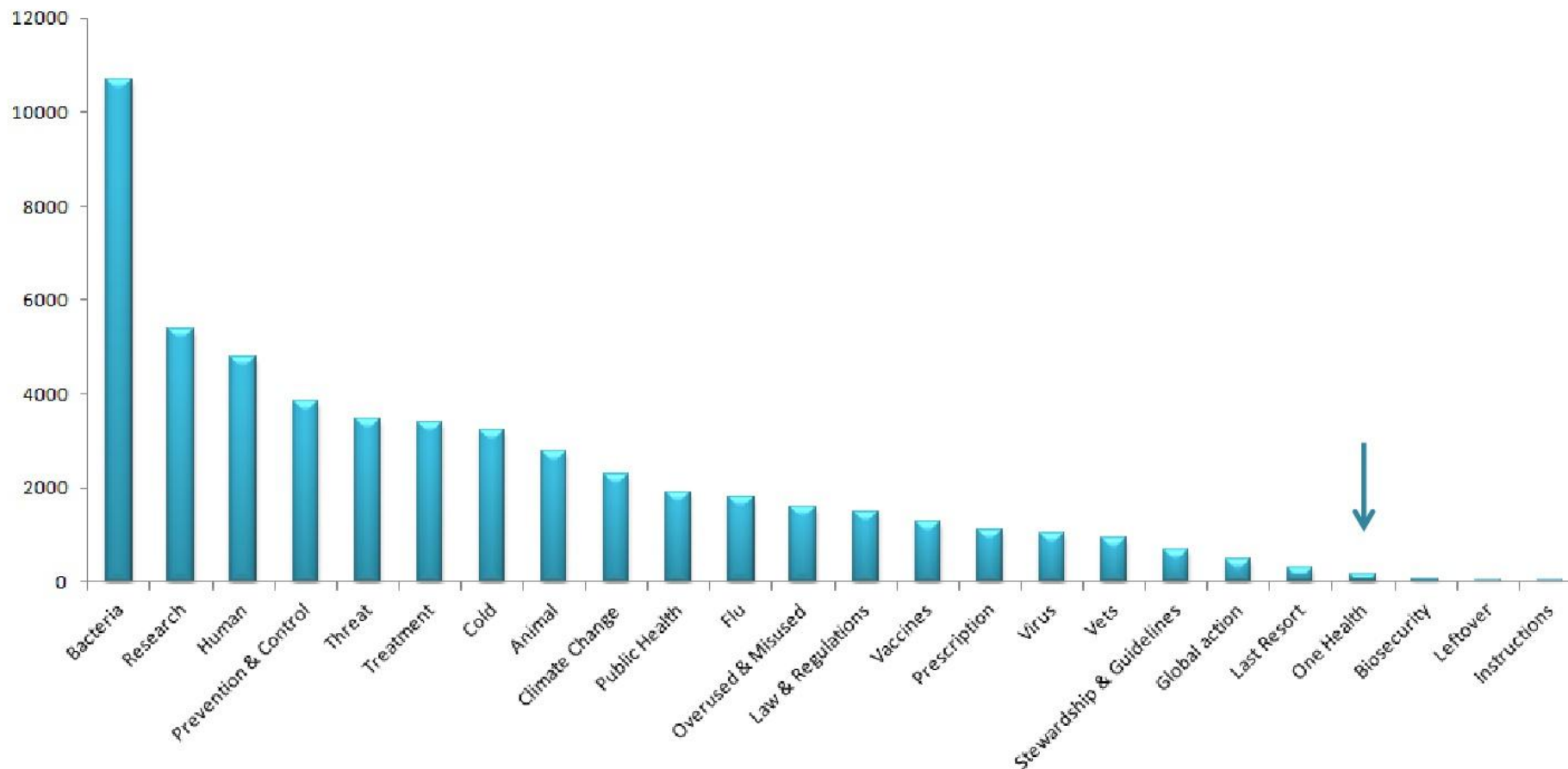


**One Health**  
is barely mentioned within  
the conversation about  
AMR



# Terms linked to Antibiotic Resistance

World



## The most shared content

World



### Antibiotic Prescribing and Use in Doctor's Offices

Appropriate Antibiotic Use: Community

CDC > Antibiotic Use

About +

Antibiotic Resistance Questions and Answers

For Patients +



For Healthcare Professionals +

Questions about Bacteria, Viruses, and Antibiotics

Improving Prescribing +

Q: What are bacteria and viruses?

Program Development and Evaluation

UNIVERSAL-SCI

State and International

Partnerships

Materials



**SURE, SUBWAYS ARE GROSS.  
BUT ANTIBIOTICS AREN'T THE  
ANSWER**



## Toothpaste and hand wash are causing antibiotic resistance – ScienceDaily

By - on Jun 19, 2018 in category Health

0 likes | Leave a comment | 183 views

A common ingredient in toothpaste and hand wash could be contributing to antibiotic resistance, according to University of Queensland research.

## Antibiotic resistance crisis worsening because of collapse in supply

Patients given wrong dose, wrong type, or poor quality medicines because supply is waning



## WHO's first global report on antibiotic resistance reveals serious, worldwide threat to public health

New WHO report provides the most comprehensive picture of antibiotic resistance to date, with data from 114 countries

News release





A comparative

## Relevant keywords in the conversation

Europe

Most relevant term

*new* is the most relevant term in the conversation, following by these terms in order of relevance:

- ✓ antibiotics
- ✓ bacteria
- ✓ use
- ✓ drug

## Relevant hashtags in the conversation

Europe

Most relevant hashtag

*#amr* is the most relevant hashtag in this conversation, the following are (in relevance order):

- ✓ #antibiotics
- ✓ #antibioticresistance
- ✓ #antibiotic
- ✓ #antimicrobialresistance

## Europe vs World

World

Most relevant term

*new* is the most relevant term in the conversation, following by these terms in order of relevance:

- ✓ antibiotics
- ✓ use
- ✓ bacteria
- ✓ health

Most relevant hashtag

*#antibiotics* is the most relevant hashtag in this conversation, the following are (in relevance order):

- ✓ #antibioticresistance
- ✓ #antimicrobialresistance
- ✓ #antibiotic
- ✓ #icd11

Antibiotics  
Bacteria

#antibiotic  
#antibioticresistance

Terms and hashtags more used within 'Antibiotic Resistance' conversation worldwide








## Top Authors





Europe

## Europe vs World






Top Authors per link

Author	Reach
 World Health Organization (WHO) @WHO	27,271,872
 The Guardian @guardian	14,436,806
 Guardian Science @guardianscience	2,184,550
 Science Museum @sciencemuseum	2,017,632
 NRDC @NRDC	1,181,964

Most mentioned Authors


Author	Tweets
 Longitude Prize @longitude_prize	134
 @theurgentneed	87
 World Health Organization @who	80
 Rich Davis @richdavisphd	78
 Science Museum @sciencemuseum	75

Authors per activity (without retweets)





Author	Tweets
 Antibiotic Research UK @1Antruk	41
 Spectromics @Spectromics	35
 Antibiotic Action @TheUrgentNeed	26
 AMR Ireland @AMR_Ireland	18
 Antibiotic Resistance @AntibioticResis	17

World

Top Authors per link

Author	Reach
 World Health Organization (WHO) @WHO	27,271,872
 NYT Science @NYTScience	6,975,708
 CDC @CDCgov	4,313,696
 Phys.org @physorg_com	3,496,190
 Global News Center @GNews_Center	1,760,335

Most mentioned Authors

Author	Tweets
 @liyanamohtar	1,235
 World Health Organization @who	432
 Centers for Disease Control @cdcgov	412
 Rich Davis @richdavisphd	378
 @whowpro	378

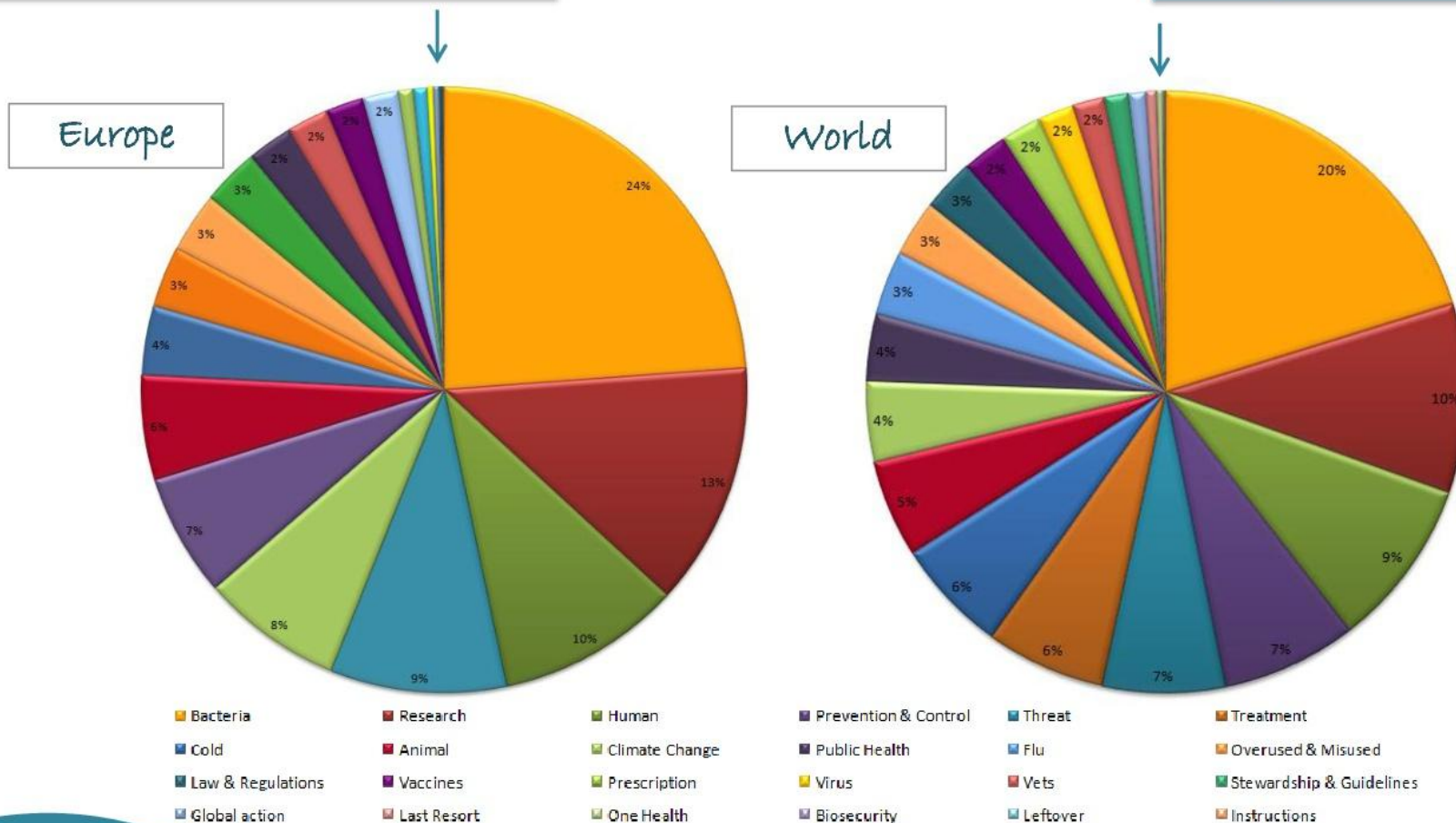
Authors per activity (without retweets)

Author	Tweets
 Battle Superbugs @battlesuperbugs	104
 MRSI @MRSI	45

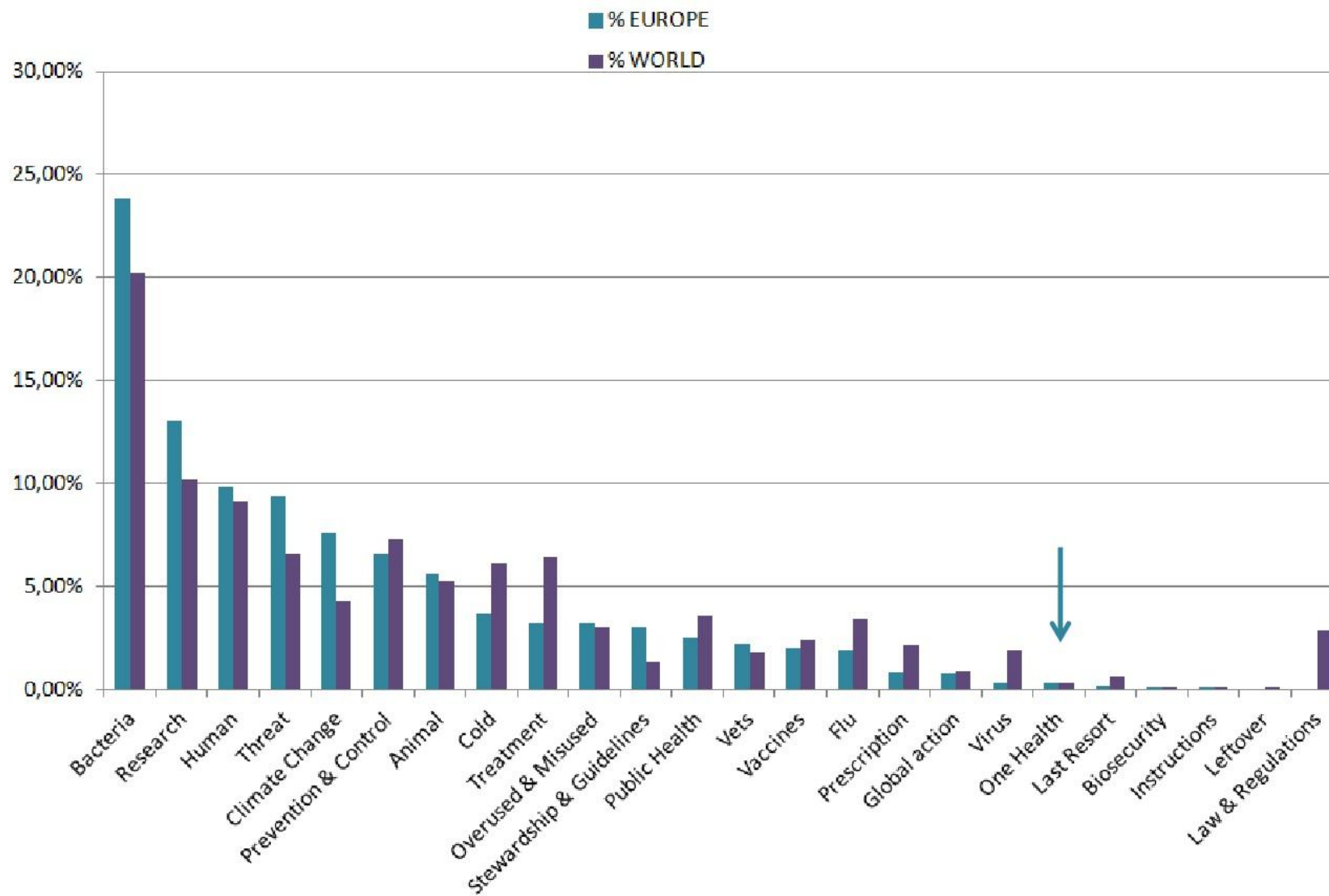
WHO, The Guardian, NYT Science, CDC and Longitude Prize are the most relevant institutions generating content related to AMR worldwide.

## Terms linked to Antibiotic Resistance

## Europe vs World



**One Health**  
is barely mentioned within  
the conversation about  
AMR neither in Europe nor  
in the world





# Audience Evolution

# Europe vs World

## Europe

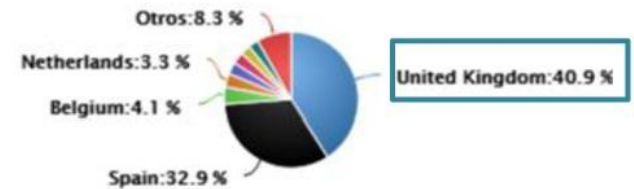
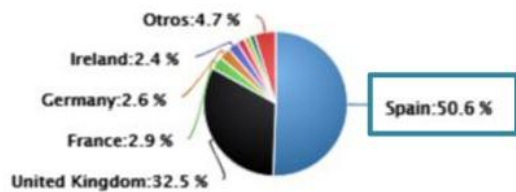
April\*



May



June



- United Kingdom
- Spain
- France
- Netherlands
- Germany
- Ireland
- Switzerland
- Sweden
- Otros

- Spain
- United Kingdom
- France
- Germany
- Ireland
- Netherlands
- Switzerland
- Sweden
- Otros

- United Kingdom
- Spain
- Belgium
- Netherlands
- Switzerland
- France
- Germany
- Ireland
- Otros

## World

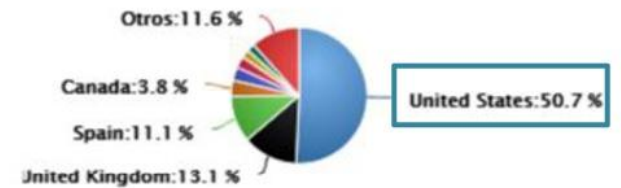
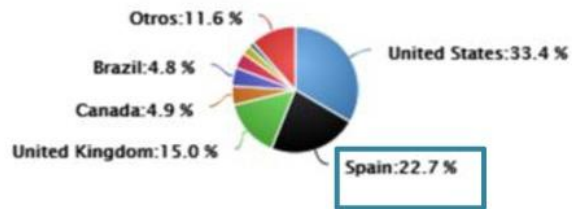
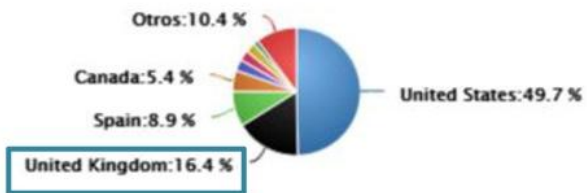
April\*



May



June



- United States
- United Kingdom
- Spain
- Canada
- India
- Australia
- Brazil
- France
- Otros

- United States
- Spain
- United Kingdom
- Canada
- Brazil
- Australia
- India
- France
- Otros

- United States
- United Kingdom
- Spain
- Canada
- Malaysia
- Australia
- Brazil
- India
- Otros

\*From 15th to 30th

## Appendix 3: List of evaluation indicators (WP3)

### Task 8.1: Data collection to define best practices in Awareness and Communication Plans

<b>(code) Indicator</b>	<b>WP8.1.1_ Report about Communication Good Practices in Awareness Campaigns</b>
<b>Definition</b>	Production of a report about Communication Good Practices in awareness campaigns
<b>Justification</b>	Availability of a report about Communication Good Practices as a guide or reference tool when designing new strategies and offer ideas to MS for building further new awareness campaigns in the future.
<b>Type of indicator</b>	Outcome
<b>Methodology</b>	Qualitative
<b>Data source(s)</b>	Report
<b>Data collection instrument</b>	Internet
<b>Responsible</b>	WP8
<b>Periodicity of data collection</b>	M12
<b>Completion criteria</b>	Report available
<b>Acceptance criteria</b>	Report available
<b>Observations</b>	

<b>(code) Indicator</b>	<b>WP8.1.2_ Pilot study about the theme “antibiotic” in social networks and Internet</b>
<b>Definition</b>	Setting up of a Pilot study about the theme “antibiotic” in social networks and Internet
<b>Justification</b>	Findings could determine the best period for launching campaigns in addition to negative attitudes or perceptions that should be considered to better address overuse and misuse.
<b>Type of indicator</b>	Outcome
<b>Methodology</b>	Qualitative
<b>Data source(s)</b>	Social networks, Internet
<b>Data collection instrument</b>	Web-based tool (pilot study)
<b>Responsible</b>	WP8
<b>Periodicity of data collection</b>	M12, M24
<b>Completion criteria</b>	Pilot study performed
<b>Acceptance criteria</b>	Pilot study performed
<b>Observations</b>	

### Task 8.2: Design and Implementation of Awareness and Communication Plan

<b>(code) Indicator</b>	<b>WP8.2.1.1_ Awareness and Communication plan</b>
<b>Definition</b>	Preparation of the Awareness and Communication plan
<b>Justification</b>	The development of an Awareness and Communication Plan with clear objectives and key messages is necessary to achieve some of the projects objectives.
<b>Type of indicator</b>	Outcome
<b>Methodology</b>	Qualitative
<b>Data source(s)</b>	WP8 leadership
<b>Data collection instrument</b>	The plan should be available at the members area (Sharefile)
<b>Responsible</b>	WP8

Periodicity of data collection	M10
Completion criteria	Awareness and Communication plan developed and available
Acceptance criteria	Awareness and Communication plan developed and available
Observations	

<b>(code) Indicator</b>	<b>WP8.2.1.2_ % of partners who consulted the Awareness and Communication plan</b>
Definition	Percentage of EU-JAMRAI partners that are aware of and have consulted the Awareness plan.
Justification	For an appropriate implementation of the Awareness Plan is necessary that all the partners are aware of the plan and support the dissemination of the different campaigns/activities that will be developed.
Type of indicator	Outcome
Methodology	Quantitative
Data source(s)	Self-reported surveys
Data collection instrument	EU-JAMRAI partners survey
Responsible	WP3
Periodicity of data collection	Twice (M12, M24)
Completion criteria	100% of partners have consulted the Awareness Plan
Acceptance criteria	80% of partners have consulted the Awareness Plan
Observations	

<b>(code) Indicator</b>	<b>WP8.2.2_ Database of European Science and Health communicators</b>
Definition	Development of a database with science and health communicators at European level.
Justification	For some of the activities of the project, such as the communication workshop, it will be necessary to have a complete database of health communicators.
Type of indicator	Outcome
Methodology	Qualitative
Data source(s)	WP8 leadership
Data collection instrument	WP8 will show WP3 the database built during the project (it can not be published at the website because of the confidentiality of the data).
Responsible	WP8
Periodicity of data collection	M18, M34
Completion criteria	Health communicators database developed
Acceptance criteria	Health communicators database developed
Observations	

<b>(code) Indicator</b>	<b>WP8.2.3.1_ Training webinar on AMR</b>
Definition	Training webinar on AMR lead by scientist
Justification	Develop a training webinar on AMR focused on health care professionals and communicators.
Type of indicator	Outcome
Methodology	Qualitative
Data source(s)	WP8
Data collection instrument	Report
Responsible	WP8
Periodicity of data collection	M16
Completion criteria	Webinar organized
Acceptance criteria	Webinar organized
Observations	

<b>(code) Indicator</b>	<b>WP8.2.3.2_ Training webinar on AMR _ satisfaction of the attendees</b>
<b>Definition</b>	Satisfaction with Training webinar on AMR
<b>Justification</b>	Develop a training webinar on AMR focused on health care professionals and communicators
<b>Type of indicator</b>	Outcome
<b>Methodology</b>	Quantitative
<b>Data source(s)</b>	Participants
<b>Data collection instrument</b>	Satisfaction survey
<b>Responsible</b>	WP3
<b>Periodicity of data collection</b>	After the webinar
<b>Completion criteria</b>	100% satisfied
<b>Acceptance criteria</b>	70% satisfied
<b>Observations</b>	

### Task 8.3: Tools for Awareness and Communication

<b>(code) Indicator</b>	<b>WP8.3.1.1_ Create profiles in Facebook, Twitter and YouTube (Video blog)</b>
<b>Definition</b>	Create profiles in the most important social networks (Facebook, Twitter and YouTube)
<b>Justification</b>	It is important to have an active social media profiles to disseminate information and drive interest to other EU-JAMRAI materials and campaigns.
<b>Type of indicator</b>	Process
<b>Methodology</b>	Qualitative
<b>Data source(s)</b>	WP8 leader
<b>Data collection instrument</b>	Social network profiles
<b>Responsible</b>	WP8
<b>Periodicity of data collection</b>	M10
<b>Completion criteria</b>	EU-JAMRAI Facebook, Twitter and YouTube pages are available
<b>Acceptance criteria</b>	EU-JAMRAI Facebook, Twitter and YouTube pages are available
<b>Observations</b>	

<b>(code) Indicator</b>	<b>WP8.3.1.2_ Number of followers in Facebook, Twitter and YouTube (Video blog)</b>
<b>Definition</b>	Number of followers in Facebook, Twitter and YouTube (Video blog)
<b>Justification</b>	Number of follower is a measure of impact on social networks (Facebook, Twitter and YouTube)
<b>Type of indicator</b>	Process
<b>Methodology</b>	Quantitative
<b>Data source(s)</b>	WP8 leader
<b>Data collection instrument</b>	Social network profiles
<b>Responsible</b>	WP8
<b>Periodicity of data collection</b>	M10
<b>Completion criteria</b>	The number of followers in the EU-JAMRAI social networks increases during the life of the project (Facebook, Twitter and YouTube pages)
<b>Acceptance criteria</b>	The number of followers in the EU-JAMRAI social networks increases during the life of the project (Facebook, Twitter and YouTube pages)
<b>Observations</b>	

<b>(code) Indicator</b>	<b>WP8.3.1.3_ Number of posts/month in the VideoBlog</b>
<b>Definition</b>	Number of posts in the Video blog
<b>Justification</b>	Keep the video blog active with new videos from EU-JAMRAI and other videos from strategic AMR actors (stakeholders, partners, etc)
<b>Type of indicator</b>	Process
<b>Methodology</b>	Quantitative
<b>Data source(s)</b>	Number of posts
<b>Data collection instrument</b>	Blog monitoring
<b>Responsible</b>	WP8
<b>Periodicity of data collection</b>	Every month (since activation). Reports on M12, M24, M36
<b>Completion criteria</b>	1 video/quarterly
<b>Acceptance criteria</b>	1 video/quarterly
<b>Observations</b>	

<b>(code) Indicator</b>	<b>WP 8.3.1.4_ Number of post/month in Facebook</b>
<b>Definition</b>	Number of post/month in Facebook
<b>Justification</b>	To keep the social networks active is crucial to disseminate information, campaigns and drive interest to EU-JAMRAI outcomes.
<b>Type of indicator</b>	Process
<b>Methodology</b>	Quantitative
<b>Data source(s)</b>	Number of post
<b>Data collection instrument</b>	Facebook page monitoring
<b>Responsible</b>	WP8
<b>Periodicity of data collection</b>	Every month (since activation). Reports on M12, M24, M36
<b>Completion criteria</b>	12 post /month
<b>Acceptance criteria</b>	8 post/ month
<b>Observations</b>	

<b>(code) Indicator</b>	<b>WP 8.3.1.5_ Number of post/month in Twitter</b>
<b>Definition</b>	Number of post/month in Twitter
<b>Justification</b>	To keep the social networks active is crucial to disseminate information, campaigns and drive interest to EU-JAMRAI outcomes.
<b>Type of indicator</b>	Process
<b>Methodology</b>	Quantitative
<b>Data source(s)</b>	Number of post
<b>Data collection instrument</b>	Twitter page monitoring
<b>Responsible</b>	WP8
<b>Periodicity of data collection</b>	Every month (since activation). Reports on M12, M24, M36
<b>Completion criteria</b>	20 post /month
<b>Acceptance criteria</b>	15 post/ month
<b>Observations</b>	

<b>(code) Indicator</b>	<b>WP 8.3.1.6_ Social media promotion actions in the second year</b>
<b>Definition</b>	Number of social media promotion actions in the second year
<b>Justification</b>	3 social media promotion actions per year will be carried out in the second and third year to attract traffic to our networks and create conversation.
<b>Type of indicator</b>	Process/Outcome
<b>Methodology</b>	Quantitative
<b>Data source(s)</b>	WP8 leader
<b>Data collection instrument</b>	EU-JAMRAI social networks profiles
<b>Responsible</b>	WP8

Periodicity of data collection	M25
Completion criteria	3
Acceptance criteria	3
Observations	

<b>(code) Indicator</b>	<b>WP 8.3.1.7_ Social media promotion actions in the third year</b>
Definition	Number of social media promotion actions in the third year
Justification	3 social media promotion actions per year will be carried out in the second and third year to attract traffic to our networks and create conversation.
Type of indicator	Process/Outcome
Methodology	Quantitative
Data source(s)	WP8 leader
Data collection instrument	EU-JAMRAI social networks profiles
Responsible	WP8
Periodicity of data collection	M36
Completion criteria	3
Acceptance criteria	3
Observations	

<b>(code) Indicator</b>	<b>WP 8.3.2_ European Award _ ARM Symbol Competition</b>
Definition	European Award (Ex: best articles/video)
Justification	The organization of competitions at European level will allow reaching some of the target audiences and achieving their engagement with the Joint Action objectives. We will develop two different competitions focused on these audiences.
Type of indicator	Report
Methodology	Qualitative
Data source(s)	Report after the competition (including information about the contest, participants, and winners)
Data collection instrument	WP8
Responsible	WP8
Periodicity of data collection	M28
Completion criteria	Report available
Acceptance criteria	Report available
Observations	

<b>(code) Indicator</b>	<b>WP 8.3.3_ Competition with students (High school or University)_Video Game</b>
Definition	Competition with students (High school or University)
Justification	The organization of competitions at European level will allow reaching some of the target audiences and achieving their engagement with the Joint Action objectives.
Type of indicator	Report
Methodology	Qualitative
Data source(s)	Report after the competition (including information about the contest, participants, and winners)
Data collection instrument	WP8
Responsible	WP8
Periodicity of data collection	M33
Completion criteria	Report available
Acceptance criteria	Report available
Observations	

**Task 8.4: Support coordination about World Week and the European Day of Appropriate Use of Antibiotics // High level awareness and communication meeting**

<b>(code) Indicator</b>	<b>WP8.4.1_ Support coordination about World Week and the European Day of Appropriate Use of Antibiotics</b>
<b>Definition</b>	Support coordination about World Week and the European Day of Appropriate Use of Antibiotics
<b>Justification</b>	To be in contact with the main actors in the EAAD (ECDC, WHO Europe) and coordinate the main information about their celebrations with the member states and their national celebrations.
<b>Type of indicator</b>	Process
<b>Methodology</b>	Qualitative
<b>Data source(s)</b>	Meeting minutes
<b>Data collection instrument</b>	WP8 minutes
<b>Responsible</b>	WP8
<b>Periodicity of data collection</b>	M14, M26
<b>Completion criteria</b>	Minutes of the meetings held with ECDC, WHO and with the communication focal points of each WP
<b>Acceptance criteria</b>	Minutes of the meetings held with ECDC, WHO and with the communication focal points of each WP
<b>Observations</b>	

<b>(code) Indicator</b>	<b>WP8.4.2.1_ High level awareness and communication meeting</b>
<b>Definition</b>	High level awareness and communication meeting
<b>Justification</b>	High Level awareness and communication Meeting is targeted to governments, institutions at the regional and national level and relevant stakeholders.
<b>Type of indicator</b>	Output
<b>Methodology</b>	Qualitative
<b>Data source(s)</b>	WP8 leader
<b>Data collection instrument</b>	Report
<b>Responsible</b>	WP8
<b>Periodicity of data collection</b>	M36
<b>Completion criteria</b>	High level Meeting organised and report available
<b>Acceptance criteria</b>	High level Meeting organised and report available
<b>Observations</b>	

<b>(code) Indicator</b>	<b>WP8.4.2.2_ Percentage of stakeholders attending the High level awareness and communication meeting (response rate)</b>
<b>Definition</b>	Percentage of stakeholders attending the High level awareness and communication meeting (response rate)
<b>Justification</b>	High Level awareness and communication Meeting is targeted to governments, institutions at the regional and national level and relevant stakeholders.
<b>Type of indicator</b>	Process
<b>Methodology</b>	Quantitative
<b>Data source(s)</b>	List of participants
<b>Data collection instrument</b>	List of signatures
<b>Responsible</b>	WP8
<b>Periodicity of data collection</b>	M36
<b>Completion criteria</b>	100% stakeholders
<b>Acceptance criteria</b>	65% stakeholders
<b>Observations</b>	



<b>(code) Indicator</b>	<b>WP8.4.2.3_ High level awareness and communication meeting (MS represented)</b>
<b>Definition</b>	High level awareness and communication meeting (MS represented)
<b>Justification</b>	High Level awareness and communication Meeting is targeted to governments, institutions at the regional and national level and relevant stakeholders.
<b>Type of indicator</b>	Process
<b>Methodology</b>	Quantitative
<b>Data source(s)</b>	List of participants
<b>Data collection instrument</b>	List of signatures
<b>Responsible</b>	WP8
<b>Periodicity of data collection</b>	M36
<b>Completion criteria</b>	100% member states
<b>Acceptance criteria</b>	70% member states
<b>Observations</b>	

<b>(code) Indicator</b>	<b>WP8.4.2.4_ High level awareness and communication meeting (satisfaction level)</b>
<b>Definition</b>	Satisfaction with High level awareness and communication meeting
<b>Justification</b>	High Level awareness and communication Meeting is targeted to governments, institutions at the regional and national level and relevant stakeholders.
<b>Type of indicator</b>	Process
<b>Methodology</b>	Quantitative
<b>Data source(s)</b>	Participants
<b>Data collection instrument</b>	High level meeting satisfaction questionnaire
<b>Responsible</b>	WP3
<b>Periodicity of data collection</b>	M36
<b>Completion criteria</b>	100% satisfied
<b>Acceptance criteria</b>	70% satisfied
<b>Observations</b>	



Code	Partner Acronym	Country	Participation in WP8	Persons/ Months per participant in WP8	Act. 1	Act. 2	Act. 3	Act. 4	Act. 5	Act. 6	Act. 7	Act. 8	Act. 9	Act. 10	Act. 11	Act. 12
LV-16	PSKUS	Latvia														
LT-17	LSMULKK	Lithuania	X	0.5												
LT-18	VULSK	Lithuania														
LT-19	HI	Lithuania	X	0.5												
LT-20	NVSC	Lithuania	X	2.5												
NL-21	VWS	Netherlands	X	2												
NO-22	HdiR	Norway	X	0.1												
NO-23	FHI	Norway														
NO-24	NVI	Norway														
PL-25	NMI	Poland														
PT-26	DGS	Portugal	X	2.5												
RO-27	UMPIH	Romania														
SI-28	NIJZ	Slovenia	X	3.5												
SP-29	AEMPS	Spain	X	49												
SP-30	GENCAT	Spain	X	4												
SP-31	CSGIB	Spain	X	3.1												
SP-32	DGPIFAC/FFIS/SMS	Spain	X	1												
SP-33	FMS	Spain	X	0.5												
SP-34	SAS/FISEVI/IBiS	Spain														

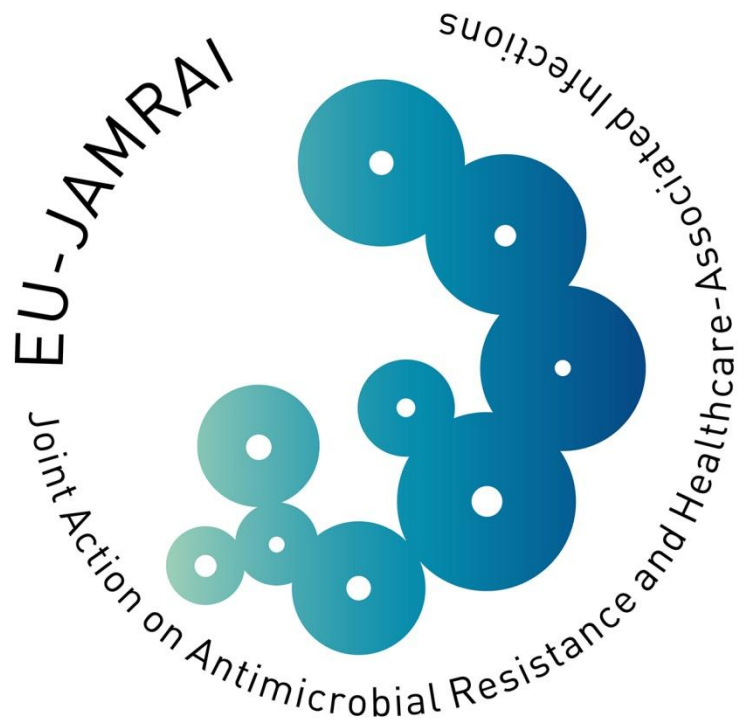
Code	Partner Acronym	Country	Participation in WP8	Persons/ Months per participant in WP8	Act. 1	Act. 2	Act. 3	Act. 4	Act. 5	Act. 6	Act. 7	Act. 8	Act. 9	Act. 10	Act. 11	Act. 12
SP-35	ISCIII	Spain	X	0.4												
SP-36	SERMAS	Spain	X	3												
SE-37	FOHM	Sweden														
SE-38	SOS	Sweden														
SE-39	SBA	Sweden														
SE-40	NFA	Sweden														
SE-41	SVA	Sweden														
SE-42	SRC	Sweden														
SE-43	UAS	Sweden														
FR-44	ANSES	FRANCE														

## Appendix 5: List of acronyms of EU-JAMRAI partners

<b>7HRC</b>	7th Health Region Crete (Dioikhsh Ygeionomikhs Perifereias Krhths)
<b>AEMPS</b>	Agencia Española de Medicamentos y Productos Sanitarios
<b>ANSES</b>	Agence Nationale de la Sécurité Sanitaire de L’Alimentation de L’Environnement et du Travail
<b>CIPH</b>	Croatian Institute of Public Health
<b>CSGIB</b>	Conselleria de Salut del Govern de les Illes Balears (IdISBa)
<b>DGPIFAC/FFIS/SMS</b>	Dirección General de Planificación, Investigación, Farmacia y Atención al Ciudadano. Servicio Murciano de Salud. Fundación para la Formación e Investigaciones Sanitarias de la Región de Murcia.
<b>DGS</b>	Directorate-General of Health
<b>ESDY- NSPH</b>	Ethniki Scholi Dimosias Ygeias
<b>FHI</b>	Norwegian Institute of Public Health
<b>FMS</b>	Fundación Miguel Servet - Navarrabiomed. Dirección General de Salud. Departamento de Salud del Gobierno de Navarra.
<b>FOHM</b>	Folkhälsomyndigheten - Public Health Agency of Sweden
<b>FPS HFCSE</b>	Federal Public Service Health, Food Chain Safety and Environment
<b>GENCAT</b>	Dirección General de Ordenación Profesional y Regulación Sanitaria. Departamento de Salud de la Generalitat de Cataluña
<b>GÖG</b>	Austrian Public Health Institute
<b>HCDCP</b>	Hellenic Centre for Disease Control & Prevention
<b>HdiR</b>	Norwegian Directorate of Health
<b>HI</b>	Institute of Hygiene
<b>INSERM</b>	Institut National de la santé et la recherche médicale
<b>ISCIH</b>	Instituto de Salud Carlos III
<b>ISS</b>	Istituto Superiore di Sanita
<b>LSMULKK</b>	The Hospital of Lithuanian University of Health Sciences Kauno Klinikos
<b>MoH-FR</b>	Ministry of Social Affairs and Health

<b>NCIPD</b>	National Center of Infectious and Parasitic Diseases
<b>NFA</b>	Livsmedelsverket - The Swedish National Food Agency
<b>NIJZ</b>	National Institute of Public Health
<b>NIPH</b>	The National Institute of Public Health
<b>NMI</b>	The National Medicines Institute
<b>NVI</b>	The Norwegian Veterinary Institute
<b>NVSC</b>	National Public Health Centre
<b>PSKUS</b>	Pauls Stradins Clinical University Hospital
<b>RKI</b>	Robert Koch-Institute
<b>SAS/FISEVI/IBiS</b>	Entity: Servicio Andaluz de Salud - Department: Hospital Universitario Virgen del Rocío
<b>SBA</b>	Jordbruksverket - The Swedish Board of Agriculture
<b>SERMAS</b>	Subdirección General de Farmacia y Productos Sanitarios.- Dirección General de Coordinación de la Asistencia Sanitaria del Servicio Madrileño de Salud
<b>SOS</b>	Socialstyrelsen - The National Board of Health and Welfare
<b>SRC</b>	Vetenskapsrådet - Swedish Research Council
<b>SSI</b>	Statens Serum Institut
<b>SVA</b>	Statens Veterinärmedicinska Anstalt - The Swedish National Veterinary Institute
<b>TA</b>	Terviseamet (Health board)
<b>UAS</b>	Akademiska sjukhuset - Uppsala University Hospital
<b>UMPIH</b>	University of Medicine and Pharmacy "Iuliu Hatieganu" CLUJ-NAPOCA
<b>UNIFG</b>	University of Foggia
<b>VULSK</b>	Vilnius University Hospital Santaros Klinikos
<b>VWS</b>	Dutch Ministry of Health, Welfare and Sport





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