



**INTERMINISTERIAL ROADMAP FOR  
CONTROLLING ANTIMICROBIAL RESISTANCE**

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**13 OVERARCHING INTERMINISTERIAL MEASURES  
40 ACTIONS**

17 November 2016



## SUMMARY OF PROPOSALS FROM THE STEERING COMMITTEE

The problems arising from the development of resistance to antibiotics in France, and more generally worldwide, are multiple and complex. They are characterised by:

- increasing resistance rates amongst bacteria that are pathogenic to humans and animals;
- rarefaction of the therapeutic arsenal, related to the industry disinvesting from research and development of new products;
- overuse of antibiotics;
- limited access or recourse to diagnostic tests that enable treatments to be better targeted;
- insufficient adoption of preventive measures, either for controlling bacterial transmission or through vaccination, which help avoid or reduce the use of antibiotics.

The diffusion of bacteria and / or resistance genes is a threat of which there is currently little or poor awareness amongst the public and professionals. Resistance has an impact on all human and veterinary medical activities, as well as on the environment, which justifies an intersectoral and interministerial approach based on the “One Health” concept as advocated by the World Health Organisation (WHO) and the World Organisation for animal health (OIE). The objective is to control the expansion of resistance to antibiotics and to maintain the immense benefits that antibiotics have brought to medicine. Applied to national public policies, this approach is necessarily conducted in close co-operation with the many international bodies that endorsed controlling the antimicrobial resistance (AMR) as public-health priority (the European Union, the G7, the G20, the WHO, FAO and the OIE).

**With that in mind, the main measures proposed to the CIS (*Comité Interministériel pour la Santé* – Interministerial Committee on Health) for adoption involve:**

- setting up a long-lasting intersectoral communication programme on AMR, aimed at bringing about a long-term modification in the way that antibiotics are perceived by all target audiences concerned;
- encouraging prescribers to prescribe antibiotics more appropriately, and linking that encouragement to making tools available, including appropriate diagnostic tests for human and animal health;
- co-ordinating research and provide support for a national intersectoral research plan, including measuring and analysing the impact of bacterial resistance in the environment;
- securing a strategic domain dedicated to innovation in antibiotic therapy and alternatives, within the thematic consortium, common to the Aviesan and AllEnvi research Alliances, in order to foster research and development of innovative new products;
- setting up an ad-hoc “technical committee” on antibiotic resistance, tasked with assessing and supporting the development of new technologies and products that may contribute to controlling resistance to antibiotics;

- strengthening the organisation of monitoring and use of data (on consumption and resistance), as well as producing indicators for monitoring that are common to the various sectors concerned;
- reinforcing the coordination of current plans from a “One health” perspective, in line with international actions.



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## ACRONYMS

<b>AFVAC</b>	Association Française des Vétérinaires pour Animaux de Compagnie (French Association of Domestic-Animal Veterinary Surgeons)	<b>ASIP Santé</b>	Agence des Systèmes d'Information Partagés de Santé (Shared Health Information Systems Agency)
<b>AGEPS</b>	Agence Générale des Equipements et Produits de Santé (Assistance publique-hôpitaux de Paris) (General Agency for Healthcare Facilities and Products (Public Assistance – Paris Hospitals))	<b>AVEF</b>	Association Vétérinaire Equine Française (French Equine Veterinary Association)
<b>AllEnvi</b>	Alliance nationale de recherche pour l'environnement (National Alliance for Environmental Research)	<b>AVIESAN</b>	Alliance nationale pour les sciences de la vie et de la santé (National Alliance for Life and Health Sciences)
<b>AMM</b>	Autorisation de Mise sur le Marché (Marketing Authorisation)	<b>BPI</b>	Banque Publique d'Investissement (Public Investment Bank)
<b>ANDPC</b>	Agence Nationale du Développement Professionnel Continu (National Agency for Continuous Professional Development)	<b>CA-SFM</b>	Comité de l'Antibiogramme de la Société Française de Microbiologie (Antibiogram Committee of the French Microbiology Society)
<b>ANMV</b>	Agence Nationale du Médicament Vétérinaire (Anses) (National Agency for Veterinary Medicines)	<b>CEPS</b>	Comité Economique des Produits de Santé (Economic Committee on Health Products)
<b>ANR</b>	Agence Nationale de la Recherche (National Agency for Research)	<b>CGAAER</b>	Conseil Général de l'Alimentation, de l'Agriculture et des Espaces Ruraux (General Council for Nutrition, Agriculture, and Rural Areas)
<b>Anses</b>	Agence nationale de sécurité sanitaire de l'alimentation, de l'environnement et du travail (National Agency for Food, Environmental, and Occupational Health Safety)	<b>CIS</b>	Comité Interministériel pour la Santé (Interministerial Committee on Health)
<b>ANSM</b>	Agence Nationale de Sécurité du Médicament et des produits de santé (National Agency for the Safety of Drugs and Healthcare Products)	<b>CNAMTS</b>	Caisse Nationale d'Assurance Maladie des Travailleurs Salariés (National Health-Insurance Fund for Salaried Workers)
<b>ANSP</b>	Agence Nationale de Santé Publique (Santé publique France) (National Agency for Public Health (Public Health France))	<b>CNEDiMETS</b>	Commission Nationale d'Evaluation des Dispositifs Médicaux et Technologies de Santé (HAS) (National Commission for Assessing Medical Devices and Health Technologies (National Authority for Health))
<b>ARIIS</b>	Alliance pour la Recherche et l'Innovation des Industries de Santé (Health Industry Alliance for Research and Innovation)	<b>CNP</b>	Collège National des Professionnels (National College of Professionals)
<b>ARS</b>	Agence Régionale de Santé (Regional Health Agency)	<b>CNRS</b>	Centre National de la Recherche Scientifique (National Centre for Scientific Research)
		<b>Coop France</b>	Organisation professionnelle unitaire de la Coopération agricole (Unitary Professional Organisation for Agricultural Co-operation)

<b>CPIAS</b>	Centres d'appui et de Prévention des Infections Associées aux Soins (Support and Prevention Centres for Healthcare-Related Infections)	<b>FSVF</b>	Fédération des Syndicats Vétérinaires de France (Federation of Veterinary Unions of France)
<b>CPR</b>	Comité Permanent Restreint (Standing Health Committee)	<b>GIS</b>	Groupement d'intérêts scientifiques (Scientific Interest Grouping)
<b>CT</b>	Commission de Transparence (HAS) (Transparency Committee (National Authority for Health))	<b>HAS</b>	Haute Autorité de Santé (National Authority for Health)
<b>CTA</b>	Comité Technique de l'Antibiorésistance (Technical Committee on Resistance to Antibiotics)	<b>IGAS</b>	Inspection Générale des Affaires Sociales (Inspectorate General of Social Affairs)
<b>DGAI</b>	Direction Générale de l'Alimentation (Directorate General for Nutrition)	<b>INRA</b>	Institut National de la Recherche Agronomique (National Institute for Agronomic Research)
<b>DGESIP</b>	Direction Générale de l'Enseignement Supérieur et de l'Insertion Professionnelle (Directorate General for Higher Education and Professional Integration)	<b>INSERM</b>	Institut National de la Santé et de la Recherche Médicale (National Institute for Health and Medical Research)
<b>DGOS</b>	Direction Générale de l'Offre de Soins (Directorate General for Healthcare Services)	<b>IRD</b>	Institut de Recherche pour le Développement (Research Institute for Development)
<b>DGS</b>	Direction Générale de la Santé (Directorate General for Health)	<b>LEEM</b>	Les Entreprises du Médicament (Businesses in the Drugs Industry)
<b>DICOM</b>	Direction de la Communication (Directorate General of Communication)	<b>MAAF</b>	Ministère de l'Agriculture, de l'Agro-alimentaire et de la Forêt (Ministry of Agriculture, Agri-Foods, and Forestry)
<b>DSS</b>	Direction de la Sécurité Sociale (Directorate General for Social Security)	<b>MASS</b>	Ministère des Affaires Sociales et de la Santé (Ministry of Social Affairs and Health)
<b>ECDC</b>	European Centre for Disease Prevention and Control	<b>MAEDI</b>	Ministère des Affaires Etrangères et du Développement International (Ministry of Foreign Affairs and International Development)
<b>EFSA</b>	European Food Safety Authority	<b>MCC</b>	Ministère de la Culture et de la Communication (Ministry of Culture and Communication)
<b>EMA</b>	European Medicines Agency	<b>MEEM</b>	Ministère de l'Environnement, de l'Energie et de la Mer (Ministry of the Environment, Energy, and the Sea)
<b>ENSV</b>	Ecole Nationale des Services Vétérinaires (National School for Veterinary Services)	<b>MEF</b>	Ministère de l'Économie et des Finances (Ministry of the Economy and Finance)
<b>ETPT</b>	Equivalent Temps Plein Travaillé (Full-Time Equivalent Worked)	<b>MENESR</b>	Ministère de l'Éducation Nationale, de l'Enseignement Supérieur et de la Recherche (Ministry of National Education, Higher Education, and Research)
<b>FAO</b>	Food and Agricultural Organisation	<b>MTEFD</b>	Ministère du Travail, de l'Emploi, de la Formation professionnelle et du
<b>FNGDS</b>	Fédération nationale des Groupements de Défense Sanitaire (National Federation of Health Defence Groupings)		

	Dialogue social (Ministry of Work, Employment, Vocational Training, and Social Dialogue)		
<b>OECD</b>	Organisation for Economic Co-operation and Development	<b>ROSP</b>	Rémunération sur Objectifs de Santé Publique (Pay for Performance related to Public Health Objectives)
<b>OIE</b>	World Organisation for Animal Health	<b>RREVA</b>	Réseau Régional de Vigilance et d'Appui (Regional Vigilance and Support Network)
<b>WHO</b>	World Health Organisation	<b>SGAE</b>	Secrétariat Général des Affaires Européennes (Secretariat General of European Affairs)
<b>ONDAM</b>	Objectif National de Dépenses de l'Assurance Maladie (National Health Insurance Expenditure Objective)	<b>SIDIV</b>	Syndicat de l'Industrie du Diagnostic In-Vitro (In-Vitro Diagnosis Industry Union)
<b>PIA</b>	Programme d'Investissements d'Avenir (Future Investments Programme)	<b>SIG</b>	Service d'Information du Gouvernement (Government Information Service)
<b>PLFSS</b>	Projet de Loi de Financement de la Sécurité Sociale (Social Security Financing Bill)	<b>SIMV</b>	Syndicat de l'Industrie du Médicament Vétérinaire (Veterinary Drugs Industry Union)
<b>PPP</b>	Public-Private Partnership	<b>SNGTV</b>	Société Nationale des Groupements Techniques Vétérinaires (National Society of Technical Veterinary Groupings)
<b>PROPIAS</b>	Programme de Prévention des Infections Associées aux Soins (Healthcare-Related Infection Prevention Programme)	<b>TROD</b>	Test Rapide d'Orientation Diagnostique (Rapid Diagnostic Test)
<b>RIHN</b>	Référentiel des actes Innovants Hors Nomenclature (Reference Framework of Innovative Acts (except Nomenclature))	<b>EU</b>	European Union



Over the past fifteen years, France faced **an overall increase in bacterial resistance to antimicrobial agents**. Over that period, new resistance mechanisms have emerged and have spread amongst pathogenic bacteria, making currently-available treatments ineffective. This phenomenon affects most countries (with just a few, rare exceptions), and it recognises no borders. It is explained by over-exposure of bacteria to antimicrobial agents, which is directly linked to the over-use and the persistent misuse of antibiotics. The growth in the prevalence of resistance goes together with **a reduction in the available therapeutic options**. Some old antibiotic molecules are no longer produced or are no longer available, due to their low or non-existent profitability. At the same time, industrial investments in research and development relating to new active treatments on new forms of resistance or tools that enable them to be anticipated and prevented have become less common over the last thirty years, due to an inefficient economic model for those products.

The combination of those factors has led to growing therapeutic difficulties and even dead ends, especially for the most vulnerable sick people. **Each year in France, 12,500 deaths are linked to an antibiotic-resistant bacterial infection**. On a global scale, antimicrobial resistance is currently estimated to account for 700,000 deaths per year.

**Antimicrobial Resistance is a universal problem** that calls for co-ordinated action between the various sectors and actors concerned: healthcare systems, animal sector, the environment, research, the school organization, occupational health, etc. Controlling the AMR issue can only be done by adopting a global approach to the phenomenon, both nationally and internationally. There is a need to put in place intersectoral measures that open up healthcare approaches and that go beyond borders. Those measures must involve monitoring the phenomenon, controlling and preventing resistance, and developing new products that enable better diagnosis and treatment of bacterial infections. The “One Health” concept, implemented by the tripartite collaboration (OMS, OIE and FAO) and adopted by the WHO global action plan<sup>1</sup>, FAO action plan and by the Strategy on Fighting AMR of the OIE<sup>2</sup> fully sums up the approach that must be implemented to counteract antimicrobial resistance.

**This growing health threat is now perceived by international bodies as one of the main health priorities**. In May 2015, after having drawn up a worrying context analysis of the issue at a global level<sup>3</sup>, the WHO issued a global action plan recommending that all member states should have drawn up a national intersectoral plan to control resistance by 2017. In the USA, President Barack Obama asked the President’s Council on Sciences and Technologies (PCAST) to make proposals in order to control the health threat linked to resistance to antibiotics, and to overturn the negative trend in research and innovation relating to antibacterial agents. The report presented by PCAST to the US President makes 8 recommendations, and adds to prior advances resulting from the setting

<sup>1</sup> WHO. Global action plan on antimicrobial resistance. [http://www.who.int/drugresistance/global\\_action\\_plan/en/](http://www.who.int/drugresistance/global_action_plan/en/)

<sup>2</sup> *Combattre la résistance aux agents antimicrobiens dans le cadre d’une approche « une seule santé » : les actions à mener et la stratégie de l’OIE.* [http://www.oie.int/fileadmin/home/fr/Media\\_Center/docs/pdf/SG2016/F\\_84SG\\_10.pdf](http://www.oie.int/fileadmin/home/fr/Media_Center/docs/pdf/SG2016/F_84SG_10.pdf)

<sup>3</sup> WHO. AMR: Global report on surveillance, 2014. <http://www.who.int/drugresistance/documents/surveillancereport/en/>



up in 2010 of the Biomedical Advanced Research and Development Authority (BARDA)<sup>4</sup>, followed by the Generating Antibiotic Incentives Now Act (GAIN Act) in 2013.

In the United Kingdom, Prime Minister David Cameron tasked Lord Jim O'Neill, an economist and the Commercial Secretary to HM Treasury, with making recommendations on controlling resistance to antibiotics. Since December 2014, the group has issued several thematic publications, and its final report was issued in May 2016<sup>5</sup>. In particular, it includes alarming estimates of the human and economic consequences of worldwide resistance to antibiotics, citing of **10 million deaths per year by 2050 if appropriate measures are not taken**. Therefore, resistance to antibiotics may become the leading cause of death in the world, ahead of cancers (8.2 million deaths), diabetes (1.5 million deaths), diarrhoea (1.4 million deaths), and road-traffic accidents (1.2 million deaths). The report provides several proposals in order to stimulate research and development of new antimicrobial agents. The objective of the latter is to ensure a return on investment for the industry by decoupling revenues from sales volumes of new products.

AMR was one of the issues raised in the declaration at the G7 summit of June 2015,<sup>6</sup> and at the Ministries of Health summit in Berlin in October 2015<sup>7</sup>. It was one of the priorities during the Netherlands' presidency of the European Union, which, on 17 June 2016, led the European Council to pass a resolution to strengthen the fight against AMR. Like the WHO plan, the latter invites member states to set up national intersectoral plans by mid-2017. The resolution also includes quantified objectives. In addition, it puts in place an intersectoral European network, the "One Health Network", for exchanges and co-ordination on human and animal health policies applied in member states. It also encourages discussions with industry in order to maintain access to existing antibiotics. It calls for the increased use of preventive vaccination in animals, as well as developing and accessing diagnostic tools. Finally, the resolution strengthens research, in particular via the European programme called the Joint Programming Initiative on Antimicrobial Resistance (JPI-AMR). On May 25th & 26th, 2016, G7 country members committed to joint efforts in order to strengthen their One-Health multisectoral national action plans. On September 5th, 2016, G20 countries issued a resolution strongly supporting WHO, FAO and OIE actions in the field of AMR. Finally, on September 21st, 2016, the United Nations General Assembly adopted an ambitious high-level declaration to combat AMR, and called the General Secretary to appoint an inter-agency coordinating body, in conjunction with FAO and OIE to coordinate tripartite actions against AMR.

In France, in spite of the initial success of antibiotic plans implemented since 2001, the level of antibiotic consumption in human health<sup>8</sup> remains excessively high compared with the European average. However, the Ecoantibio plan<sup>9</sup> allowed a reduction of about 20% in the use of antibiotics in veterinary medicine between 2012 and 2015, thus lowering consumption to the European average; nonetheless, it is important to maintain that effort over time.

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<sup>4</sup> Biomedical Advanced Research and Development Authority. <http://www.phe.gov/about/BARDA/Pages/default.aspx>

<sup>5</sup> AMR Review: Tackling drug-resistant infections globally: Final report and recommendations. [http://amr-review.org/sites/default/files/160518\\_Final%20paper\\_with%20cover.pdf](http://amr-review.org/sites/default/files/160518_Final%20paper_with%20cover.pdf)

<sup>6</sup> [https://www.bundesregierung.de/Content/EN/Anlagen/G7/2015-06-08-g7-abschluss-eng\\_en.pdf?blob=publicationFile&v=3](https://www.bundesregierung.de/Content/EN/Anlagen/G7/2015-06-08-g7-abschluss-eng_en.pdf?blob=publicationFile&v=3)

<sup>7</sup> [http://www.bmg.bund.de/fileadmin/dateien/Downloads/G/G7-Ges.Minister\\_2015/G7\\_Health\\_Ministers\\_Declaration\\_AMR\\_and\\_EBOLA.pdf](http://www.bmg.bund.de/fileadmin/dateien/Downloads/G/G7-Ges.Minister_2015/G7_Health_Ministers_Declaration_AMR_and_EBOLA.pdf)

<sup>8</sup> *Plan national d'alerte sur les antibiotiques 2011-2016*. <http://www.plan-antibiotiques.sante.gouv.fr/>

<sup>9</sup> *Plan d'action Ecoantibio 2012-2017*. <http://agriculture.gouv.fr/le-plan-daction-ecoantibio-2012-2017>

Despite its high-ranking among priority health risks at the global level, AMR remains a danger that is under-estimated by the general public and by professionals themselves (physicians, healthcare professionals, veterinary surgeons, stockbreeders, agronomists, ecologists, evolutionists, hydrologists, etc.). The phenomenon remains poorly visible, whereas the traditional “all-mighty” image of antibiotics remains dominant. As a consequence, antimicrobial agents are not adequately viewed as a common, fragile and threatened good, which must be preserved.

For those reasons, the French Prime Minister, Mr. Manuel Valls, has decided to focus the first meeting of the *Comité Interministériel pour la Santé* (CIS – Interministerial Committee on Health) on controlling resistance to antibiotics, thus making of the topic a health priority for the government, by re-stating the challenges and objectives in terms of reducing the consumption of antibiotics and fatalities associated with antibiotic-resistant infections.



## THE INTERMINISTERIAL COMMITTEE ON HEALTH

In January 2015, the French Minister of Health Marisol Touraine tasked Dr. J. Carlet with putting together a special working group on AMR, in order to make innovative, concrete proposals which could be swiftly put into action. The conclusions and recommendations of that multidisciplinary, 120-member group were presented in September 2015.<sup>10</sup> For the first time in France, the report included an estimate made by the *Agence Nationale de Santé Publique* (National Agency for Public Health) of the human cost of AMR. The latter was quantified at 150,000 cases per year of infections due to multiresistant bacteria, linked to 12 500 annual deaths.

The group's recommendations included four actions that were deemed priorities, serving four main objectives:

- 1) encourage and develop research into antimicrobial resistance;
- 2) strengthen monitoring through indicators shared between activity sectors;
- 3) improve the use of antibiotics;
- 4) increase general public awareness to the risk of antibiotic resistance and to the proper use of antibiotics.

The four actions deemed priorities for attaining those objectives consisted of:

- setting up an interministerial committee tasked with co-ordinating actions to fight resistance to antibiotics, steered by an interministerial delegate;
- drawing up a 5-year national interdisciplinary research plan on antimicrobial resistance;
- supporting research and development relating to innovative products against resistance to antibiotics, in particular by setting up a particular status;
- acknowledging the significance of the problem by granting a “great national cause” label to the fight against resistance to antibiotics.

In that context, the Minister of Health suggested to the Prime Minister that the *Comité Interministériel pour la Santé* (CIS - Interministerial Committee on Health) should hold a meeting, for which preparation work would be co-ordinated by a ministerial delegate. The mission of that board is to define a roadmap of cross-sectoral actions aimed at controlling AMR, based on the recommendations of the Carlet – Le Coz report. On 11st December 2015, the suggestion was accepted under the terms of a letter from the Prime Minister. Thus, resistance to antibiotics was the first topic to be dealt with by the CIS. This report summarises the results of the work done by the *Comité Permanent Restreint* (CPR – Steering Committee for Health), meeting under the ægis of the Director General for Health and the interministerial delegate, to prepare for the CIS meeting and to make suggestions to it concerning the implementation of concrete actions.

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<sup>10</sup> J. Carlet, P. Le Coz. Propositions du groupe de travail spécial pour la préservation des antibiotiques. Ministère des affaires sociales et de la santé, juin 2015. [http://social-sante.gouv.fr/IMG/pdf/rapport\\_antibiotiques.pdf](http://social-sante.gouv.fr/IMG/pdf/rapport_antibiotiques.pdf)

## THE STEERING COMMITTEE FOR HEALTH

The CIS's *Comité Permanent Restreint* (CPR – Steering Committee) on controlling resistance to antibiotics brought together all the directors (or their representatives) of central administrations concerned by that theme, as well as some health agencies (ANMV, Anses, ANSM, ANSP, and the HAS). Other institutions (CNAMTS, ANR, research institutes and Alliances) were invited to take part in the CPR's working groups.

Five plenary meetings were held between January and July 2016 and an interministerial roadmap was developed. That roadmap was structured around five cross-cutting pillars dealt with within the CPR or within interministerial working subgroups:

1. Public and professionals' awareness
2. proper use and resources for good practice
3. new indicators and monitoring
4. solutions for innovation and research
5. intersectoral governance in the international context.

A progress *Réunion Interministérielle* (RIM – Interministerial Meeting) was held on July 1<sup>st</sup>, and enabled the presentation of an initial version of this document as well as the refinement of some suggestions. The measures that follow are organised according to the actions proposed by each subgroup, and were validated at the CPR meeting held on 13 July 2016.

The appendices to the document bring together:

- a summary table that recapitulates all the measures and actions proposed;
- the list of contributors to the interministerial roadmap on antimicrobial resistance.

The French version includes in addition descriptive notes for each action (context, technical description, pilot institutions and other participants concerned, budgetary impact, provisional timetable for implementation, and indicators).

The detailed notes can be found at:

[http://social-sante.gouv.fr/IMG/pdf/feuille\\_de\\_route\\_antibioresistance\\_nov\\_2016.pdf](http://social-sante.gouv.fr/IMG/pdf/feuille_de_route_antibioresistance_nov_2016.pdf)



## INTERMINISTERIAL ROADMAP FOR CONTROLLING ANTIMICROBIAL RESISTANCE

### RAISING AWARENESS AMONG THE GENERAL PUBLIC AND HEALTHCARE PROFESSIONALS

In human health, in spite of many awareness-raising programmes carried out mainly by the CNAMTS and communication actions rolled out in the various ministerial plans, antibiotic consumption remains much too high in France and well above the European average. AMR is a phenomenon misunderstood by the general public, and the perception of antibiotics remains all too often in line with old representations of omnipotent and readily available drugs.

In animal health, the favorable results observed following the implementation of the first Ecoantibo plan improved France's ranking in Europe. After the Netherlands, France is the second European country to have most reduced its antibiotic consumption in veterinary medicine over the last few years, thus allowing it to return below the European average in terms of antibiotics animal exposure. That downward trend, and, more generally, the careful and reasoned use of antibiotics, must be maintained and continued through active and ongoing mobilisation of all actors. Furthermore, the *Loi d'Avenir pour l'agriculture, l'alimentation et la Forêt* (Law for the future of agriculture, food and forest) passed in 2014, has strengthened the risk management framework for antibiotic use with binding measures. For example, these measures should enable to restrict critical antibiotics use, monitor antibiotic consumption or create economic rules for market moralization.

We are just beginning to explore the role that the environment plays in the process, by encouraging the dissemination and, potentially, the selection of resistant bacteria, in particular when it is contaminated by residue of antibiotics used in humans or animals, by biocides, or by other pollutants. The effluents reused for agricultural purposes may play a part in the environmental dispersal of resistance to antibiotics. In some countries (outside Europe), antibiotics are also used to protect plants. Thus, resistance to antibiotics can spread quickly over very large areas. Addressing the problem of antimicrobial resistance within the "One Health" approach must account for the indirect role and potential impact on human health of the environment and its contamination.

Consequently, resistance to antibiotics is a major, multisector, worldwide challenge that requires all actors to be mobilised. Those actors must be sensitized to the specific characteristics of antibiotics, and they must be alerted to the individual and collective risks of resistance to antibiotics as well as to prevention measures from a "One Health" perspective. For an effective communication campaign, all these components must be included

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## CHALLENGES

- Raising awareness of collective responsibility among the general population and professionals, in order to induce a long-lasting modification in how antibiotics are perceived and used, so that antibiotics are perceived as a common good to be preserved and used prudently, from a sustainable development perspective.

- Encouraging access to information, increase the general public and professionals knowledge, and highlight the commitment of all relevant stakeholders (public authorities, professionals and users) in the control of antibiotic resistance.

## MEASURES ADOPTED

### MEASURE 1 – Launch the first national intersectoral programme to raise awareness on prevention of antimicrobial resistance

<b>Action no. 1:</b>	<p>Implement the first major intersectoral communication campaign, as part of a pluriannual communication programme focusing on AMR, its determinants, and its consequences.</p> <p>Developed under a common banner, the campaign must be tailored to target various audiences (professionals working in human and animal healthcare, stockbreeders and owners of domestic animals, populations at specific risk, environmental professionals, etc.), and will put into perspective the role that vaccinations and hygiene measures play in preventing infections, as well as the risks associated with antibiotics release into the environment.</p>
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### MEASURE 2 – Improve access to information, and public commitment to controlling antimicrobial resistance

<b>Action no. 2:</b>	Reinforce health education for populations, especially young people and animal owners, through educational modules (“e-bug” programmes in a school setting, training in secondary schools and in colleges) and the media (“Entertainment Education”).
<b>Action no. 3:</b>	Set up a single interministerial portal (or a section on <a href="http://social-sante.gouv.fr">social-sante.gouv.fr</a> website) that provides information to the public and to professionals, raising their awareness of antibiotic resistance, as well as enabling everyone to get involved in controlling resistance to antibiotics.



A significant proportion of human antibiotic consumption can be attributed to treatments prescribed for viral infections, or to treatments that are unnecessarily prolonged. Over-prescribing antibiotics and the excessive exposure of human and animal populations play a direct role in the emergence of resistance, and incur unnecessary costs in human medicine for the healthcare system. Preventive measures that allow limiting antibiotic exposure, especially preventive vaccination, remain insufficiently widespread and adopted.

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## **CHALLENGE**

- Reduce the population exposure to antibiotics by lowering consumption down to the European average in human medicine, providing appropriate tools to improve the relevance and quality of prescribing by all healthcare professionals concerned (human and animal health), and by encouraging preventive measures.

## **MEASURES ADOPTED**

### **MEASURE 3 – Provide support to proper prescribing by healthcare professionals in both the human and animal sector**

**Action no. 4:** Upgrade the importance of antimicrobial resistance in the healthcare professional's initial training, especially for pharmacists, midwives, nurses, and dentists. Set up and prioritise the monitoring of continuous training programmes dedicated to the proper use of antibiotics in human health. In animal health, strengthen continuous training and education programs for veterinary surgeons and stockbreeding professionals by developing e-learning training modules.

**Action no. 5:** Roll out regional structures providing support for the fight against antimicrobial resistance, to serve healthcare professionals in the community, in hospitals, and in nursing homes institutions in each region, by relying on regional reference networks in relation to resistance against antibiotics as well as vigilance and support structures, especially those devoted to healthcare-associated infection (CPIASs). In animal health, widen the network of regional reference veterinarians, and secure its funding.

- Action no. 6:** Ensure the dissemination, promotion, and availability to all prescribers of tools contributing to the proper use of antibiotics:
- practice guidelines for dealing with common pathologies;
  - updated recommendations on the relevance and duration of treatment;
  - ruling against prescribing antibiotics in the absence of indications;
  - recommendations sheets and guides to best practice for veterinary surgeons and stockbreeders.
- Action no. 7:** Encourage the use of rapid diagnostic tests that contribute to controlling antibiotic resistance in the community and in hospitals. In the veterinary setting, develop and provide access to diagnostic kits as well as rapid tests to determine bacterial susceptibility to antibiotics.

#### **MEASURE 4 – Incentivize healthcare professionals to prescribe appropriately by reinforcing the regulatory framework**

- Action no. 8:** In human medicine, use regulatory provisions to limit prescription duration to a maximum of 7 days for common infections.
- Action no. 9:** In human medicine, put in place dedicated prescription forms for antibiotic prescriptions, by linking them to the use of TRODs (*Tests Rapides d’Orientation Diagnostique* – Rapid Diagnostic Tests) for rhinopharyngeal infections, in prescribing-assistance software or thanks to online services developed by CNAMTS.
- Action no. 10:** Limit the list of tested antibiotics provided to prescribers for antibiotic susceptibility tests performed on urinary pathogens, in order to restrict the prescription of the so-called “critically important antibiotics” in human health.
- Action no. 11:** Follow the progress of the objective set in the medical convention on limiting the prescribing rate for so-called “critically important” antibiotics, linked to remuneration based on public-health objectives, and work with “outliers” (overprescribers) to reduce unjustified prescriptions. In veterinary medicine, ensure the proper application of the April 2016 decree and ruling, which govern or prohibit the prescription and delivery of “critically important” antibiotics.



## MEASURE 5 – Encourage the proper use of antibiotics

**Action no. 12:** In human medicine, adapt the packaging of oral and injectable presentations to minimum recommended treatment durations. When appropriate, extend the dispensing experiment to the antibiotics unit. In veterinary medicine, favour the development by manufacturers of tailored packaging, and propose a regulatory framework that favours antibiotics being issued in small doses.

**Action no. 13:** On antibiotic packaging, insert a warning message for patients or stockbreeders.

## MEASURE 6 – Promote adoption by healthcare professionals and public of effective preventive measures to improve human and animal health

**Action no. 14:** In veterinary medicine, promote biosecurity measures in stockbreeding by strengthening and developing programmes to improve stockbreeding conditions.

**Action no. 15:** In human medicine, use monitoring by the interministerial intersectoral plan co-ordination body (*cf.* action no. 36) to ensure compliance with recommendations and the achievement of objectives set out in pillar 2 of the *Programme de Prévention des Infections Associées aux Soins* (PROPIAS – Healthcare-Related Infection Prevention Programme), especially concerning the promotion of standard hygiene precautions, means for rapid diagnostic of resistances, and objectives for the proper use of antibiotics and vaccination for patients and residents.

**Action no. 16:** Promote preventive vaccination against infections in humans and animals, in particular through the communication campaign (*cf.* action no. 1) and the current national consultation.



## INTERMINISTERIAL ROADMAP FOR CONTROLLING ANTIMICROBIAL RESISTANCE RESEARCH AND INNOVATION IN THE FIELD OF ANTIBIOTIC RESISTANCE

France is one of the world leaders in innovation relating to controlling resistance to antibiotics, thanks to the excellence of its research and the dynamism of businesses established in the country. Controlling antimicrobial resistance must involve developing knowledge of how resistance to antimicrobial agents emerges and is transmitted, as well as developing new therapeutic and diagnostic solutions or alternative solutions to antibiotics. Those objectives require:

- Structuring research networks and observatories to strengthen research efforts;
- Encouraging better interaction between scientific, human, and social disciplines, and ensuring co-ordination of research efforts between the human-health, animal-health, and environmental sectors, steered by a transdisciplinary strategic council;
- Supporting and accelerating the transfer of research from the academic world to the industrial world by setting up a pro-active policy on public-private partnership and project support;
- Adapting new economic model applied to the development of new practices and products that enable resistance to antibiotics to be controlled.

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### CHALLENGE

- Encourage access to and the availability of innovative products and new tools contributing to the control of antimicrobial resistance, by strengthening the structuring and co-ordination of research, as well as by encouraging academic / industry exchanges and by promoting products that contribute to controlling resistance to antibiotics.

### MEASURES ADOPTED

#### **MEASURE 7 – Structure and co-ordinate research, development, and innovation efforts into AMR and its consequences**

**Action no. 17:** Install a strategic steering committee for research on antimicrobial resistance.

**Action no. 18:** Set up a common intersectoral, interactive web portal identifying public and private actors as well as networks, laboratories, and research projects relating to AMR.

**Action no. 19:** Strengthen and connect research and monitoring networks as well as observatories.

**Action no. 20:** Strengthen research and innovation efforts. At national level, co-ordinate the scientific research program on antimicrobial resistance and related financing, while ensuring that the national effort is integrated with actions taken at European level (especially the JPI AMR), and by supporting research focused on public-health priorities.

## **MEASURE 8 – Foster convergence between support for scientific research and innovation by strengthening public-private partnerships**

**Action no. 21:** Support and speed up transfers from the academic world to the industrial world in the field of antimicrobial resistance.

**Action no. 22:** On a joint basis between academics and industrialists, set up regular exchange programmes by organising “academic / industry” meetings in the field of human and animal health , as well as the fields of agriculture, nutrition, and the environmental health.

## **MEASURE 9 – Promote and preserve products that contribute to controlling resistance to antibiotics**

**Action no. 23:** Install a *Comité Technique de l’Antibiorésistance* (Technical Committee on Antimicrobial Resistance) in charge of giving opinions on the relevance of products to be used in human or veterinary medicine, and contributing to controlling resistance to antibiotics.

**Action no. 24:** Maintain the effectiveness of the therapeutic arsenal by adopting incentive measures that allow existing antibiotics to be retained in the market.

**Action no. 25:** Provide innovative products and technologies contributing to the control of antimicrobial resistance with a set of regulatory and financial incentive mechanisms.

**Action no. 26:** Improve the use of *in vitro* diagnostic (IVD) tools contributing to control antimicrobial resistance, thanks to a better use of those technologies.





## INTERMINISTERIAL ROADMAP FOR CONTROLLING ANTIMICROBIAL RESISTANCE ASSESSMENT AND MONITORING OF ANTIBIOTIC RESISTANCE

France has an extensive monitoring system that covers resistance to antibiotics as well as antibiotic consumption in human and veterinary medicine. However, the large number of actors in human medicine and the redundant nature of some of their assigned tasks impair the effectiveness and efficiency of the monitoring system, especially for resistance to antibiotics. For that reason, the national policy for monitoring antibiotic resistance and consumption must be consolidated through a better structure and organisation. Moreover, current monitoring lacks cross-sectoral indicators and data on resistance in the environment (soils, plants, and water), and new tools are needed in terms of methodology and indicators shared between the various sectors.

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### CHALLENGE

- Boost the effectiveness of monitoring resistance to antibiotics and the consumption of antibiotics, and improve the data dissemination.

### MEASURES ADOPTED

#### **MEASURE 10 – Clarify the national policy on monitoring antibiotic resistance and consumption, and improve the availability of its results.**

**Action no. 27:** Use a “One Health” approach to provide annual communication to the public and to professionals on consumption and resistance data by prioritising common indicators.

**Action no. 28:** Making clearer and operating the monitoring mapping of antibiotic resistance and the consumption of antibiotics in human health. Use vigilance and support networks to generate point-of-care indicators of consumption and resistance for healthcare professionals.

## **MEASURE 11 – Develop new indicators and monitoring tools through better use of databases**

**Action no. 29:** Normalise and open up laboratory data on antibiotic resistance.

**Action no. 30:** At the national and European level, develop new global and specific indicators aimed at measuring antibiotic resistance and exposure to antibiotics on a common basis for humans, animals, and the environment.

**Action no. 31:** Study the cost of bacterial resistance to antibiotics in human and veterinary medicine in order to develop relevant economic indicators.

**Action no. 32:** Organise a Hackathon dedicated to operating databases on antibiotic consumption in human medicine.



There are currently several ministerial plans and programmes aimed at controlling resistance to antibiotics. Co-ordination between the human antibiotic plan, the EcoAntibio plan in veterinary medicine, and the *Environnement-Santé* (Environment-Health) plan (measure 12b) must be strengthened and formalised to enable better consistency and effectiveness, according to the recommendations of the WHO's global plan, the OIE's Strategy in the Fight against Resistance to Antibiotics, and the European plan. By end 2016, the human antibiotic plan and the EcoAntibio plan come together to an end, which represented a unique opportunity to set up a co-ordinated "One Health" plan on controlling resistance to antibiotics, adapted to the challenges that are specific to human and animal health as well as to the environment.

The high-level priority ascribed to antimicrobial resistance and the many ongoing initiatives at the European and international levels (G7 and G20, WHO, OIE, FAO, OECD, UN, etc.) require a strong vigilance over consistency between actions taken nationally and internationally, as well as over the clarity and consistency of French positions defended during many discussions with our European and international partners.

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## CHALLENGES

- Ensure that the national policy on controlling resistance to antibiotics is consistent with international actions taken from the "One Health" perspective, by strengthening intersectorality.
- Guarantee consistency and support of the concerted positions taken by France at the international level.

## MEASURES ADOPTED

### MEASURE 12 – Strengthen interministerial co-ordination on controlling antimicrobial resistance

**Action no. 33:** Summarise the situational analyses of the various plans in order to define common themes to the various sectors, with the objective of gathering them into an overall, co-ordinated action plan to tackle AMR.

**Action no. 34:** Develop this co-ordinated programme to tackle AMR in actions. These actions will be adapted to the challenges specific to each sector (human health, animal health, and the environment), grouped according to their own sectoral identity and monitored by each ministerial department concerned.

**Action no. 35:** Set up a high-level ministerial body for intersectoral co-ordination relating to controlling antibiotic resistance and to monitoring actions taken by each ministerial department concerned, by ensuring that they are consistent with European and international actions.

### **MEASURE 13 - Co-ordinate national actions with European and international programmes, in order to strengthen France's lead role in controlling antibiotic resistance**

**Action no. 36:** Keep an updated, shared agenda of European and international events relating to controlling AMR, in order to strengthen France's place in the most important initiatives. Summarise essential interministerial positions on controlling AMR, and place them at European and international level.

**Action no. 37:** At European level, make a proposal to set up a special framework dedicated to developing products that contribute to controlling AMR.

**Action no. 38:** At international level and with the help of the European Union, promote the adoption of measures for checking that antibiotics are used properly, in particular banning the use antibacterial agents as growth promoters in stockbreeding.

**Action no. 39:** At European level, promote the development of co-ordinated monitoring of the main pathogens observed in veterinary medicine.

**Action no. 40:** In collaboration with the WHO and the OIE, develop a network for monitoring the emergence and spread of resistance to antibiotics (in humans, animals, and the environment) in low-income countries, by relying on existing networks.





## APPENDICES

- Summary table
- Contributors to the roadmap



SYNOPSIS OF MEASURES AND ACTIONS ADOPTED BY THE INTERMINISTERIAL FOR HEALTH TO CONTROL ANTIMICROBIAL RESISTANCE

Theme	Measures	Actions	Strategic steering	Operational steering (Administrations concerned, co-pilots, and relays)	Budget elements	Implementation
Awareness raising and communication	1. Launch the first national intersectoral programme to raise awareness on prevention of antimicrobial resistance	1. Implement the first major intersectoral communication campaign, as part of a multiannual communication programme focusing on resistance to antibiotics, its determinants, and its consequences	SIG DICOM of MASS	Directorates in charge of communication in the ministries concerned ANSP / Anses CNAMTS	10-15 million euros One full-time ETP (full-time equivalent)	4 <sup>th</sup> quarter 2017
	2. Improve access to information, and public commitment to controlling antimicrobial resistance	2. Reinforce health education for populations, especially young people and animal owners, through educational programmes and the media	MENESR	MASS / MEEM / MAAF / MCC ANSP CNAMTS The public-health departments of Nice University Hospital	135,000 euros to develop E-Bug	The start of the 2016 academic year
		3. Set up a single interministerial portal (or an internet area at social-sante.gouv.fr) that provides information to the public and to professionals and that raises their awareness in relation to resistance to antibiotics, as well as enabling everyone to get involved in controlling resistance to antibiotics.	SIG DICOM of MASS	Directorates in charge of communication in the ministries concerned ANSP / Anses	One ETP (full-time equivalent) As part of SPIS	4 <sup>th</sup> quarter 2017
Education and proper use	3. Provide support to proper prescribing by healthcare professionals in both the human and animal sector	4. Upgrade the importance of antimicrobial resistance in the healthcare professional's initial training, especially for pharmacists, midwives, nurses, and dentists. Set up and prioritise the monitoring of continuous training programmes dedicated to the proper use of antibiotics in human health. In animal health, strengthen continuous training and education programs for veterinary surgeons and stockbreeding professionals by developing e-learning training modules.	MAAF MASS MENESR	Anses ANDPC ENSV / SNGTV / CNPs	Possible budget for developing ongoing training	1 <sup>st</sup> quarter 2017
		5. Roll out regional structures providing support for the fight against resistance to antibiotics, to serve healthcare professionals in the community, in hospitals, and in medical-social establishments in each region, by relying on regional reference networks in relation to resistance to antibiotics as well as vigilance and support structures, especially CPIASs. In animal health, widen the network of regional references in veterinary medicine, and guarantee its funding.	MAAF MASS	Anses ARS / RREVA SNGTV	Redeployment of specific budget / ARS	1 <sup>st</sup> quarter 2017
		6. Ensure the spread, promotion, and availability to all prescribers of tools for the proper use of antibiotics.	MAAF MASS	ANSM / Anses-ANMV HAS CNAMTS ASIP Santé and Software publishers AVEF / AFVAC / SNGTV	The administration's budget	3 <sup>rd</sup> quarter 2017
	4. Incentivize healthcare professionals to prescribe appropriately by reinforcing the regulatory framework	7. Encourage the use of rapid diagnosis tests that contribute to controlling AMR in the community and in hospitals. In a veterinary setting, develop and provide access to diagnostic kits as well as rapid tests to determine bacterial susceptibility to antibiotics.	MAAF MASS	MENESR CNAMTS Anses LEEM / SIDIV / SIMV	Research programme	4 <sup>th</sup> quarter 2016
		8. In human medicine, use regulatory provisions to limit prescription duration to a maximum of 7 days for common infections.	MASS	ANSM HAS ASIP Santé	Budget revenue	4 <sup>th</sup> quarter 2016
		9. In human medicine, put in place a dedicated prescription that covers antibiotic prescriptions, by linking them to the use of TRODs for rhinopharyngeal infections, in prescribing-assistance software or thanks to online services developed by CNAMTS.	MASS	ANSM HAS CNAMTS Software publishers	Budget revenue	4 <sup>th</sup> quarter 2016
		10. Limit the list of tested antibiotics provided to prescribers for antibiotic susceptibility tests performed on urinary pathogens, in order to restrict the prescription of the so-called "critically important antibiotics" in human health.	MASS	Antibiogram Committee of the French Microbiology Society (CA-SFM) Software publishers	Budget revenue	4 <sup>th</sup> quarter 2016

		11. Follow the progress of the objective set in the medical convention on limiting the prescribing rate for so-called “critically important” antibiotics, linked to remuneration based on public-health objectives, and work with “outliers” (overprescribers) to reduce unjustified prescriptions. In veterinary medicine, ensure the proper application of the April 2016 decree and ruling, which govern or prohibit the prescription and delivery of “critically important ” antibiotics.	MAAF MASS	CNAMTS ARS	Additional expenditure if additional point in remuneration of public health objectives (ROSP) (except for redistribution) Additional resources CNAMTS	4 <sup>th</sup> quarter 2016
	5. Encourage the proper use of antibiotics	12. In human medicine, adapt the packaging of oral and injectable presentations to minimum recommended treatment durations. When appropriate, extend the dispensing experiment to the antibiotics unit. In veterinary medicine, favour the development by manufactures of tailored packaging, and propose a regulatory framework that favours antibiotics being issued in small doses.	MASS MAAF	ANSM / Anses-ANMV SIMV	Budget revenue	2017
		13. On antibiotic packaging, insert a warning message for patients or stockbreeders.	MASS MAAF	EMA / European Commission MEEM ANSM / Anses-ANMV Pharmaceutical and veterinary industry	No budget incidence	4 <sup>th</sup> quarter 2016
	6. Promote adoption by healthcare professionals and the public of effective preventive measures to improve human and animal health	14. In veterinary medicine, promote biosecurity measures in stockbreeding by strengthening and developing programmes to improve stockbreeding conditions.	MAAF	GDS France / Coop France / SNGTV / FSVF	Expenditure as part of financing for vaccination or for improving stockbreeding conditions	In hand
		15. In human medicine, use monitoring by the interministerial intersectoral plan (cf. action no. 36) to ensure compliance with recommendations and the achievement of objectives set out in pilar 2 of the <i>Programme de Prévention des Infections Associées aux Soins</i> (PROPIAS)	MASS	HAS ANSP	No financial incidence	In hand
		16. Promote preventive vaccination against infections, in particular through the communication campaign (cf. action no. 1) and the current national consultation.	MASS MAAF	HAS SIMV FNGDS / Coop de France / SNGTV	Financing plan for medico-economic studies and vaccination promotion Communication campaign plan for promoting veterinary vaccination	4 <sup>th</sup> quarter 2017
Research and Innovation	7. Structure and co-ordinate research, development, and innovation efforts into AMR and its consequences	17. Install a strategic steering committee for research into AMR.	MENESR MAAF MEEM MASS MDef MEF	Aviesan / AllEnvi / Athena ANR / Anses / ANSP Inserm / Inra / CNRS	FTE secretariat	4 <sup>th</sup> quarter 2016
		18. Set up a common intersectoral, interactive portal identifying public and private actors as well as networks, laboratories, and research projects relating to AMR.	MENESR MAAF MEEM MASS MDef MEF	Aviesan / AllEnvi / Athena ANR / Anses / ANSP / BPI CEA / CNRS / INRA / INRIA / IRD / INSERM / Institut Pasteur / CHRU / CPU / etc. Medicen / ARIIS / LEEM / etc.	Financing functioning and facilitation (human resources and setting up the portal)	1 <sup>st</sup> quarter 2017
		19. Strengthen and connect research and monitoring networks as well as observatories.	Research directorates in the ministries concerned	Aviesan / AllEnvi / Athena ANR / Anses / ANSM / Other health and environmental safety agencies concerned CIRAD Existing research networks and observatories concerned Structures and actions put in place at European level: JPI-ANR, JA-AMR-HCAI, WHO Global Action Plan, ECDC, and ECRAID (European Clinical Research Alliance on Infectious Diseases, pending validation)	To be determined by the alliances	From 2017 onwards

		20. Strengthen research and innovation efforts. At national level, co-ordinate the scientific research program on antimicrobial resistance and related financing, while ensuring that the national effort is integrated with actions taken at European level (especially the JPI AMR), and by supporting research focused on public-health priorities.	MENESR MAAF MEEM MASS MDef MEF	Aviesan / AllEnvi / Athena ANR / Anses / ANSP / BPI / Other financing agencies under ministerial oversight CEA / CNRS / INRA / INRIA / IRD / INSERM / Institut Pasteur / CHRU / CPU / etc.	To be determined by the alliances	From the end of 2016	
	8. Foster convergence of activities supporting research and innovation by strengthening public-private partnerships	21. Support and speed up transfers from the academic world to the industrial world in the field of resistance to antibiotics	Strategic steering committee	Ministries concerned Agencies Scientific experts Competitiveness clusters Businesses and federations	Start-up funds to be budgeted (PIA3)	DVS launch: 4 <sup>th</sup> quarter 2016	
		22. On a joint basis between academics and industrialists, set up regular exchange programmes by organising “academic / business meetings” in the field of human and animal health, as well as the fields of agriculture, nutrition, and the environment.	MEF	Wide perimeter covering researchers and business inside and outside the healthcare sector	PPP industry / alliances	Already in place, but to be extended to the agrifood and environmental sectors	
	9. Promote and preserve products that contribute to controlling antibiotic resistance	23. Set up a Technical Committee on Resistance to Antibiotics (CTA) in charge of giving advices on the relevance of products to be used in human or veterinary medicine, and contributing to controlling resistance to antibiotics.	MASS	MEF / MAAF/ MENESR ANSM, Anses, HAS	Setting up a new committee will lead to additional expenditure for the host body	2 <sup>nd</sup> quarter 2017	
		24. Maintain the effectiveness of the therapeutic arsenal by adopting incentive measures that allow existing antibiotics to be retained in the market.	MASS	MAAF / MEF ANSM / Anses-ANMV CTA HAS CEPS	Possible additional expenditure in the event of reassessing the prices of some technologies	2 <sup>nd</sup> quarter 2017	
		25. Provide Innovative products and technologies contributing to the control of AMR with a set of regulatory and financial incentive mechanisms.	MASS	MAAF / MEF ANSM / Anses-ANMV CTA HAS CEPS	Price of innovative technologies	2 <sup>nd</sup> quarter 2017	
		26. Improve the use of <i>in vitro</i> diagnostic (IVD) tools in controlling resistance to antibiotics, thanks to better use of those technologies.	MASS	MEF CTA HAS CNAMTS Drugs and diagnosis industries	ONDAM List above RIHN	2 <sup>nd</sup> quarter 2017	
	Assesment and monitoring	10. Clarify the national policy on monitoring of antibiotic resistance and consumption , and improve the availability of its results	27. Use a “One Health” approach to provide annual communication to the public and professionals on consumption and resistance data by prioritising common indicators.	MASS MAAF	ANSP ANSM Anses CNAMTS	Cost of producing infographics (with ANSP bearing the cost) Costs relating to a dissemination plan (to be budgeted)	4 <sup>th</sup> quarter 2016
			28. Making clearer and operating the mapping of monitoring of antibiotic resistance and the consumption of antibiotics in human health. Use vigilance and support networks to generate proximity indicators on consumption and resistance data for human-healthcare professionals.	MASS	ANSP Anses ARS CPIAS ANSM / CNAMTS	Budget revenue	2 <sup>nd</sup> quarter 2016
11. Develop new indicators and monitoring tools through better use of databases		29. Normalise and open up laboratory data on antibiotic resistance	MASS	ASIP Santé ANSP ARS / CPIAS Professional unions of microbiologists Software publishers	No financial incidence	1 <sup>st</sup> quarter 2017	
		30. At national and European level, develop new global and specific indicators aimed at measuring antibiotic resistance and exposure to antibiotics on a common basis in humans, animals, and the environment.	MASS MAFF	ECDC / EMA / EFSA / WHO CNAMTS ANSP Anses	Setting up and facilitating a national group of experts (financed by the agencies responsible)	4 <sup>th</sup> quarter 2016	

		31. Study the cost of bacterial resistance to antibiotics in human and veterinary medicine in order to develop relevant economic indicators.	MENES	MASS / MAFF CNAMTS ANR  ANSP Anses AVIESAN / AllEnvi Inserm / Inra / CNRS	Research budget	1 <sup>st</sup> quarter 2017
		32. Organise a Hackathon dedicated to operating databases on antibiotic consumption in human medicine	MASS	Mission Etalab ANSP ANSM CNAMTS	4,000 euros	4 <sup>th</sup> quarter 2016
<b>Governance and intersectorial policy</b>	<b>12. Strengthen interministerial co-ordination on controlling antibiotic resistance</b>	33. Summarise the situational analysis of the various plans in order to define common themes to the various sectors, with the objective of gathering them into an overall, co—ordinated action plan to tackle antibiotic resistance.	MASS MAAF MEEM	Ministries concerned (research, industry, economy, defence, etc.) IGAS / CGAAER ANSM / Anses-ANMV HAS ANSP / Anses	Some themes and measures that cut across the various sectors will need a dedicated budget (research, innovation, and communication) that has already been presented in preceding measures	4 <sup>th</sup> quarter 2016
		34. Develop the co-ordinated programme for controlling antibiotic resistance into actions. These actions will be adapted to specific challenges of each sector (human health, animal health, and the environment), grouped according to their own sectoral identity and monitored by each ministerial department concerned.	Governance body	MEEM / MASS / MAAF / Ministries and administrations concerned Plan stakeholders	Each plan must be covered by a dedicated budget and human resources	2 <sup>nd</sup> quarter 2017
		35. Set up a high-level interministerial body for intersectoral coordination relating to controlling antibiotic resistance and to monitoring actions taken by each ministerial department concerned, by ensuring that they are consistent with European and international actions.	Interministerial delegate on resistance to antibiotics	MASS / MAAF / MEEM / MAEDI / Ministries and administrations concerned Stakeholders	This body and its budget will be contained in the overall plan on controlling resistance to antibiotics	2 <sup>nd</sup> quarter 2017
	<b>13. Co-ordinate national actions with European and international programmes, in order to strengthen France's lead role in controlling antibiotic resistance</b>	36. Keep an updated, shared agenda of European and international events relating to controlling antibiotic resistance, in order to strengthen France's place in the most important initiatives. Summarise essential interministerial positions on controlling antibiotic resistance.	SGAE MAEDI	MAAF / MASS / MEEM ANSM / Anses-ANMV	No financial incidence	4 <sup>th</sup> quarter 2016
		37. At the European level, make a proposal to set up a special framework dedicated to developing products that contribute to controlling AMR.	MASS	MAEDI SGAE	The proposal can commit France to take part, with other European partners, in a European fund to finance innovation in the field of controlling resistance to antibiotics	4 <sup>th</sup> quarter 2016
		38. At the international level and with the help of the European Union, promote the adoption of measures for checking that antibiotics are used properly, in particular prohibition to use antibacterial agents as growth promoters in stockbreeding.	SGAE MAEDI	MAAF / MASS / MEEM ANSM / Anses-ANMV Anses	No financial incidence	1 <sup>st</sup> quarter 2017
		39. At the European level, promote the development of co-ordinated monitoring of the main pathogens observed in veterinary medicine.	MAEDI MAAF MASS	ANSP Anses	Actions to promote the French arrangement (Résapath network)	4 <sup>th</sup> quarter 2017
		40. In collaboration with the WHO and the OIE, develop a network for monitoring the emergence and spread of resistance to antibiotics (in humans, animals, and the environment) in low-income countries, by relying on existing networks.	MEEM MASS MAAF MAEDI	WHO, FAO, OIE  European partners Anses IRD / Fondation Rodolphe Mérieux/ Institut Pasteur React-ing	500,000 euros	2 <sup>nd</sup> quarter 2017





## APPENDIX - CONTRIBUTORS TO THE INTERMINISTERIAL ROADMAP FOR CONTROLLING ANTIMICROBIAL RESISTANCE

### STEERING COMMITTEE FOR HEALTH (COMITE PERMANENT RESTREINT)

The interministerial roadmap was prepared and validated by the interministerial Steering Committee for Health (CPR) gathering representatives of the central administration directorates. The CPR convened for 5 sessions, under the chairmanship of the Director General for Health.

#### Ministère des Affaires étrangères et du Développement international (MAEDI)

- Direction générale de la Mondialisation, du Développement et des Partenariats - DGMDP
  - **Anne-Marie DESCÔTES** - *Directrice générale de la mondialisation, du développement et des partenariats*
    - or represented by: **Taraneh SHOJAEI** - *Cheffe du pôle de la santé mondiale*  
**André FURCO** - *Conseiller technique*

#### Ministère de l'Environnement, de l'Energie et de la Mer (MEEM)

- Conseil Général de l'Environnement et du Développement Durable - CGEDD
  - **Anne-Marie LEVRAUT** - *Vice-présidente du conseil général de l'environnement et du développement durable*
    - ou représentée par: **Thierry GALIBERT** - *Membre de l'Autorité Environnementale*
- Commissariat Général au Développement Durable - CGDD
  - **Laurence MONNOYER-SMITH** - *Commissaire générale au développement durable*
    - or represented by: **Serge BOSSINI** - *Directeur de la recherche et de l'innovation*  
**Hélène SOUBELET** - *Cheffe de la mission « Biodiversité et gestion durable des milieux »*  
**Guillaume MOREL** - *Mission « Biodiversité et gestion durable des milieux »*  
**Céline COUDERC-OBERT** - *Adjointe à la cheffe de mission « Risque, Environnement, Santé »*
- Direction Générale de la Prévention des Risques - DGPR
  - **Marc MORTUREUX** - *Directeur général de la prévention des risques*
    - or represented by: **Laure ALNOT** - *Chargée de mission au bureau des biotechnologies et de l'agriculture*

#### Ministère de l'Éducation nationale, de l'Enseignement supérieur et de la Recherche (MENESR)

- Direction Générale de l'Enseignement Scolaire - DGESCO
  - **Florence ROBINE** - *Directrice générale de l'enseignement scolaire*
    - or represented by: **Véronique GASTE** - *Cheffe du bureau de la santé, de l'action sociale et de la sécurité*  
**Henri CAZABAN** - *Adjoint de la cheffe du bureau*  
**Brigitte MOLTRECHT** - *Médecin conseillère technique auprès de la directrice générale*
- Direction Générale de la Recherche et de l'Innovation - DGRI
  - **Alain BERETZ** - *Directeur général de la recherche et de l'innovation*
    - or represented by: **Didier HOFFSCHIR** - *Service Stratégie, Recherche et Innovation*  
**Jocelyne BERILLE** - *Chargée de mission, service « stratégie de la recherche et de l'innovation »*

#### Ministère des Finances et des Comptes Publics (MFCP)

- Direction du Budget - DB
  - **Denis MORIN** - *Directeur du budget*
    - or represented by: **Claire VINCENTI** - *Cheffe du bureau des comptes sociaux et de la santé*  
**Juliette MOISSET** - *Adjointe au chef de bureau en charge des soins de ville*

## Ministère des Affaires sociales et de la Santé (MASS)

- **Christian BRUN-BUISSON** - *Délégué ministériel à l'antibiorésistance*
- **Pierre RICORDEAU** - *Secrétaire général, Secrétariat Général des Ministères chargés des Affaires Sociales (SGMAS)*
- Direction Générale de la Santé - DGS
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Les mesures présentées dans la feuille de route interministérielle ont été préparées par quatre groupes thématiques composés des représentants d'administration centrale et des agences, ainsi que d'experts scientifiques.

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