anses
French agency for food, environmental and occupational health & safety

RESAPATH

French surveillance network for antimicrobial resistance in pathogenic bacteria of animal origin

2012 Annual Report

October 2013 Scientific publication

Contents

Introduction

Monitoring of Antimicrobial Resistance in Pathogenic Bacteria in Animals in France in 2012: Summary Report of the RESAPATH network

The French surveillance network for antimicrobial resistance in pathogenic bacteria of animal origin (RESAPATH) was set up in 1982 under the name of RESABO (BO for bovines). In 2000, it was expanded to pigs and poultry and, in 2007, to other animal species such as small ruminants, companion animals or horses. RESAPATH is a long-term cooperative effort by 64 local routine laboratories throughout France coordinated by the Lyon and Ploufragan-Plouzané Laboratories at the French Agency for Food, Environmental and Occupational Health Safety (ANSES). As mentioned below, the information presented here is based on data from an ongoing surveillance system estimating the proportion of resistances to relevant antibiotics in diseased animals treated by veterinarians as part of their regular clinical services. RESAPATH is also a key component of the recent strategic action Plan (EcoAntibio2017) adopted by the French Ministry of Agriculture, Food and Forest to combat antimicrobial resistance in animals. The epidemiology of resistance is increasingly complex, and we strongly believe that providing annual data of resistance trends in animal pathogens contributes to a comprehensive overview of antimicrobial resistance in veterinary medicine. We especially thank all laboratories and staff who are contributing to these surveillance efforts, and to a better control of this major issue in animals.

Dr Jean-Yves MADEC, DVM, PhD
ANSES Lyon
On behalf of the RESAPATH

Editors

Emilie Gay, ANSES Lyon
Marisa Haenni, ANSES Lyon
Eric Jouy, ANSES Ploufragan-Plouzané
Jean-Yves Madec, ANSES Lyon

The following persons contributed to the data collection and analysis, and to the molecular work:

Odile Balan, ANSES Ploufragan-Plouzané
Géraldine Cazeau, ANSES Lyon
Pierre Châtre, ANSES Lyon
Claire Chauvin, ANSES Ploufragan-Plouzané
Nathalie Jarrige, ANSES Lyon
Laëtitia Le Devendec, ANSES Ploufragan-Plouzané
Véronique Métayer, ANSES Lyon
Christelle Philippon, ANSES Lyon
Cécile Ponsin, ANSES Lyon
Estelle Saras, ANSES Lyon
Jean-Luc Vinard, ANSES Lyon

Organisation and key figures

The objectives of the RESAPATH are the followings:

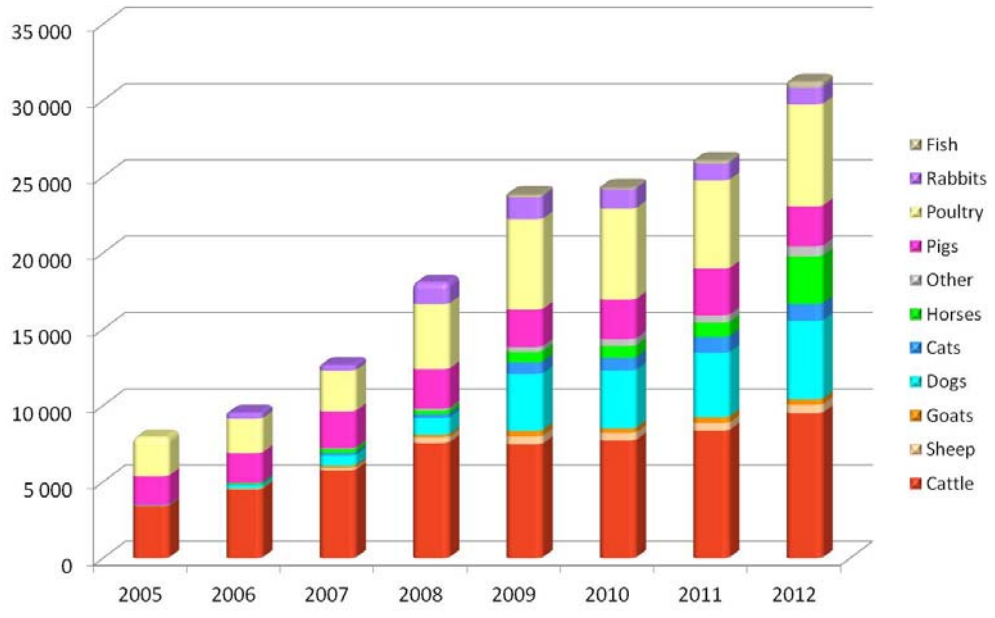
- To monitor antimicrobial resistance in pathogenic bacteria of animal origin in France,
- To collect resistant isolates of particular interest, and to characterize their genetic background (including deciphering mechanisms of resistance),
- To provide a technical support to local laboratories,
- To contribute to updated comparative data between animals and humans in France.

Bacteria recovered from diseased animals and sampled by veterinarians for diagnostic purposes as part of their routine activity are tested for antimicrobial susceptibility by private or public local veterinary laboratories throughout France. Antibiograms are performed by disk diffusion according to the guidelines of the Antibiogram Committee of the French Society of Microbiology (CA-SFM 2012) and of the AFNOR NF U47-107 standard, and inhibition zone diameters are transmitted to ANSES. Isolates are then categorized as susceptible (S), intermediate (I) or resistant (R) according to the recommendations provided by the CA-SFM 2012. Should no established breakpoints be available, critical values provided by the manufacturer for the corresponding molecules are used.
In addition to data collection, RESAPATH also allows the collection of isolates harbouring resistance profiles of specific interest (such as resistance to broad-spectrum cephalosporins), which are then subjected to in-depth molecular studies. Laboratories participate to annual ring trials (External Quality Assurance System), which contribute to the quality control of the data gathered by RESAPATH. In addition, annual training sessions, technical support, on-site training and other actions are also provided.

RESAPATH is the unique veterinary member of the French National Observatory for Epidemiology of Bacterial Resistance to Antimicrobials (ONERBA), which encompasses 16 other surveillance networks throughout France, all in private or public human practices. RESAPATH is a passive or 'event-based' surveillance network. Member laboratories join the RESAPATH on a voluntary basis and data collected depend on the initial decision of veterinary practitioners. Hence, those data cannot be considered as perfectly representative of the global resistance of pathogenic bacteria but are a good indicator of their resistance rates in field conditions. In all, the significance of this monitoring relies on its ability to detect most resistant bacteria and to measure trends in antimicrobial resistance in diseased animals in France.

In 2012, 64 laboratories were members of RESAPATH and a total of 31,211 antibiograms were transmitted to ANSES, all animal species included. The evolution of the distribution of antibiograms per animal sector is presented in Figure 1.

***Figure 1** – Annual number of antibiograms collected per animal sector*



Resistance data

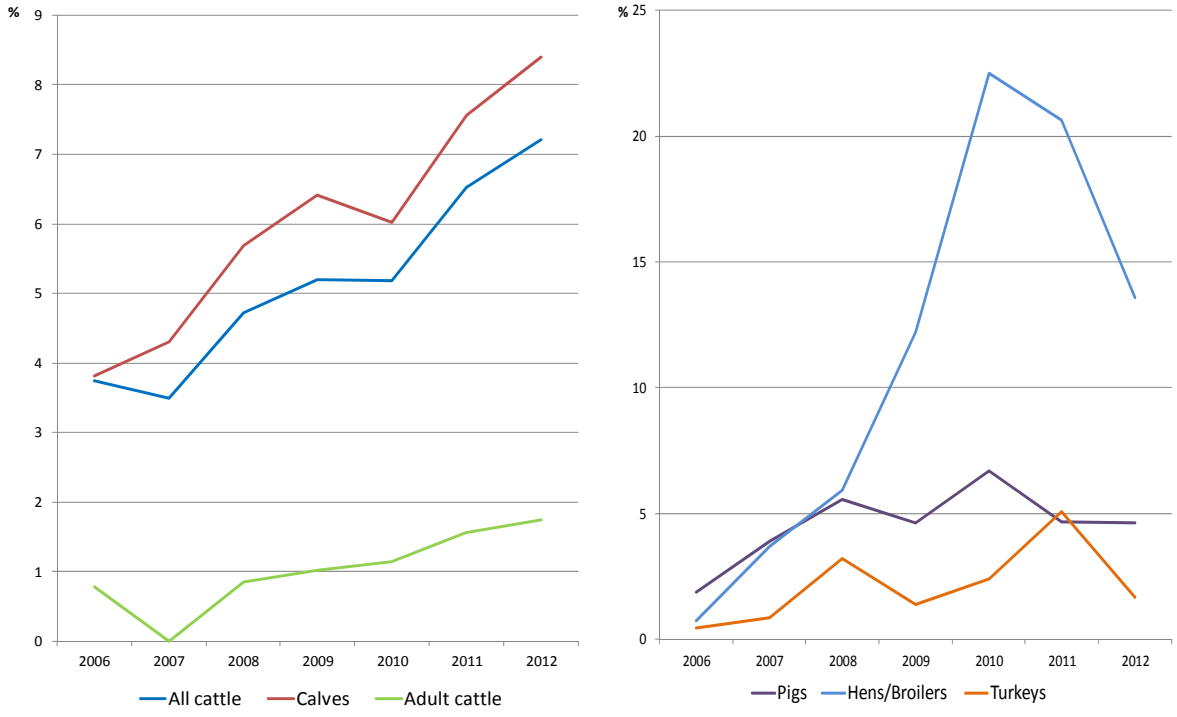
This chapter summarizes the key results on resistance to broad-spectrum cephalosporins and fluroquinolones that are considered as critically important antibiotics both in human and veterinary medicine. Other important topics such as multidrug resistance, veterinary nosocomial infections or various molecular data are also highlighted. Detailed information on other resistances of the clinical isolates is available for each animal species and infection types in the Annex section.

Resistance to broad-spectrum cephalosporins

Isolates are routinely tested for susceptibility to ceftiofur and cefquinome (food animals and horses) or cefovecin (companions animals). Resistance is mainly observed for *Escherichia coli*, and to a lesser extent for *Klebsiella pneumoniae* and *Enterobacter* spp. In 2012, resistance to ceftiofur in clinical *E. coli* isolates was 14% in broilers, 11.5% in dogs, 8.5% in cattle and horses, 8% in cats, 5% in pigs, 3-4% in sheep and goats, 2% in turkey and 1% in rabbits. Extended-Spectrum Beta-Lactamases (ESBLs) are the main enzymes responsible for resistance to broad-spectrum cephalosporins in France (principally CTX-M-1). It should be noted that ESBLs also confer resistance to cefquinome, and that the additional decreased susceptibility to cefquinome observed on ceftiofur susceptible *E. coli* isolates is most likely due to the dissemination of oxacillinase-type enzymes. Altogether, the use of cefquinome should be considered with similar attention than ceftiofur.

In broilers, a considerable increase in resistance to ceftiofur in *E. coli* was observed, reaching 21% in 2010, and the proportion dropped down rapidly to 14% in 2012 (Figure 2). This is most likely reflecting a decrease in the off-label use of cetiofur in broilers since 2010. Nevertheless, resistance level to ceftiofur in poultry remains by far the highest of any other animal species or food production in France.

***Figure 2**: Evolution of proportions of E. coli strains non-susceptible (R+I) to ceftiofur in cattle, pigs and poultry (2006-2012)*



In cattle, resistance to ceftiofur in *E. coli* is constantly increasing since 2007 (Figure 2). Resistance to ceftiofur is mainly found in calves compared to adult cattle where ESBL producers are highly rare. In 2012, the proportion of resistance to ceftiofur in *E. coli* in calves reached 8-9%. In parallel to a probable non appropriate use of antibiotics in cattle production, these data also question the contribution of calves fed waste milk from antimicrobial-treated cows at farm.

In companion animals and horses, analysis of trends in resistance was possible since 2009 only, due to a more recent inclusion of these animal species into RESAPATH. In 2012, resistance to ceftiofur in *E. coli* is still increasing up to 8-11.5% in dogs, cats and horses. In horses, a particular increase was observed in 2012, which may result from the very recently extended surveillance to sport horses. Hence, the use of antibiotics greatly differs in sport compared to family horses, which in turn may result in higher levels of resistance.

ESBL plasmids in clinical isolates

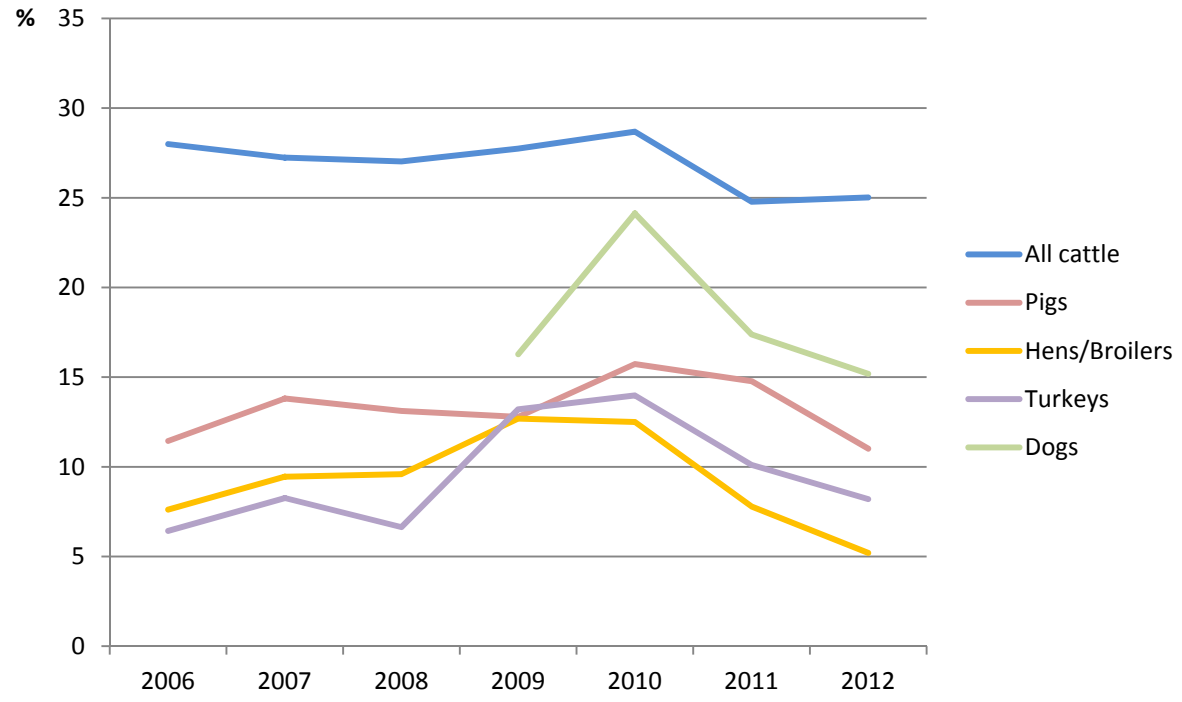
Resistance to Extended-Spectrum Cephalosporins (ESC) is a major concern both in animal and public health. The vast majority of genes responsible for these resistances are located on plasmids, which can easily spread between bacteria and animal hosts. Recent data also suggest that animals and humans share a common pool of ESC-carrying plasmids, even though they are usually hosted by different *E. coli* clones.

In France, numerous Enterobacteriaceae (mostly *E. coli*, but also *K. pneumoniae* or *Enterobacter cloacae*) are collected through the RESAPATH for molecular characterization. In 2012, ceftiofur resistance (due to the production of CTX-M-1 enzyme) resulted from the presence of identical or highly similar plasmids in several animal species without any epidemiological or temporal links (cats, dogs, goats, horses). This $bla_{\text{CTX-M-1}}$/IncI1/ST3 plasmid had also been described in *Salmonella enterica* from humans, poultry and cattle. This suggests a large diffusion of this plasmid in animals in France, irrespectively of the bacterial clones and animal hosts. The question remains open on the reasons for specific ESC-plasmids being so successful in various infected animals.

Resistance to fluoroquinolones

Isolates are routinely tested for susceptibility to enrofloxacin, marbofloxacin or danofloxacin. Other fluoroquinolones are also tested depending on the animal species, including the recently marketed pradofloxacin in companion animals.
In Figure 3, resistance to enrofloxacin in *E. coli* was used as an indicator of resistance to fluoroquinolones. A global decrease in the level of resistance was observed in all animal species (except stability in cattle) since 2010.

***Figure 3**: Evolution of proportions of E. coli strains non-susceptible (R+I) to enrofloxacin in cattle, pigs, poultry and dogs (2006-2012)*



Multidrug resistance

Multidrug resistance was investigated in *E. coli*, the most frequent bacterial species among the RESAPATH data. The list of antimicrobials considered for this issue included the most frequently tested molecules by the RESAPATH laboratories, in combination with relevance in veterinary practice. Also, a single molecule per class was considered. Five antibiotics were chosen, namely ceftiofur, gentamicin, tetracycline, trimethoprim-sulfonamide in combination, and either enrofloxacin or marbofloxacin. For horses, trimethoprim-sulfonamide was not considered further as this combination was too rarely tested (in coherence with a limited usage). Similarly, tetracycline was not taken into account for dogs.

In production animals (cattle, pigs and poultry), more than 20% of the isolates collected by RESAPATH had no resistance to any of the antimicrobials considered, except in pigs where this percentage was lower (15.6%) (Table 1). Most isolates were resistant to one or two molecules, and very few were resistant to more than three molecules, except in cattle (11.2%). The number of resistances differed depending on the animal species, but also the type of disease. In cattle and pigs, where diseases were statistically distinguishable, resistance of *E. coli* to several antimicrobials was significantly higher in digestive disorders. In cattle, contrary to pigs and poultry, ceftiofur resistant isolates harboured numerous co-resistances, such as to tetracycline and sulfonamides.

***Table 1**: Number and proportion of resistant isolates (R+I) from a list of five antimicrobials in E. coli in cattle, pigs and poultry*

Resistance number (R+I)	Cattle		Pigs		Hens/broilers		Turkeys	
	n	%	n	%	n	%	n	%
0	928	22.0	163	15.6	661	33.0	171	26.5
1	1488	35.3	265	25.3	695	34.7	265	41.0
2	777	18.4	430	41.1	505	25.2	152	23.5
3	545	12.9	164	15.7	133	6.6	52	8.0
4	368	8.7	23	2.2	9	0.4	6	0.9
5	107	2.5	2	0.2	2	0.1	0	0.0
Total	4213	100	1047	100	2005	100	646	100

Any direct comparison of multidrug resistance data between production animals and horses/dogs was not possible due to differences in the list of antibiotics considered.

For horses and dogs, the huge majority (more than 70%) of the isolates were not resistant to the four antimicrobials considered (Tables 2 and 3). Nonetheless, the proportion of isolates with more than 3 resistances reached 3.5% in horses and 2.8% in dogs, which seems higher than previously identified in production animals, except cattle. As in cattle, ceftiofur-resistant isolates from horses and dogs had numerous co-resistances.

***Table 2**: Number and proportion of resistant isolates (R+I) from a list of four antimicrobials in E. coli in horses*

Resistance number (R+I)	Horses	
	n	%
0	376	72.7
1	77	14.9
2	21	4.1
3	25	4.8
4	18	3.5
Total	517	100

***Table 3**: Number and proportion of resistant isolates (R+I) from a list of four antimicrobials in E. coli in dogs*

Resistance number (R+I)	Dogs	
	n	%
0	591	72.2
1	106	13.0
2	49	6.0
3	49	6.0
4	23	2.8
Total	818	100

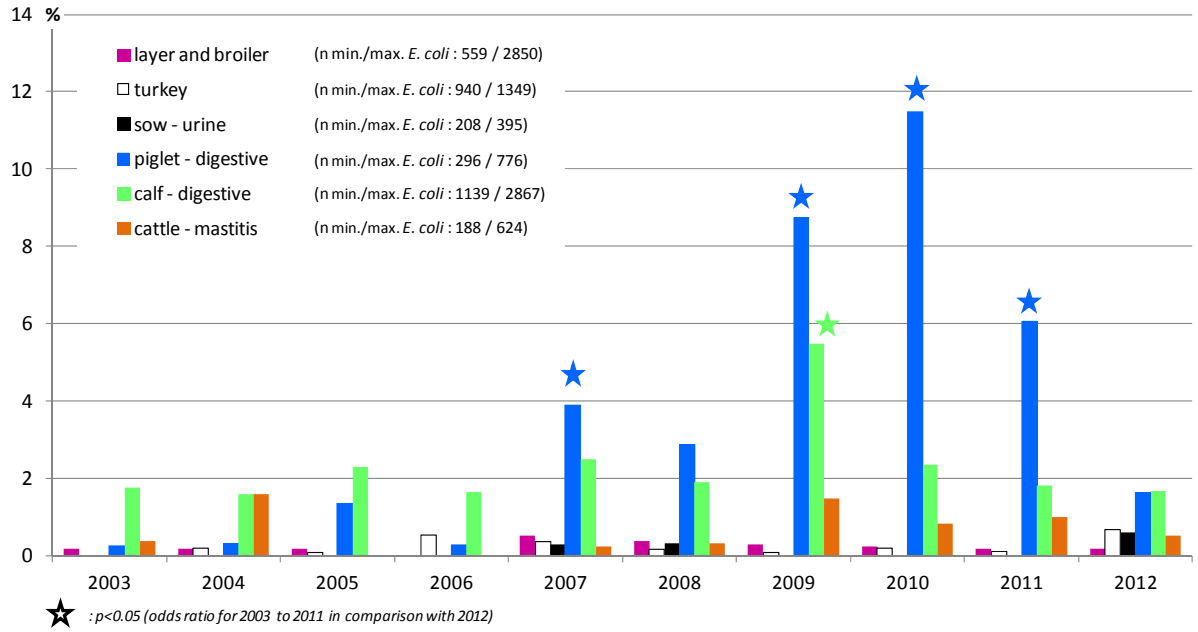
Altogether, these data highlight to what extent diseased animals became a major reservoir of multiple resistance genes. The abundance of multidrug resistant isolates confirms that the driving force for selection does not only rely on recently marketed molecules (cephalosporins, for instance), but that so-called "older" compounds, such as tetracyclines, may play a significant role as well.

Resistance to colistin

In 2012, the veterinary group of the Antibiogram Committee of the French Society of Microbiology (CA-SFM) modified the upper cut-off for colistin (50 µg), from a diameter of 15 mm to 18 mm. This was driven by recent publications as well as by the experience of the RESAPATH members who observed a lack of correlation between diameters ranging from 15 mm to 17 mm and the Minimal Inhibitory Concentrations (MICs) determined by E-tests. On the contrary, both methods were coherent above or below these diameters. Consequently, an MIC testing is now recommended on all isolates with a colistin diameter of 15-17mm, and those values (and categorisations) will replace the antibiogram results given to veterinarians.

Altogether, data from the RESAPATH probably underestimate the proportions of susceptible or resistant bacteria. However, trends of these proportions over years are a first approach of colistin resistance. Figure 4 presents the proportions of colistin diameters under 15 mm for different animal species or ages. Odd ratios for 2003 to 2011 compared to 2012 show a significant difference in the proportion of colistin-resistant isolates in digestive samples from calves in 2009, and weaning pigs in 2007, and in 2009 to 2011.

***Figure 4**: Proportions of colistin diameters under 15 mm for different animal species or ages from 2003 to 2012*



The increase in the proportion of diameters <15 mm was neither explained by methodological issues nor by a higher exposure to polymyxins, as confirmed by the French Agency for Veterinary Medicinal Products. As shown in Figure 4, this situation was limited to a specific time period and has now turned down.

Methicillin-resistant coagulase-positive staphylococci

Methicillin-resistance in staphylococci is difficult to infer from phenotypic results because of the intermediate region (25-26 mm) of the cefoxitin disk, which is the main marker used by veterinary laboratories to detect methicillin-resistance. Ideally, all cefoxitin-intermediate and cefoxitin-resistant strains should be confirmed by molecular methods, which is obviously not possible under routine conditions. Consequently, any trend in resistance to cefoxitin should be carefully interpreted as an indicator of methicillin-resistance.

Coagulase-positive staphylococci (CoPS), and more particularly *Staphylococcus aureus,* is one of the major pathogen causing bovine mastitis. Even though mastitis is massively treated with antibiotics, resistance phenotypes are overall very rare, except for penicillin. Cefoxitin resistance is highly limited and only around 1% of the CoPS isolated from both clinical and sub-clinical mastitis are resistant to methicillin. However, a special attention must be drawn on bovine methicillin-resistant *S. aureus* (MRSA) since the recent discovery of a new *mecA* variant, so-called *mecC*, which is not detected by conventional *mecA*-specific PCR. This specific gene has

been identified for the first time in France last year in clones that are otherwise susceptible to non-beta-lactams.

Contrarily to cattle, data on CoPS isolated from goat and sheep are very scarce. Consequently, the weak number of antibiograms received through the RESAPATH does not allow us to infer statistically robust data.

MRSA in swine were particularly reported due to the emergence and rapid spread of the livestock associated clone ST398. However, in this animal host, ST398 is abundantly found in asymptomatic carriers and is mostly not a cause of infection. Since the RESAPATH only gathers antibiograms from clinical samples, MRSA in swine are not reported here.

In broilers, the detection of methicillin-resistant CoPS is also rare (<3%) even though it seems to be the highest proportion observed in livestock animals through the RESAPATH. This trend has to be scrutinized over years through specific studies aiming at determining which clones circulate in poultry in France.

The number of antibiograms collected from horses recently increased in the network (2011) so that any trend should be further confirmed. Nonetheless, the percentage of methicillin-resistance reaches ca 25%, which deserves a specific attention. This has to be validated by molecular approaches aiming at characterizing the population structure of horse-associated methicillin-resistant CoPS.

Finally, in cats but more specifically in dogs, methicillin-resistance is closely associated with the important role of *Staphylococcus pseudintermedius*. Since 2006, this pathogen was susceptible to roughly all antimicrobials used in veterinary medicine. However, specific clones carrying the *mecA* gene responsible for methicillin-resistance rapidly emerged and disseminated throughout the world. In France, the RESAPATH estimates a proportion of 5-10% of methicillin-resistant *S. pseudintermedius* (MRSP) in companion animals, depending on the pathology. This number might be underestimated since the majority of veterinary laboratories use cefoxitin as a marker for methicillin resistance, which is unfortunately of limited value. Indeed, this underestimation was recently confirmed by a specific study in French dogs, which showed a prevalence of 15% of MRSP in clinical samples.

Nosocomial infections

The selection and transmission of resistant pathogens in human healthcare settings has been abundantly reported. On the contrary, this is much less documented for animals, except for horses and dogs. Nonetheless, similar risks exist in animal hospitals. In France, two nosocomial outbreaks were reported in 2012 through the RESAPATH.

The first case was identified in a veterinary clinic in the suburb of Paris with companion animals suffering from Urinary Tract Infections (UTI) due to *Klebsiella pneumoniae*. A total of 24 cats and dogs got UTI between 2008 and 2010, among which 17 were infected by the same bacterial clone. All ST15 *K. pneumoniae* isolates displayed an ESBL phenotype due to the presence of a $bla_{\text{CTX-M-15}}$ gene carried on an IncR plasmid, in addition to multiple other associated resistances. Epidemiological investigations proved that all animals got infected through surgery within the clinic.

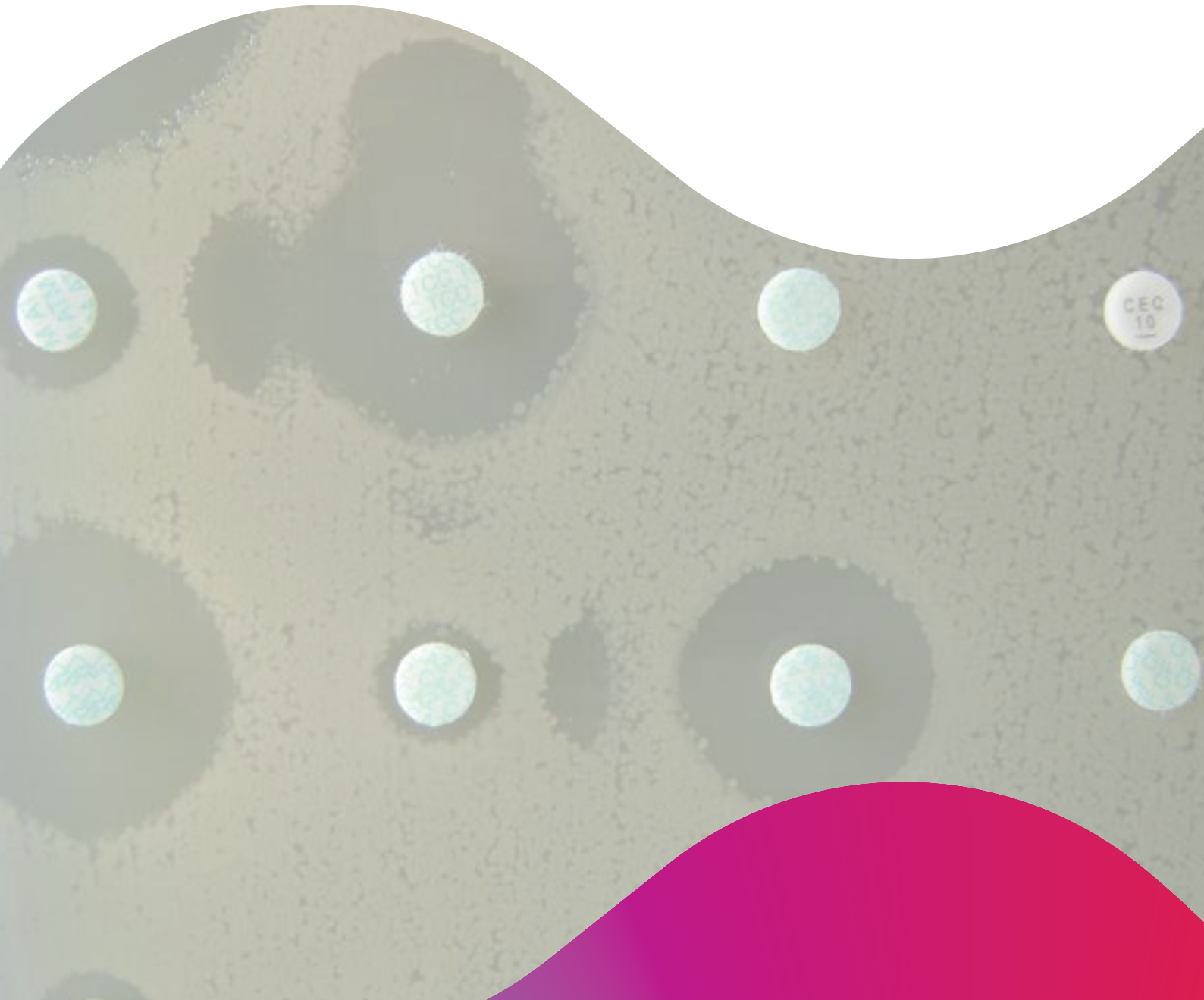
The second case was reported in a veterinary clinic in the Southern part of France, where 15 dogs developed post-operative infections due to *Staphylococcus pseudintermedius*. Molecular investigations showed that all isolates belonged to a rather unusual clone in Europe. Indeed, the most frequent clones in Europe belong to the MLST type ST71 and *spa*-type t02 whereas this one was an ST71-t06 type. Genetic typing by Pulse-Field Gel Electrophoresis (PFGE) proved that 14/15 isolates were closely related, and the only divergent isolate was recovered from a dog which had suffered surgery in a different clinic, but was controlled in this one.

These data confirm that nosocomial infections do exist in veterinary medicine and may be underreported. This might be partly due to difficulties in gathering robust epidemiological data, contrary to humans where records are easily available. Nevertheless, investigations on nosocomial outbreaks should be encouraged in order to identify and ultimately stop the spread of such multidrug resistant strains. This is indeed of particular importance for companion animals due to their proximity with humans.

anses
French agency for food, environmental and occupational health & safety

Annex 1

List of RESAPATH laboratories



Laboratories members

Laboratoire Départemental d'Analyses - BOURG EN BRESSE (01)
Eurofins Laboratoire Cœur de France - MOULINS (03)
Laboratoire Départemental Vétérinaire et Hygiène Alimentaire - GAP (05)
Laboratoire Vétérinaire Départemental - SOPHIA ANTIPOLIS (06)
Laboratoire Départemental d'Analyses - HAGNICOURT (08)
Laboratoire d'Analyses Vétérinaires - TROYES (10)
Aveyron Labo - RODEZ (12)
Laboratoire Départemental d'Analyses - MARSEILLE (13)
LABEO Frank Duncombe - CAEN (14)
Laboratoire Départemental d'Analyses et de Recherches - AURILLAC (15)
Laboratoire Départemental d'Analyses de la Charente - ANGOULEME (16)
Laboratoire Départemental d'Analyses Vétérinaires agricoles et des eaux - AJACCIO (20)
LABOCEA Ploufragan - PLOUFRAGAN (22)
Labofarm - LOUDEAC (22)
Laboratoire Départemental d'Analyse et de Recherche - COULOUNIEIX CHAMIERS (24)
Laboratoire Vétérinaire Départemental - BESANCON (25)
LBAA - BOURG DE PEAGE (26)
LABOCEA Quimper - QUIMPER (29)
Alcyon - LANDERNEAU (29)
Laboratoire Départemental d'Analyses - NIMES (30)
Laboratoire Départemental Vétérinaire et des Eaux - AUCH (32)
Biolab 33 - LE HAILLAN (33)
Laboratoire Départemental Vétérinaire - MONTPELLIER (34)
Institut en Santé Agro Environnement - JAVENE (35)
Bio-Chêne Vert - CHATEAUBOURG (35)
Biovilaine - REDON (35)
Deltavit - JANZE (35)
Laboratoire des Sources - LECOUSSE (35)
Laboratoire de Touraine - TOURS (37)
Laboratoire Vétérinaire Départemental - GRENOBLE (38)
Laboratoire Départemental d'Analyses - POLIGNY (39)
Laboratoire des Pyrénées et des Landes - MONT-DE-MARSAN (40)
Laboratoire Vétérinaire Départemental - MONTBRISON (42)
INOVALYS Nantes - NANTES (44)
Laboratoire Départemental d'Analyses - MENDE (48)
INOVALYS Angers - ANGERS (49)
Laboratoire HGRTS - SAINT LAURENT DE LA PLAINE (49)
LABEO Manche - SAINT LO (50)
Laboratoire Vétérinaire Départemental - LAVAL (53)
Laboratoire Vétérinaire et Alimentaire - MALZEVILLE (54)
Laboratoire Départemental d'Analyses - SAINT AVE (56)
ANIBIO - PLUMELIAU (56)
Service du Laboratoire Départemental - NEVERS (58)
Laboratoire Départemental Public - VILLENEUVE D'ASCQ (59)
LABEO Orne - ALENCON (61)
Laboratoire Départemental d'Analyses - ARRAS (62)
Laboratoire Vétérinaire et Biologique - LEMPDES (63)
Laboratoire Départemental d'Analyses - STRASBOURG (67)
Laboratoire Vétérinaire Départemental – COLMAR (68)

Laboratoire Départemental Vétérinaire - MARCY L'ETOILE (69)
Laboratoire Départemental d'Analyses - MACON (71)
INOVALYS Le Mans - LE MANS (72)
Laboratoire Départemental d'Analyses Vétérinaires - CHAMBERY (73)
Lidal - Laboratoire Vétérinaire Départemental - SEYNOD (74)
Laboratoire Agro Vétérinaire Départemental - ROUEN (76)
Laboratoire d'Analyses Sèvres Atlantique - NIORT (79)
Laboratoire Vétérinaire Départemental - MONTAUBAN (82)
Laboratoire Départemental d'Analyses - AVIGNON (84)
Laboratoire de l'Environnement et de l'Alimentation de la Vendée - LA ROCHE SUR YON (85)
Labovet - LES HERBIERS (85)
Laboratoire Vétérinaire Départemental - LIMOGES (87)
Laboratoire Vétérinaire Départemental - EPINAL (88)
Institut Départemental de l'Environnement et d'Analyses - AUXERRE (89)
VEBIO - ARCUEIL (94)

anses
French agency for food, environmental
and occupational health & safety

Annex 2

Cattle

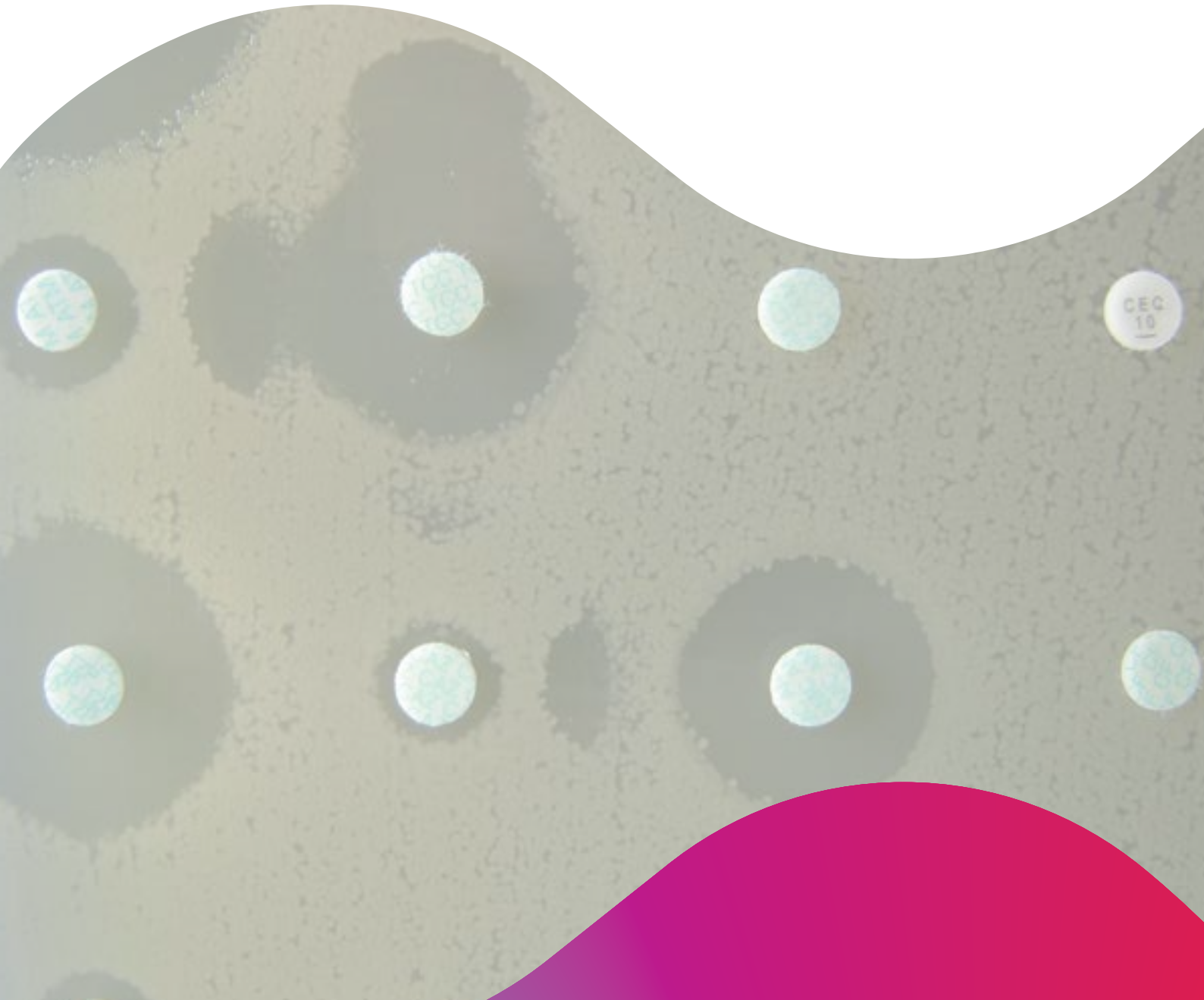
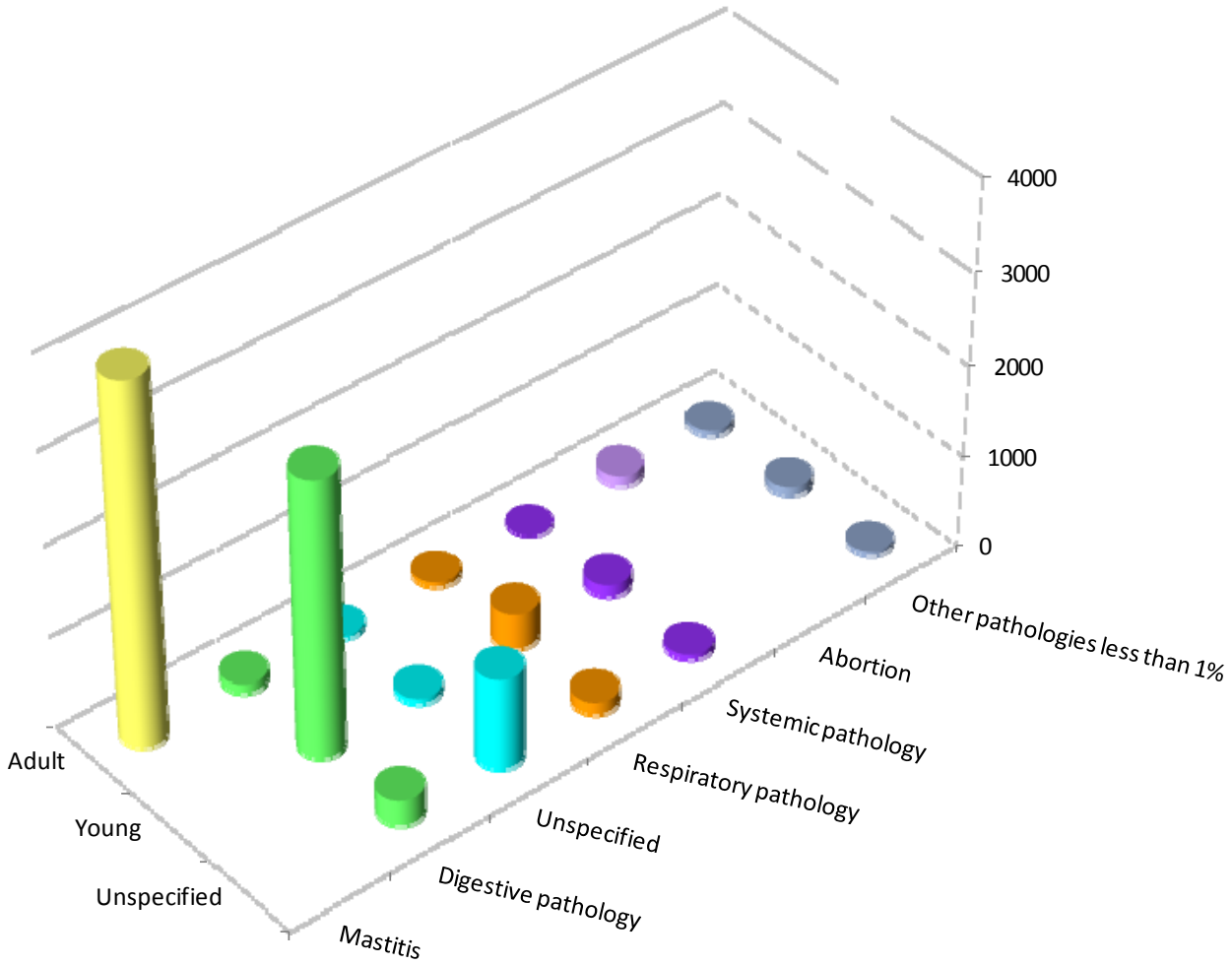


Figure 1 - Cattle 2012 – Number of antibiograms by age group and pathology

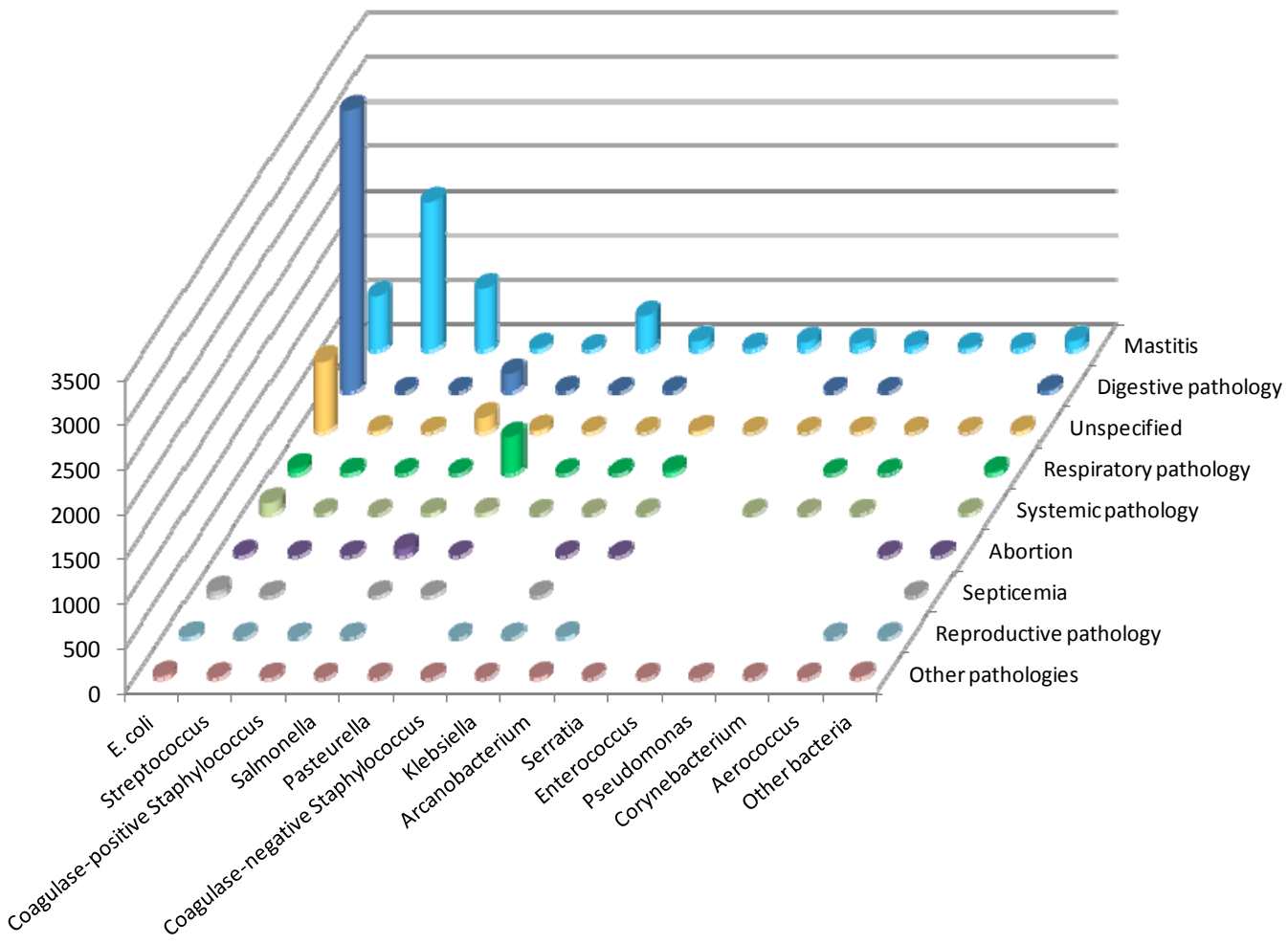


Note: *all values are detailed in table 1 (including other pathologies, representing less than 1%, grouped together)*

Table 1 - Cattle 2012 – Number of antibiograms by age group and pathology

	Pathology N *(%)*																		
Age group N (%)	Mastitis	Digestive pathology	Unspecified	Respiratory pathology	Systemic pathology	Abortion	Septicemia	Reproductive pathology	Nervous system pathology	Skin and mucous membrane pathology	Arthritis	Omphalitis	Kidney and urinary tract pathology	Ocular pathology	Cardiac pathology	Oral pathology	Bone pathology	Otitis	**Total N *(%)***
Adult	3,940 *(41.49)*	97 *(1.02)*	29 *(0.31)*	*53* *(0.56)*	7 *(0.07)*	110 *(1.16)*	3 *(0.03)*	41 *(0.43)*	1 *(0.01)*	2 *(0.02)*	2 *(0.02)*		2 *(0.02)*	2 *(0.02)*	2 *(0.02)*		2 *(0.02)*		**4,293** ***(45.21)***
Young		3,032 *(31.93)*	55 *(0.58)*	*391* *(4.12)*	132 *(1.39)*		61 *(0.64)*	3 *(0.03)*	12 *(0.13)*	1 *(0.01)*	7 *(0.07)*	8 *(0.08)*			2 *(0.02)*	1 *(0.01)*		**1** *(0.01)*	**3,706** ***(39.03)***
Unspecified		285 *(3.00)*	993 *(10.46)*	*129* *(1.36)*	52 *(0.55)*		7 *(0.07)*		4 *(0.04)*	11 *(0.12)*	4 *(0.04)*	1 *(0.01)*	5 *(0.05)*	4 *(0.04)*	1 *(0.01)*	1 *(0.01)*			**1,497** ***(15.76)***
Total N *(%)*	**3,940** ***(41.49)***	**3,414** ***(35.95)***	**1,077** ***(11.34)***	***573*** ***(6.03)***	**191** ***(2.01)***	**110** ***(1.16)***	**71** ***(0.75)***	**44** ***(0.46)***	**17** ***(0.18)***	**14** ***(0.15)***	**13** ***(0.14)***	**9** ***(0.09)***	**7** ***(0.07)***	**6** ***(0.06)***	**5** ***(0.05)***	**2** ***(0.02)***	**2** ***(0.02)***	**1** ***(0.01)***	9,496 ***(100.00)***

Figure 2 - Cattle 2012 – Number of antibiograms by bacteria group and pathology (all age groups included)

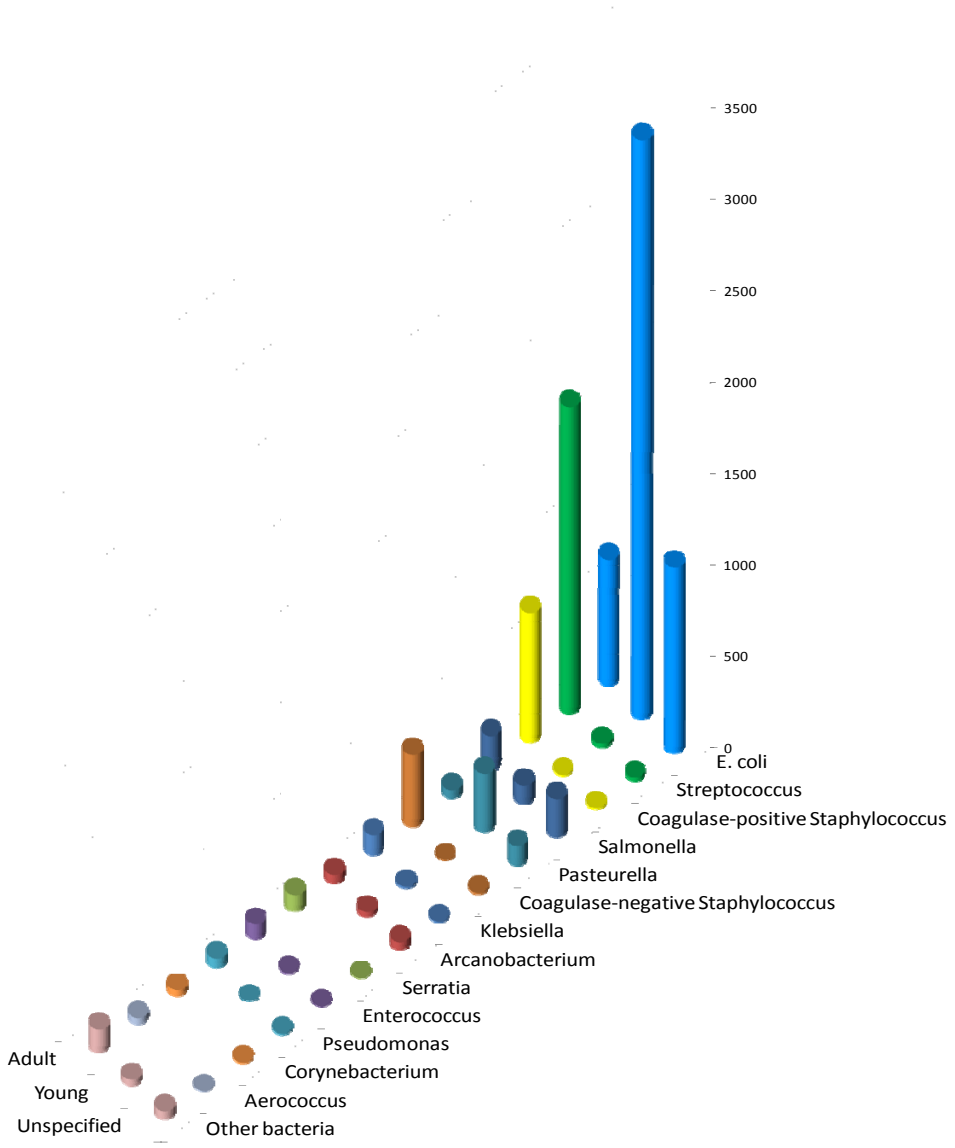


Note: only values for pathologies and bacteria groups having more than 30 occurrences are represented. Detailed values are presented in table 2 below.

Table 2 - Cattle 2012 – Number of antibiograms by bacteria group and pathology (all age groups included)

	Pathology N *(%)*																		
Bacteria N ***(%)***	Mastitis	Digestive pathology	Unspecified	Respiratory pathology	Systemic pathology	Abortion	Septicemia	Reproductive pathology	Nervous system pathology	Skin and mucous membrane pathology	Arthritis	Omphalitis	Kidney and urinary tract pathology	Ocular pathology	Cardiac pathology	Bone pathology	Oral pathology	Otitis	**Total N** ***(%)***
E. coli	617	3,160	800	64	130	12	58	17	10	1	4	5	3		2			1	**4,884**
	(6.50)	*(33.28)*	*(8.42)*	*(0.67)*	*(1.37)*	*(0.13)*	*(0.61)*	*(0.18)*	*(0.11)*	*(0.01)*	*(0.04)*	*(0.05)*	*(0.03)*		*(0.02)*			*(0.01)*	***(51.43)***
Streptococcus	1,671	1	19	13	7	4	2	3	2	1	1		1	2			1		**1,728**
	(17.60)	*(0.01)*	*(0.20)*	*(0.14)*	*(0.07)*	*(0.04)*	*(0.02)*	*(0.03)*	*(0.02)*	*(0.01)*	*(0.01)*		*(0.01)*	*(0.02)*			*(0.01)*		***(18.20)***
Coagulase-positive Staphylococcus	704	2	3	6	2	1		2		3					1				**724**
	(7.41)	*(0.02)*	*(0.03)*	*(0.06)*	*(0.02)*	*(0.01)*		*(0.02)*		*(0.03)*					*(0.01)*				***(7.62)***
Salmonella	23	209	168	4	11	82	4	2											**503**
	(0.24)	*(2.20)*	*(1.77)*	*(0.04)*	*(0.12)*	*(0.86)*	*(0.04)*	*(0.02)*											***(5.30)***
Pasteurella	10	9	26	405	18	2	5				1	1			1				**478**
	(0.11)	*(0.09)*	*(0.27)*	*(4.26)*	*(0.19)*	*(0.02)*	*(0.05)*				*(0.01)*	*(0.01)*			*(0.01)*				***(5.03)***
Coagulase-negative Staphylococcus	392	1	9	4	1			1			1								**409**
	(4.13)	*(0.01)*	*(0.09)*	*(0.04)*	*(0.01)*			*(0.01)*			*(0.01)*								***(4.31)***
Klebsiella	105	6	2	5	3	1	2	1				1							**126**
	(1.11)	*(0.06)*	*(0.02)*	*(0.05)*	*(0.03)*	*(0.01)*	*(0.02)*	*(0.01)*				*(0.01)*							***(1.33)***
Arcanobacterium	25		20	38	5	1		13	1	6	5	2							**116**
	(0.26)		*(0.21)*	*(0.40)*	*(0.05)*	*(0.01)*		*(0.14)*	*(0.01)*	*(0.06)*	*(0.05)*	*(0.02)*							***(1.22)***
Serratia	92		3																**95**
	(0.97)		*(0.03)*																***(1.00)***
Enterococcus	82	2	1		3								1				1		**90**
	(0.86)	*(0.02)*	*(0.01)*		*(0.03)*								*(0.01)*				*(0.01)*		***(0.95)***
Pseudomonas	51	1	6	3	2														**63**
	(0.54)	*(0.01)*	*(0.06)*	*(0.03)*	*(0.02)*														***(0.66)***
Corynebacterium	29		4	2	1										1	1			**38**
	(0.31)		*(0.04)*	*(0.02)*	*(0.01)*										*(0.01)*	*(0.01)*			***(0.40)***
Aerococcus	31		1			1		1		1			1						**36**
	(0.33)		*(0.01)*			*(0.01)*		*(0.01)*		*(0.01)*			*(0.01)*						***(0.38)***
Other bacteria < 30 occurrences	108	23	15	29	8	6		4	4	2	1		1	4		1			**206**
	(1.14)	*(0.24)*	*(0.16)*	*(0.31)*	*(0.08)*	*(0.06)*		*(0.04)*	*(0.04)*	*(0.02)*	*(0.01)*		*(0.01)*	*(0.04)*		*(0.01)*			***(2.17)***
Total N ***(%)***	**3,940** ***(41.49)***	**3,414** ***(35.95)***	**1,077** ***(11.34)***	**573** ***(6.03)***	**191** ***(2.01)***	**110** ***(1.16)***	**71** ***(0.75)***	**44** ***(0.46)***	**17** ***(0.18)***	**14** ***(0.15)***	**13** ***(0.14)***	**9** ***(0.09)***	**7** ***(0.07)***	**6** ***(0.06)***	**5** ***(0.05)***	**2** ***(0.02)***	**2** ***(0.02)***	**1** ***(0.01)***	**9,496** ***(100.00)***

Figure 3 - Cattle 2012 – Number of antibiograms by bacteria and age group



Note: only bacterial groups having more than 30 occurrences are represented. Detailed values are presented in table 3 below.

Table 3 - Cattle 2012 – Number of antibiograms by bacteria and age group

	Age group N *(%)*			
Bacteria N *(%)*	Adult	Young	Unspecified	**Total N *(%)***
E. coli	691 *(7.28)*	3,173 *(33.41)*	1,020 *(10.74)*	**4,884** ***(51.43)***
Streptococcus	1,685 *(17.74)*	22 *(0.23)*	21 *(0.22)*	**1,728** ***(18.20)***
Coagulase-positive Staphylococcus	710 *(7.48)*	7 *(0.07)*	7 *(0.07)*	**724** ***(7.62)***
Salmonella	189 *(1.99)*	102 *(1.07)*	212 *(2.23)*	**503** ***(5.3)***
Pasteurella	49 *(0.52)*	321 *(3.38)*	108 *(1.14)*	**478** ***(5.03)***
Coagulase-negative Staphylococcus	397 *(4.18)*	3 *(0.03)*	9 *(0.09)*	**409** ***(4.31)***
Klebsiella	108 *(1.14)*	11 *(0.12)*	7 *(0.07)*	**126** ***(1.33)***
Arcanobacterium	45 *(0.47)*	26 *(0.27)*	45 *(0.47)*	**116** ***(1.22)***
Serratia	92 *(0.97)*		3 *(0.03)*	**95** ***(1.00)***
Enterococcus	84 *(0.88)*	4 *(0.04)*	2 *(0.02)*	**90** ***(0.95)***
Pseudomonas	53 *(0.56)*	2 *(0.02)*	8 *(0.08)*	**63** ***(0.66)***
Corynebacterium	32 *(0.34)*		6 *(0.06)*	**38** ***(0.40)***
Aerococcus	33 *(0.35)*		3 *(0.03)*	**36** ***(0.38)***
Other bacteria < 30 occurrences	125 *(1.32)*	35 *(0.37)*	46 *(0.48)*	**206** ***(2.17)***
Total N *(%)*	**4,293** ***(45.21)***	**3,706** ***(39.03)***	**1,497** ***(15.76)***	**9,496** ***(100.00)***

Table 4 - Cattle 2012 – Digestive pathology – Young animals – *E. coli*: susceptibility to antibiotics (proportion) (N=2,916)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*2,671*	**16**
Amoxicillin-Clavulanic ac.	*2,898*	**46**
Cephalexin	*2,338*	**75**
Cephalothin	*587*	**52**
Cefoxitin	*2,152*	**90**
Cefuroxime	*912*	**62**
Cefoperazone	*804*	**79**
Ceftiofur	*2,890*	**92**
Cefquinome 30 µg	*2,754*	**87**
Streptomycin 10 UI	*1,738*	**16**
Spectinomycin	*816*	**43**
Kanamycin 30 UI	*1,709*	**51**
Gentamicin 10 UI	*2,909*	**80**
Neomycin	*1,915*	**52**
Apramycin	*904*	**88**
Tetracycline	*2,667*	**21**
Chloramphenicol	*135*	**53**
Florfenicol	*1,915*	**76**
Nalidixic ac.	*1,743*	**56**
Oxolinic ac.	*782*	**51**
Flumequine	*1,302*	**55**
Enrofloxacin	*2,701*	**72**
Marbofloxacin	*2,693*	**77**
Danofloxacin	*1,198*	**68**
Sulfonamides	*417*	**16**
Trimethoprim	*72*	**71**
Trimethoprim-Sulfonamides	*2,822*	**62**

Table 5 - Cattle 2012 – Mastitis – Adults – *E. coli:* susceptibility to antibiotics (proportion) (N=617)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*534*	**75**
Amoxicillin-Clavulanic ac.	*612*	**82**
Cephalexin	*448*	**90**
Cephalothin	*208*	**86**
Cefoxitin	*442*	**97**
Cefuroxime	*295*	**95**
Cefoperazone	*431*	**98**
Ceftiofur	*498*	**99**
Cefquinome 30 µg	*559*	**99**
Streptomycin 10 UI	*353*	**73**
Spectinomycin	*135*	**83**
Kanamycin 30 UI	*267*	**91**
Gentamicin 10 UI	*608*	**97**
Neomycin	*489*	**90**
Apramycin	*154*	**99**
Tetracycline	*575*	**85**
Chloramphenicol	*46*	**87**
Florfenicol	*388*	**96**
Nalidixic ac.	*312*	**94**
Oxolinic ac.	*158*	**97**
Flumequine	*170*	**97**
Enrofloxacin	*525*	**98**
Marbofloxacin	*557*	**98**
Danofloxacin	*232*	**98**
Sulfonamides	*119*	**77**
Trimethoprim	*88*	**91**
Trimethoprim-Sulfonamides	*544*	**93**

Table 6 - Cattle 2012 – All pathologies and age groups included – *Salmonella* Typhimurium*:* susceptibility to antibiotics (proportion) (N=189)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*170*	**18**
Amoxicillin-Clavulanic ac.	*187*	**37**
Cephalexin	*159*	**99**
Cephalothin	*38*	**100**
Cefoxitin	*157*	**100**
Cefuroxime	*57*	**100**
Cefoperazone	*68*	**53**
Ceftiofur	*188*	**99**
Cefquinome 30 µg	*172*	**99**
Streptomycin 10 UI	*88*	**18**
Spectinomycin	*109*	**27**
Kanamycin 30 UI	*95*	**98**
Gentamicin 10 UI	*189*	**99**
Neomycin	*161*	**100**
Apramycin	*102*	**100**
Tetracycline	*179*	**14**
Florfenicol	*133*	**45**
Nalidixic ac.	*102*	**95**
Oxolinic ac.	*65*	**94**
Flumequine	*87*	**93**
Enrofloxacin	*186*	**99**
Marbofloxacin	*160*	**99**
Danofloxacin	*97*	**99**
Sulfonamides	*32*	**9**
Trimethoprim-Sulfonamides	*184*	**95**

Table 7 - Cattle 2012 – All pathologies and age groups included – *Salmonella* Mbandaka*:* susceptibility to antibiotics (proportion) (N=136)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*123*	**98**
Amoxicillin-Clavulanic ac.	*131*	**98**
Cephalexin	*128*	**99**
Cephalothin	*60*	**100**
Cefoxitin	*125*	**99**
Cefuroxime	*86*	**99**
Cefoperazone	*87*	**100**
Ceftiofur	*135*	**100**
Cefquinome 30 µg	*133*	**99**
Streptomycin 10 UI	*69*	**64**
Spectinomycin	*75*	**67**
Kanamycin 30 UI	*71*	**96**
Gentamicin 10 UI	*135*	**99**
Neomycin	*129*	**98**
Apramycin	*67*	**97**
Tetracycline	*136*	**99**
Florfenicol	*130*	**99**
Nalidixic ac.	*69*	**99**
Oxolinic ac.	*65*	**100**
Flumequine	*50*	**100**
Enrofloxacin	*119*	**100**
Marbofloxacin	*134*	**100**
Danofloxacin	*113*	**100**
Sulfonamides	*61*	**93**
Trimethoprim	*59*	**100**
Trimethoprim-Sulfonamides	*130*	**100**

Table 8 - Cattle 2012 – All pathologies and age groups included – *Salmonella* Montevideo*:* susceptibility to antibiotics (proportion) (N=70)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*62*	**98**
Amoxicillin-Clavulanic ac.	*70*	**100**
Cephalexin	*64*	**100**
Cefoxitin	*64*	**100**
Ceftiofur	*69*	**100**
Cefquinome 30 µg	*69*	**100**
Spectinomycin	*54*	**87**
Gentamicin 10 UI	*70*	**97**
Neomycin	*65*	**100**
Apramycin	*49*	**96**
Tetracycline	*69*	**97**
Florfenicol	*65*	**100**
Oxolinic ac.	*48*	**100**
Flumequine	*47*	**98**
Enrofloxacin	*61*	**100**
Marbofloxacin	*65*	**100**
Danofloxacin	*48*	**100**
Trimethoprim-Sulfonamides	*69*	**100**

Table 9 - Cattle 2012 – Respiratory pathology – Young animals – *Pasteurella multocida:* susceptibility to antibiotics (proportion) (N=164)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*152*	**99**
Amoxicillin-Clavulanic ac.	*162*	**100**
Cephalexin	*116*	**98**
Ceftiofur	*164*	**99**
Cefquinome 30 µg	*156*	**98**
Streptomycin 10 UI	*56*	**52**
Spectinomycin	*94*	**82**
Gentamicin 10 UI	*144*	**94**
Neomycin	*112*	**87**
Tetracycline	*157*	**87**
Florfenicol	*156*	**99**
Nalidixic ac.	*47*	**96**
Oxolinic ac.	*88*	**89**
Flumequine	*108*	**90**
Enrofloxacin	*157*	**97**
Marbofloxacin	*149*	**100**
Danofloxacin	*124*	**95**
Trimethoprim-Sulfonamides	*155*	**95**

Table 10 - Cattle 2012 – Respiratory pathology – Young animals – *Mannheimia haemolytica:* susceptibility to antibiotics (proportion) (N=110)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*102*	**94**
Amoxicillin-Clavulanic ac.	*108*	**98**
Cephalexin	*83*	**99**
Ceftiofur	*109*	**98**
Cefquinome 30 µg	*103*	**97**
Spectinomycin	*51*	**73**
Gentamicin 10 UI	*99*	**88**
Neomycin	*81*	**73**
Tetracycline	*109*	**78**
Florfenicol	*109*	**98**
Nalidixic ac.	*45*	**84**
Oxolinic ac.	*66*	**85**
Flumequine	*69*	**88**
Enrofloxacin	*108*	**96**
Marbofloxacin	*103*	**97**
Danofloxacin	*78*	**94**
Trimethoprim-Sulfonamides	*107*	**93**

Table 11 - Cattle 2012 – Mastitis – Adults – *Serratia Marcescens:* susceptibility to antibiotics (proportion) (N=68)

Antibiotic	*Total (N)*	**% S**
Amoxicillin-Clavulanic ac.	*67*	**15**
Cefoxitin	*50*	**84**
Cefuroxime	*33*	**6**
Cefoperazone	*47*	**96**
Ceftiofur	*56*	**98**
Cefquinome 30 µg	*65*	**98**
Streptomycin 10 UI	*39*	**64**
Gentamicin 10 UI	*66*	**100**
Neomycin	*42*	**100**
Tetracycline	*63*	**8**
Florfenicol	*41*	**85**
Nalidixic ac.	*38*	**97**
Enrofloxacin	*53*	**98**
Marbofloxacin	*58*	**98**
Trimethoprim-Sulfonamides	*52*	**100**

Table 12 - Cattle 2012 – Mastitis – Adults – *Klebsiella pneumoniae:* susceptibility to antibiotics (proportion) (N=58)

Antibiotic	*Total (N)*	**% S**
Amoxicillin-Clavulanic ac.	*58*	**90**
Cephalexin	*35*	**100**
Cefoxitin	*41*	**100**
Cefoperazone	*43*	**95**
Ceftiofur	*45*	**100**
Cefquinome 30 µg	*52*	**100**
Streptomycin 10 UI	*37*	**81**
Gentamicin 10 UI	*58*	**100**
Neomycin	*40*	**98**
Tetracycline	*57*	**93**
Florfenicol	*31*	**97**
Enrofloxacin	*49*	**100**
Marbofloxacin	*55*	**98**
Trimethoprim-Sulfonamides	*51*	**98**

Table 13 - Cattle 2012 – Mastitis – Adults – *Coagulase-positive Staphylococcus*: susceptibility to antibiotics (proportion) (N=704), including 470 identified S. *aureus* strains.

Antibiotic	*Total (N)*	**% S**
Penicillin	*692*	**68**
Cefoxitin	*591*	**94**
Oxacillin	*115*	**98**
Erythromycin	*617*	**94**
Tylosin	*407*	**98**
Spiramycin	*698*	**96**
Lincomycin	*673*	**96**
Pirlimycin	*97*	**95**
Streptomycin 10 UI	*554*	**87**
Kanamycin 30 UI	*438*	**98**
Gentamicin 10 UI	*673*	**99**
Neomycin	*369*	**98**
Tetracycline	*670*	**95**
Chloramphenicol	*50*	**96**
Florfenicol	*228*	**99**
Enrofloxacin	*566*	**99**
Marbofloxacin	*638*	**99**
Danofloxacin	*164*	**98**
Sulfonamides	*54*	**76**
Trimethoprim-Sulfonamides	*576*	**99**
Rifampicin	*230*	**97**

Table 14 - Cattle 2012 – Mastitis – Adults – *Coagulase-negative Staphycoccus*: susceptibility to antibiotics (proportion) (N=392)

Antibiotic	*Total (N)*	**% S**
Penicillin	*386*	**67**
Cefoxitin	*325*	**97**
Oxacillin	*83*	**98**
Erythromycin	*364*	**90**
Tylosin	*231*	**94**
Spiramycin	*392*	**93**
Lincomycin	*380*	**87**
Pirlimycin	*72*	**94**
Streptomycin 10 UI	*274*	**83**
Kanamycin 30 UI	*220*	**94**
Gentamicin 10 UI	*383*	**98**
Neomycin	*210*	**99**
Tetracycline	*377*	**87**
Florfenicol	*146*	**98**
Enrofloxacin	*310*	**98**
Marbofloxacin	*328*	**99**
Danofloxacin	*107*	**98**
Trimethoprim-Sulfonamides	*319*	**99**
Rifampicin	*120*	**97**

Table 15 - Cattle 2012 – Mastitis – Adults – *Streptococcus uberis*: susceptibility to antibiotics (proportion) (N=1, 345)

Antibiotic	*Total (N)*	**% S**
Ampicillin	*174*	**99**
Oxacillin	*1,017*	**89**
Erythromycin	*1,247*	**81**
Tylosin	*827*	**80**
Spiramycin	*1,338*	**81**
Lincomycin	*1,299*	**84**
Pirlimycin	*95*	**96**
Streptomycin 500 µg	*1,251*	**86**
Kanamycin 1000 µg	*1,048*	**95**
Gentamicine 500 µg	*1,240*	**98**
Tetracycline	*1,177*	**83**
Chloramphenicol	*97*	**93**
Florfenicol	*557*	**98**
Enrofloxacin	*1,067*	**75**
Marbofloxacin	*997*	**93**
Danofloxacin	*213*	**39**
Trimethoprim-Sulfonamides	*1,204*	**95**
Rifampicin	*356*	**71**

Table 16 - Cattle 2012 – Mastitis – Adults – *Streptococcus dysgalactiae:* susceptibility to antibiotics (proportion) (N=244)

Antibiotic	*Total (N)*	**% S**
Ampicillin	*36*	**94**
Oxacillin	*198*	**95**
Erythromycin	*214*	**85**
Tylosin	*155*	**90**
Spiramycin	*244*	**93**
Lincomycin	*227*	**90**
Streptomycin 500 µg	*227*	**95**
Kanamycin 1000 µg	*194*	**97**
Gentamicine 500 µg	*216*	**99**
Tetracycline	*209*	**33**
Florfenicol	*73*	**95**
Enrofloxacin	*186*	**66**
Marbofloxacin	*190*	**94**
Trimethoprim-Sulfonamides	*218*	**96**
Rifampicin	*53*	**51**

anses
French agency for food, environmental
and occupational health & safety

Annex 3

Sheep

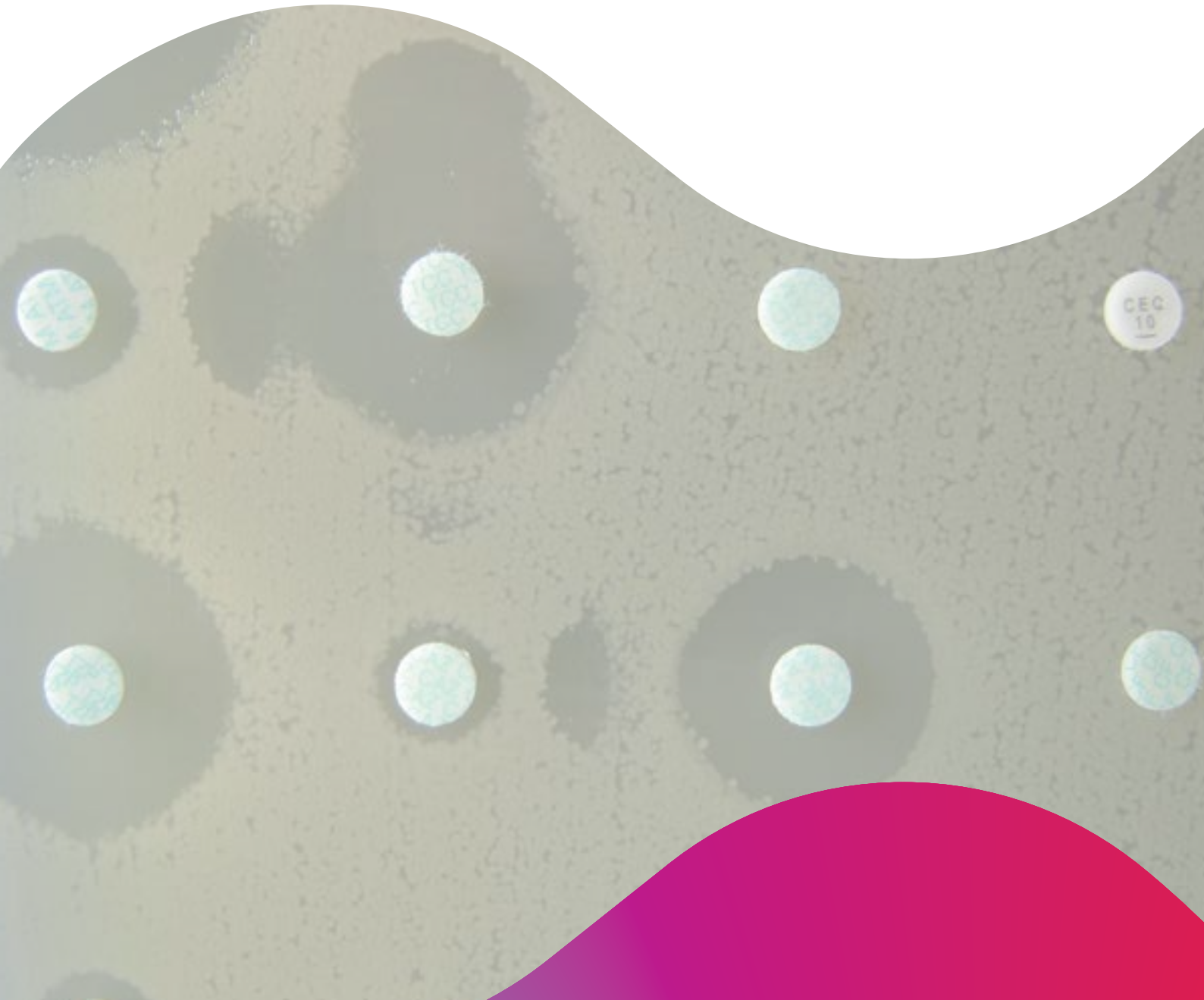


Figure 1 - Sheep 2012 – Number of antibiograms by age group and pathology

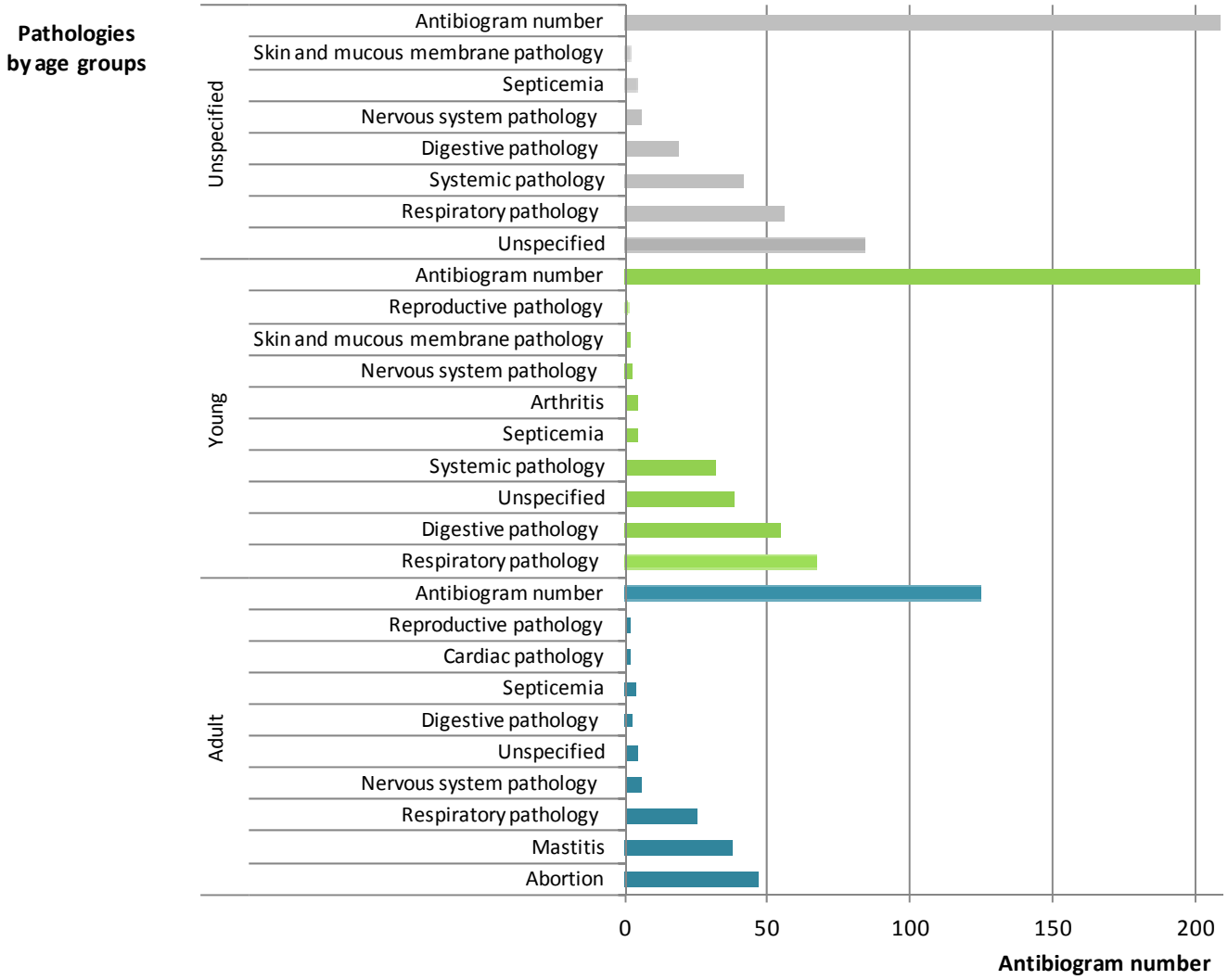
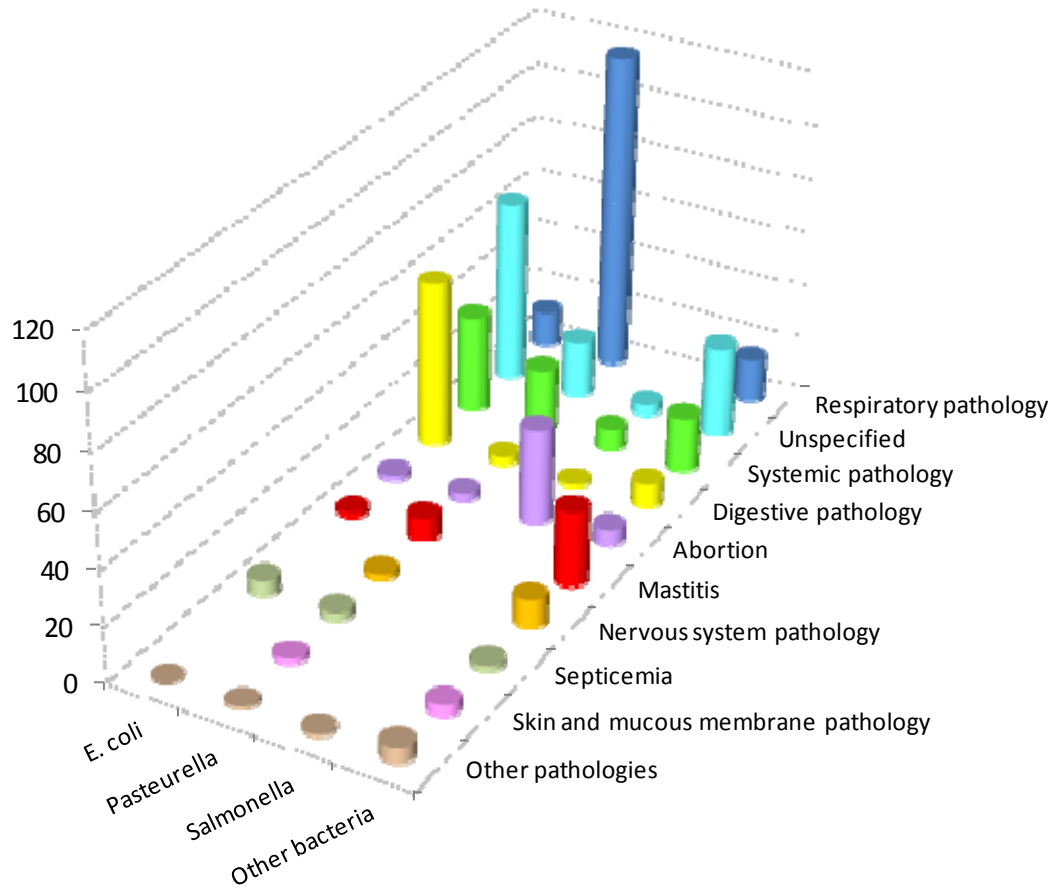


Table 1 - Sheep 2012 – Number of antibiograms by age group and pathology

	Pathology N *(%)*													
Age group N *(%)*	Respiratory pathology	Unspecified	Systemic pathology	Digestive pathology	Abortion	Mastitis	Nervous system pathology	Septicemia	Skin and mucous membrane pathology	Arthritis	Reproductive pathology	Cardiac pathology	Kidney and urinary tract pathology	**Total N *(%)***
Unspecified	55 *(10.0)*	83 *(15.0)*	41 *(7.4)*	18 *(3.3)*			5 *(0.9)*	4 *(0.7)*	2 *(0.4)*					**208 *(37.7)***
Young	66 *(12.0)*	38 *(6.9)*	31 *(5.6)*	54 *(9.8)*			2 *(0.4)*	4 *(0.7)*	1 *(0.2)*	4 *(0.7)*	1 *(0.2)*			**201 *(36.4)***
Adult	25 *(4.5)*	4 *(0.7)*	15 *(2.7)*	2 *(0.4)*	46 *(8.3)*	37 *(6.7)*	5 *(0.9)*	3 *(0.5)*	3 *(0.5)*		1 *(0.2)*	1 *(0.2)*	1 *(0.2)*	**143 *(25.9)***
Total N *(%)*	**146 *(26.4)***	**125 *(22.6)***	**87 *(15.8)***	**74 *(13.4)***	**46 *(8.3)***	**37 *(6.7)***	**12 *(2.2)***	**11 *(2.0)***	**6 *(1.1)***	**4 *(0.7)***	**2 *(0.4)***	**1 *(0.2)***	**1 *(0.2)***	**552 *(100.0)***

Figure 2 - Sheep 2012 – Number of antibiograms by bacteria group and pathology



Note: only values for pathologies and bacterial groups having more than 30 occurrences are represented. Detailed values are presented in table 2 below.

Table 2 - Sheep 2012 – Number of antibiograms by bacteria group and pathology

	Pathology N *(%)*													
Bacteria N *(%)*	Respiratory pathology	Unspecified	Systemic pathology	Digestive pathology	Abortion	Mastitis	Nervous system pathology	Septicemia	Skin and mucous membrane pathology	Arthritis	Reproductive pathology	Cardiac pathology	Kidney and urinary tract pathology	**Total N *(%)***
E. coli	13 *(2.4)*	67 *(12.1)*	36 *(6.5)*	61 *(11.1)*	2 *(0.4)*	2 *(0.4)*		6 *(1.1)*						**187** ***(33.9)***
Pasteurella	117 *(21.2)*	21 *(3.8)*	23 *(4.2)*	3 *(0.5)*	3 *(0.5)*	8 *(1.4)*	2 *(0.4)*	3 *(0.5)*	2 *(0.4)*			1 *(0.2)*		**183** ***(33.2)***
Salmonella		4 *(0.7)*	8 *(1.4)*	1 *(0.2)*	35 *(6.3)*						1 *(0.2)*			**49** ***(8.9)***
Other bacteria < 30 occurrences	16 *(2.9)*	33 *(6.0)*	20 *(3.6)*	9 *(1.6)*	6 *(1.1)*	27 *(4.9)*	10 *(1.8)*	2 *(0.4)*	4 *(0.7)*	4 *(0.7)*	1 *(0.2)*	0	1 *(0.2)*	**133** ***(24.1)***
Total N *(%)*	**146** ***(26.4)***	**125** ***(22.6)***	**87** ***(15.8)***	**74** ***(13.4)***	**46** ***(8.3)***	**37** ***(6.7)***	**12** ***(2.2)***	**11** ***(2)***	**6** ***(1.1)***	**4** ***(0.7)***	**2** ***(0.4)***	**1** ***(0.2)***	**1** ***(0.2)***	**552** ***(100.0)***

Table 3 - Sheep 2012 – Digestive pathology – *E. coli:* susceptibility to antibiotics (proportion) (N=61)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*57*	**47**
Amoxicillin-Clavulanic ac.	*61*	**67**
Cephalexin	*48*	**90**
Ceftiofur	*56*	**96**
Cefquinome 30 µg	*51*	**92**
Gentamicin 10 UI	*60*	**98**
Neomycin	*52*	**81**
Tetracycline	*57*	**40**
Florfenicol	*50*	**90**
Nalidixic ac.	*46*	**87**
Flumequine	*40*	**88**
Enrofloxacin	*53*	**92**
Marbofloxacin	*49*	**94**
Trimethoprim-Sulfonamides	*59*	**80**

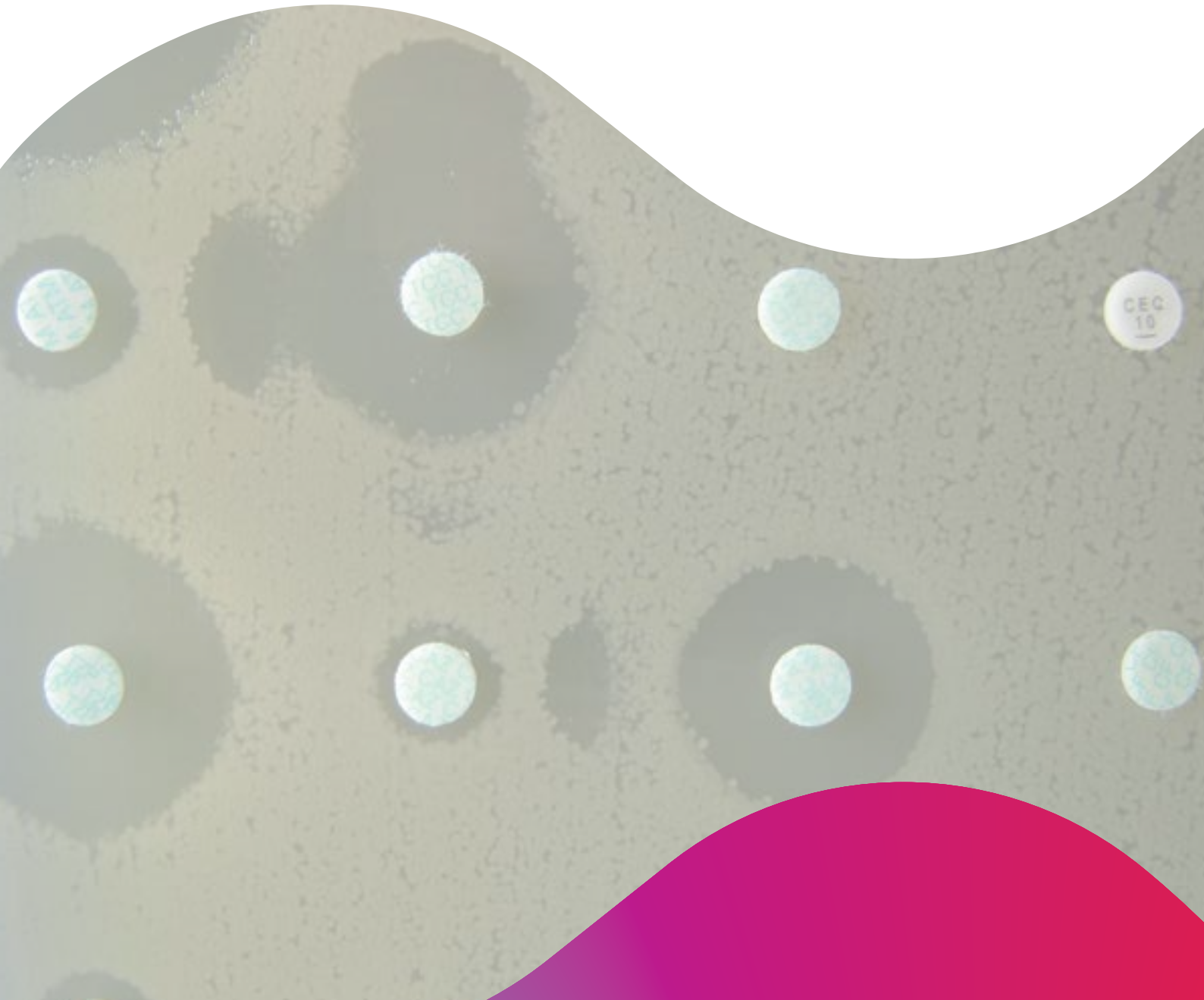
Table 4 - Sheep 2012 – Respiratory pathology – All age groups – *Mannheimia haemolytica:* susceptibility to antibiotics (proportion) (N=77)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*71*	**93**
Amoxicillin-Clavulanic ac.	*76*	**93**
Cephalexin	*52*	**94**
Cefoxitin	*30*	**100**
Ceftiofur	*71*	**94**
Cefquinome 30 µg	*72*	**94**
Streptomycin 10 UI	*51*	**47**
Gentamicin 10 UI	*76*	**91**
Neomycin	*66*	**80**
Tetracycline	*75*	**95**
Florfenicol	*71*	**99**
Nalidixic ac.	*62*	**95**
Flumequine	*61*	**93**
Enrofloxacin	*72*	**90**
Marbofloxacin	*50*	**96**
Trimethoprim-Sulfonamides	*75*	**91**

anses
French agency for food, environmental
and occupational health & safety

Annex 4

Goats



Annex 4 - Goats

Figure 1 - Goats 2012 – Number of antibiograms by age group and pathology

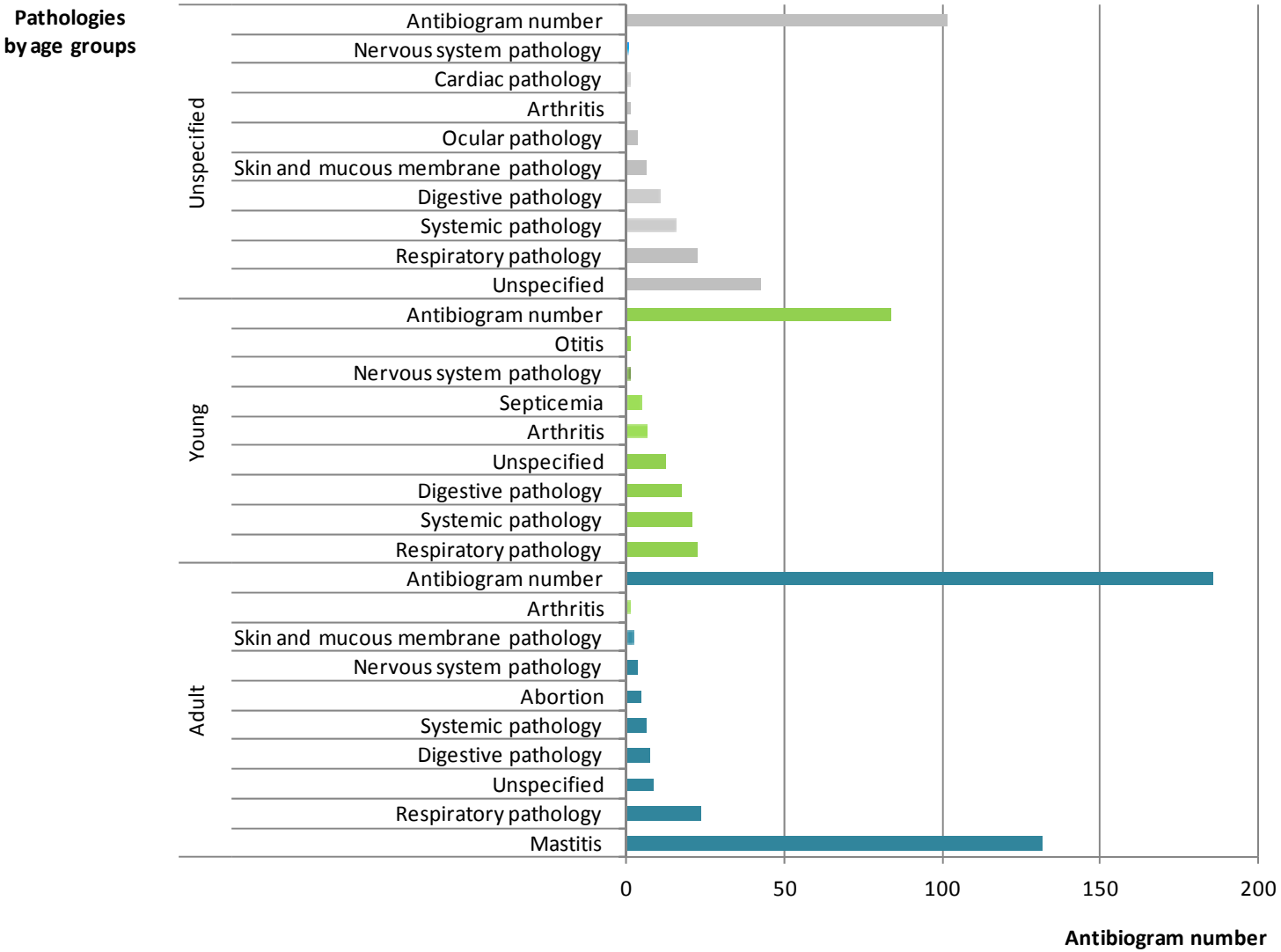
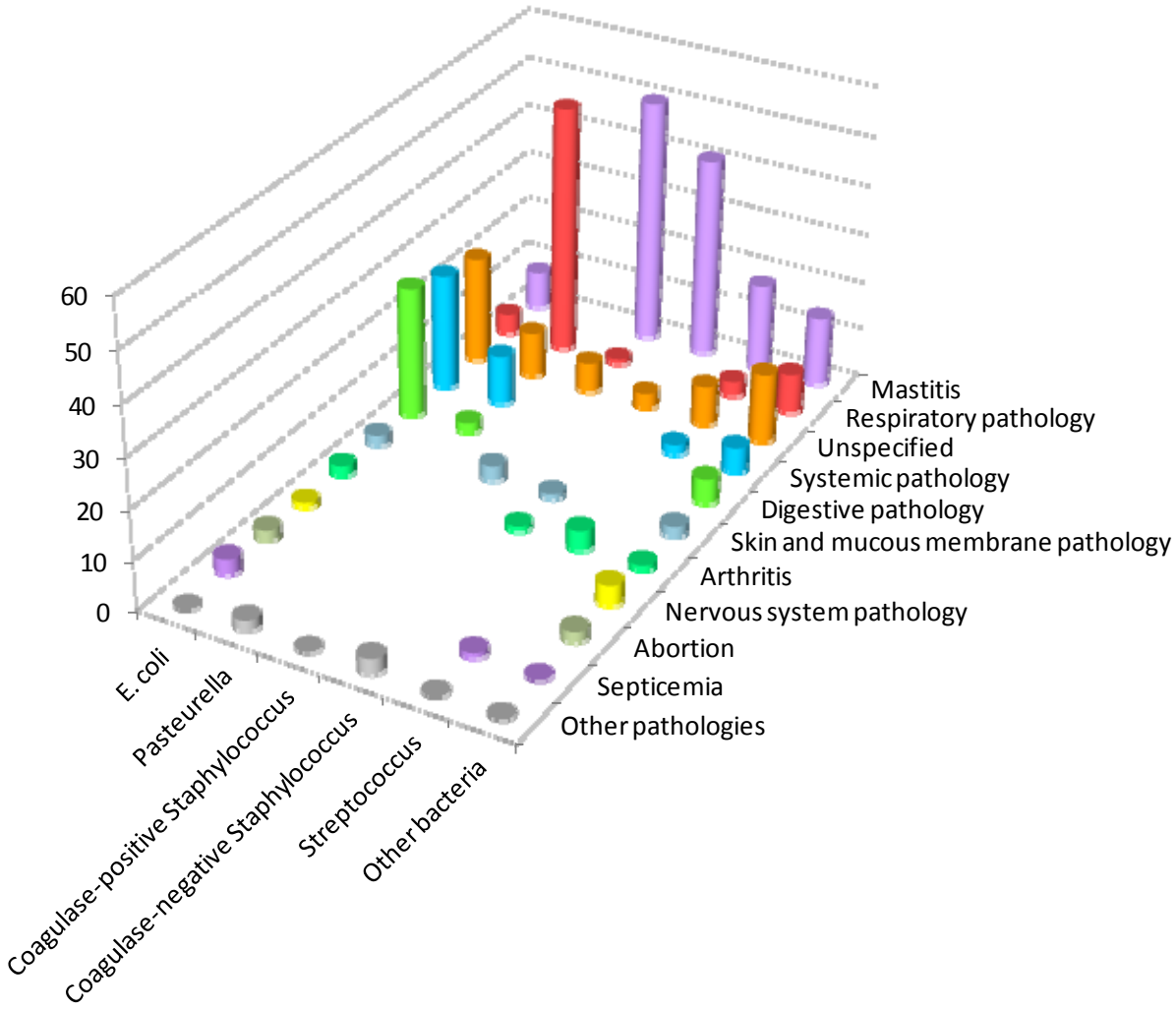


Table 1 - Goats 2012 – Number of antibiograms by age group and pathology

	Pathology N *(%)*													
Age group N *(%)*	Mastitis	Respiratory pathology	Unspecified	Systemic pathology	Digestive pathology	Skin and mucous membrane pathology	Arthritis	Nervous system pathology	Abortion	Septicemia	Ocular pathology	Otitis	Cardiac pathology	**Total N *(%)***
Adult	131 *(35.5)*	23 *(6.2)*	8 *(2.2)*	6 *(1.6)*	7 *(1.9)*	2 *(0.5)*	1 *(0.3)*	3 *(0.8)*	4 *(1.1)*					185 *(50.1)*
Unspecified		22 *(6.0)*	42 *(11.4)*	15 *(4.1)*	10 *(2.7)*	6 *(1.6)*	1 *(0.3)*	1 *(0.3)*			3 *(0.8)*		1 *(0.3)*	101 *(27.4)*
Young		22 *(6.0)*	12 *(3.3)*	20 *(5.4)*	17 *(4.6)*		6 *(1.6)*	1 *(0.3)*		4 *(1.1)*		1 *(0.3)*		83 *(22.5)*
Total N *(%)*	**131 *(35.5)***	**67 *(18.2)***	**62 *(16.8)***	**41 *(11.1)***	**34 *(9.2)***	**8 *(2.2)***	**8 *(2.2)***	**5 *(1.4)***	**4 *(1.1)***	**4 *(1.1)***	**3 *(0.8)***	**1 *(0.3)***	**1 *(0.3)***	**369 *(100.0)***

Figure 2 - Goats 2012 – Number of antibiograms by bacteria group and pathology



Note: only values for pathologies and bacterial groups having more than 30 occurrences are represented. Detailed values are presented in table 2 below.

Table 2 - Goats 2012 – Number of antibiograms by bacteria and pathology

	Pathology N *(%)*													
Bacteria N *(%)*	Mastitis	Respiratory pathology	Unspecified	Systemic pathology	Digestive pathology	Skin and mucous membrane pathology	Arthritis	Nervous system pathology	Septicemia	Abortion	Ocular pathology	Otitis	Cardiac pathology	**Total N *(%)***
E. coli	8 *(2.2)*	4 *(1.1)*	22 *(6.0)*	24 *(6.5)*	27 *(7.3)*	2 *(0.5)*	2 *(0.5)*	1 *(0.3)*	3 *(0.8)*	2 *(0.5)*	1 *(0.3)*		1 *(0.3)*	**97** ***(26.3)***
Pasteurella		51 *(13.8)*	9 *(2.4)*	10 *(2.7)*	2 *(0.5)*									**72** ***(19.5)***
Coagulase-positive Staphylococcus	50 *(13.6)*	1 *(0.3)*	6 *(1.6)*			3 *(0.8)*					2 *(0.5)*	1 *(0.3)*		**63** ***(17.1)***
Coagulase-negative Staphylococcus	41 *(11.1)*		3 *(0.8)*			1 *(0.3)*	1 *(0.3)*							**46** ***(12.5)***
Streptococcus	18 *(4.9)*	3 *(0.8)*	8 *(2.2)*	2 *(0.5)*			4 *(1.1)*		1 *(0.3)*					**36** ***(9.8)***
Other bacteria < 30 occurrences	14 *(3.8)*	8 *(2.2)*	14 *(3.8)*	5 *(1.4)*	5 *(1.4)*	2 *(0.5)*	1 *(0.3)*	4 *(1.1)*	0	2 *(0.5)*	0	0	0	**55** ***(14.9)***
Total N *(%)*	**131** ***(35.5)***	**67** ***(18.2)***	**62** ***(16.8)***	**41** ***(11.1)***	**34** ***(9.2)***	**8** ***(2.2)***	**8** ***(2.2)***	**5** ***(1.4)***	**4** ***(1.1)***	**4** ***(1.1)***	**3** ***(0.8)***	**1** ***(0.3)***	**1** ***(0.3)***	**369** ***(100.0)***

Table 3 - Goats 2012 – All pathologies and age groups included – *E. coli:* susceptibility to antibiotics (proportion) (N=97)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*91*	**51**
Amoxicillin-Clavulanic ac.	*97*	**78**
Cephalexin	*80*	**82**
Cefoxitin	*79*	**96**
Cefoperazone	*32*	**84**
Ceftiofur	*94*	**97**
Cefquinome 30 µg	*92*	**96**
Streptomycin 10 UI	*56*	**39**
Gentamicin 10 UI	*96*	**92**
Neomycin	*60*	**83**
Tetracycline	*86*	**45**
Florfenicol	*88*	**90**
Nalidixic ac.	*57*	**89**
Flumequine	*42*	**86**
Enrofloxacin	*71*	**92**
Marbofloxacin	*60*	**93**
Trimethoprim-Sulfonamides	*73*	**64**

Table 4 - Goats 2012 – All pathologies and age groups included – *Pasteurella*: susceptibility to antibiotics (proportion) (N=72)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*63*	**90**
Amoxicillin-Clavulanic ac.	*64*	**92**
Cephalexin	*52*	**100**
Ceftiofur	*68*	**97**
Cefquinome 30 µg	*64*	**92**
Streptomycin 10 UI	*50*	**42**
Gentamicin 10 UI	*64*	**80**
Neomycin	*30*	**83**
Tetracycline	*59*	**81**
Florfenicol	*52*	**96**
Nalidixic ac.	*36*	**94**
Flumequine	*40*	**80**
Enrofloxacin	*53*	**92**
Marbofloxacin	*49*	**98**
Trimethoprim-Sulfonamides	*59*	**88**

anses
French agency for food, environmental
and occupational health & safety

Annex 5

Pigs

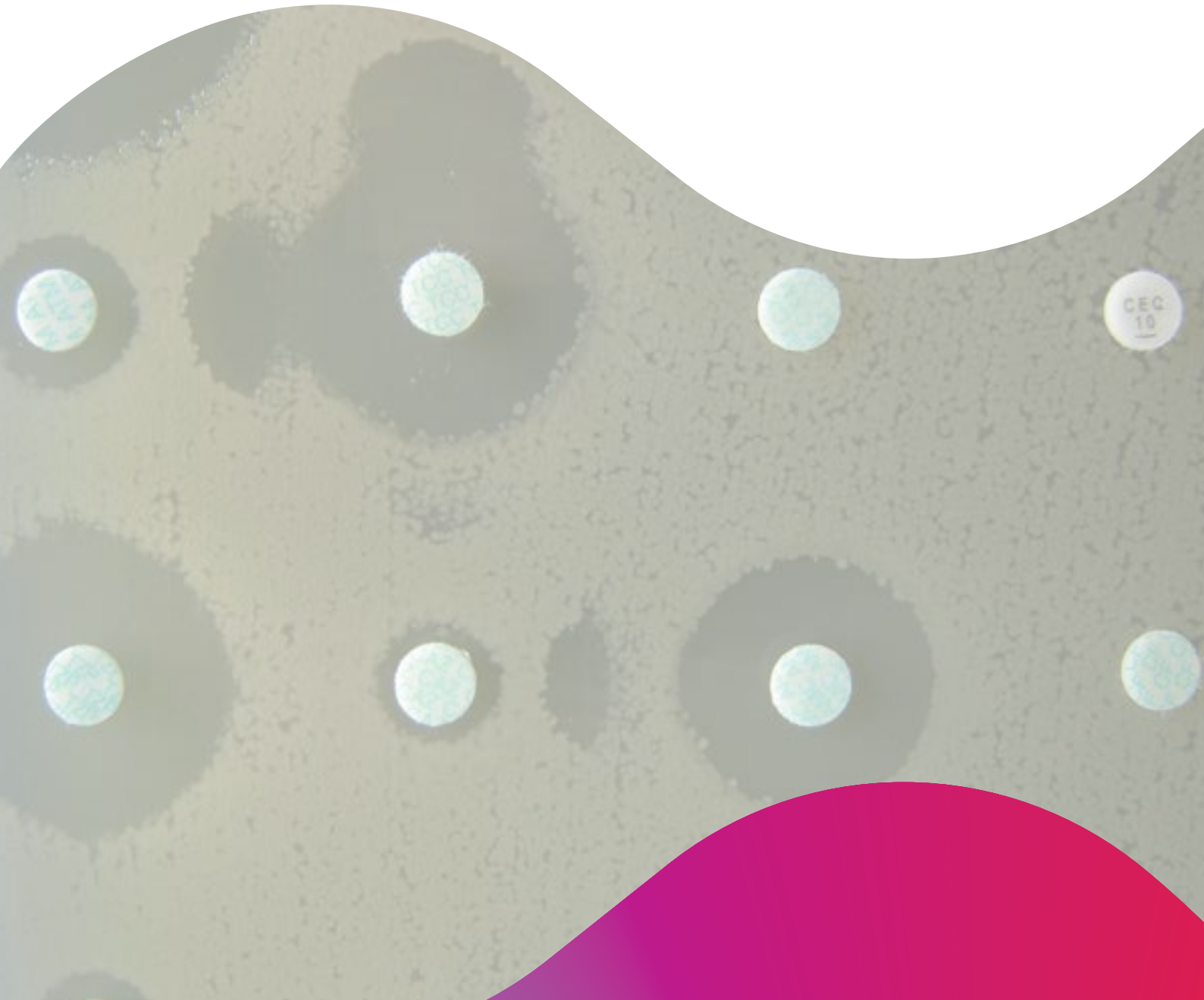


Figure 1 - Pigs 2012 – Antibiogram proportions by animal category

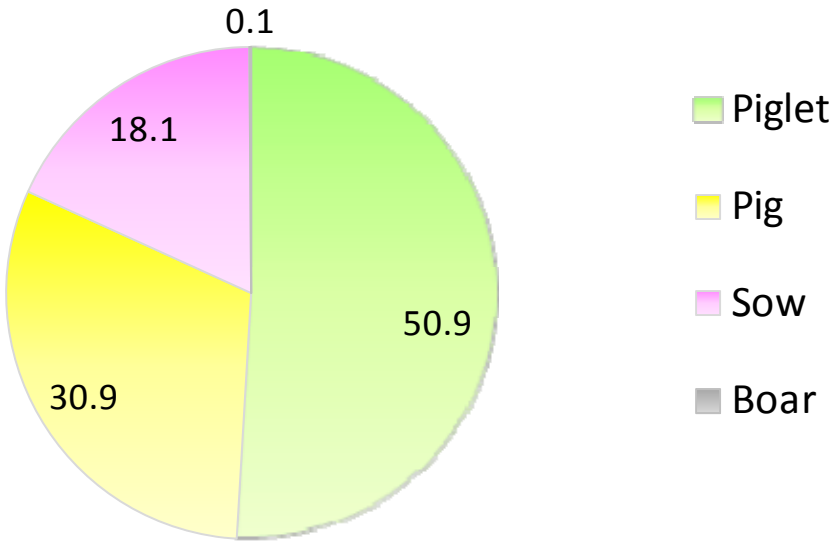


Figure 2 - Pigs 2012 – Number of antibiograms by pathology and animal category

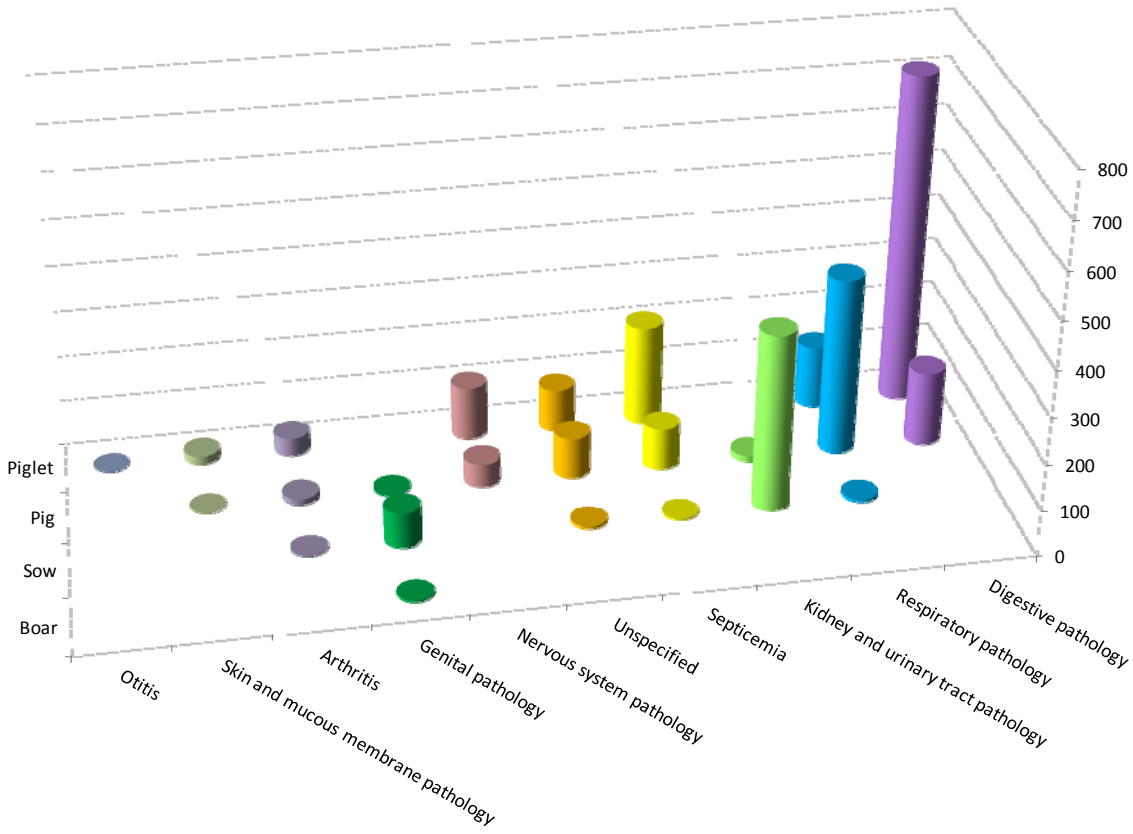
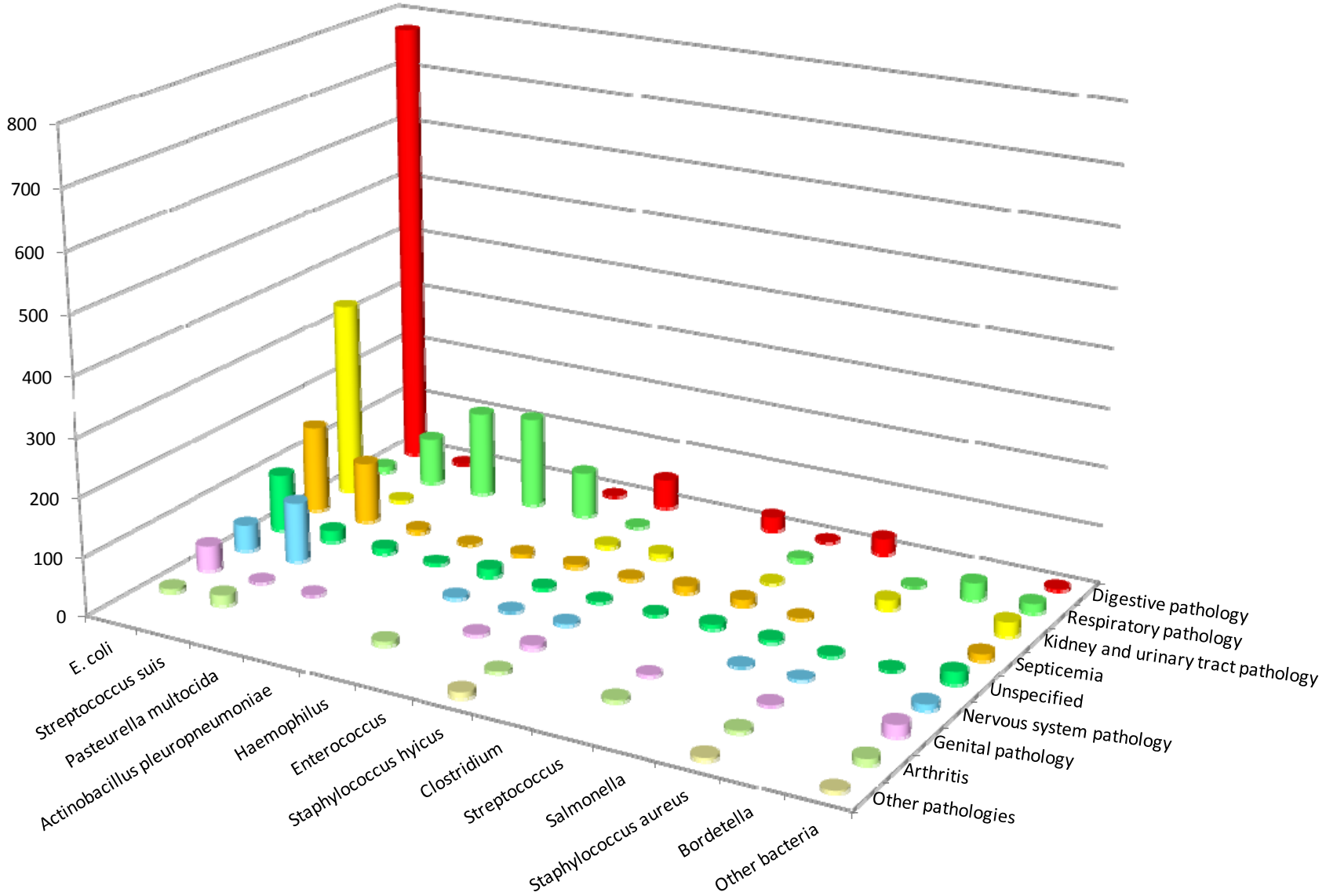


Table 1 - Pigs 2012 – Number of antibiograms by pathology and animal category

	Pathology N *(%)*										
Age group N (%)	Digestive pathology	Respiratory pathology	Kidney and urinary tract pathology	Septicemia	Unspecified	Nervous system pathology	Genital pathology	Arthritis	Skin and mucous membrane pathology	Otitis	**Total N** *(%)*
Piglet	719 *(27.45)*	135 *(5.15)*		217 *(8.29)*	92 *(3.51)*	115 *(4.39)*		38 *(1.45)*	17 *(0.65)*	1 *(0.04)*	**1,334** ***(50.93)***
Pig	163 *(6.22)*	386 *(14.74)*	12 *(0.46)*	91 *(3.47)*	89 *(3.40)*	52 *(1.99)*	2 *(0.08)*	12 *(0.46)*	1 *(0.04)*		**808** ***(30.85)***
Sow		5 *(0.19)*	385 *(14.70)*	2 *(0.08)*	5 *(0.19)*		75 *(2.86)*	2 *(0.08)*			**474** ***(18.10)***
Boar							3 *(0.11)*				**3** ***(0.11)***
Total N ***(%)***	**882** *(33.68)*	**526** *(20.08)*	**397** *(15.16)*	**310** *(11.84)*	**186** *(7.10)*	**167** *(6.38)*	**80** *(3.05)*	**52** *(1.99)*	**18** *(0.69)*	**1** *(0.04)*	**2,619** ***(100.00)***

Figure 3 - Pigs 2012 – Number of antibiograms by bacteria and pathology



Note: only values for pathologies and bacteria having more than 30 occurrences are represented. Detailed values are presented in table 2 below.

Table 2 - Pigs 2012 – Number of antibiograms by bacteria and pathology

	Pathology N *(%)*										
Bacteria N *(%)*	Digestive pathology	Respiratory pathology	Kidney and urinary tract pathology	Septicemia	Unspecified	Nervous system pathology	Genital pathology	Arthritis	Skin and mucous membrane pathology	Otitis	**Total N *(%)***
E. coli	775 *(29.59)*	10 *(0.38)*	337 *(12.87)*	150 *(5.73)*	97 *(3.70)*	44 *(1.68)*	44 *(1.68)*	6 *(0.23)*			**1,463 *(55.86)***
Streptococcus suis	1 *(0.04)*	82 *(3.13)*	3 *(0.11)*	103 *(3.93)*	19 *(0.73)*	103 *(3.93)*	1 *(0.04)*	17 *(0.65)*			**329 *(12.56)***
Pasteurella multocida		147 *(5.61)*		6 *(0.23)*	9 *(0.34)*		1 *(0.04)*				**163 *(6.22)***
Actinobacillus pleuropneumoniae		156 *(5.96)*		1 *(0.04)*	3 *(0.11)*						**160 *(6.11)***
Haemophilus	1 *(0.04)*	77 *(2.94)*		5 *(0.19)*	14 *(0.53)*	3 *(0.11)*		7 *(0.27)*			**107 *(4.09)***
Enterococcus	50 *(1.91)*	1 *(0.04)*	5 *(0.19)*	6 *(0.23)*	3 *(0.11)*	1 *(0.04)*	2 *(0.08)*				**68 *(2.60)***
Staphylococcus hyicus			11 *(0.42)*	3 *(0.11)*	2 *(0.08)*	3 *(0.11)*	7 *(0.27)*	4 *(0.15)*	10 *(0.38)*		**40 *(1.53)***
Clostridium	24 *(0.92)*			12 *(0.46)*	2 *(0.08)*						**38 *(1.45)***
Streptococcus	1 *(0.04)*	7 *(0.27)*	1 *(0.04)*	11 *(0.42)*	8 *(0.31)*		3 *(0.11)*	4 *(0.15)*			**35 *(1.34)***
Salmonella	27 *(1.03)*			2 *(0.08)*	5 *(0.19)*	1 *(0.04)*					**35 *(1.34)***
Staphylococcus aureus		1 *(0.04)*	16 *(0.61)*		2 *(0.08)*	2 *(0.08)*	2 *(0.08)*	4 *(0.15)*	5 *(0.19)*		**32 *(1.22)***
Bordetella		29 *(1.11)*			1 *(0.04)*						**30 *(1.15)***
Other bacteria *< 30 occurrences*	3 *(0.11)*	16 *(0.61)*	24 *(0.92)*	11 *(0.42)*	21 *(0.80)*	10 *(0.38)*	20 *(0.76)*	10 *(0.38)*	3 *(0.11)*	1 *(0.04)*	***119*** ***(4.54)***
Total N *(%)*	**882 *(33.68)***	**526 *(20.08)***	**397 *(15.16)***	**310 *(11.84)***	**186 *(7.10)***	**167 *(6.38)***	**80 *(3.05)***	**52 *(1.99)***	**18 *(0.69)***	**1 *(0.04)***	**2,619 *(100.00)***

Table 3 - Pigs 2012 – all pathologies included – *E. coli*: susceptibility to antibiotics (proportion) (N=1,463)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*1,428*	**39**
Amoxicillin-Clavulanic ac.	*1,100*	**85**
Cephalexin	*676*	**88**
Cefuroxime	*216*	**90**
Cefoxitin	*838*	**97**
Ceftiofur	*1,463*	**95**
Cefquinome 30 µg	*326*	**94**
Neomycin	*1,210*	**80**
Apramycin	*1,138*	**82**
Gentamicin 10 UI	*1,352*	**83**
Tetracycline	*1,139*	**26**
Nalidixic ac.	*397*	**66**
Flumequine	*750*	**71**
Oxolinic ac.	*1,159*	**73**
Enrofloxacin	*1,381*	**89**
Marbofloxacin	*1,206*	**92**
Danofloxacin	*267*	**88**
Difloxacin	*117*	**74**
Trimethoprim	*498*	**36**
Trimethoprim-Sulfonamides	*1,458*	**38**

Table 4 - Pigs 2012 – Digestive pathology – piglets (post-weaning included)– *E. coli*: susceptibility to antibiotics (proportion) (N=719)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*619*	**36**
Ceftiofur	*633*	**93**
Neomycin	*604*	**77**
Apramycin	*601*	**78**
Gentamicin 10 UI	*611*	**74**
Tetracycline	*419*	**25**
Flumequine	*364*	**69**
Oxolinic ac.	*505*	**74**
Enrofloxacin	*631*	**90**
Marbofloxacin	*511*	**94**
Trimethoprim-Sulfonamides	*633*	**34**

Table 5 - Pigs 2012 – All pathologies included – sow – *E. coli*: susceptibility to antibiotics (N=385)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*325*	**40**
Ceftiofur	*326*	**97**
Neomycin	*140*	**85**
Apramycin	*115*	**83**
Gentamicin 10 UI	*250*	**98**
Tetracycline	*311*	**34**
Oxolinic ac.	*304*	**64**
Enrofloxacin	*250*	**84**
Marbofloxacin	*310*	**91**
Trimethoprim-Sulfonamides	*326*	**49**

Table 6 - Pigs 2012 – All pathologies included – *Actinobacillus pleuropneumoniae*: susceptibility to antibiotics (proportion) (N=160)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*159*	**97**
Amoxicillin-Clavulanic ac.	*140*	**100**
Ceftiofur	*160*	**99**
Florfenicol	*159*	**99**
Tetracycline	*160*	**89**
Tilmicosin	*159*	**94**
Enrofloxacin	*160*	**99**
Marbofloxacin	*149*	**99**
Trimethoprim-Sulfonamides	*159*	**96**

Table 7 - Pigs 2012 – All pathologies included – *Pasteurella multocida*: susceptibility to antibiotics (proportion) (N=163)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*155*	**99**
Amoxicillin-Clavulanic ac.	*134*	**100**
Ceftiofur	*161*	**100**
Florfenicol	*150*	**99**
Tetracycline	*153*	**95**
Tilmicosin	*145*	**99**
Enrofloxacin	*160*	**100**
Marbofloxacin	*143*	**99**
Trimethoprim-Sulfonamides	*163*	**80**

Table 8 - Pigs 2012 – All pathologies included – *Streptococcus suis*: susceptibility to antibiotics (proportion) (N=329)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*287*	**100**
Tetracycline	*248*	**25**
Doxycycline	*133*	**28**
Erythromycin	*255*	**29**
Spiramycin	*294*	**26**
Lincomycin	*315*	**24**
Tylosin	*301*	**25**
Streptomycin 500 µg	*187*	**94**
Kanamycin 1000 µg	*122*	**90**
Gentamicine 500 µg	*188*	**99**
Trimethoprim-Sulfonamides	*315*	**87**

anses
French agency for food, environmental
and occupational health & safety

Annex 6

Poultry

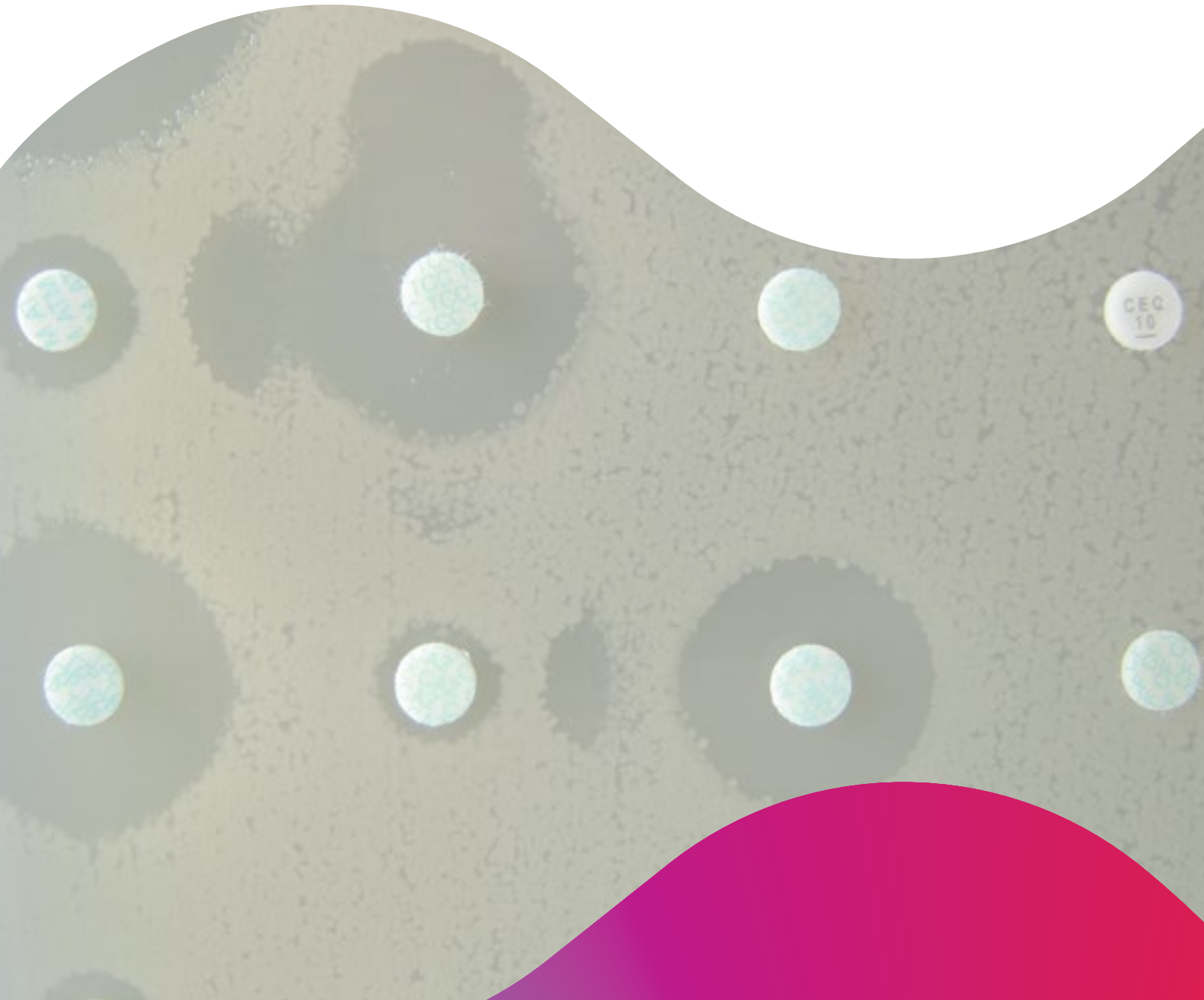
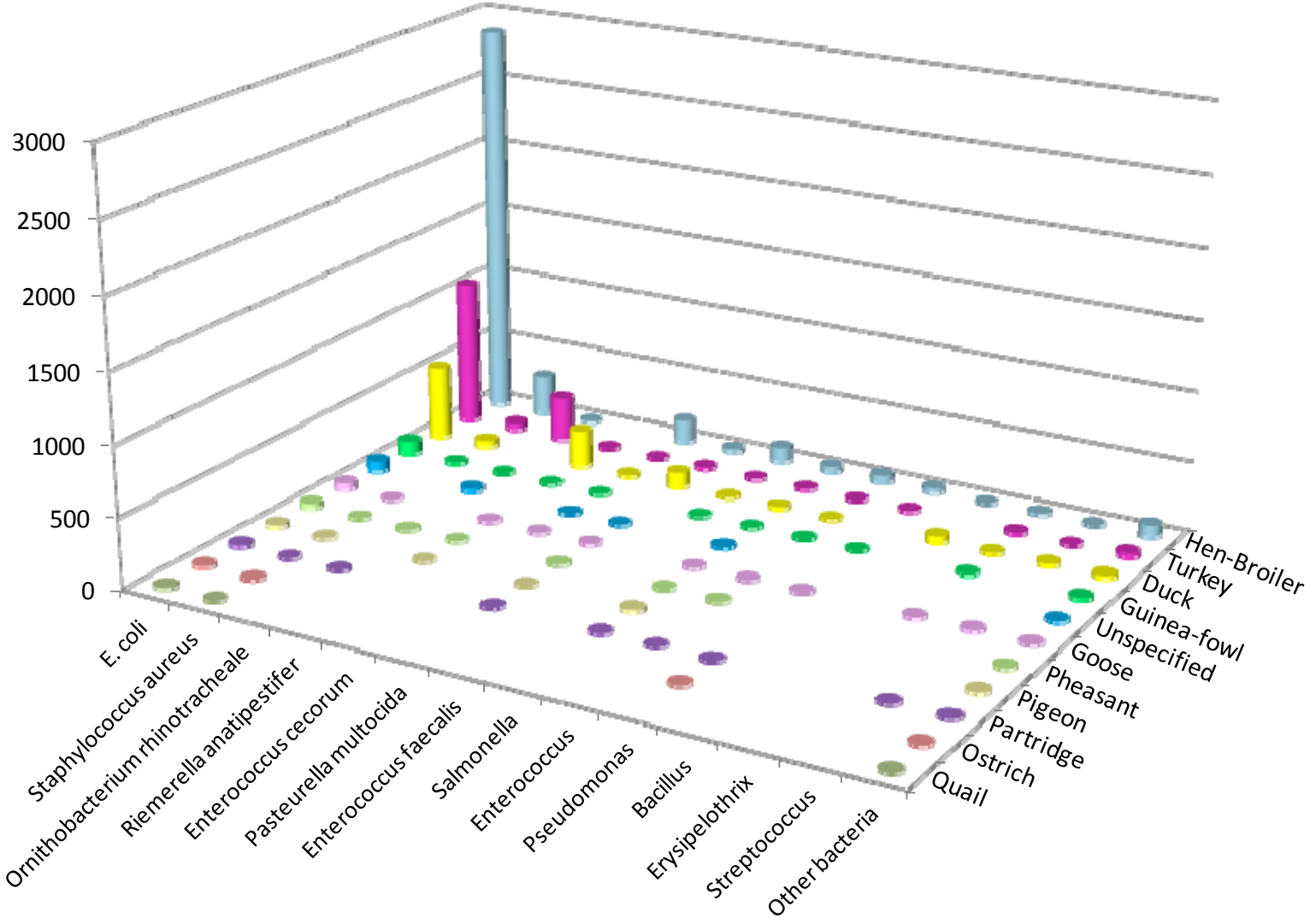


Figure 1 - Poultry 2012 – Number of antibiograms by bacteria and animal



Note: only values for bacteria groups having more than 30 occurrences are represented. Detailed values are presented in table 1 below.

Table 1 - Poultry 2012 – Number of antibiograms by bacteria and animal

	Animal species N *(%)*											
Bacteria N ***(%)***	Hen-broiler	Turkey	Duck	Guinea-fowl	Poultry	Goose	Pheasant	Pigeon	Partridge	Ostrich	Quail	**Total N** ***(%)***
E. coli	2,856 *(42.81)*	1,050 *(15.74)*	529 *(7.93)*	93 *(1.39)*	72 *(1.08)*	43 *(0.64)*	30 *(0.45)*	15 *(0.22)*	15 *(0.22)*	11 *(0.16)*	10 *(0.15)*	**4,724** ***(70.81)***
Staphylococcus aureus	285 *(4.27)*	49 *(0.73)*	42 *(0.63)*	9 *(0.13)*		1 *(0.01)*	3 *(0.04)*	2 *(0.03)*	1 *(0.01)*	1 *(0.01)*	4 *(0.06)*	**397** ***(5.95)***
Ornithobacterium rhinotracheale	11 *(0.16)*	314 *(4.71)*		2 *(0.03)*	25 *(0.37)*		1 *(0.01)*		1 *(0.01)*			**354** ***(5.31)***
Riemerella anatipestifer		6 *(0.09)*	265 *(3.97)*	1 *(0.01)*		3 *(0.04)*	1 *(0.01)*	1 *(0.01)*				**277** ***(4.15)***
Enterococcus cecorum	162 *(2.43)*	3 *(0.04)*	9 *(0.13)*	3 *(0.04)*	1 *(0.01)*	2 *(0.03)*						**180** ***(2.70)***
Pasteurella multocida	21 *(0.31)*	13 *(0.19)*	106 *(1.59)*		1 *(0.01)*	3 *(0.04)*	1 *(0.01)*	1 *(0.01)*	1 *(0.01)*			**147** ***(2.20)***
Enterococcus faecalis	106 *(1.59)*	4 *(0.06)*	3 *(0.04)*	1 *(0.01)*								**114** ***(1.71)***
Salmonella	39 *(0.58)*	8 *(0.12)*	15 *(0.22)*	1 *(0.01)*	5 *(0.07)*	3 *(0.04)*	2 *(0.03)*	13 *(0.19)*	5 *(0.07)*			**91** ***(1.36)***
Enterococcus	48 *(0.72)*	4 *(0.06)*	3 *(0.04)*	1 *(0.01)*		1 *(0.01)*	1 *(0.01)*		1 *(0.01)*			**59** ***(0.88)***
Pseudomonas	33 *(0.49)*	7 *(0.10)*		1 *(0.01)*		2 *(0.03)*			1 *(0.01)*	1 *(0.01)*		**45** ***(0.67)***
Bacillus	1 *(0.01)*		43 *(0.64)*									**44** ***(0.66)***
Erysipelothrix	9 *(0.13)*	11 *(0.16)*	9 *(0.13)*	6 *(0.09)*		6 *(0.09)*						**41** ***(0.61)***
Streptococcus	4 *(0.06)*	1 *(0.01)*	16 *(0.24)*			9 *(0.13)*			1 *(0.01)*			**31** ***(0.46)***
Other bacteria *< 30 occurrences*	85 *(1.27)*	29 *(0.43)*	18 *(0.27)*	13 *(0.19)*	5 *(0.07)*	1 *(0.01)*	3 *(0.04)*	8 *(0.12)*	1 *(0.01)*	3 *(0.04)*	1 *(0.01)*	**167** ***(2.50)***
Total N ***(%)***	**3,660** ***(54.86)***	**1,499** ***(22.47)***	**1,058** ***(15.86)***	**131** ***(1.96)***	**109** ***(1.63)***	**74** ***(1.11)***	**42** ***(0.63)***	**40** ***(0.60)***	**27** ***(0.40)***	**16** ***(0.24)***	**15** ***(0.22)***	6,671 ***(100.00)***

Table 2 - Hens and broilers 2012 – All pathologies included - *E. coli*: susceptibility to antibiotics (proportion) (N=2,856)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*2,824*	**56**
Amoxicillin-Clavulanic ac.	*2,042*	**88**
Cephalothin	*1,417*	**87**
Cefuroxime	*220*	**81**
Cefoxitin	*620*	**96**
Ceftiofur	*2,618*	**86**
Neomycin	*2,027*	**97**
Apramycin	*1,502*	**98**
Gentamicin 10 UI	*2,402*	**96**
Tetracycline	*2,303*	**37**
Nalidixic ac.	*1,553*	**68**
Flumequine	*2,650*	**66**
Oxolinic ac.	*921*	**65**
Enrofloxacin	*2,848*	**95**
Marbofloxacin	*356*	**96**
Danofloxacin	*263*	**91**
Difloxacin	*118*	**50**
Sulfonamides	*345*	**56**
Trimethoprim	*1,754*	**76**
Trimethoprim-Sulfonamides	*2,824*	**77**

Table 3 - Laying hens (table eggs and hatching) 2012 – All pathologies included - *E. coli*: susceptibility to antibiotics (proportion) (N=1,276)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*1,258*	**63**
Amoxicillin-Clavulanic ac.	*968*	**92**
Cephalothin	*826*	**91**
Ceftiofur	*1,204*	**92**
Neomycin	*918*	**98**
Apramycin	*771*	**98**
Gentamicin 10 UI	*1,051*	**95**
Tetracycline	*1,072*	**50**
Nalidixic ac.	*863*	**76**
Flumequine	*1,234*	**74**
Enrofloxacin	*1,274*	**97**
Trimethoprim-Sulfonamides	*1,249*	**85**

Table 4 – Broilers 2012 – All pathologies included - *E. coli*: susceptibility to antibiotics (proportion) (N=1,275)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*1,268*	**50**
Amoxicillin-Clavulanic ac.	*798*	**85**
Cephalothin	*556*	**81**
Ceftiofur	*1,122*	**83**
Neomycin	*872*	**97**
Apramycin	*568*	**99**
Gentamicin 10 UI	*1,080*	**98**
Tetracycline	*953*	**25**
Nalidixic ac.	*618*	**57**
Flumequine	*1,264*	**58**
Enrofloxacin	*1,273*	**93**
Trimethoprim-Sulfonamides	*1,273*	**70**

Table 5 - Turkeys 2012 – All pathologies included - *E. coli*: susceptibility to antibiotics (proportion) (N=1,050)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*1,039*	**48**
Amoxicillin-Clavulanic ac.	*646*	**76**
Cephalexin	*425*	**82**
Cefoxitin	*410*	**99**
Ceftiofur	*1,018*	**98**
Neomycin	*566*	**88**
Apramycin	*319*	**99**
Gentamicin 10 UI	*747*	**96**
Tetracycline	*760*	**33**
Nalidixic ac.	*364*	**75**
Flumequine	*997*	**70**
Oxolinic ac.	*452*	**69**
Enrofloxacin	*1,049*	**92**
Marbofloxacin	*149*	**87**
Danofloxacin	*204*	**83**
Sulfonamides	*210*	**50**
Trimethoprim	*631*	**78**
Trimethoprim-Sulfonamides	*969*	**75**

Table 6 - Ducks 2012 – All pathologies included - *E. coli*: susceptibility to antibiotics (proportion) (N=529)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*522*	**37**
Amoxicillin-Clavulanic ac.	*487*	**71**
Cephalothin	*243*	**92**
Cefoxitin	*236*	**97**
Ceftiofur	*518*	**98**
Neomycin	*312*	**96**
Gentamicin 10 UI	*505*	**92**
Tetracycline	*485*	**22**
Nalidixic ac.	*435*	**74**
Flumequine	*507*	**75**
Oxolinic ac.	*389*	**74**
Enrofloxacin	*520*	**94**
Danofloxacin	*213*	**93**
Trimethoprim	*445*	**50**
Trimethoprim-Sulfonamides	*522*	**50**

Table 7 - Hens and broilers 2012 – All pathologies included - *Staphylococcus aureus*: susceptibility to antibiotics (proportion) (N=285)

Antibiotic	*Total (N)*	**% S**
Penicillin G	*101*	**76**
Cefoxitin	*149*	**97**
Neomycin	*180*	**99**
Gentamicin 10 UI	*198*	**96**
Tetracycline	*228*	**54**
Erythromycin	*230*	**88**
Spiramycin	*210*	**91**
Lincomycin	*232*	**86**
Tylosin	*180*	**93**
Tiamulin	*190*	**97**
Enrofloxacin	*284*	**89**
Trimethoprim-Sulfonamides	*242*	**99**

Table 8 - Hens and broilers 2012 – All pathologies included – *Enterococcus cecorum*: susceptibility to antibiotics (proportion) (N=162)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*161*	**98**
Tetracycline	*126*	**6**
Erythromycin	*121*	**47**
Lincomycin	*121*	**47**
Trimethoprim-Sulfonamides	*137*	**72**

anses
French agency for food, environmental
and occupational health & safety

Annex 7

Rabbits

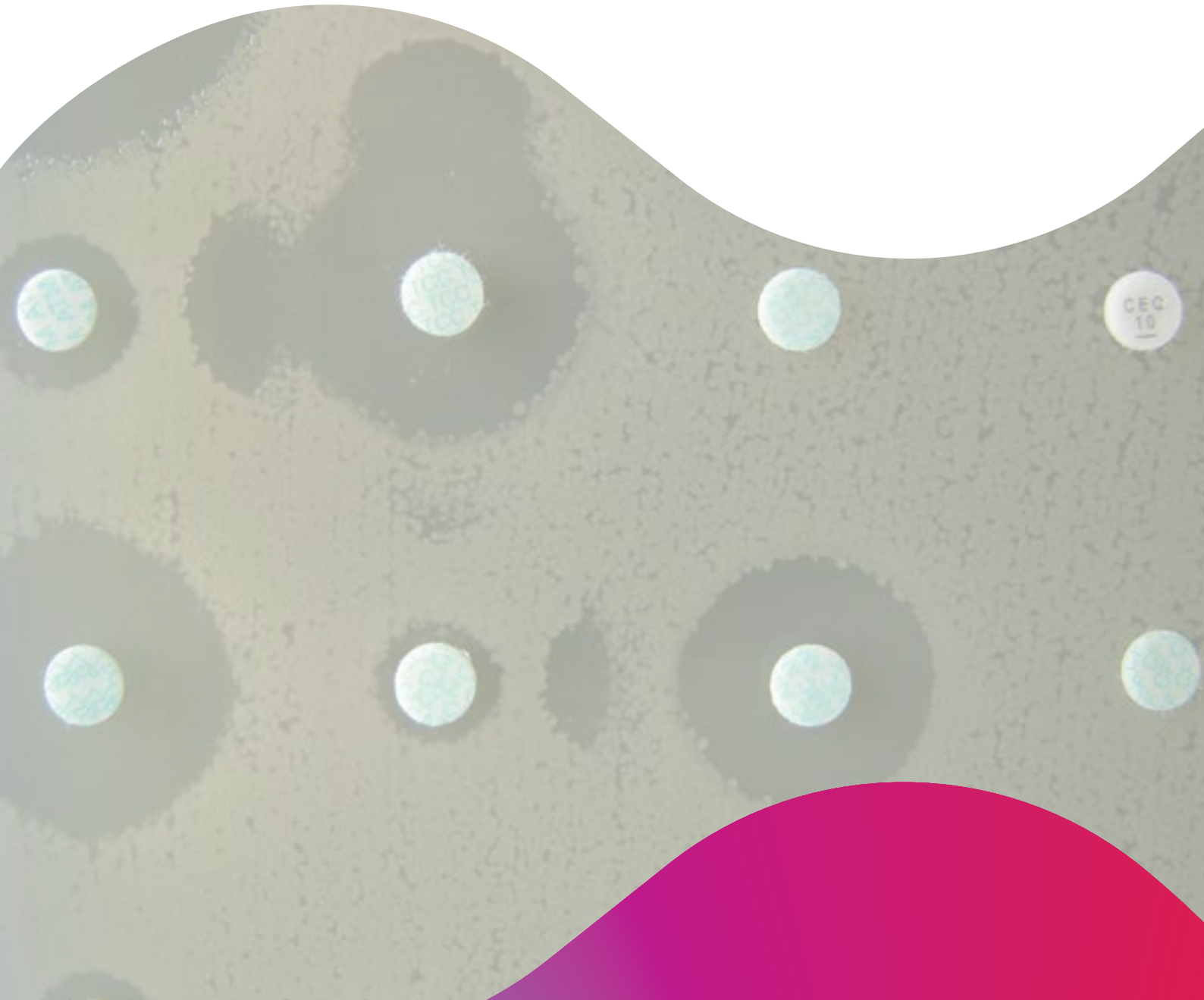
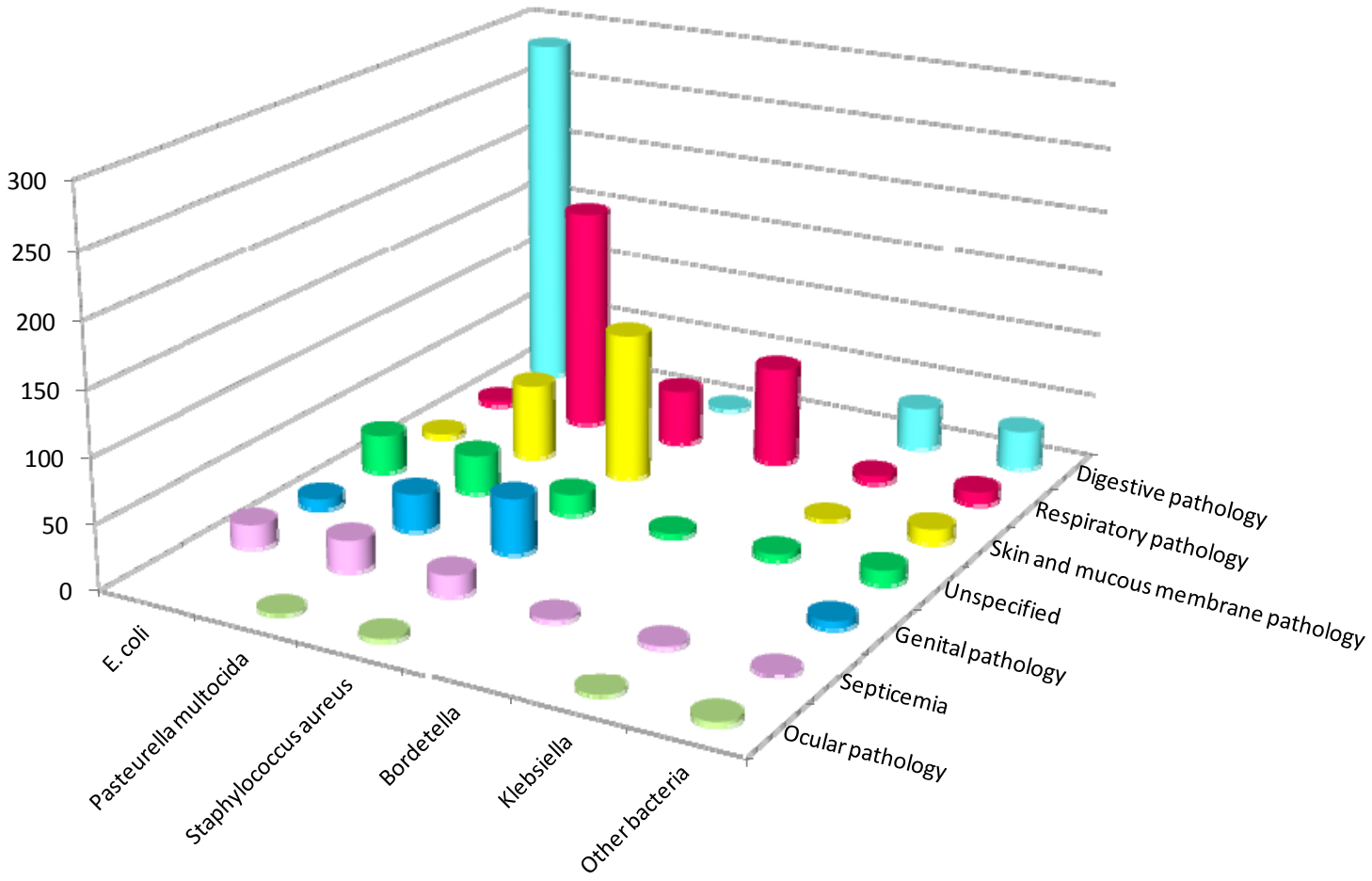


Figure 1 - Rabbits 2012 – Number of antibiograms by bacteria and pathology



Note: only values for pathologies and bacteria having more than 30 occurrences are represented. Detailed values are presented in table 1 below.

Table 1 - Rabbits 2012 – Number of antibiograms by bacteria and pathology

	Pathology N *(%)*							
Bacteria N *(%)*	Digestive pathology	Respiratory pathology	Skin and mucous membrane pathology	Unspecified	Genital pathology	Septicemia	Ocular pathology	**Total N *(%)***
E. coli	284 *(25.70)*	4 *(0.36)*	3 *(0.27)*	30 *(2.71)*	8 *(0.72)*	18 *(1.63)*		**347** ***(31.40)***
Pasteurella multocida		177 *(16.02)*	59 *(5.34)*	30 *(2.71)*	29 *(2.62)*	24 *(2.17)*	1 *(0.09)*	**320** ***(28.96)***
Staphylococcus aureus	1 *(0.09)*	43 *(3.89)*	115 *(10.41)*	16 *(1.45)*	43 *(3.89)*	16 *(1.45)*	2 *(0.18)*	**236** ***(21.36)***
Bordetella		77 *(6.97)*		3 *(0.27)*		2 *(0.18)*		**82** ***(7.42)***
Klebsiella	33 *(2.99)*	6 *(0.54)*	1 *(0.09)*	5 *(0.45)*		2 *(0.18)*	1 *(0.09)*	**48** ***(4.34)***
Other bacteria < 30 occurrences	30 *(2.71)*	10 *(0.90)*	11 *(1.00)*	11 *(1.00)*	6 *(0.54)*	1 *(0.09)*	3 *(0.27)*	**72** ***(6.52)***
Total N (%)	**348** ***(31.49)***	**317** ***(28.69)***	**189** ***(17.10)***	**95** ***(8.60)***	**86** ***(7.78)***	**63** ***(5.70)***	**7** ***(0.63)***	**1,105** ***(100.00)***

Table 2 - Rabbits 2012 – All pathologies included - *E. coli*: susceptibility to antibiotics (proportion) (N=347)

Antibiotic	*Total (N)*	**% S**
Ceftiofur	*177*	**99**
Streptomycin 10 UI	*272*	**33**
Neomycin	*336*	**71**
Apramycin	*323*	**81**
Gentamicin 10 UI	*343*	**87**
Tetracycline	*344*	**11**
Doxycycline	*215*	**6**
Flumequine	*164*	**66**
Oxolinic ac.	*203*	**58**
Enrofloxacin	*346*	**89**
Danofloxacin	*131*	**83**
Trimethoprim-Sulfonamides	*303*	**20**

Table 3 - Rabbits 2012 – All pathologies included - *Pasteurella multocida*: susceptibility to antibiotics (proportion) (N=320)

Antibiotic	*Total (N)*	**% S**
Ceftiofur	*198*	**99**
Streptomycin 10 UI	*206*	**66**
Gentamicin 10 UI	*258*	**98**
Tetracycline	*315*	**96**
Doxycycline	*262*	**96**
Tilmicosin	*313*	**98**
Tiamulin	*300*	**70**
Flumequine	*167*	**98**
Enrofloxacin	*317*	**100**
Danofloxacin	*103*	**100**
Trimethoprim-Sulfonamides	*288*	**97**

Table 4 - Rabbits 2012 – All pathologies included - *Staphylococcus aureus*: susceptibility to antibiotics (proportion) (N=236)

Antibiotic	*Total (N)*	**% S**
Penicillin G	*122*	**80**
Gentamicin 10 UI	*234*	**48**
Tetracycline	*234*	**35**
Doxycycline	*182*	**59**
Erythromycin	*171*	**32**
Spiramycin	*235*	**37**
Tiamulin	*227*	**90**
Enrofloxacin	*232*	**89**
Trimethoprim-Sulfonamides	*210*	**53**

anses
French agency for food, environmental
and occupational health & safety

Annex 8

Fish

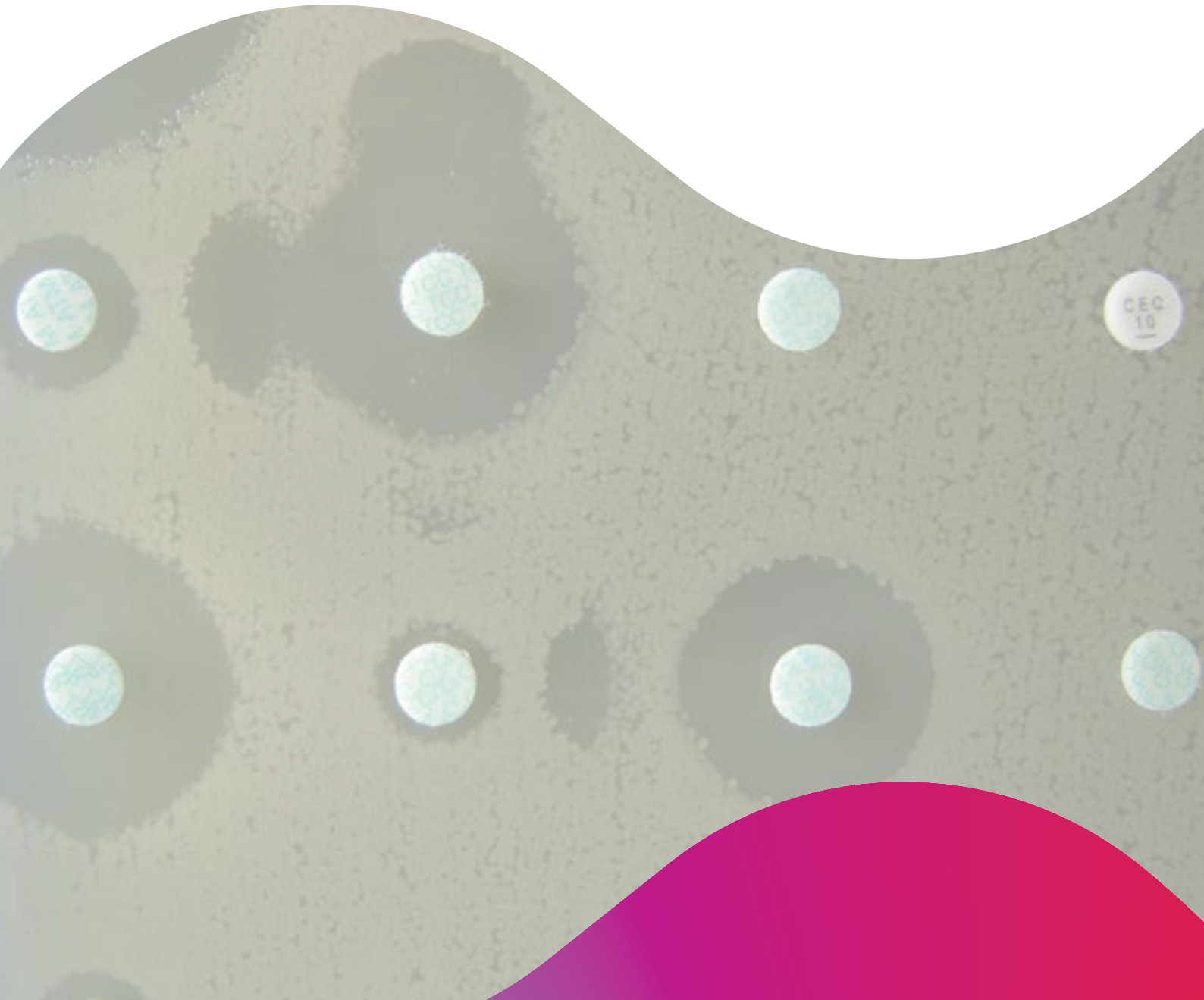


Figure 1 - Fish 2012 – Antibiogram proportions by animal species

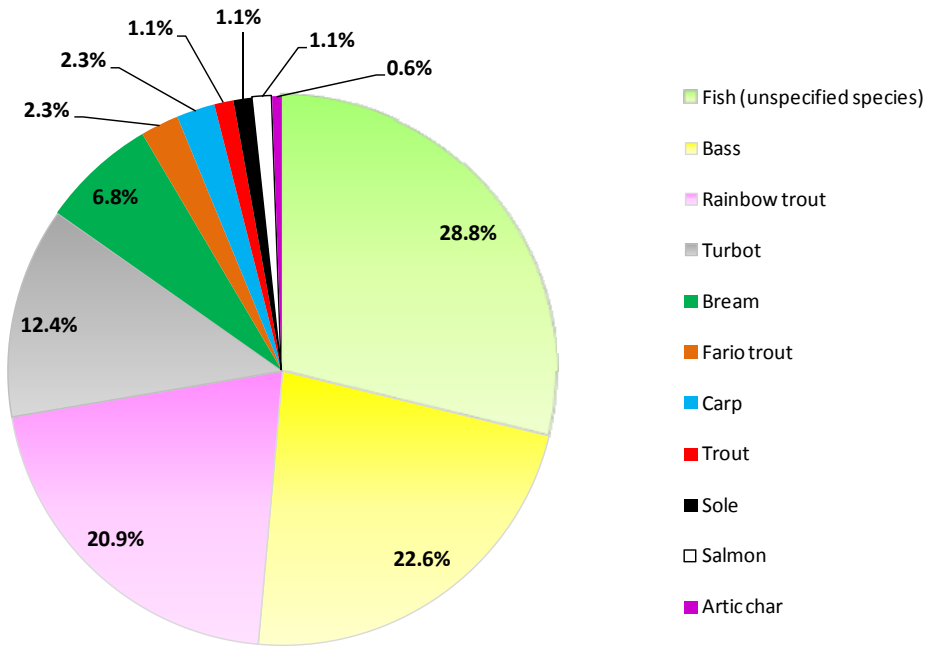


Table 1 - Fish 2012 – Number of antibiograms by bacteria and pathology

	Pathology N *(%)*			
Bacteria N *(%)*	Unspecified	Septicemia	Skin and mucous membrane pathology	**Total N *(%)***
Tenacibaculum	19 *(10.73)*	1 *(0.56)*	29 *(16.38)*	**49 *(27.68)***
Aeromonas	39 *(22.03)*	9 *(5.08)*	1 *(0.56)*	**49 *(27.68)***
Vibrio	17 *(9.60)*	13 *(7.34)*		**30 *(16.95)***
Yersinia ruckeri	19 *(10.73)*	3 *(1.69)*		**22 *(12.43)***
Edwardsiella tarda	9 *(5.08)*	1 *(0.56)*		**10 *(5.65)***
Photobacterium	3 *(1.69)*	4 *(2.26)*		**7 *(3.95)***
Pseudomonas	2 *(1.13)*	1 *(0.56)*	1 *(0.56)*	**4 *(2.26)***
Shewanella putrefaciens	2 *(1.13)*	1 *(0.56)*		**3 *(1.69)***
Yersinia		1 *(0.56)*		**1 *(0.56)***
Enterococcus	1 *(0.56)*			**1 *(0.56)***
Coagulase-unspecified Staphylococcus	1 *(0.56)*			**1 *(0.56)***
Total N *(%)*	**112 *(63.28)***	**33 *(18.64)***	**31 *(17.51)***	**177 *(100.00)***

anses
French agency for food, environmental
and occupational health & safety

Annex 9

Horses

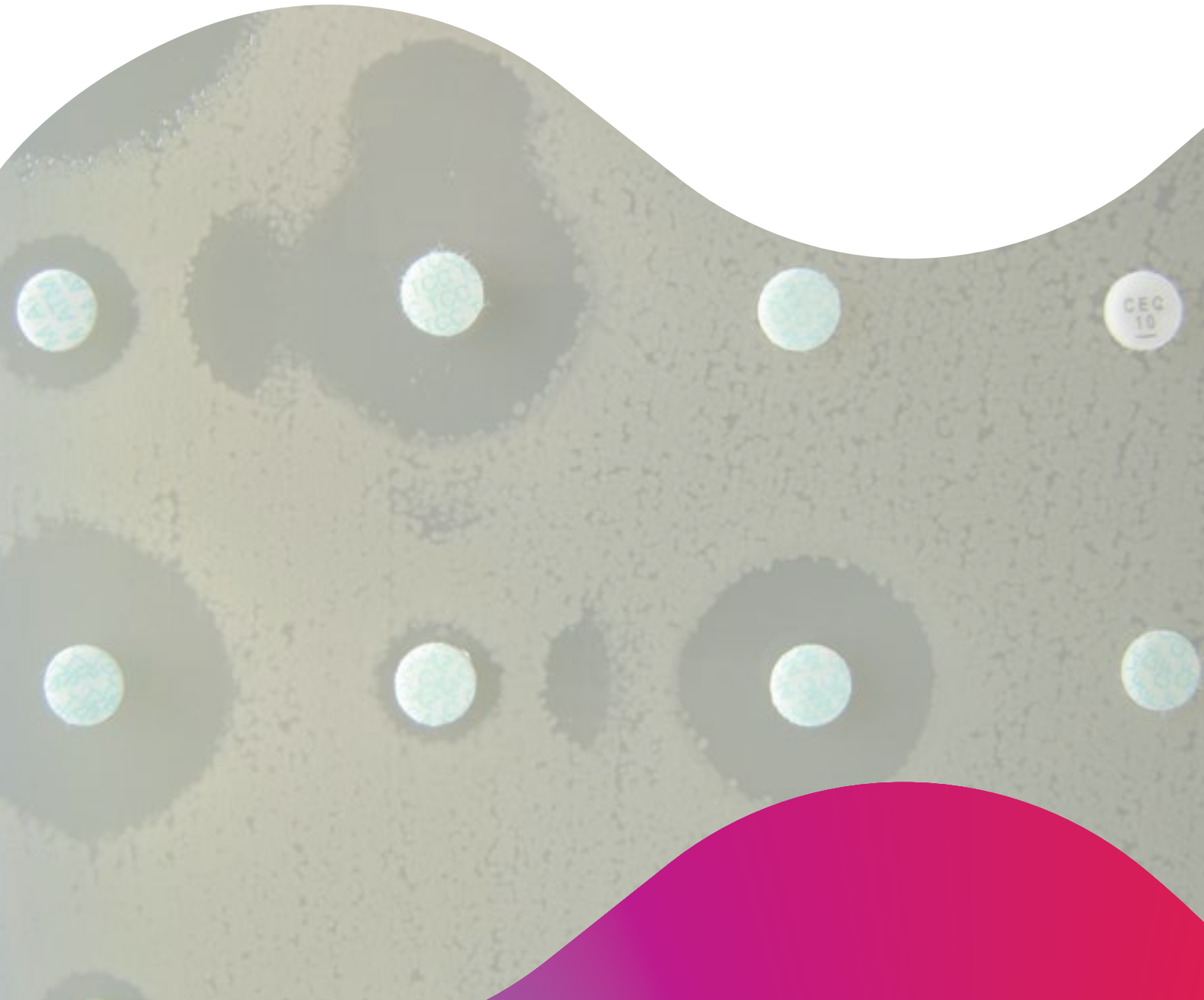


Figure 1 - Horses 2012 – Number of antibiograms by age group and pathology

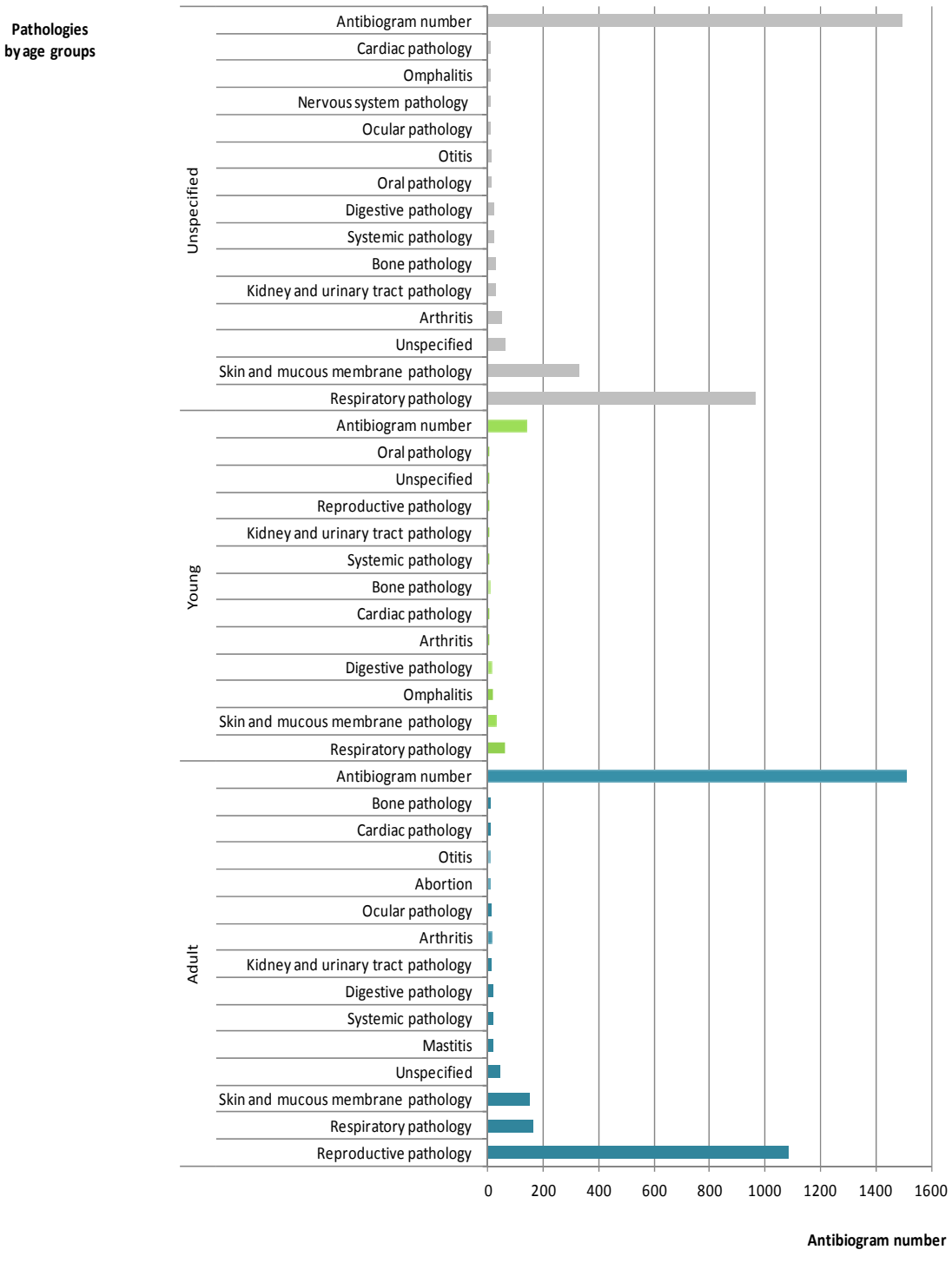
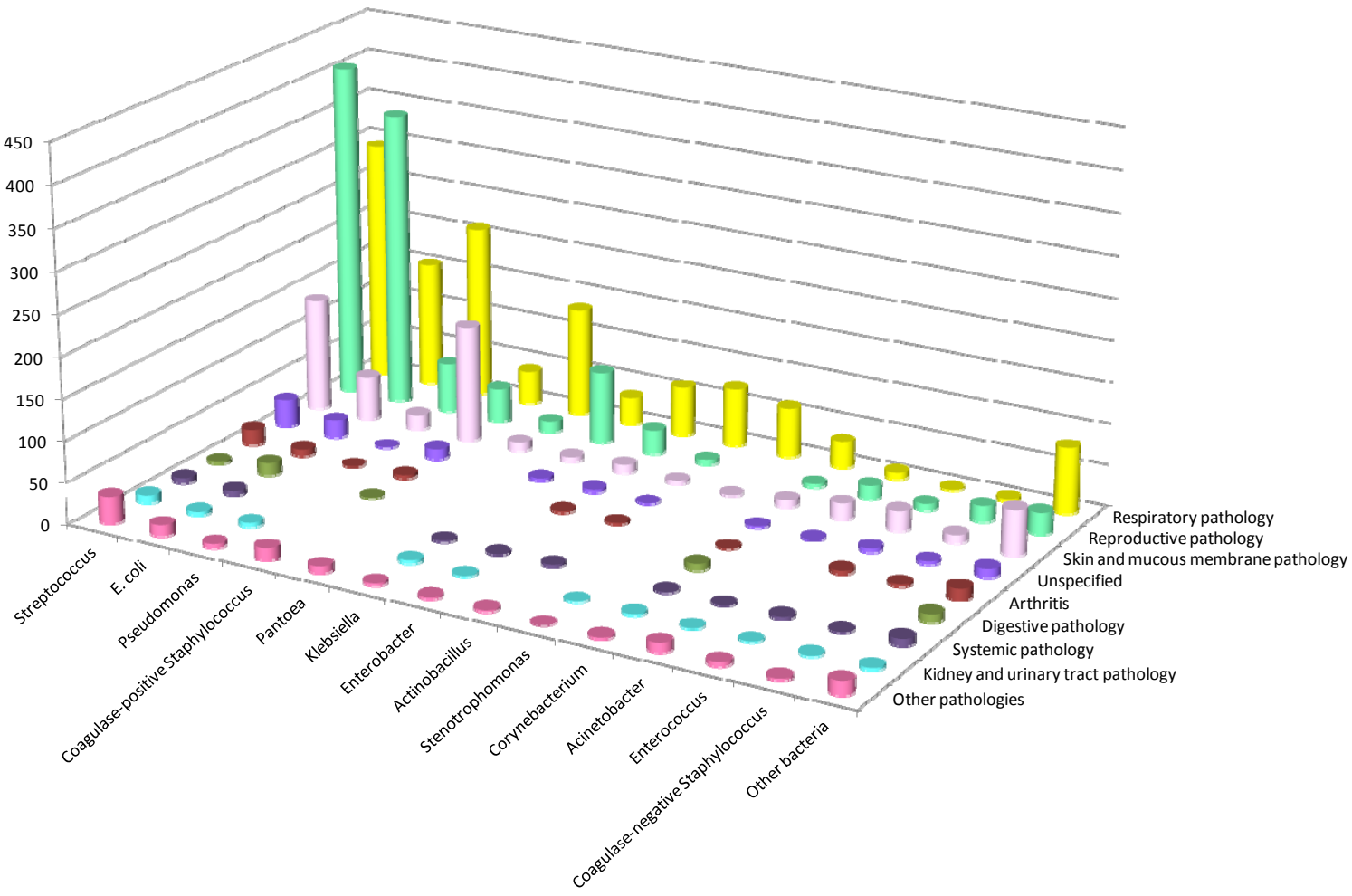


Table 1 - Horses 2012 – Number of antibiograms by age group and pathology

	Pathology N (%)																	
Age group N *(%)*	Respiratory pathology	Reproductive pathology	Skin and mucous membrane pathology	Unspecified	Arthritis	Digestive pathology	Systemic pathology	Kidney and urinary tract pathology	Bone pathology	Omphalitis	Mastitis	Ocular pathology	Otitis	Oral pathology	Cardiac pathology	Abortion	Nervous system pathology	**Total N *(%)***
Adult	156 *(4.98)*	1,078 *(34.44)*	145 *(4.63)*	39 *(1.25)*	10 *(0.32)*	12 *(0.38)*	13 *(0.42)*	11 *(0.35)*	3 *(0.1)*		15 *(0.48)*	8 *(0.26)*	5 *(0.16)*		3 *(0.10)*	6 *(0.19)*		**1,504** ***(48.05)***
Unspecified	961 *(30.70)*		324 *(10.35)*	58 *(1.85)*	42 *(1.34)*	17 *(0.54)*	17 *(0.54)*	20 *(0.64)*	20 *(0.64)*	4 *(0.13)*		6 *(0.19)*	7 *(0.22)*	9 *(0.29)*	2 *(0.06)*		4 *(0.13)*	**1,491** ***(47.64)***
Young	62 *(1.98)*	1 *(0.03)*	27 *(0.86)*	1 *(0.03)*	5 *(0.16)*	8 *(0.26)*	3 *(0.1)*	2 *(0.06)*	4 *(0.13)*	17 *(0.54)*				1 *(0.03)*	4 *(0.13)*			**135** ***(4.31)***
Total N *(%)*	**1,179** ***(37.67)***	**1,079** ***(34.47)***	**496** ***(15.85)***	**98** ***(3.13)***	**57** ***(1.82)***	**37** ***(1.18)***	**33** ***(1.05)***	**33** ***(1.05)***	**27** ***(0.86)***	**21** ***(0.67)***	**15** ***(0.48)***	**14** ***(0.45)***	**12** ***(0.38)***	**10** ***(0.32)***	**9** ***(0.29)***	**6** ***(0.19)***	**4** ***(0.13)***	**3,130** ***(100.00)***

Figure 2 - Horses 2012 – Number of antibiograms by bacteria group and pathology



Note: only values for pathologies and bacterial groups having more than 30 occurrences are represented. Detailed values are presented in table 2 below.

Table 2 - Horses 2012 – Number of antibiograms by bacteria group and pathology

	Pathology N (%)																	
Bacteria N *(%)*	Respiratory pathology	Reproductive pathology	Skin and mucous membrane pathology	Unspecified	Arthritis	Digestive pathology	Systemic pathology	Kidney and urinary tract pathology	Bone pathology	Omphalitis	Mastitis	Ocular pathology	Otitis	Oral pathology	Cardiac pathology	Abortion	Nervous system pathology	**Total N *(%)***
Streptococcus	293 *(9.36)*	408 *(13.04)*	137 *(4.38)*	33 *(1.05)*	19 *(0.61)*	3 *(0.10)*	7 *(0.22)*	10 *(0.32)*	7 *(0.22)*	7 *(0.22)*	10 *(0.32)*	2 *(0.06)*	2 *(0.06)*	3 *(0.10)*	2 *(0.06)*			**943 *(30.13)***
E. coli	153 *(4.89)*	360 *(11.50)*	53 *(1.69)*	21 *(0.67)*	8 *(0.26)*	15 *(0.48)*	5 *(0.16)*	4 *(0.13)*	2 *(0.06)*	5 *(0.16)*	1 *(0.03)*		2 *(0.06)*		2 *(0.06)*	1 *(0.03)*		**632 *(20.19)***
Pseudomonas	210 *(6.71)*	60 *(1.92)*	18 *(0.58)*	1 *(0.03)*	1 *(0.03)*			5 *(0.16)*	2 *(0.06)*			3 *(0.10)*						**300 *(9.58)***
Coagulase-positive Staphylococcus	41 *(1.31)*	41 *(1.31)*	141 *(4.50)*	12 *(0.38)*	4 *(0.13)*	1 *(0.03)*			2 *(0.06)*	5 *(0.16)*	1 *(0.03)*	2 *(0.06)*	1 *(0.03)*	1 *(0.03)*	1 *(0.03)*	1 *(0.03)*	1 *(0.03)*	**255 *(8.15)***
Pantoea	132 *(4.22)*	13 *(0.42)*	10 *(0.32)*						1 *(0.03)*		2 *(0.06)*	1 *(0.03)*	1 *(0.03)*	1 *(0.03)*	1 *(0.03)*		1 *(0.03)*	**163 *(5.21)***
Klebsiella	34 *(1.09)*	88 *(2.81)*	6 *(0.19)*	4 *(0.13)*			2 *(0.06)*	4 *(0.13)*	1 *(0.03)*					1 *(0.03)*		1 *(0.03)*		**141 *(4.50)***
Enterobacter	60 *(1.92)*	29 *(0.93)*	10 *(0.32)*	4 *(0.13)*	2 *(0.06)*		1 *(0.03)*	1 *(0.03)*	2 *(0.06)*									**109 *(3.48)***
Actinobacillus	71 *(2.27)*	6 *(0.19)*	4 *(0.13)*	1 *(0.03)*	2 *(0.06)*		3 *(0.10)*		1 *(0.03)*					1 *(0.03)*				**89 *(2.84)***
Stenotrophomonas	60 *(1.92)*		1 *(0.03)*					1 *(0.03)*										**62 *(1.98)***
Corynebacterium	32 *(1.02)*	4 *(0.13)*	9 *(0.29)*	2 *(0.06)*	1 *(0.03)*	8 *(0.26)*	1 *(0.03)*	2 *(0.06)*	1 *(0.03)*					1 *(0.03)*				**61 *(1.95)***
Acinetobacter	8 *(0.26)*	16 *(0.51)*	19 *(0.61)*	1 *(0.03)*			1 *(0.03)*	1 *(0.03)*	2 *(0.06)*	1 *(0.03)*		3 *(0.10)*	2 *(0.06)*	2 *(0.06)*			1 *(0.03)*	**57 *(1.82)***
Enterococcus	1 *(0.03)*	8 *(0.26)*	24 *(0.77)*	5 *(0.16)*	4 *(0.13)*		3 *(0.10)*	1 *(0.03)*	2 *(0.06)*	2 *(0.06)*					1 *(0.03)*			**51 *(1.63)***
Coagulase-negative Staphylococcus	4 *(0.13)*	20 *(0.64)*	10 *(0.32)*	4 *(0.13)*	3 *(0.10)*		1 *(0.03)*	1 *(0.03)*				2 *(0.06)*				1 *(0.03)*		**46 *(1.47)***
Other bacteria < 30 occurrences	80 *(2.56)*	26 *(0.83)*	54 *(1.73)*	10 *(0.32)*	13 *(0.42)*	10 *(0.32)*	9 *(0.29)*	3 *(0.10)*	4 *(0.13)*	1 *(0.03)*	1 *(0.03)*	1 *(0.03)*	4 *(0.13)*	0	2 *(0.06)*	2 *(0.06)*	1 *(0.03)*	**221 *(7.06)***
Total N *(%)*	**1,179 *(37.67)***	**1,079 *(34.47)***	**496 *(15.85)***	**98 *(3.13)***	**57 *(1.82)***	**37 *(1.18)***	**33 *(1.05)***	**33 *(1.05)***	**27 *(0.86)***	**21 *(0.67)***	**15 *(0.48)***	**14 *(0.45)***	**12 *(0.38)***	**10 *(0.32)***	**9 *(0.29)***	**6 *(0.19)***	**4 *(0.13)***	**3,130 *(100.00)***

Table 3 - Horses 2012 – Reproductive pathology – All age groups included – *E. coli*: susceptibility to antibiotics (proportion) (N=360)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*355*	**54**
Amoxicillin-Clavulanic ac.	*351*	**69**
Cephalexin	*65*	**97**
Cephalothin	*52*	**96**
Cefoxitin	*66*	**100**
Cefuroxime	*61*	**97**
Cefoperazone	*61*	**98**
Ceftiofur	*358*	**96**
Cefquinome 30 µg	*351*	**96**
Streptomycin 10 UI	*258*	**32**
Kanamycin 30 UI	*348*	**86**
Gentamicin 10 UI	*355*	**94**
Neomycin	*166*	**97**
Amikacine	*287*	**100**
Tetracycline	*259*	**80**
Florfenicol	*65*	**100**
Nalidixic ac.	*248*	**95**
Oxolinic ac.	*100*	**99**
Flumequine	*297*	**96**
Enrofloxacin	*354*	**97**
Marbofloxacin	*350*	**99**
Danofloxacin	*60*	**100**
Sulfonamides	*227*	**71**
Trimethoprim	*50*	**84**
Trimethoprim-Sulfonamides	*182*	**81**

Table 4 - Horses 2012 – Respiratory Pathology – All age groups included –*E. coli*: susceptibility to antibiotics (proportion) (N=153)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*152*	**36**
Amoxicillin-Clavulanic ac.	*153*	**64**
Ceftiofur	*153*	**92**
Cefquinome 30 µg	*153*	**92**
Streptomycin 10 UI	*153*	**30**
Kanamycin 30 UI	*153*	**78**
Gentamicin 10 UI	*153*	**92**
Amikacine	*152*	**100**
Tetracycline	*153*	**75**
Nalidixic ac.	*153*	**95**
Flumequine	*152*	**97**
Enrofloxacin	*153*	**97**
Marbofloxacin	*153*	**97**
Sulfonamides	*108*	**54**
Trimethoprim-Sulfonamides	*45*	**87**

Table 5 - Horses 2012 – All pathologies and age groups included – *Klebsiella:* susceptibility to antibiotics (proportion) (N=141)

Antibiotic	*Total (N)*	**% S**
Amoxicillin-Clavulanic ac.	*141*	**76**
Cefoxitin	*34*	**94**
Ceftiofur	*141*	**95**
Cefquinome 30 µg	*141*	**98**
Streptomycin 10 UI	*89*	**73**
Kanamycin 30 UI	*137*	**93**
Gentamicin 10 UI	*141*	**92**
Neomycin	*73*	**100**
Amikacine	*119*	**100**
Tetracycline	*90*	**76**
Nalidixic ac.	*86*	**91**
Oxolinic ac.	*51*	**94**
Flumequine	*126*	**91**
Enrofloxacin	*141*	**95**
Marbofloxacin	*139*	**97**
Sulfonamides	*65*	**78**
Trimethoprim-Sulfonamides	*90*	**93**

Table 6 - Horses 2012 – All pathologies and age groups included – *Enterobacter:* susceptibility to antibiotics (proportion) (N=109)

Antibiotic	*Total (N)*	**% S**
Amoxicillin-Clavulanic ac.	*108*	**16**
Ceftiofur	*107*	**71**
Cefquinome 30 µg	*108*	**85**
Streptomycin 10 UI	*98*	**51**
Kanamycin 30 UI	*106*	**67**
Gentamicin 10 UI	*109*	**63**
Amikacine	*100*	**91**
Tetracycline	*99*	**48**
Nalidixic ac.	*97*	**75**
Flumequine	*103*	**73**
Enrofloxacin	*108*	**77**
Marbofloxacin	*107*	**98**
Sulfonamides	*69*	**55**
Trimethoprim-Sulfonamides	*41*	**56**

Table 7 - Horses 2012 – Skin and mucous membrane pathology – All age groups included –*Staphylococcus aureus*: susceptibility to antibiotics (proportion) (N=107)

Antibiotic	*Total (N)*	**% S**
Penicillin	*105*	**63**
Cefoxitin	*100*	**72**
Oxacillin	*91*	**95**
Erythromycin	*103*	**92**
Streptomycin 10 UI	*104*	**78**
Kanamycin 30 UI	*100*	**72**
Gentamicin 10 UI	*107*	**76**
Tetracycline	*102*	**72**
Enrofloxacin	*105*	**92**
Marbofloxacin	*101*	**97**
Sulfonamides	*58*	**97**
Trimethoprim-Sulfonamides	*50*	**84**
Rifampicin	*91*	**93**

Table 8 - Horses 2012 – Reproductive pathology – All pathologies and age groups included – *Streptococcus groupe C and Streptococcus zooepidemicus:* susceptibility to antibiotics (proportion) (N=324)

Antibiotic	*Total (N)*	**% S**
Ampicillin	*47*	**100**
Oxacillin	*259*	**99**
Erythromycin	*319*	**89**
Spiramycin	*145*	**98**
Lincomycin	*102*	**99**
Streptomycin 500 µg	*275*	**95**
Kanamycin 1000 µg	*273*	**96**
Gentamicine 500 µg	*274*	**99**
Tetracycline	*279*	**60**
Florfenicol	*85*	**100**
Enrofloxacin	*318*	**37**
Marbofloxacin	*295*	**85**
Trimethoprim-Sulfonamides	*163*	**82**
Rifampicin	*274*	**56**

anses
French agency for food, environmental
and occupational health & safety

Annex 10

Dogs

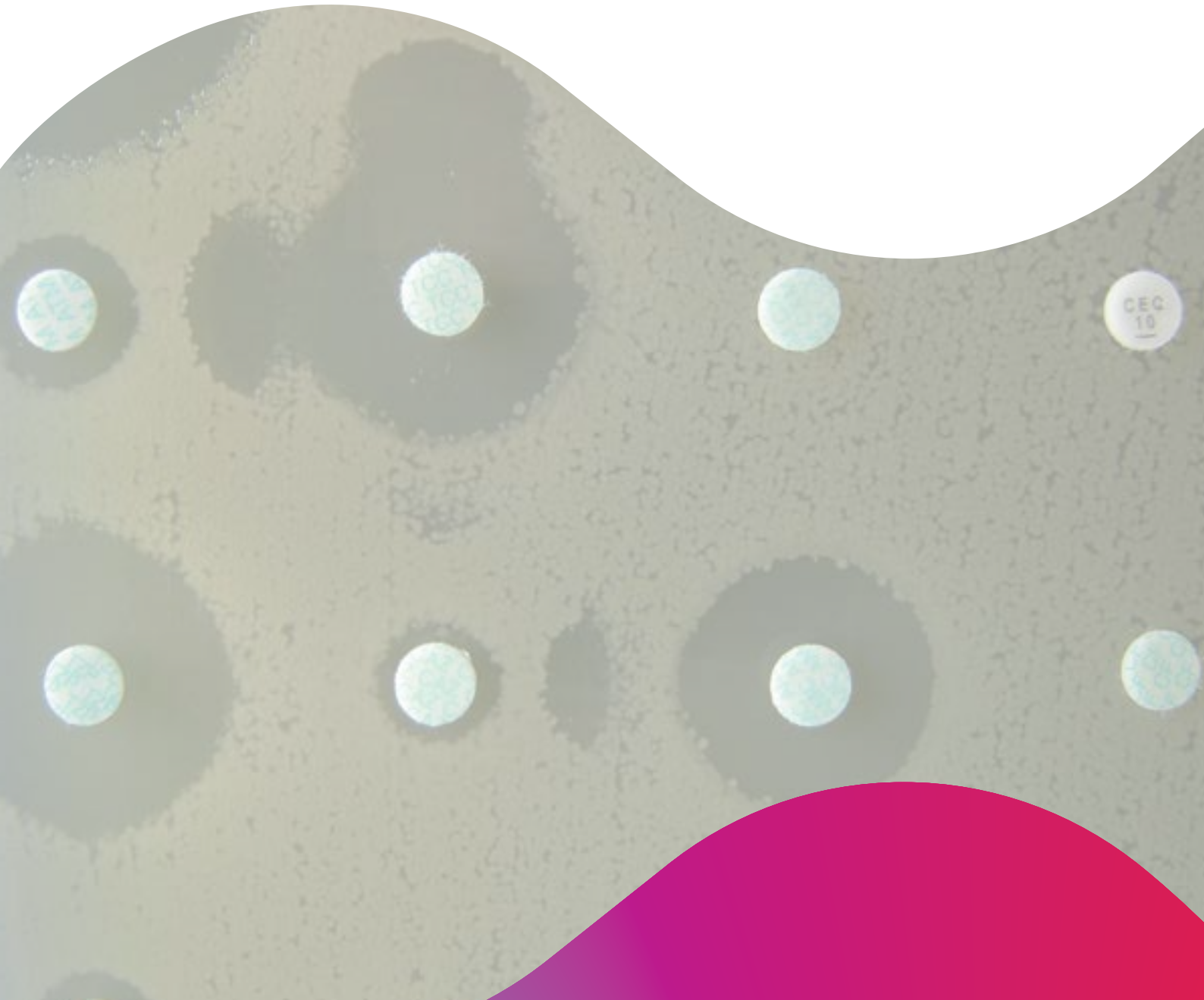


Figure 1 - Dogs 2012 – Number of antibiograms by age group and pathology

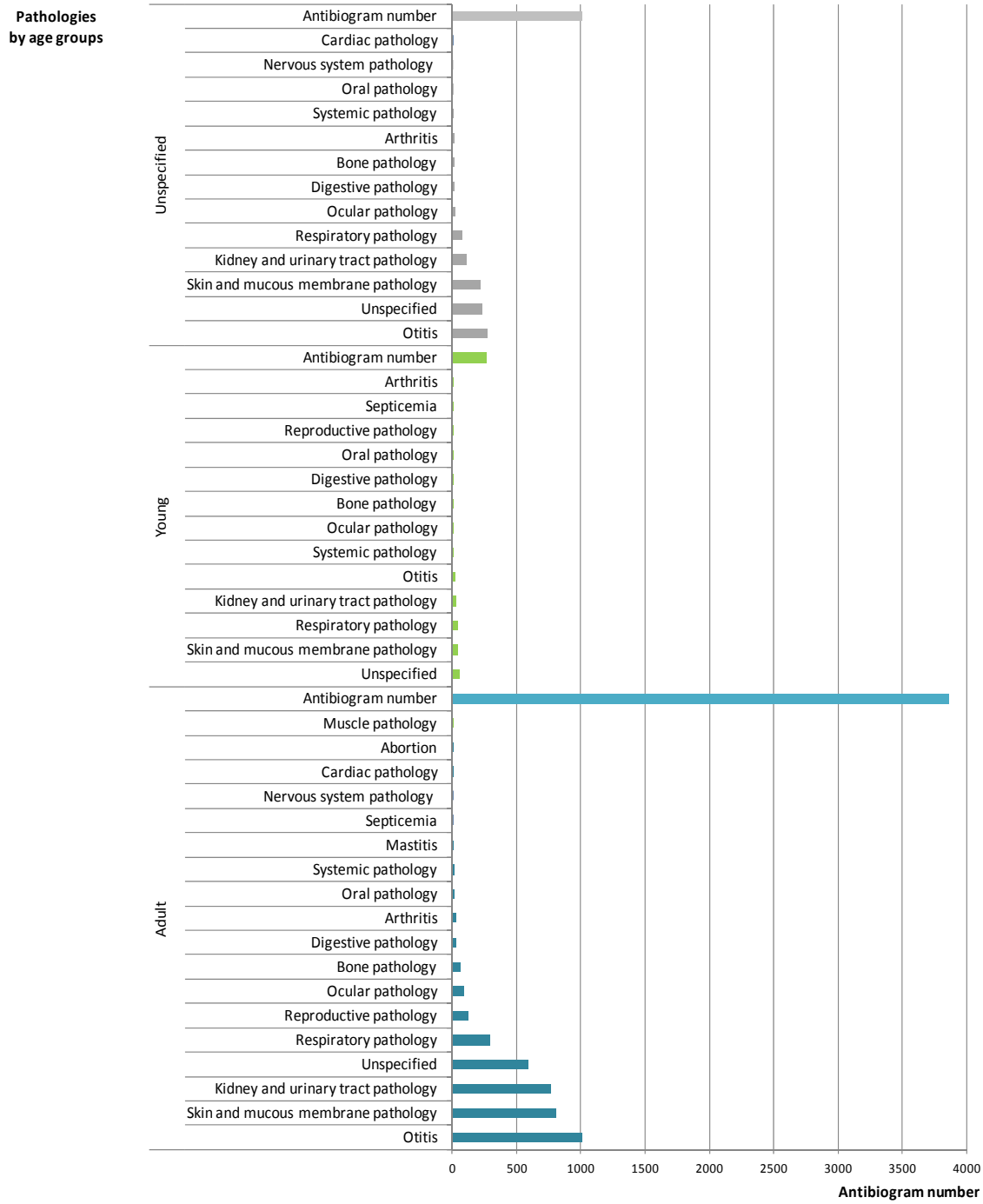
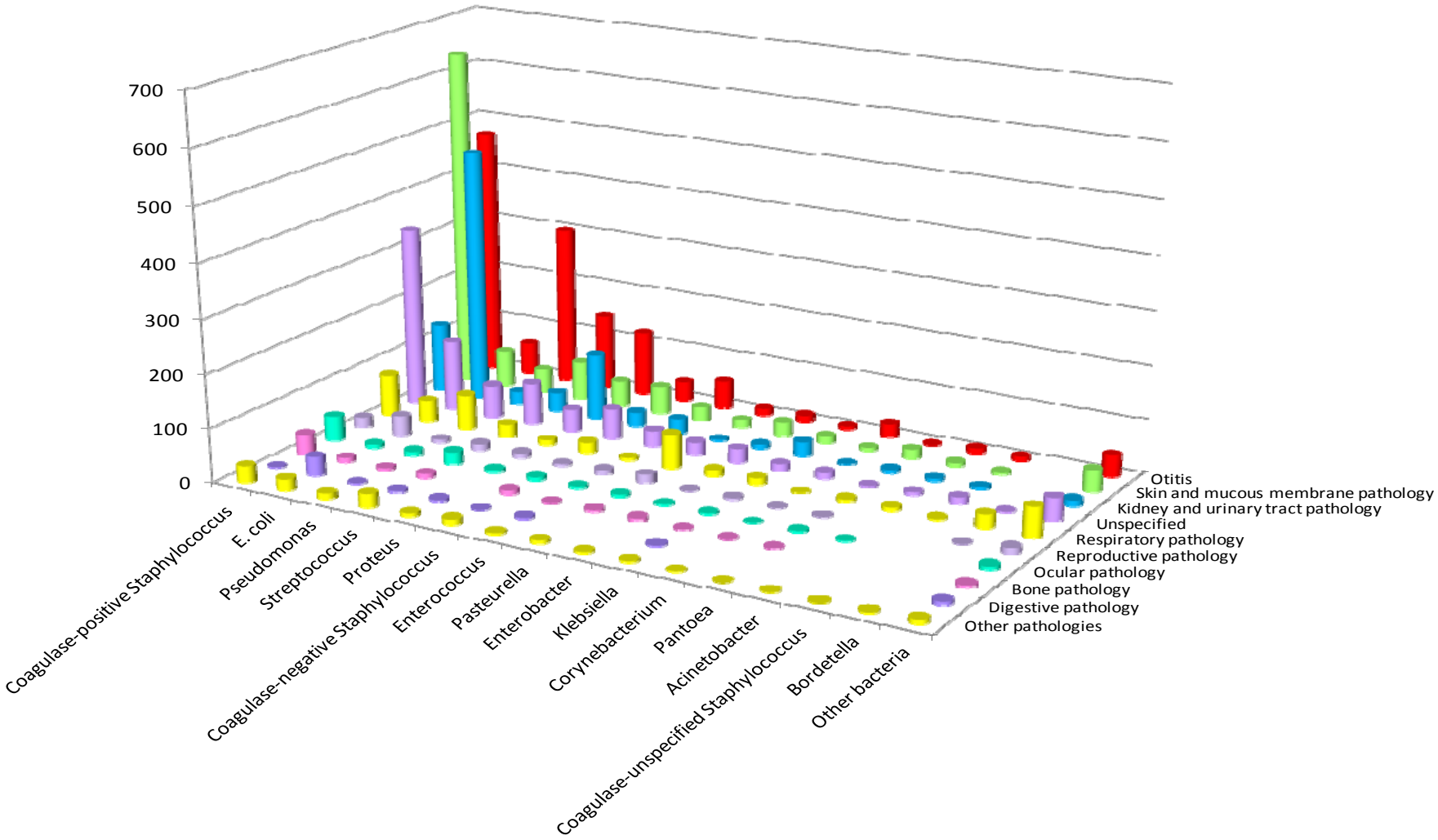


Table 1 - Dogs 2012 – Number of antibiograms by age group and pathology

	Pathology N (%)																		
Age group N *(%)*	Otitis	Skin and mucous membrane pathology	Kidney and urinary tract pathology	Unspecified	Respiratory pathology	Reproductive pathology	Ocular pathology	Bone pathology	Digestive pathology	Arthritis	Systemic pathology	Oral pathology	Mastitis	Septicemia	Nervous system pathology	Cardiac pathology	Abortion	Muscle pathology	**Total N *(%)***
Adult	1,006 *(19.58)*	808 *(15.73)*	772 *(15.03)*	589 *(11.46)*	296 *(5.76)*	124 *(2.41)*	93 *(1.81)*	61 *(1.19)*	35 *(0.68)*	30 *(0.58)*	17 *(0.33)*	18 *(0.35)*	9 *(0.18)*	1 *(0.02)*	1 *(0.02)*	1 *(0.02)*	1 *(0.02)*	1 *(0.02)*	**3,863** ***(75.18)***
Unspecified	273 *(5.31)*	221 *(4.30)*	108 *(2.10)*	235 *(4.57)*	81 *(1.58)*		22 *(0.43)*	17 *(0.33)*	20 *(0.39)*	14 *(0.27)*	9 *(0.18)*	7 *(0.14)*			2 *(0.04)*	1 *(0.02)*			**1,010** ***(19.66)***
Young	24 *(0.47)*	51 *(0.99)*	33 *(0.64)*	57 *(1.11)*	50 *(0.97)*	4 *(0.08)*	10 *(0.19)*	9 *(0.18)*	6 *(0.12)*	3 *(0.06)*	10 *(0.19)*	4 *(0.08)*		4 *(0.08)*					**265** ***(5.16)***
Total N *(%)*	**1,303** ***(25.36)***	**1,080** ***(21.02)***	**913** ***(17.77)***	**881** ***(17.15)***	**427** ***(8.31)***	**128** ***(2.49)***	**125** ***(2.43)***	**87** ***(1.69)***	**61** ***(1.19)***	**47** ***(0.91)***	**36** ***(0.70)***	**29** ***(0.56)***	**9** ***(0.18)***	**5** ***(0.10)***	**3** ***(0.06)***	**2** ***(0.04)***	**1** ***(0.02)***	**1** ***(0.02)***	**5,138** ***(100.00)***

Figure 2 - Dogs 2012 – Number of antibiograms by bacteria group and pathology



Note: only values for pathologies and bacteria having more than 30 occurrences are represented. Detailed values are presented in table 2 below.

Table 2 - Dogs 2012 – Number of antibiograms by bacteria group and pathology

	Pathology N (%)																	
Bacteria N ***(%)***	Otitis	Skin and mucous membrane pathology	Kidney and urinary tract pathology	Unspecified	Respiratory pathology	Reproductive pathology	Ocular pathology	Bone pathology	Digestive pathology	Arthritis	Systemic pathology	Oral pathology	Mastitis	Septicemia	Nervous system pathology	Cardiac pathology	Muscle pathology	Abortion	**Total N** ***(%)***
Coagulase-positive Staphylococcus	468 *(9.11)*	637 *(12.4)*	130 *(2.53)*	338 *(6.58)*	77 *(1.5)*	19 *(0.37)*	46 *(0.90)*	37 *(0.72)*	2 *(0.04)*	13 *(0.25)*	6 *(0.12)*	7 *(0.14)*	3 *(0.06)*					1 *(0.02)*	**1,784** ***(34.72)***
E. coli	61 *(1.19)*	68 *(1.32)*	477 *(9.28)*	133 *(2.59)*	42 *(0.82)*	36 *(0.70)*	7 *(0.14)*	8 *(0.16)*	36 *(0.70)*	4 *(0.08)*	10 *(0.19)*	5 *(0.10)*		2 *(0.04)*					**889** ***(17.30)***
Pseudomonas	301 *(5.86)*	45 *(0.88)*	24 *(0.47)*	61 *(1.19)*	66 *(1.28)*	6 *(0.12)*	9 *(0.18)*	4 *(0.08)*	2 *(0.04)*	6 *(0.12)*		3 *(0.06)*					1 *(0.02)*		**528** ***(10.28)***
Streptococcus	143 *(2.78)*	73 *(1.42)*	36 *(0.70)*	79 *(1.54)*	24 *(0.47)*	12 *(0.23)*	23 *(0.45)*	8 *(0.16)*	4 *(0.08)*	14 *(0.27)*	5 *(0.10)*	2 *(0.04)*	2 *(0.04)*	1 *(0.02)*	1 *(0.02)*				**427** ***(8.31)***
Proteus	122 *(2.37)*	49 *(0.95)*	124 *(2.41)*	42 *(0.82)*	9 *(0.18)*	10 *(0.19)*	4 *(0.08)*		3 *(0.06)*	2 *(0.04)*	1 *(0.02)*	2 *(0.04)*		1 *(0.02)*					**369** ***(7.18)***
Coagulase-negative Staphylococcus	38 *(0.74)*	52 *(1.01)*	26 *(0.51)*	57 *(1.11)*	19 *(0.37)*	4 *(0.08)*	6 *(0.12)*	9 *(0.18)*	1 *(0.02)*	2 *(0.04)*	3 *(0.06)*	2 *(0.04)*	2 *(0.04)*	1 *(0.02)*	1 *(0.02)*	1 *(0.02)*			**224** ***(4.36)***
Enterococcus	53 *(1.03)*	26 *(0.51)*	28 *(0.54)*	30 *(0.58)*	5 *(0.10)*	8 *(0.16)*	5 *(0.10)*	2 *(0.04)*	3 *(0.06)*		1 *(0.02)*	1 *(0.02)*	1 *(0.02)*						**163** ***(3.17)***
Pasteurella	12 *(0.23)*	15 *(0.29)*	3 *(0.06)*	23 *(0.45)*	64 *(1.25)*	15 *(0.29)*	5 *(0.10)*	5 *(0.10)*			1 *(0.02)*	5 *(0.1)*							**148** ***(2.88)***
Enterobacter	14 *(0.27)*	25 *(0.49)*	8 *(0.16)*	26 *(0.51)*	12 *(0.23)*	1 *(0.02)*	3 *(0.06)*	6 *(0.12)*		2 *(0.04)*		1 *(0.02)*							**98** ***(1.91)***
Klebsiella	6 *(0.12)*	13 *(0.25)*	28 *(0.54)*	12 *(0.23)*	13 *(0.25)*	3 *(0.06)*	3 *(0.06)*	1 *(0.02)*	2 *(0.04)*	1 *(0.02)*	2 *(0.04)*								**84** ***(1.63)***
Corynebacterium	26 *(0.51)*	6 *(0.12)*	1 *(0.02)*	12 *(0.23)*	1 *(0.02)*	1 *(0.02)*	1 *(0.02)*	1 *(0.02)*		1 *(0.02)*	1 *(0.02)*								**51** ***(0.99)***
Pantoea	1 *(0.02)*	18 *(0.35)*	6 *(0.12)*	3 *(0.06)*	5 *(0.10)*	1 *(0.02)*	3 *(0.06)*	1 *(0.02)*											**38** ***(0.74)***
Acinetobacter	9 *(0.18)*	8 *(0.16)*	5 *(0.10)*	6 *(0.12)*	6 *(0.12)*		2 *(0.04)*				1 *(0.02)*								**37** ***(0.72)***

	Pathology N (%)																		
Bacteria N ***(%)***	Otitis	Skin and mucous membrane pathology	Kidney and urinary tract pathology	Unspecified	Respiratory pathology	Reproductive pathology	Ocular pathology	Bone pathology	Digestive pathology	Arthritis	Systemic pathology	Oral pathology	Mastitis	Septicemia	Nervous system pathology	Cardiac pathology	Muscle pathology	Abortion	**Total N** ***(%)***
Coagulase-unspecified Staphylococcus	8 *(0.16)*	5 *(0.10)*	5 *(0.10)*	13 *(0.25)*	2 *(0.04)*					1 *(0.02)*									**34** ***(0.66)***
Bordetella				2 *(0.04)*	26 *(0.51)*	1 *(0.02)*						1 *(0.02)*				1 *(0.02)*			**31** ***(0.60)***
Other bacteria < 30 occurrences	41 *(0.80)*	40 *(0.78)*	12 *(0.23)*	44 *(0.86)*	56 *(1.09)*	11 *(0.21)*	8 *(0.16)*	5 *(0.10)*	8 *(0.16)*	1 *(0.02)*	5 *(0.10)*	0	1 *(0.02)*	0	1 *(0.02)*	0	0	0	**233** ***(4.53)***
Total N ***(%)***	**1,303** ***(25.36)***	**1,080** ***(21.02)***	**913** ***(17.77)***	**881** ***(17.15)***	**427** ***(8.31)***	**128** ***(2.49)***	**125** ***(2.43)***	**87** ***(1.69)***	**61** ***(1.19)***	**47** ***(0.91)***	**36** ***(0.7)***	**29** ***(0.56)***	**9** ***(0.18)***	**5** ***(0.1)***	**3** ***(0.06)***	**2** ***(0.04)***	**1** ***(0.02)***	**1** ***(0.02)***	**5,138** ***(100.00)***

Table 3 - Dogs 2012 – Otitis – All age groups included - *E. coli*: susceptibility to antibiotics (proportion) (N=61)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*56*	**70**
Amoxicillin-Clavulanic ac.	*61*	**80**
Cephalexin	*54*	**89**
Cefoxitin	*48*	**92**
Cefovecin	*31*	**97**
Ceftiofur	*55*	**95**
Gentamicin 10 UI	*59*	**95**
Nalidixic ac.	*54*	**87**
Enrofloxacin	*49*	**94**
Marbofloxacin	*35*	**89**
Trimethoprim-Sulfonamides	*57*	**93**

Table 4 - Dogs 2012 – Skin and mucous membrane pathology - All age groups included - *E. coli:* susceptibility to antibiotics (proportion) (N=68)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*68*	**47**
Amoxicillin-Clavulanic ac.	*68*	**62**
Cephalexin	*67*	**81**
Cefoxitin	*60*	**85**
Cefovecin	*52*	**85**
Ceftiofur	*65*	**86**
Gentamicin 10 UI	*68*	**94**
Nalidixic ac.	*63*	**71**
Enrofloxacin	*60*	**72**
Trimethoprim-Sulfonamides	*66*	**79**

Table 5 - Dogs 2012 – Kidney and urinary tract pathology - All age groups included - *E. coli:* susceptibility to antibiotics (proportion) (N=477)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*467*	**62**
Amoxicillin-Clavulanic ac.	*476*	**71**
Cephalexin	*459*	**79**
Cephalothin	*35*	**40**
Cefoxitin	*433*	**85**
Cefoperazone	*37*	**92**
Cefovecin	*293*	**80**
Ceftiofur	*467*	**87**
Cefquinome 30 µg	*131*	**89**
Streptomycin 10 UI	*116*	**62**
Kanamycin 30 UI	*58*	**88**
Gentamicin 10 UI	*473*	**91**
Neomycin	*125*	**86**
Tetracycline	*137*	**63**
Chloramphenicol	*34*	**82**
Florfenicol	*73*	**96**
Nalidixic ac.	*438*	**76**
Oxolinic ac.	*32*	**88**
Flumequine	*111*	**75**
Enrofloxacin	*374*	**85**
Marbofloxacin	*215*	**83**
Danofloxacin	*35*	**91**
Trimethoprim-Sulfonamides	*472*	**80**

Table 6 - Dogs 2012 – All pathologies and age groups included - *Pasteurella*: susceptibility to antibiotics (proportion) (N=148)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*148*	**86**
Amoxicillin-Clavulanic ac.	*147*	**91**
Cephalexin	*145*	**80**
Cefoxitin	*105*	**84**
Cefovecin	*96*	**77**
Ceftiofur	*137*	**86**
Cefquinome 30 µg	*36*	**86**
Streptomycin 10 UI	*40*	**42**
Kanamycin 30 UI	*36*	**61**
Gentamicin 10 UI	*148*	**86**
Neomycin	*34*	**65**
Tetracycline	*49*	**98**
Florfenicol	*33*	**100**
Nalidixic ac.	*131*	**78**
Flumequine	*32*	**78**
Enrofloxacin	*133*	**92**
Marbofloxacin	*67*	**99**
Trimethoprim-Sulfonamides	*145*	**86**

Table 7 - Dogs 2012 – Otitis – All age groups included - All *Coagulase-positive Staphylococcus:* susceptibility to antibiotics (proportion) (N=468)

Antibiotic	*Total (N)*	**% S**
Penicillin	*449*	**32**
Cefoxitin	*420*	**95**
Oxacillin	*55*	**93**
Cefovecin	*244*	**91**
Erythromycin	*450*	**70**
Tylosin	*53*	**75**
Spiramycin	*236*	**70**
Lincomycin	*405*	**64**
Pristinamycin	*38*	**100**
Streptomycin 10 UI	*200*	**66**
Kanamycin 30 UI	*188*	**65**
Gentamicin 10 UI	*464*	**85**
Neomycin	*66*	**85**
Tetracycline	*239*	**62**
Chloramphenicol	*100*	**75**
Florfenicol	*85*	**99**
Enrofloxacin	*403*	**83**
Marbofloxacin	*283*	**88**
Danofloxacin	*32*	**88**
Trimethoprim-Sulfonamides	*446*	**88**
Acide Fusidique	*308*	**85**
Rifampicin	*60*	**98**

Table 8 - Dogs 2012 – Skin and mucous membrane pathology – All age groups included – All *Coagulase-positive Staphylococcus:* susceptibility to antibiotics (proportion) (N=637)

Antibiotic	*Total (N)*	**% S**
Penicillin	*544*	**29**
Cefoxitin	*568*	**90**
Oxacillin	*46*	**91**
Cefovecin	*301*	**81**
Erythromycin	*539*	**62**
Tylosin	*80*	**62**
Spiramycin	*274*	**57**
Lincomycin	*581*	**59**
Pristinamycin	*82*	**100**
Streptomycin 10 UI	*216*	**51**
Kanamycin 30 UI	*233*	**50**
Tobramycin	*56*	**29**
Gentamicin 10 UI	*629*	**85**
Neomycin	*171*	**73**
Tetracycline	*314*	**56**
Chloramphenicol	*173*	**71**
Florfenicol	*114*	**97**
Enrofloxacin	*583*	**81**
Marbofloxacin	*375*	**84**
Danofloxacin	*50*	**90**
Trimethoprim-Sulfonamides	*619*	**82**
Acide Fusidique	*478*	**87**
Rifampicin	*100*	**94**

Table 9 - Dogs 2012 – Kidney and urinary tract pathology – All age groups included – All *Coagulase-positive Staphylococcus:* susceptibility to antibiotics (proportion) (N=130)

Antibiotic	*Total (N)*	**% S**
Penicillin	*129*	**31**
Cefoxitin	*111*	**94**
Cefovecin	*60*	**90**
Erythromycin	*128*	**57**
Spiramycin	*70*	**51**
Lincomycin	*119*	**55**
Streptomycin 10 UI	*62*	**45**
Kanamycin 30 UI	*58*	**47**
Gentamicin 10 UI	*129*	**91**
Tetracycline	*71*	**46**
Chloramphenicol	*45*	**69**
Enrofloxacin	*111*	**80**
Marbofloxacin	*80*	**82**
Trimethoprim-Sulfonamides	*129*	**86**
Acide Fusidique	*93*	**88**

Table 10 - Dogs 2012 – Otitis – All age groups included – *Streptococcus:* susceptibility to antibiotics (proportion) (N=143)

Antibiotic	*Total (N)*	**% S**
Oxacillin	*76*	**88**
Cefovecin	*58*	**74**
Erythromycin	*139*	**75**
Tylosin	*35*	**97**
Spiramycin	*87*	**85**
Lincomycin	*124*	**78**
Streptomycin 500 µg	*80*	**86**
Kanamycin 1000 µg	*61*	**97**
Gentamicine 500 µg	*82*	**98**
Tetracycline	*87*	**28**
Florfenicol	*39*	**95**
Enrofloxacin	*121*	**37**
Marbofloxacin	*98*	**77**
Trimethoprim-Sulfonamides	*130*	**79**

Table 11 - Dogs 2012 – Skin and mucous membrane pathology – All age groups included – All *Streptococcus:* susceptibility to antibiotics (proportion) (N=73)

Antibiotic	*Total (N)*	**% S**
Cefovecin	*40*	**88**
Erythromycin	*70*	**64**
Spiramycin	*34*	**74**
Lincomycin	*65*	**75**
Streptomycin 500 µg	*32*	**75**
Gentamicine 500 µg	*31*	**94**
Tetracycline	*31*	**23**
Enrofloxacin	*65*	**37**
Marbofloxacin	*42*	**71**
Trimethoprim-Sulfonamides	*72*	**75**

anses
French agency for food, environmental
and occupational health & safety

Annex 11

Cats

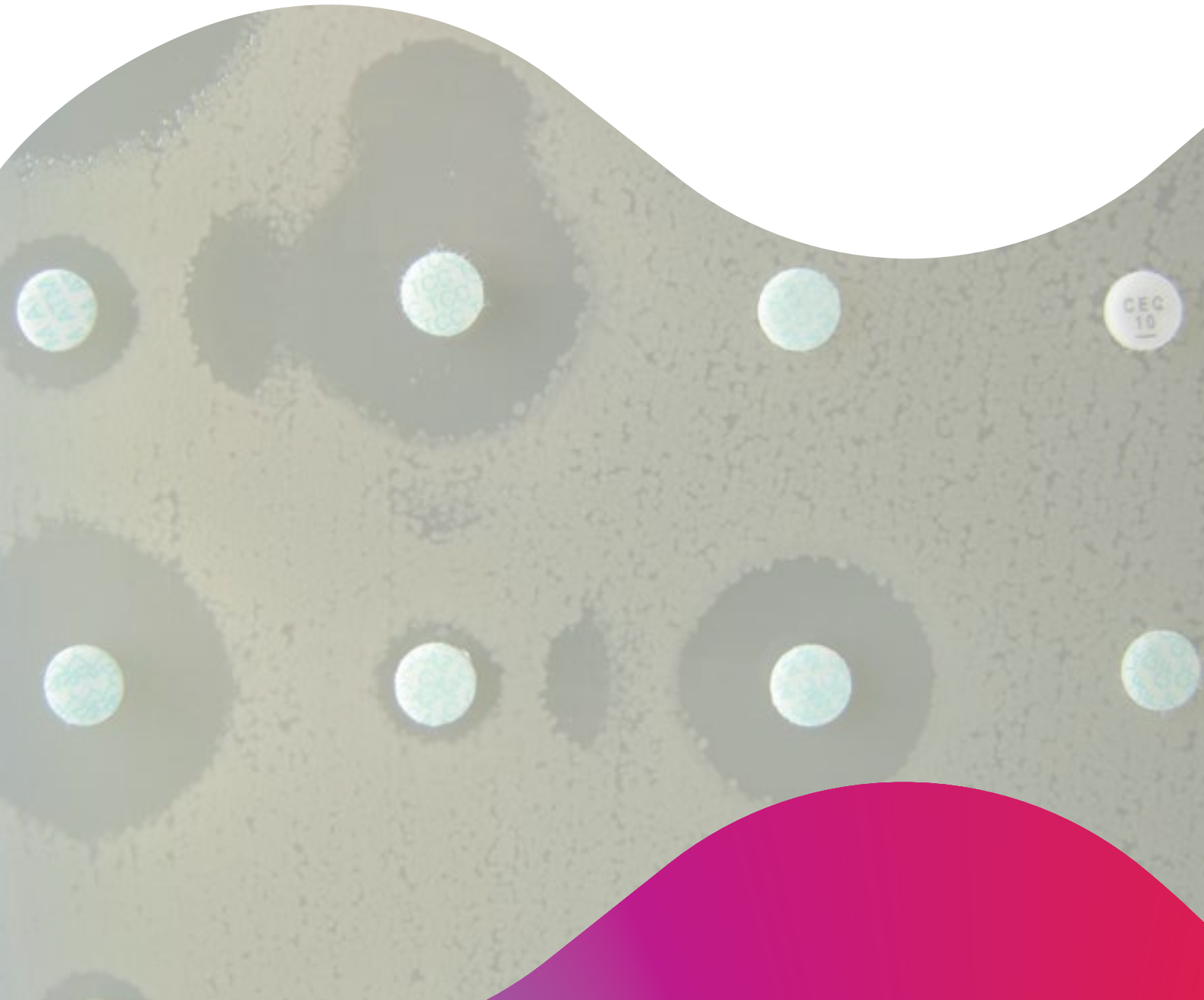


Figure 1 - Cats 2012 – Number of antibiograms by age group and pathology

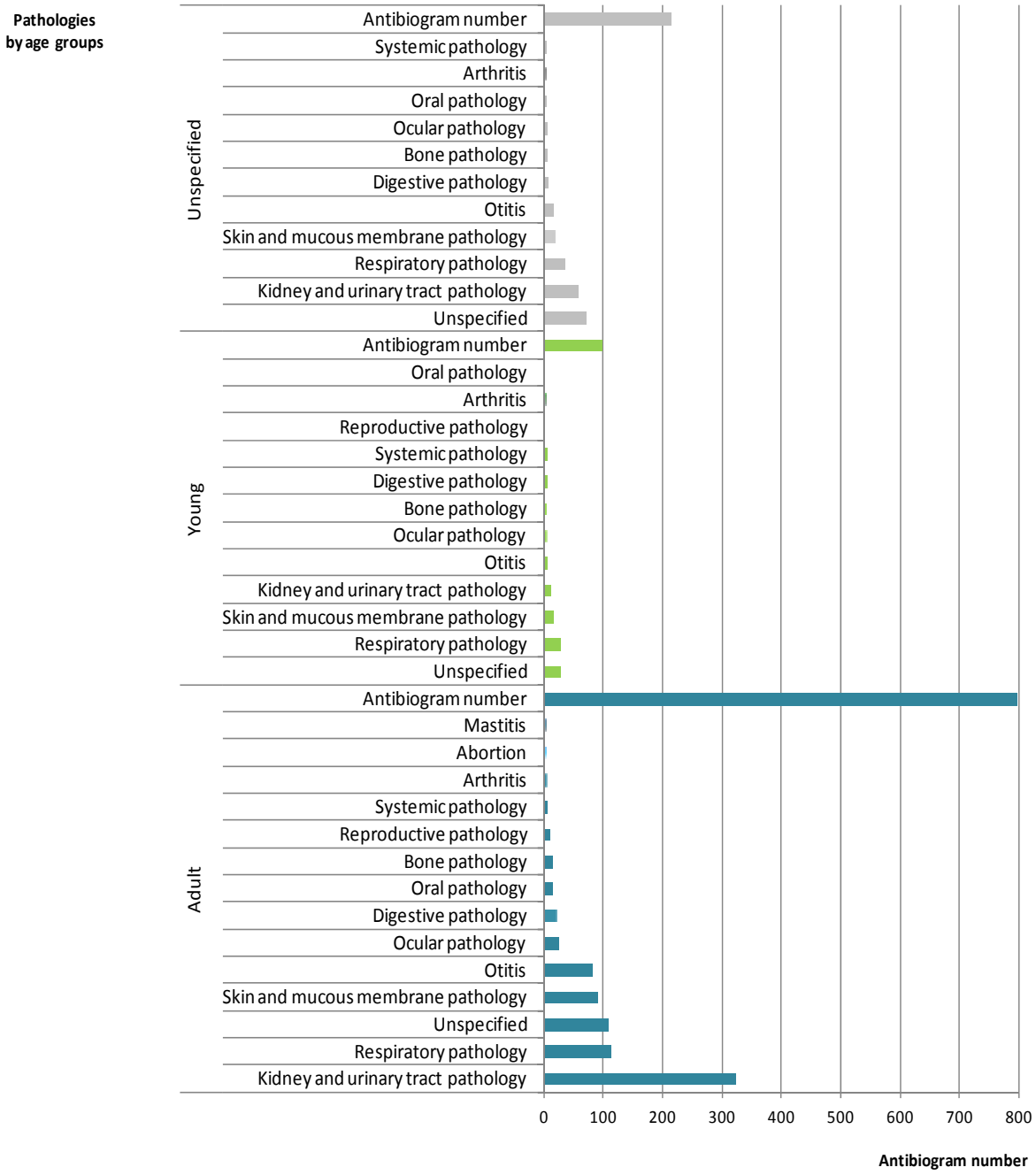
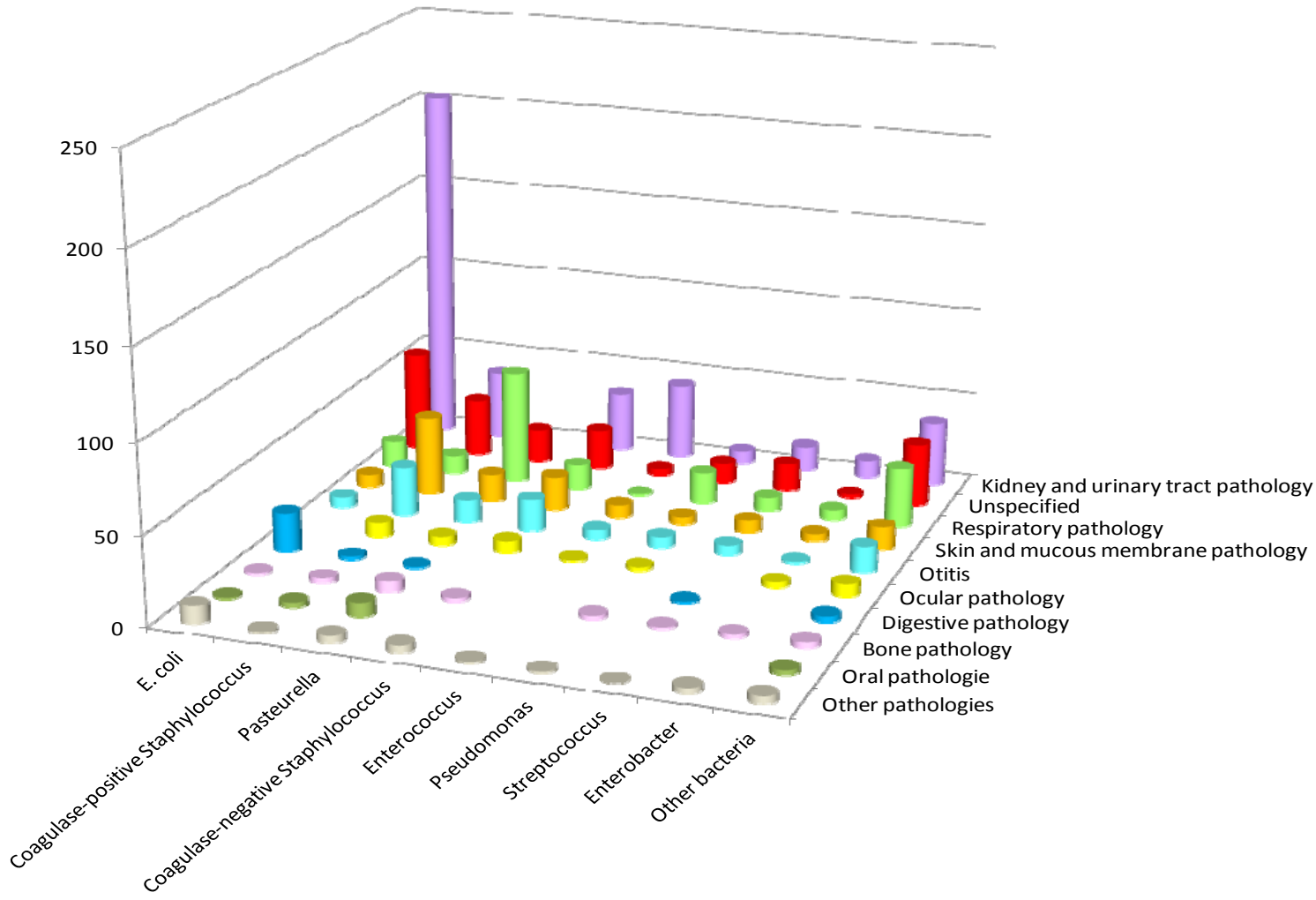


Table 1 - Cats 2012 – Number of antibiograms by age group and pathology

	Pathology N (%)															
Age group N *(%)*	Kidney and urinary tract pathology	Un-specified	Respiratory pathology	Skin and mucous membrane pathology	Otitis	Ocular pathology	Digestive pathology	Bone pathology	Oral pathology	Reproductive pathology	Systemic pathology	Arthritis	Abortion	Mastitis	Cardiac pathology	**Total N *(%)***
Adult	321 *(29.02)*	107 *(9.67)*	111 *(10.04)*	90 *(8.14)*	80 *(7.23)*	24 *(2.17)*	19 *(1.72)*	12 *(1.08)*	12 *(1.08)*	8 *(0.72)*	5 *(0.45)*	4 *(0.36)*	2 *(0.18)*	1 *(0.09)*	1 *(0.09)*	**797** ***(72.06)***
Unspecified	56 *(5.06)*	69 *(6.24)*	35 *(3.16)*	17 *(1.54)*	14 *(1.27)*	5 *(0.45)*	7 *(0.63)*	5 *(0.45)*	2 *(0.18)*		1 *(0.09)*	1 *(0.09)*				**212** ***(19.17)***
Young	10 *(0.90)*	26 *(2.35)*	25 *(2.26)*	16 *(1.45)*	4 *(0.36)*	4 *(0.36)*	3 *(0.27)*	3 *(0.27)*	1 *(0.09)*	1 *(0.09)*	3 *(0.27)*	1 *(0.09)*				**97** ***(8.77)***
Total N *(%)*	**387** ***(34.99)***	**202** ***(18.26)***	**171** ***(15.46)***	**123** ***(11.12)***	**98** ***(8.86)***	**33** ***(2.98)***	**29** ***(2.62)***	**20** ***(1.81)***	**15** ***(1.36)***	**9** ***(0.81)***	**9** ***(0.81)***	**6** ***(0.54)***	**2** ***(0.18)***	**1** ***(0.09)***	**1** ***(0.09)***	**1,106** ***(100.00)***

Figure 2 - Cats 2012 – Number of antibiograms by bacteria group and pathology



Note: only values for pathologies and bacteria groups having more than 30 occurrences are represented. Detailed values are presented in table 2 below.

Table 2 - Cats 2012 – Number of antibiograms by bacteria group and pathology

	Pathology N (%)															
Bacteria N ***(%)***	Kidney and urinary tract pathology	Un-specified	Respiratory pathology	Skin and mucous membrane pathology	Otitis	Ocular pathology	Digestive pathology	Bone pathology	Oral pathology	Systemic pathology	Reproductive pathology	Arthritis	Abortion	Cardiac pathology	Mastitis	**Total N** ***(%)***
E. coli	203 *(18.35)*	57 *(5.15)*	15 *(1.36)*	7 *(0.63)*	6 *(0.54)*		22 *(1.99)*	1 *(0.09)*	1 *(0.09)*	2 *(0.18)*	6 *(0.54)*		1 *(0.09)*		1 *(0.09)*	**322** ***(29.11)***
Coagulase-positive Staphylococcus	39 *(3.53)*	33 *(2.98)*	11 *(0.99)*	45 *(4.07)*	28 *(2.53)*	8 *(0.72)*	2 *(0.18)*	3 *(0.27)*	3 *(0.27)*			1 *(0.09)*				**173** ***(15.64)***
Pasteurella		19 *(1.72)*	65 *(5.88)*	16 *(1.45)*	13 *(1.18)*	5 *(0.45)*	1 *(0.09)*	6 *(0.54)*	8 *(0.72)*			4 *(0.36)*				**137** ***(12.39)***
Coagulase-negative Staphylococcus	34 *(3.07)*	23 *(2.08)*	14 *(1.27)*	19 *(1.72)*	18 *(1.63)*	7 *(0.63)*		2 *(0.18)*		2 *(0.18)*	1 *(0.09)*	1 *(0.09)*				**121** ***(10.94)***
Enterococcus	43 *(3.89)*	4 *(0.36)*	1 *(0.09)*	7 *(0.63)*	5 *(0.45)*	1 *(0.09)*					1 *(0.09)*					**62** ***(5.61)***
Pseudomonas	7 *(0.63)*	12 *(1.08)*	18 *(1.63)*	5 *(0.45)*	6 *(0.54)*	2 *(0.18)*		2 *(0.18)*					1 *(0.09)*			**53** ***(4.79)***
Streptococcus	14 *(1.27)*	16 *(1.45)*	8 *(0.72)*	7 *(0.63)*	6 *(0.54)*		1 *(0.09)*	1 *(0.09)*								**53** ***(4.79)***
Enterobacter	10 *(0.90)*	2 *(0.18)*	5 *(0.45)*	4 *(0.36)*	1 *(0.09)*	3 *(0.27)*		2 *(0.18)*		2 *(0.18)*				1 *(0.09)*		**30** ***(2.71)***
Other bacteria < 30 occurrences	37 *(3.35)*	36 *(3.25)*	34 *(3.07)*	13 *(1.18)*	15 *(1.36)*	7 *(0.63)*	3 *(0.27)*	3 *(0.27)*	3 *(0.27)*	1 *(0.09)*	3 *(0.27)*					**155** ***(14.01)***
Total N ***(%)***	**387** ***(34.99)***	**202** ***(18.26)***	**171** ***(15.46)***	**123** ***(11.12)***	**98** ***(8.86)***	**33** ***(2.98)***	**29** ***(2.62)***	**20** ***(1.81)***	**15** ***(1.36)***	**9** ***(0.81)***	**9** ***(0.81)***	**6** ***(0.54)***	**2** ***(0.18)***	**1** ***(0.09)***	**1** ***(0.09)***	**1,106** ***(100.00)***

Table 3 - Cats 2012 – All pathologies and age groups included – *E. coli:* susceptibility to antibiotics (proportion) (N=322)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*310*	**63**
Amoxicillin-Clavulanic ac.	*315*	**75**
Cephalexin	*306*	**85**
Cefoxitin	*288*	**92**
Cefuroxime	*38*	**82**
Cefovecin	*174*	**87**
Ceftiofur	*311*	**92**
Cefquinome 30 µg	*117*	**93**
Streptomycin 10 UI	*108*	**64**
Kanamycin 30 UI	*52*	**88**
Gentamicin 10 UI	*314*	**93**
Neomycin	*97*	**95**
Tetracycline	*112*	**65**
Florfenicol	*63*	**92**
Nalidixic ac.	*280*	**80**
Flumequine	*88*	**86**
Enrofloxacin	*243*	**90**
Marbofloxacin	*161*	**92**
Trimethoprim-Sulfonamides	*316*	**82**

Table 4 - Cats 2012 – Kidney and urinary tract pathology – All age groups included – *E. coli:* susceptibility to antibiotics (proportion) (N=203)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*202*	**65**
Amoxicillin-Clavulanic ac.	*203*	**78**
Cephalexin	*202*	**86**
Cefoxitin	*192*	**93**
Cefovecin	*136*	**90**
Ceftiofur	*200*	**92**
Cefquinome 30 µg	*50*	**88**
Streptomycin 10 UI	*51*	**67**
Gentamicin 10 UI	*202*	**95**
Neomycin	*46*	**98**
Tetracycline	*54*	**56**
Nalidixic ac.	*192*	**81**
Flumequine	*45*	**78**
Enrofloxacin	*148*	**91**
Marbofloxacin	*83*	**89**
Trimethoprim-Sulfonamides	*202*	**82**

Table 5 - Cats 2012 –Respiratory pathology – All age groups included – *Pasteurella:* susceptibility to antibiotics (proportion) (N=65)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*64*	**95**
Amoxicillin-Clavulanic ac.	*64*	**95**
Cephalexin	*64*	**91**
Cefoxitin	*45*	**89**
Cefovecin	*39*	**85**
Ceftiofur	*59*	**90**
Gentamicin 10 UI	*65*	**83**
Nalidixic ac.	*57*	**91**
Enrofloxacin	*59*	**93**
Trimethoprim-Sulfonamides	*60*	**95**

Table 6 - Cats 2012 – All pathologies and age groups included – *Coagulase-positive Staphylococcus:* susceptibility to antibiotics (proportion) (N=173)

Antibiotic	*Total (N)*	**% S**
Penicillin	*163*	**26**
Cefoxitin	*165*	**79**
Cefovecin	*96*	**76**
Erythromycin	*162*	**60**
Spiramycin	*91*	**60**
Lincomycin	*164*	**60**
Pristinamycin	*30*	**93**
Streptomycin 10 UI	*73*	**55**
Kanamycin 30 UI	*86*	**63**
Gentamicin 10 UI	*172*	**84**
Tetracycline	*97*	**68**
Chloramphenicol	*73*	**75**
Florfenicol	*33*	**91**
Enrofloxacin	*159*	**73**
Marbofloxacin	*94*	**78**
Trimethoprim-Sulfonamides	*171*	**87**
Acide Fusidique	*140*	**81**

French Agency for Food, Environmental and Occupational Health & Safety

- Lyon Laboratory
  31 avenue Tony Garnier
  69364 LYON Cedex 7
  Telephone: +33 (0)4 78 72 65 43

- Ploufragan-Plouzané Laboratory
  BP 53
  22440 Ploufragan
  Telephone: +33 (0)2 96 01 62 22

Graphic design: ANSES Maisons-Alfort

Photo credits: ANSES – Lyon Laboratory

Contacts: resapath@anses.fr

Website: www.resapath.anses.fr