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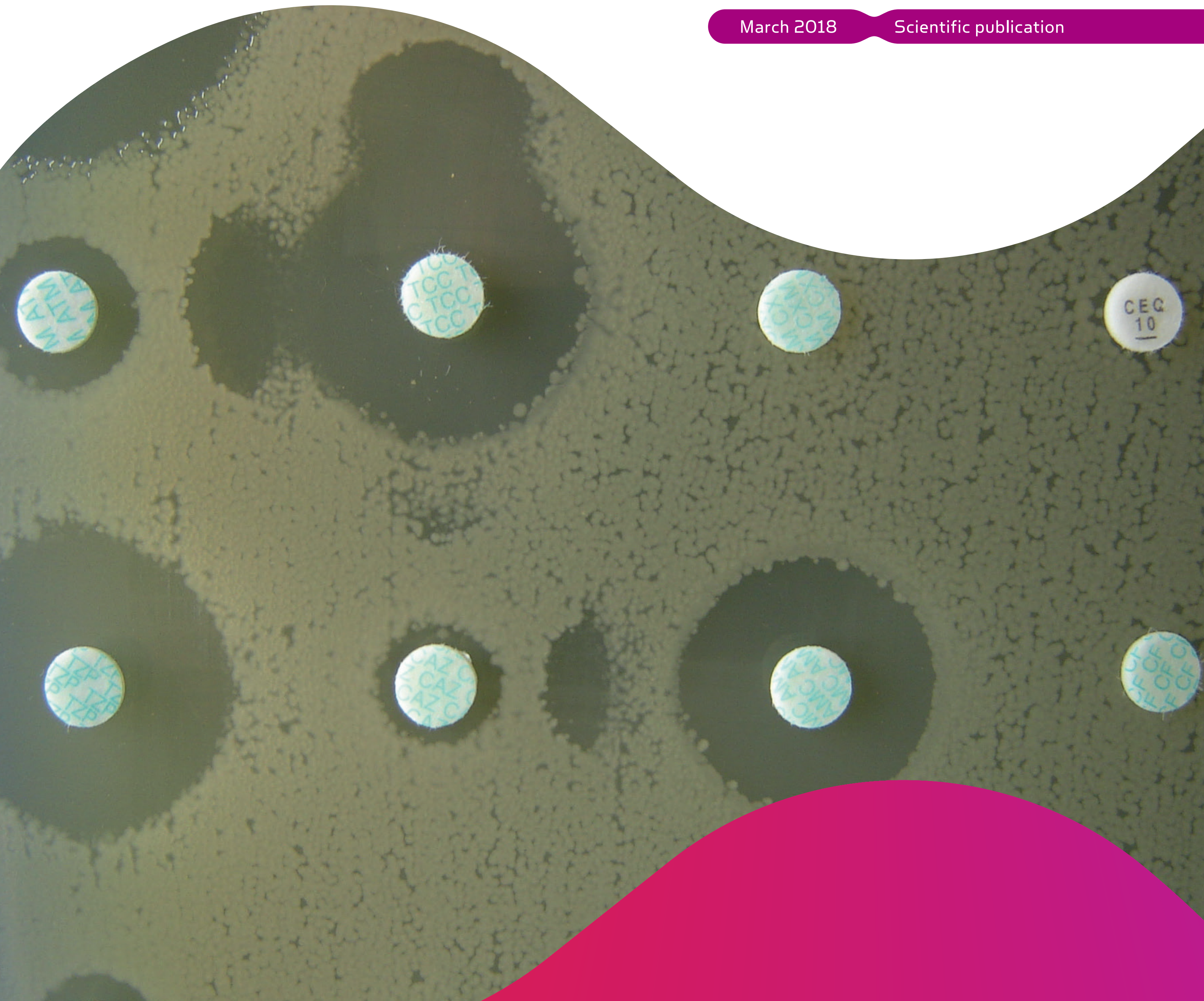
RESAPATH

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

2016 Annual Report

March 2018 | Scientific publication



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Contents

INTRODUCTION

Monitoring of Antimicrobial Resistance in Pathogenic Bacteria in Animals in France in 2016: Summary Report of the RESAPATH network (www.resapath.anses.fr)

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 74 diagnostic 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 on-going surveillance system estimating the proportion of susceptibility to relevant antibiotics in diseased animals treated by veterinarians as part of their regular clinical services. RESAPATH is a key component of the strategic national action plans (EcoAntibio 1, 2012-2016; EcoAntibio 2: 2017-2021) adopted by the French Ministry of Agriculture, Food and Forest to combat antimicrobial resistance in animals. RESAPATH is also part of the recent intersectorial "One Health" national action plan against antimicrobial resistance in humans, animals and the environment adopted by the French Prime Minister on November 17, 2016. 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

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ORGANISATION AND KEY FIGURES

The objectives of the RESAPATH are the following:

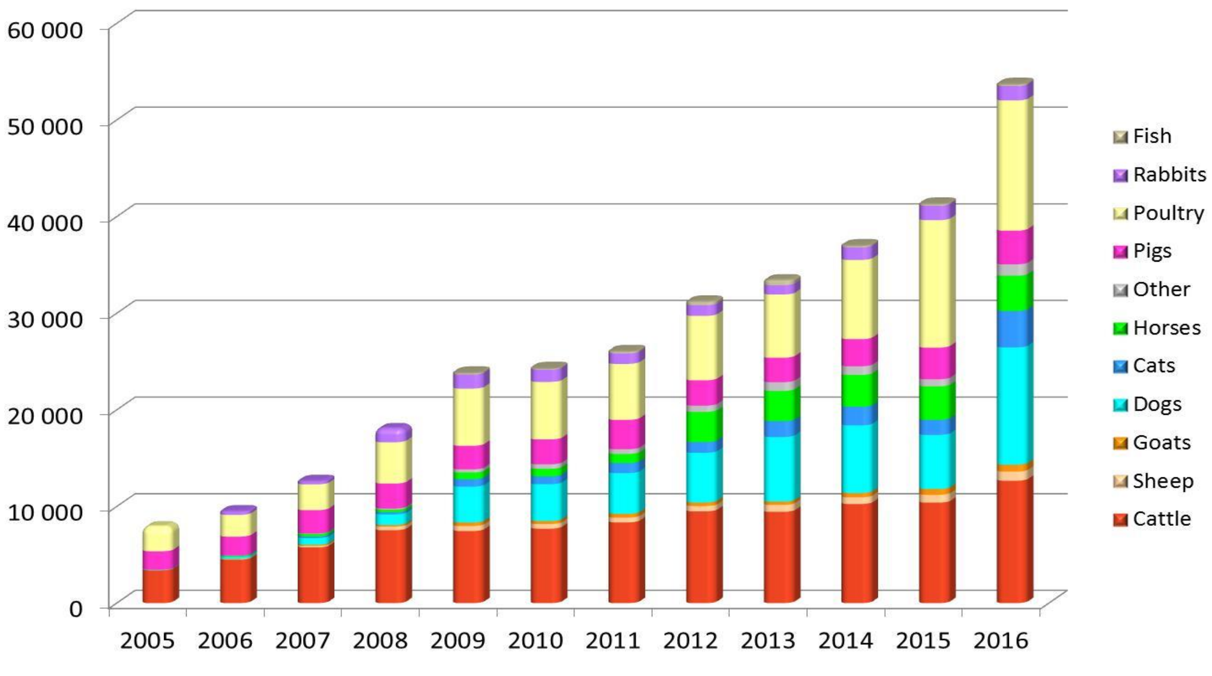
- To monitor antimicrobial resistance in pathogenic bacteria of animal origin in France,
- To collect resistant isolates of particular interest and to characterize their genetic background (including the mechanisms of resistance),
- To provide technical support to local laboratories.

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 veterinary laboratories throughout France. Antibiograms are performed by disk diffusion according to the guidelines of the veterinary part of the Antibiogram Committee of the French Society of Microbiology (CA-SFM) 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 veterinary part of the CA-SFM. 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 demonstrating resistance profiles of specific interest, 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 medical practices (community of health-care centers). 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 over time in antimicrobial resistance in diseased animals in France.

In 2016, 74 laboratories were members of RESAPATH and a total of 53,691 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*



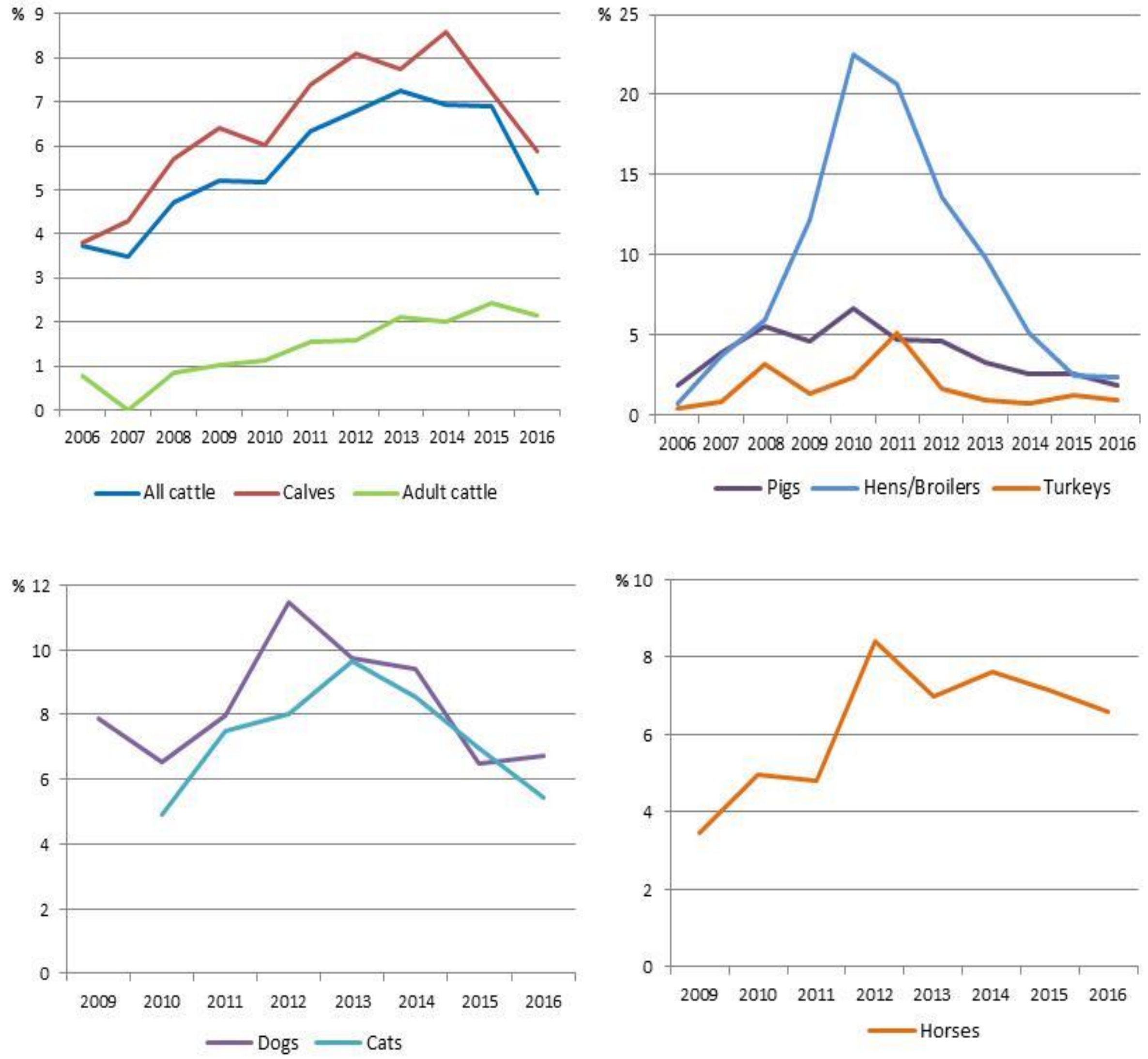
RESISTANCE DATA

This chapter summarizes the key results on resistance trends to the different antimicrobial classes, especially to broad-spectrum cephalosporins and fluroquinolones that are considered of critical importance both in human and veterinary medicine. Other important topics such as resistance trends to other antibiotics or on specific relevant phenotypes are also included. Detailed information on resistances of the clinical isolates is available for each animal species and infection type in the Annex section.

Resistance to broad-spectrum cephalosporins

Isolates are routinely tested for their susceptibility to ceftiofur and cefquinome in food animals and horses, and to ceftiofur and cefovecin in companion animals. Resistance is mainly observed for *Escherichia coli* and to a lesser extent for *Klebsiella pneumoniae* and *Enterobacter* spp. In 2016, the highest rate of resistance to ceftiofur in clinical *E. coli* isolates of animal origin in France was around 5-7%, and was found in veal calves, cats and dogs, and horses. Ceftiofur resistance in *E. coli* in other animal species was less than 3% (poultry: 2.4%, pigs: 1.8%, adult cattle: 2.2%, turkeys: 1%).

***Figure 2**: Evolution of proportions of E. coli isolates non-susceptible (R+I) to ceftiofur in cattle, pigs, poultry, turkey, horses, cats and dogs (2006-2016)*



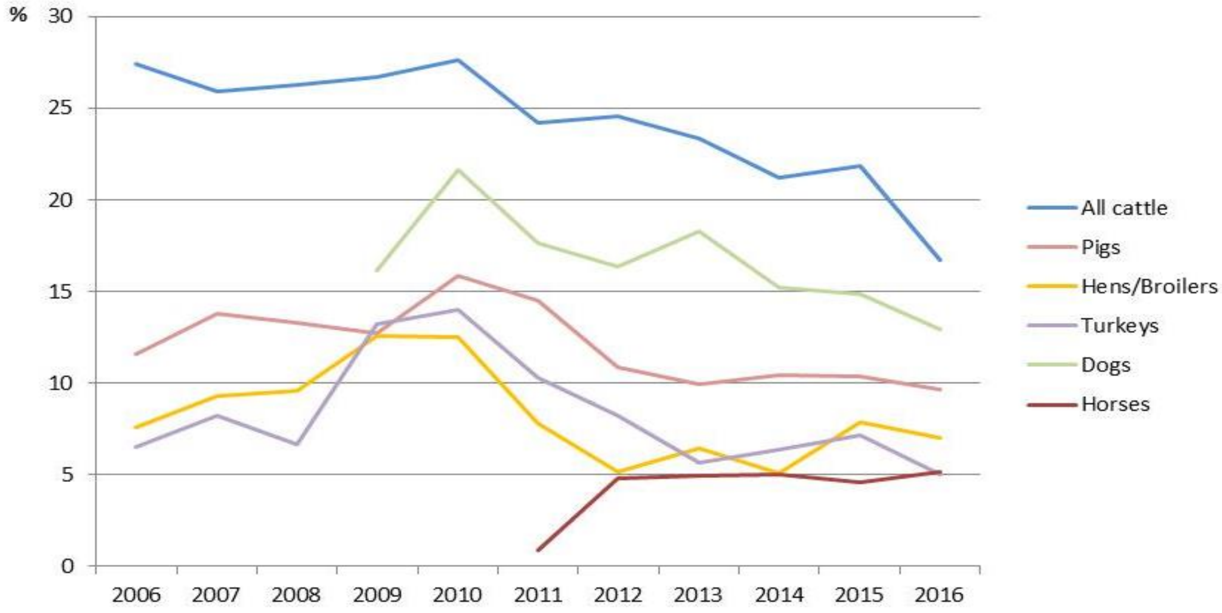
In broilers, resistance to ceftiofur in clinical *E. coli* has been continuously decreasing from 22.5% in 2010 to 2.4% in 2016, and this almost ten-fold reduction in 6 years is a very positive result (Figure 2). A similar decrease has been observed in diseased turkeys and pigs suggesting that the recent strategic actions set up on the use of antimicrobials in food animals in France had a global impact on the ESBL spread in those animal species. Also in cats (Figure 2), a decreasing trend has been observed over the last four years, suggesting that more responsible practices were not only considered in food animals but also in pets. The stabilization in dogs will have to be confirmed in the future. Finally, a slight decrease was also observed in horses over the 2014-2016 period of time.

Resistance to fluoroquinolones

Isolates are routinely tested for their 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 either enrofloxacin or marbofloxacin in *E. coli* was used as an indicator of resistance to fluoroquinolones.

The highest rate of fluoroquinolone resistance in clinical *E. coli* of animal origin remains in cattle (16.5%) in 2016, despite a marked decrease this last year. Overall, a continuous downward trend in fluoroquinolone resistance has been observed over the last 6 years in almost all animal species. Nonetheless, in certain animal species such as pigs, broilers and turkeys, fluoroquinolone resistance has mostly decreased between 2010 and 2013 and much less over the last 3 years. Of note, rates of fluoroquinolone resistance in clinical *E. coli* range from 5% to 16.5% among animal species, to be compared with the much lower range of 1.2% to 5-7% of resistance rates to broad-spectrum cephalosporins. This highlights that fluoroquinolone resistance, even though not transmitted through highly mobile genetic elements bearing ESBL/AmpC-encoding genes, should be considered as a major issue which has still not been efficiently counter-acted by national strategic actions.

***Figure 3**: Evolution of proportions of E. coli isolates non-susceptible (R+I) to enrofloxacin or marbofloxacin in cattle, pigs, poultry, turkeys, horses and dogs (2006-2016)*



Resistance to other antibiotics

Trends were investigated for *E. coli*. Antimicrobials that were considered here included those most frequently tested by the RESAPATH laboratories according to relevant classes in veterinary practice (excluding broad-spectrum cephalosporins and fluoroquinolones that have been studied separately). Seven antibiotics (5 classes) were chosen, namely gentamicin, spectinomycin or streptomycin, trimethoprim-sulfonamides in combination, tetracycline, amoxicillin, amoxicillin and clavulanic acid in combination, and a quinolone (nalidixic or oxolinic acid). Trends were analyzed over the 2006-2016 period in cattle, pigs and poultry.

The global decreasing trend identified in the previous years is again observed in 2016. Resistance levels showed a slight increase between 2014 and 2015 for nearly all animal species and antimicrobials. This increase was not confirmed for cattle, in which the situation came back to what had been reported in 2014 (Figure 4).

In pigs, only resistances to amoxicillin and amoxicillin + clavulanic acid slightly increased, while resistances to other antibiotics either remained stable (tetracycline and sulfonamides + trimethoprim) or decreased (gentamicin, spectinomycin and quinolones) (Figure 5).

Resistance rates in poultry slightly increased between 2015 and 2016 except for tetracycline and gentamicin (Figure 6). After a strong decrease of resistance to all antimicrobials between 2006 and 2014, this slightly increasing trend between 2014 and 2016 will have to be confirmed in the following years. The same global situation was observed in turkeys (Figure 7), with slight variations depending on the antibiotics.

***Figure 4**: Evolution of proportions (%) of E. coli isolates non-susceptible (R+I) to seven antimicrobials in cattle (2006-2016)*

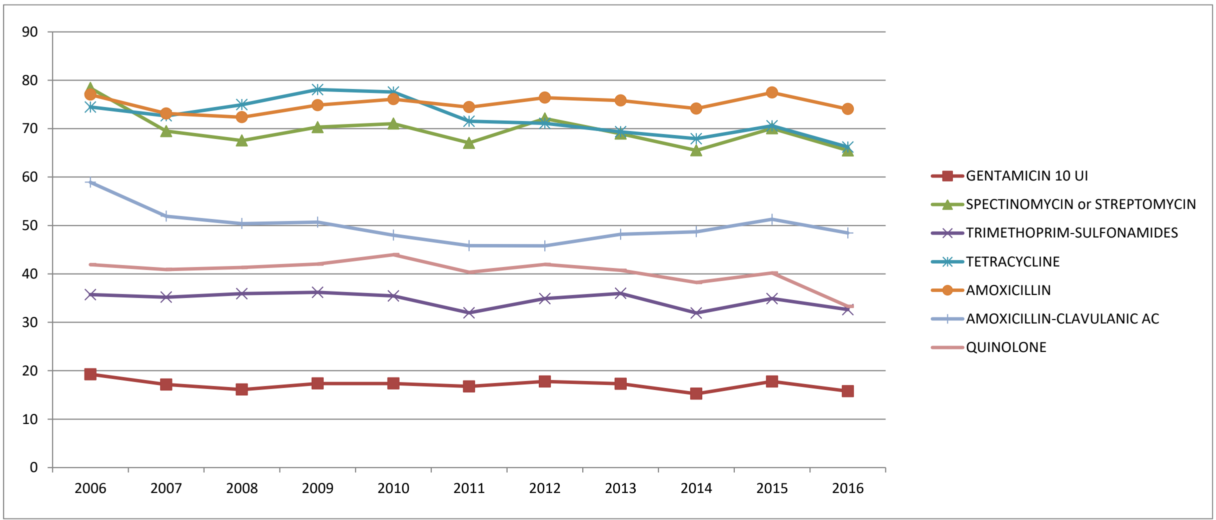


***Figure 5**: Evolution of proportions (%) of E. coli strains non-susceptible (R+I) to seven antimicrobial in pigs (2006-2016)*

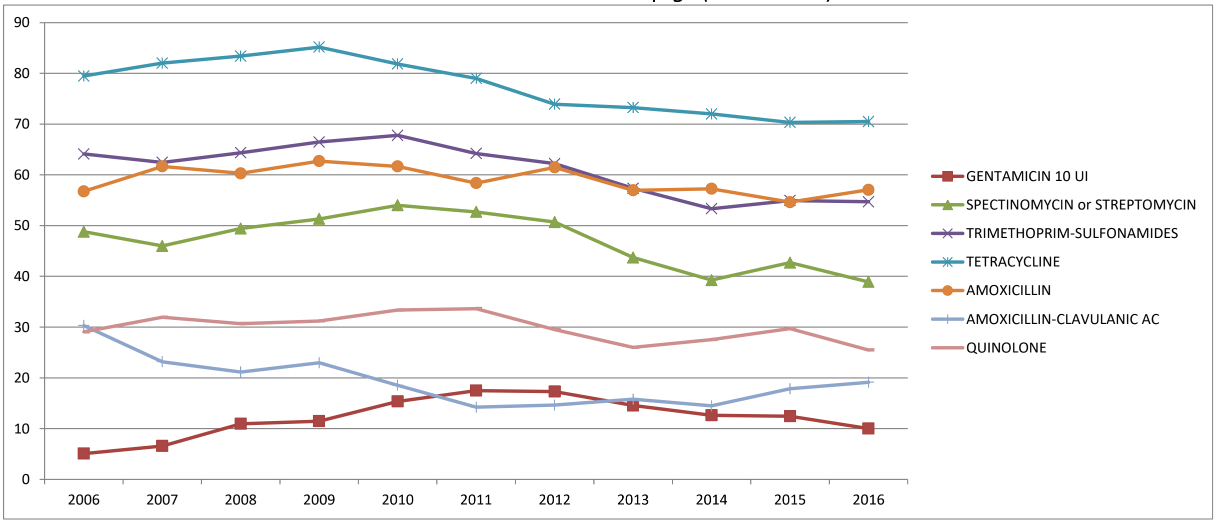


***Figure 6**: Evolution of proportions (%) of E. coli isolates non-susceptible (R+I) to seven antimicrobials in hens and broilers (2006-2016)*

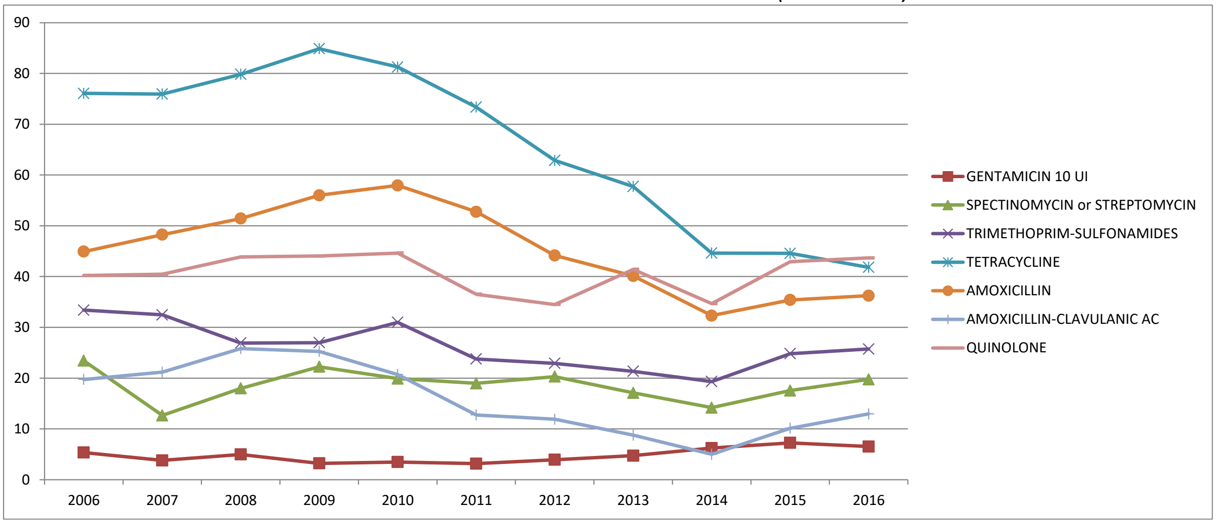
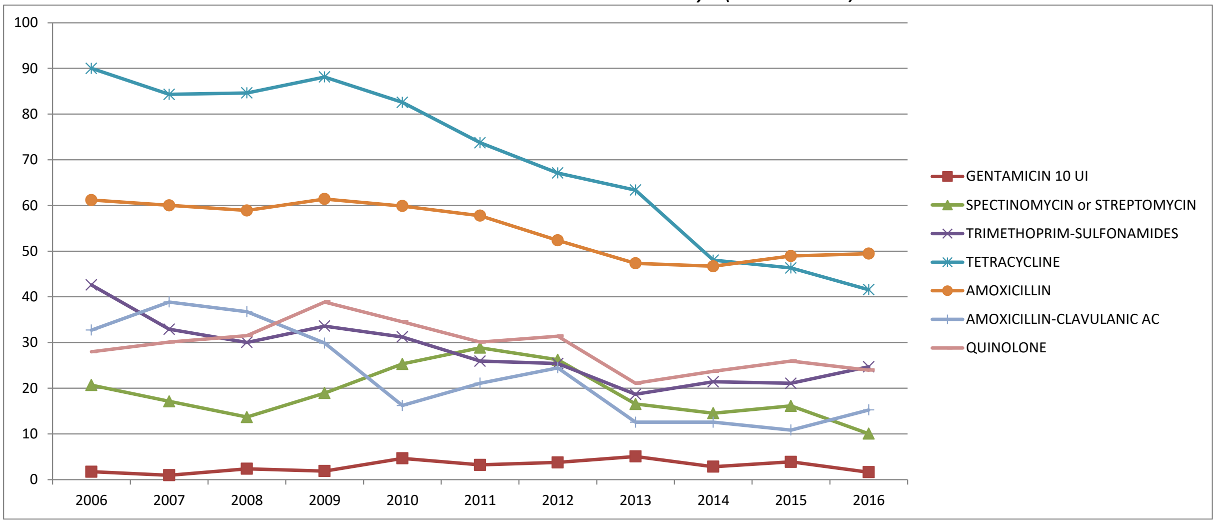


***Figure 7**: Evolution of proportions (%) of E. coli isolates non-susceptible (R+I) to seven antimicrobials in turkeys (2006-2016)*



Multidrug resistance

Multidrug resistance was investigated in *E. coli*, the most frequent bacterial species detected by RESAPATH. The selective criteria used to select antibiotics analyzed here were: i) relevance in veterinary and human medicine; ii) a single antimicrobial per class (as resistance mechanisms within a class often overlap); iii) antimicrobials frequently tested by the RESAPATH laboratories to guarantee a good representativeness of the data. Five antibiotics were selected, namely ceftiofur, gentamicin, tetracycline, trimethoprim-sulfonamide in combination, and either enrofloxacin or marbofloxacin. For dogs, tetracycline was not considered due to poor usage in companion animals and subsequent limited resistance data available.

In food animals (cattle, pigs, poultry), the proportion of isolates collected by RESAPATH that were susceptible to all antimicrobials considered here ranged from 18.6% (pigs) to 53.2% (hens/broilers) (Table 1). Since 2011, this proportion slightly increased in cattle and pigs (Chi² tests for trend, $p<0.0001$ for both species) and has doubled in poultry (hens/broilers and turkeys) (Figure 8).

The proportion of multidrug resistant isolates (resistant to at least 3 classes of antimicrobials among the 5 considered) significantly decreased over the period 2011-2016 for all species, with variable amplitude. The proportion in 2016 is the highest in cattle (19.2%), followed by pigs (13.2%), and is much lower in poultry (5.3% for hens/broilers and 2.7% for turkeys) (Figure 9). In cattle, contrary to pigs and poultry, ceftiofur-resistant isolates harbored numerous co-resistances, such as to tetracycline and fluoroquinolones.

***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	1,712	*26.7*	271	*18.6*	2,320	*46.2*	619	*53.2*
1	2,302	*35.9*	477	*32.8*	1,557	*31.0*	293	*25.2*
2	1,164	*18.2*	516	*35.4*	883	*17.6*	220	*18.9*
3	751	*11.7*	161	*11.1*	246	*4.9*	31	*2.7*
4	418	*6.5*	29	*2.0*	19	*0.4*	0	*0.0*
5	65	*1.0*	2	*0.1*	0	*0.0*	1	*0.1*
Total	6,412	*100*	1,456	*100*	5,025	*100*	1,164	*100*

***Figure 8**: Evolution of proportions (%) of E. coli isolates **susceptible** to all the five antimicrobials considered in the different animal species (only four antimicrobials considered for dogs)*

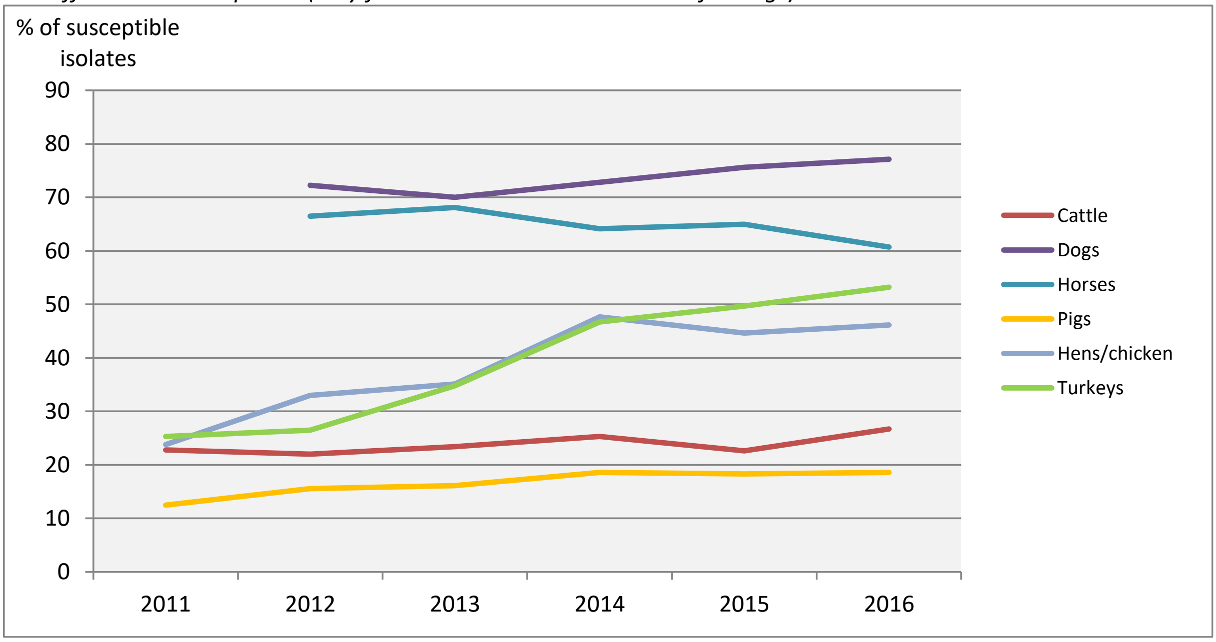
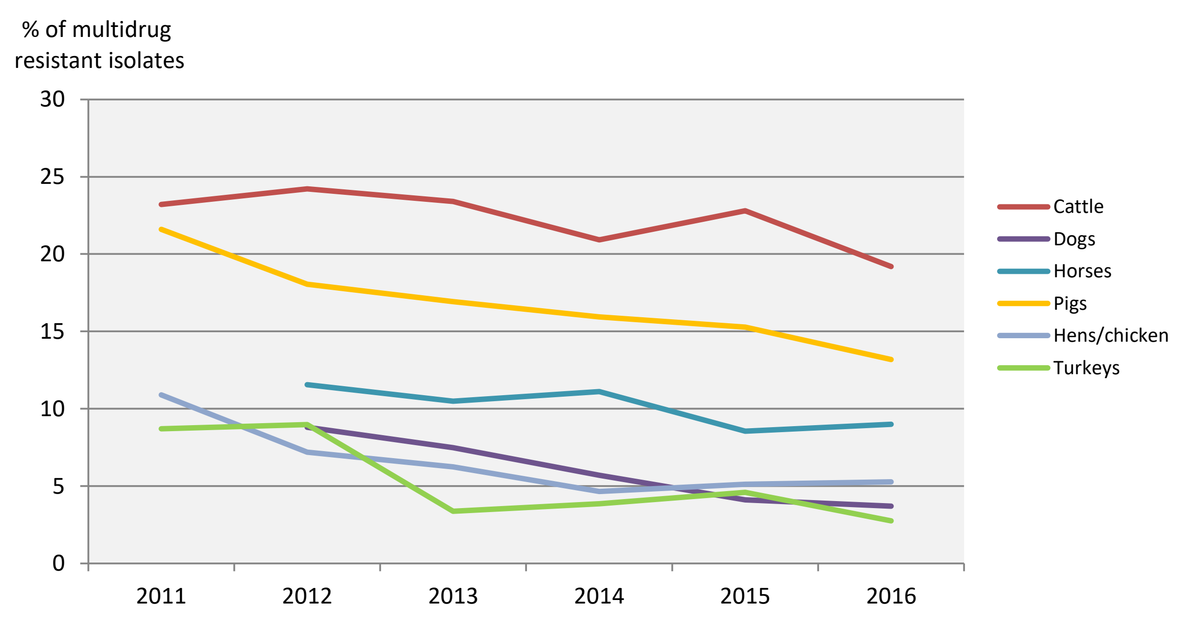


Figure 9: Evolution of proportions (%) of **multidrug resistant** *E. coli* isolates (resistant to at least three out of the five antimicrobials considered) in the different animal species (only four antimicrobials considered for dogs)



For horses and dogs, the huge majority of the isolates (60% to 77%) were fully susceptible to the antimicrobials considered, but this proportion significantly decreased over the period for horses (Tables 2 and 3, Figure 9). In horses, the proportion of multidrug resistant isolates (resistant to at least 3 antimicrobial classes) reached 9.0%, but significantly decreased between 2012 and 2016. For dogs, the proportion of multidrug resistant isolates has decreased significantly from 8.8% in 2012 to 3.7% in 2016, but a direct comparison with the other animal species is hardly relevant as only four antimicrobials were considered for dogs versus five for the other species. 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 five antimicrobials in E. coli in horses*

Resistance number (R+I)	Horses	
	n	%
0	284	*60.7*
1	85	*18.2*
2	57	*12.2*
3	16	*3.4*
4	17	*3.6*
5	9	*1.9*
Total	468	*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	1,601	*77.1*
1	270	*13.0*
2	129	*6.2*
3	57	*2.7*
4	20	*1.0*
Total	2,077	*100*

Colistin resistance in veterinary medicine

Colistin use had been recurrently questioned over the last years because of the renewed interest of this molecule in human medicine to treat pan-resistant Enterobacteriaceae. Several opinions had been released (European Medicine Agency[1,2], ANSES[3], European Commission[4]), which all considered colistin an important antibiotic for veterinary medicine and recommended prudent use only. The place of colistin in the veterinary therapeutic arsenal has however more seriously been challenged by the discovery of the plasmid-borne *mcr-1* gene, and the subsequent numerous reports of the worldwide dissemination of this gene, principally in animals but also in humans and the environment. The previous opinions were of course revised in 2016 in line with these new findings[5]. Since then, the *mcr-2* to *mcr-5* genes have been described. Of note, other chromosomic mechanisms are also implicated in colistin resistance, among which *mgrB* mutations in *Klebsiella pneumoniae*, such as reported in 2015 in France in the case of a bovine mastitis[6].

The EcoAntibio 2 plan launched in 2017 by the Ministry of the Agriculture includes a specific point (action 12, axis 2) entirely dedicated to colistin, with an objective of reducing its use by half over 5 years in poultry, swine and cattle. In France, the *mcr-1* gene was described in *E. coli* isolated from livestock (with a prevalence of 21 % in ESBL-producing *E. coli* from diarrheic veal calves[7] versus 2-6 % in other healthy animal species[8]) and in *Salmonella* isolates[9]. In Europe, the prevalence of colistin-resistant Enterobacteriaceae in the digestive flora of healthy animals is also considered low (1 à 2 %)[10]. Interestingly, colistin use is continuously decreasing in France but the prevalence of *E. coli* isolates presenting both the ESBL and *mcr-1* genes follows a reverse trend, suggesting other selecting factors than colistin usage.

Nowadays, microdilution assay is the only official method for the determination of the MIC to colistin[11]. This method is not well-adapted to the routine work in French veterinary laboratories which are still using disc diffusion, a method which is not entirely reliable for detecting colistin resistance in a clinical perspective. Consequently, the low levels of colistin-resistance (<2 %) observed for several years through the Resapath network have always been considered as a probable under-estimation of the true prevalence. Nevertheless, since biases were *a priori* constant, the evolution of the resistance over the years is considered reliable from an epidemiological perspective. Moreover, according to experimental data accumulated by the veterinary laboratories as well as the ANSES laboratories, interpretation rules for diameters zones around the colistin disc (50 µg) were defined. Indeed for *E. coli*, diameters of <15 mm or ≥18 mm correspond to MICs of >2 mg/L (resistant) or <2 mg/L (susceptible), respectively. Intermediate diameters (15, 16 and 17 mm) are non-informative and require the determination of the MIC. However, the probability for the MIC to be >2 mg/L (resistant) is decreasing in parallel with the increase in diameters.

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1 European Medicines Agency. (2013). Use of colistin products in animals within the European Union : Development of resistance and possible impact on human and animal health. EMA/755938/2012, 19 July 2013. URL : http://www.ema.europa.eu/docs/en_GB/document_library/Report/2013/07/WC500146813.pdf

2 European Medicines Agency. (2014). Answers to the requests for scientific advice on the impact on public health and animal health of the use of antibiotics in animals. EMA/381884/2014, 18 December 2014.

3 Avis de l'Anses relatif à l'évaluation des risques d'émergence d'antibiorésistance liés aux modes d'utilisation des antibiotiques dans le domaine de la santé animale. (2014). URL https://www.anses.fr/fr/system/files/SANT2011sa0071Ra.pdf.

4 Décision adoptée le 16 mars 2015, suite à un référé pris au titre de l'article 35 de la directive 2001/82/CE relative aux médicaments vétérinaires et concernant toutes les AMM de formes orales de colistine (EMA/EC/2015)

5 European Medicines Agency. (2016). Updated advice on the use of colistin products in animals within the European Union: development of resistance and possible impact on human and animal health. EMA/231573/2016, 26 May 2016.

6 Kieffer N., Poirel L., Nordmann P., Madec J.-Y., Haenni M. (2015) Emergence of colistin resistance in Klebsiella pneumoniae from veterinary medicine. *Journal of Antimicrobial Chemotherapy*, 70 (4): 1265-1267.

7 Haenni M., Poirel L., Kieffer N., Chatre P., Saras E., Metayer V., Dumoulin R., Nordmann P., and Madec J.Y. (2016). Co-occurrence of extended spectrum beta lactamase and MCR-1 encoding genes on plasmids. *Lancet Infect Dis* 16**,** 281-282. doi: 10.1016/S1473-3099(16)00007-4

8 Perrin-Guyomard A., Bruneau M., Houee P., Deleurme K., Legrandois P., Poirier C., Soumet C., and Sanders P. (2016). Prevalence of mcr-1 in commensal Escherichia coli from French livestock, 2007 to 2014. Euro Surveill 21. doi: 10.2807/1560-7917.ES.2016.21.6.30135

9 Webb H.E., Granier S.A., Marault M., Millemann Y., Den Bakker H.C., Nightingale K.K., Bugarel M., Ison S.A., Scott H.M. and Loneragan G.H. (2016). Dissemination of the *mcr-1* colistin resistance gene. *Lancet Infect Dis* 16**,** 144-145. doi: 10.1016/S1473-3099(15)00538-1

10 Kempf I., Fleury M.-A., Drider D., Bruneau M., Sanders P., Chauvin C., Madec J.-Y., Jouy E. (2013). What do we know about resistance to colistin in Enterobacteriaceae in avian and pig production in Europe? *International Journal of Antimicrobial Agents*, 42: 379-383.

11 CLSI-EUCAST (2016). Polymyxin Breakpoints Working Group. Recommendations for MIC determination of colistin (polymyxin E). http://www.eucast.org/fileadmin/src/media/PDFs/EUCAST_files/General_documents/Recommendations_for_MIC_determination_of_colistin_March_2016.pdf

The evolution of the proportions of the different diameters was observed between 2003 and 2016 (*Figures 15 to 19*) and a Chi² test for trend was performed on diameters ≥ 18mm.

A significant increase in the proportion of susceptible isolates was observed in all animal species albeit with various dynamics (*Figure 15 and 19*). Overall, these data suggest that the spread of colistin-resistant *E. coli* that are pathogenic for animals is under control.

***Figure 15** : Relative proportion of diameters < 15 mm, 15 mm, 16 mm, 17 mm and ≥ 18 mm around the colistin disc (50 µg) for E. coli isolated from digestive pathologies in piglets (n min.: 296 (2005); n max.: 776 (2,011))*

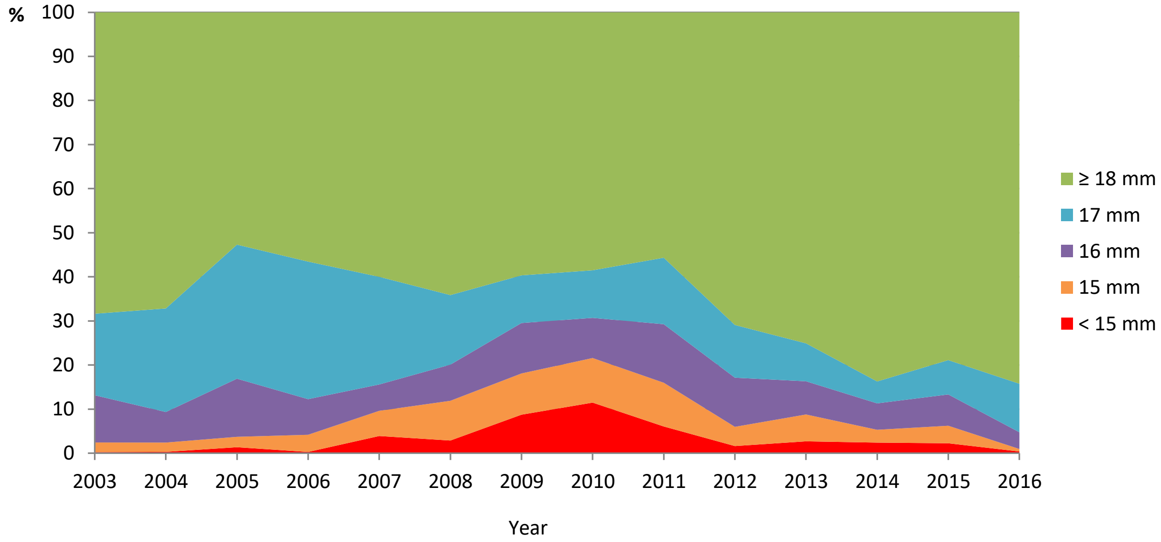


***Figure 16** : Relative proportion of diameters < 15 mm, 15 mm, 16 mm, 17 mm and ≥ 18 mm around the colistin disc (50 µg) for E. coli isolated from digestive pathologies in veal calves (n min.: 1,139 (2003); n max.: 4,218 (2016))*

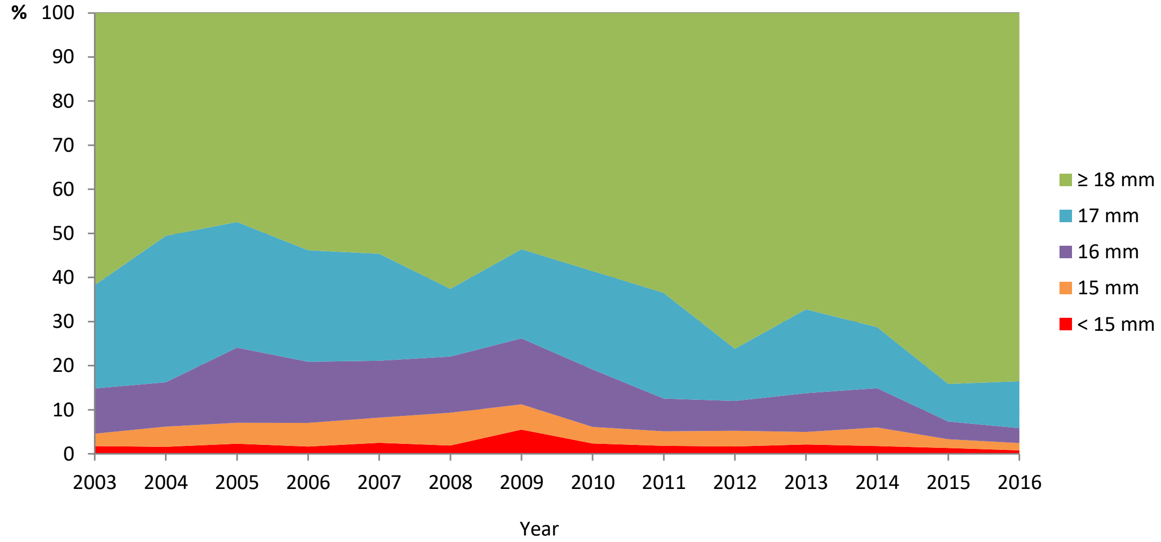


Figure 17 *: Relative proportion of diameters < 15 mm, 15 mm, 16 mm, 17 mm and ≥ 18 mm around the colistin disc (50 µg) for E. coli isolated from bovine mastitis(n min.: 188 (2004); n max.: 1,192 (2016))*

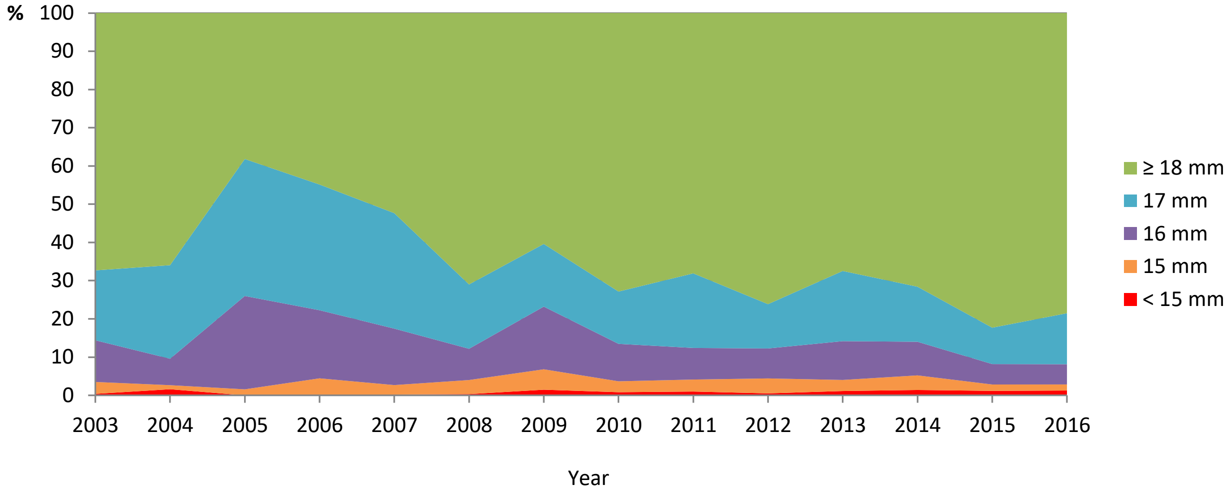


Figure 18 *: Relative proportion of diameters < 15 mm, 15 mm, 16 mm, 17 mm and ≥ 18 mm around the colistin disc (50 µg) for E. coli isolated from turkey (n min.: 862 (2013); n max.: 2,220 (2015))*

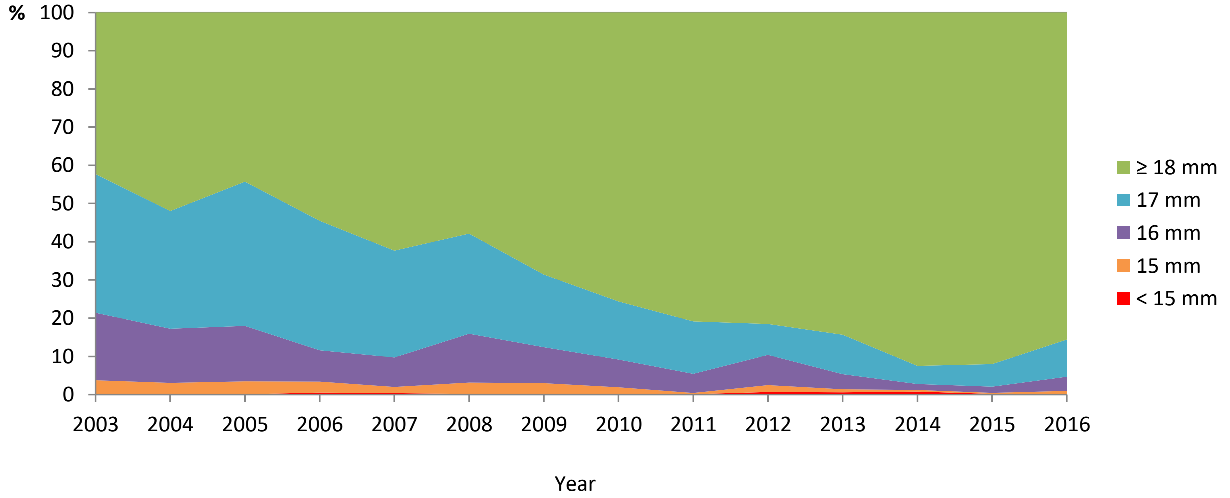
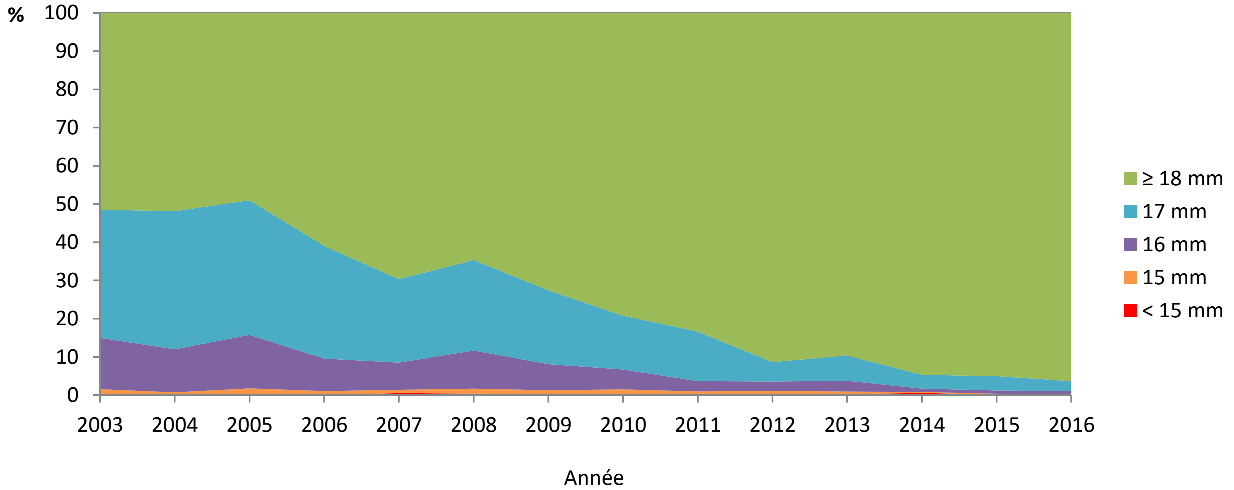


Figure 19 *: Relative proportion of diameters < 15 mm, 15 mm, 16 mm, 17 mm and ≥ 18 mm around the colistin disc (50 µg) for E. coli isolated from hens and chickens (n min.: 559 (2004); n max.: 7,003 (2016))*



Colispot: a reliable test to detect colistin-resistance in veterinary medicine

Since the discovery of *mcr* genes, the reliable detection of colistin resistance is a major issue. This is especially true in France, where veterinary surveillance relies on disc diffusion data and not on the recommended microdilution method. Thus, the Anses developed an easy alternative method called Colispot [12]. This test is performed by placing a 10 µL drop of colistin at 8 mg/L on a Mueller-Hinton agar plate previously seeded with the bacterial inoculum. After incubation, the presence of an inhibition zone (around 10 mm) indicates a susceptible isolate, whereas a continuous growth indicates a resistant isolate. The Colispot was developed to be used according either to the AFNOR NF U47-107 (10^6 CFU/mL (flooding) or 10^7 CFU/mL (swabbing) at 37°C), CLSI or EUCAST (10^8 CFU/mL (swabbing) at 35°C) methodologies.

After its development, Colispot was used to determine colistin resistance in a second collection of *E. coli* (n=197) isolated from swine infections (n=116) or from poultry (n=81). These isolates were sent to the Anses between 2011 and 2017 in the frame of the Resapath network because of particular resistance patterns (resistance to colistin and/or to other antimicrobials). They were all characterized using the Colispot, the Sensititre® microtiter plates (Thermo®) for the determination of MICs [13] and by PCRs for the detection of *mcr-1* and *mcr-2* genes. An isolate was considered as resistant when the MIC was above 2 mg/L. MICs ranged from 0.25 to 1 mg/L for 133 isolates and from 4 to 16 mg/L for the 64 others, all from porcine origin. The Colispot showed a perfect coherence with the MICs, independently of the inoculum or the incubation temperature used. The *mcr-1* gene was detected in 87.5% of the resistant isolates, whereas *mcr-2* was absent from this collection.

In conclusion, the Colispot can be routinely implemented in veterinary laboratories to reliably detect colistin resistance in *E. coli*, without the need of a MIC determination. This test is thus useful both for the veterinarians and for Resapath surveillance system.

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12 Jouy E., Haenni M., Le Devendec L., Le Roux A., Châtre P., Madec J.-Y. and Kempf I. (2017). Improvement in routine detection of colistin resistance in *E. coli* isolated in veterinary diagnostic laboratories. *Journal of Microbiological Methods*, 132: 125-127.

13 http://www.eucast.org/fileadmin/src/media/PDFs/EUCAST_files/Warnings/Matuschek_colistin_ECCMID_2017.pdf

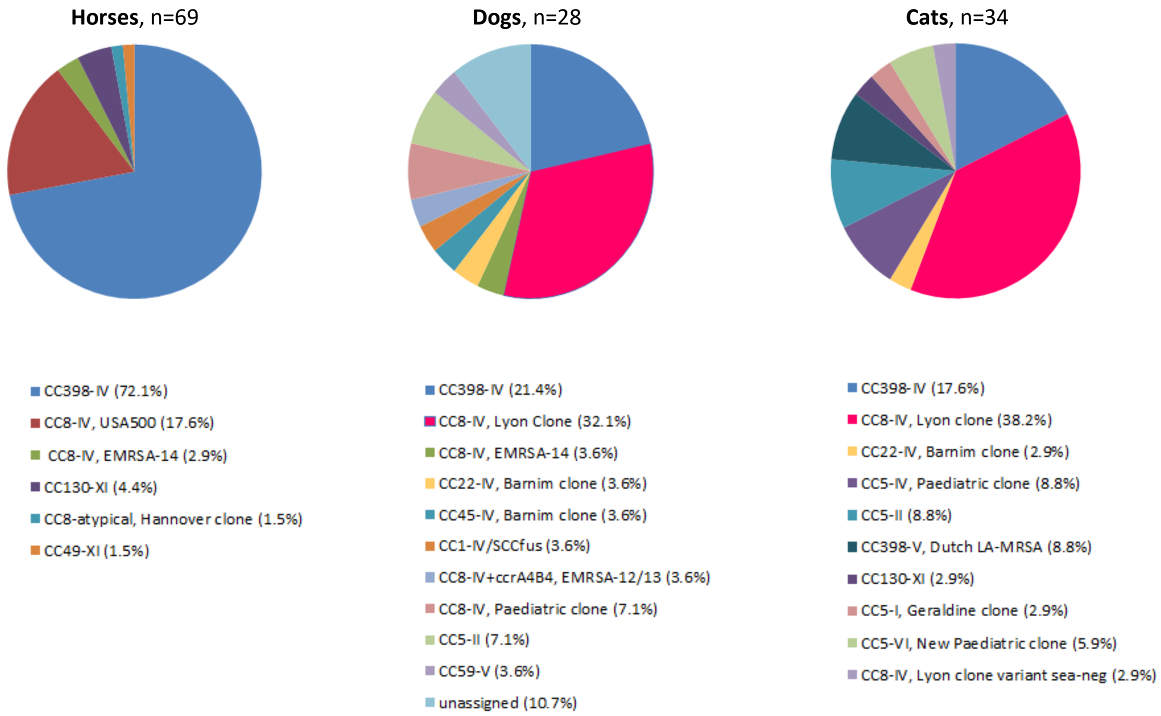
Clonal diversity of *Staphylococcus aureus* in horses, cats and dogs

Methicillin-resistant *Staphylococcus aureus* (MRSA) of human origin can be found in companion animals such as cats, dogs and horses, which can then act as a reservoir for human re-contamination. Since France is counting around 19 millions of cats and dogs and 750 000 horses, it appeared important to assess the current situation of MRSA clones circulating in those animal populations.

Between 2010 and 2015, 130 MRSA isolates collected from dogs (n=28), cats (n=34) and horses (n=68) were characterized[14] *(Figure 20).* Results confirmed what had been described in a previous study on fewer isolates, which showed that the epidemiology of MRSA infecting cats and dogs is mirroring the one in humans. However, the CC398 clone, which was rare in the first study, seems here to be on the rise.
On the contrary, horses presented a specific epidemiology with the large dominance of the CC398-IV clone belonging to the *spa*-type t011, which completely out-competed the horse-associated USA500 clone. Since CC398 is capable of colonizing humans, a specific attention should be taken in the coming years to people working in close contacts with horses.

These results give a global overview of the population structure of MRSA in companion animals in France over a five-year period of time. In a One-Health perspective, these data allow a better understanding of the risk of MRSA transmission between animals and humans. This study also suggests a decrease in the MRSA prevalence in companion animals between 2010 and 2015, which will have to be confirmed.

***Figure 20** : Schematic representation of all clones associated to horses, dogs and cats.*



[14] Haenni M., Chatre P., Dupieux-Chabert C., Metayer V., Bes M., Madec J.Y. and Laurent F. (2017). Molecular Epidemiology of Methicillin-Resistant *Staphylococcus aureus* in Horses, Cats, and Dogs Over a 5-Year Period in France. Front Microbiol 8, 2493.

Emergence of carbapenemases in pets in France

Carbapenem are last-resort antibiotics in human medicine and carbapenemase production is undoubtedly a major public health issue. In veterinary medicine, carbapenem use is prohibited so that the occurrence of carbapenemases in animals has still rarely been reported. Carbapenems are not tested by laboratories members of the Resapath, even in a surveillance perspective. Nevertheless, multidrug resistant isolates additionally presenting a carbapenemase have been detected lately through the Resapath.

Last year, we reported the occurrence of the carbapenemase OXA-23 in 7 *Acinetobacter baumannii* isolates collected from companion animals between 2011 and 2015. The origin of the contamination remains to be determined since a human-to-animal transfer could not be demonstrated[15]. In 2016, a survey was conducted in order to detect carbapenemase-producing Enterobacteriaceae in healthy cats and dogs. Only one carbapenem-resistant *E. coli* producing an OXA-48 enzyme was isolated from a dog which had no specific risk factor[16]. These two studies prove that carbapenem-resistant isolates are circulating in the French animal population even though their proportion is still low. This may be an issue because of potential treatment failures, and these animals may also be a source of human re-contamination.

Carbapenem resistance in *Pseudomonas aeruginosa* from animal origin in the absence of carbapenem use

Pseudomonas aeruginosa is a human pathogen that can also cause infections in animals, for example otitis or skin infections in dogs. This pathogen presents multiple intrinsic resistances and specific antibiotics are used in human medicine, such as ticarcillin, ceftazidime, ciprofloxacin or carbapenems. As a consequence, carbapenem-resistant *P. aeruginosa* isolates are now regularly detected, principally due to mutations in OprD, a porin allowing the entrance of carbapenems inside the bacteria. Other less prevalent mechanisms are also described, such as the production of carbapenemases or the inactivation of efflux pumps. In veterinary medicine, *P. aeruginosa* infections are usually treated with gentamicin and fluoroquinolones since the use of carbapenems is strictly prohibited. Nevertheless, isolates presenting decreased susceptibilities to carbapenems have been identified.

Between 2008 and 2014, among 527 *P. aeruginosa* collected through the Resapath network, 30 showed a decreased susceptibility to imipenem and/or meropenem[17]. Most of them originated from dogs (n=24) but also from cats (n=5) and a cattle (n=1). An altered OprD was only identified in 6/30 isolates which belonged to clones that were frequently found in humans. The 24 remaining isolates belonged to diverse clones, most of which have also been identified in humans. In these 24 isolates, carbapenem non-susceptibility was systematically due to mutations in the efflux pumps and respective regulators (such as MexAB-OprM, MexEF-OprN, MexXY or CzcCBA) concomitantly conferring decreased susceptibilities to other antibiotics such as aminoglycosides or fluoroquinolones. It strongly suggests that decreased susceptibility to carbapenems in animal isolates is selected by the veterinary use of non-carbapenem antibiotics. Consequently, even in the absence of carbapenem use, treatments with aminoglycosides or fluoroquinolones may lead to cross-resistance to carbapenems.

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15 Lupo, A., Chatre, P., Ponsin, C., Saras, E., Boulouis, H.J., Keck, N., Haenni, M., Madec, J.Y. (2017). Clonal spread of *Acinetobacter baumannii* sequence type 25 carrying *bla*$_{OXA-23}$ in companion animals in France. *Antimicrobial Agents Chemotherapy,* 61.

16 Melo, L.C., Boisson, M.N., Saras, E., Medaille, C., Boulouis, H.J., Madec, J.Y., Haenni, M. (2017). OXA-48-producing ST372 *Escherichia coli* in a French dog. J Antimicrob Chemother 72, 1256-1258.

17 Haenni M., Bour M., Châtre P., Madec J.-Y., Plésiat P. and Jeannot K. (2017). Resistance of animal strains of *Pseudomonas aeruginosa* to carbapenems. *Frontiers in Microbiology.* 8: 1847. doi: 10.3389/fmicb.2017.01847

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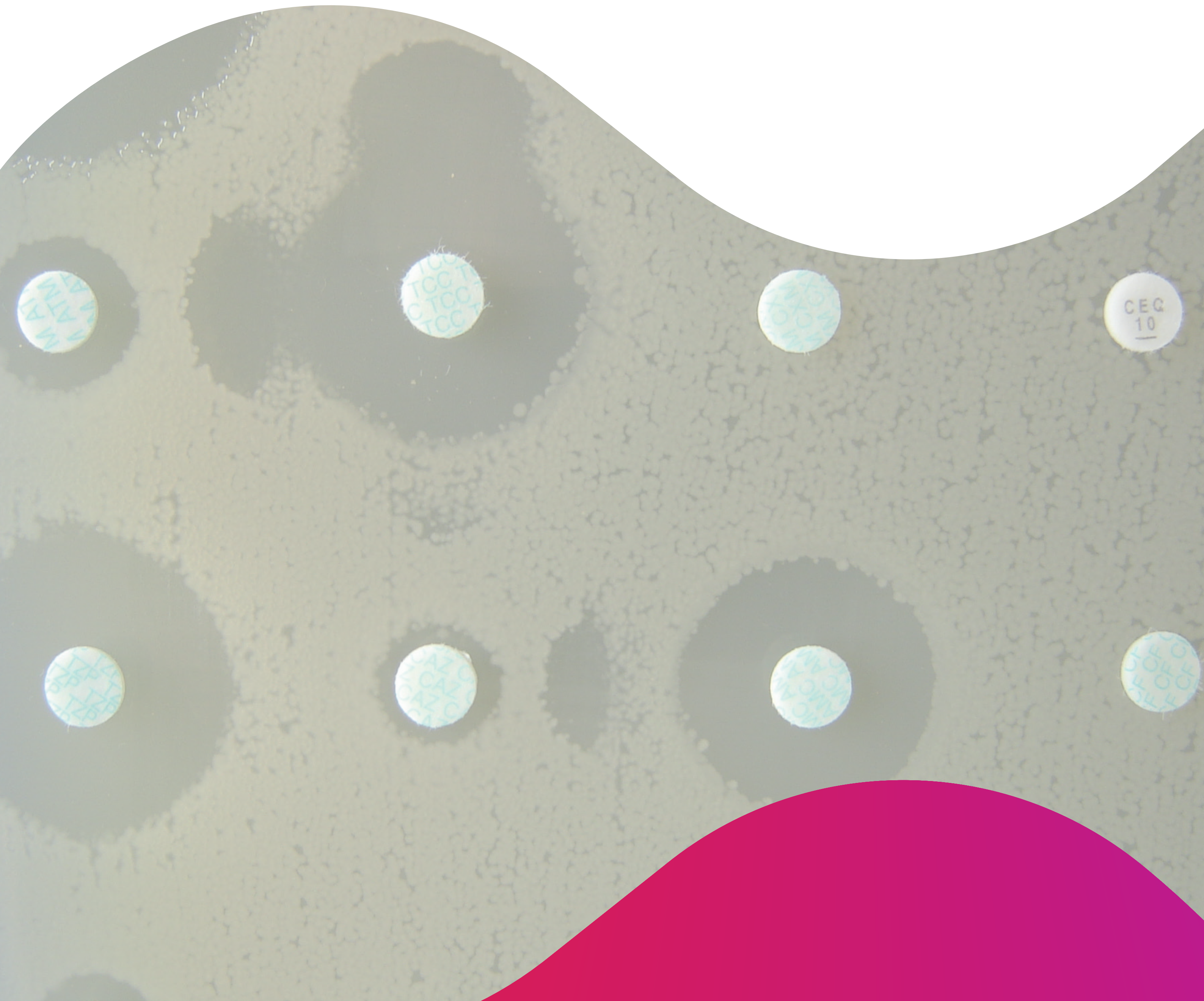
Annex 1

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 Départemental d'Analyses - TROYES (10)
Aveyron Labo - RODEZ (12)
Laboratoire Départemental d'Analyses - MARSEILLE (13)
ANSES Laboratoire de pathologie équine de Dozulé - GOUSTRANVILLE (14)
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 – BOURGES (18)
Laboratoire Départemental de la Côte d'Or - DIJON (21)
LABOCEA Ploufragan - PLOUFRAGAN (22)
LABOFARM - LOUDEAC (22)
Laboratoire Départemental d'Analyse - (23) AJAIN
Laboratoire Départemental d'Analyse et de Recherche - COULOUNIEIX CHAMIERS (24)
Laboratoire Vétérinaire Départemental - BESANCON (25)
LBAA - BOURG DE PEAGE (26)
ALCYON - LANDERNEAU (29)
LABOCEA Quimper - QUIMPER (29)
Laboratoire Départemental d'Analyses - NIMES (30)
Laboratoire Guilhem Meynaud - SAINT JEAN (31)
SOCSA Analyse - L'UNION (31)
Laboratoire Départemental Vétérinaire et des Eaux - AUCH (32)
BIOLAB 33 - LE HAILLAN (33)
Laboratoire Départemental Vétérinaire - MONTPELLIER (34)
Bio-Chêne Vert - CHATEAUBOURG (35)
Biovilaine - REDON (35)
LABOCEA- FOUGERES (35)
Laboratoire de Touraine - TOURS (37)
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Laboratoire Départemental d'Analyses - POLIGNY (39)
Laboratoire des Pyrénées et des Landes - MONT-DE-MARSAN (40)
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INOVALYS Nantes - NANTES (44)
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INOVALYS Angers - ANGERS (49)
Laboratoire HGRTS Pays de Loire - MAUGES SUR LOIRE (49)
LABEO Manche - SAINT LO (50)
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Laboratoire Vétérinaire et Alimentaire - MALZEVILLE (54)
Laboratoire Départemental d'Analyses - SAINT AVE (56)
Laboratoire RESALAB-Bretagne - GUENIN (56)
Service du Laboratoire Départemental - NEVERS (58)

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LABEO Orne - ALENCON (61)
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AABIOVET - SAINT-OMER (62)
TERANA Puy-de -Dôme- LEMPDES (63)
Laboratoire Départemental d'Analyses - STRASBOURG (67)
Laboratoire Vétérinaire Départemental - COLMAR (68)
ORBIO LABORATOIE - BRON (689
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)
LASAT Laboratoire d'Analyses Sèvres Atlantique - CHAMPDENIERS (79)
Laboratoire Vétérinaire Départemental - DURY (80)
Laboratoire Vétérinaire Départemental - MONTAUBAN (82)
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Laboratoire Vétérinaire Départemental - EPINAL (88)
Laboratoire de bactériologie – Biopôle ALFORT - MAISONS-ALFORT (94)
VEBIO - ARCUEIL (94)

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Annex 2

Cattle

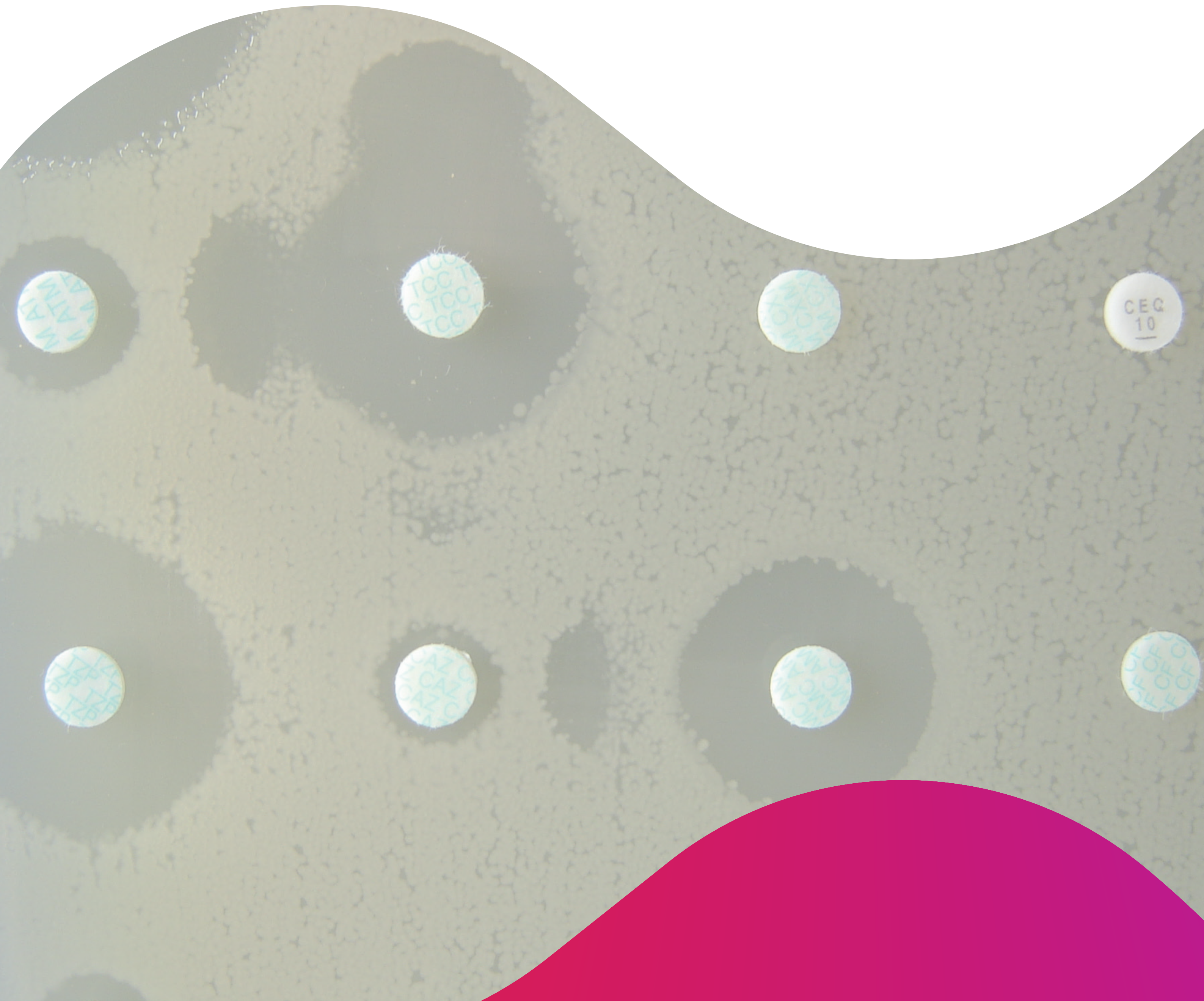
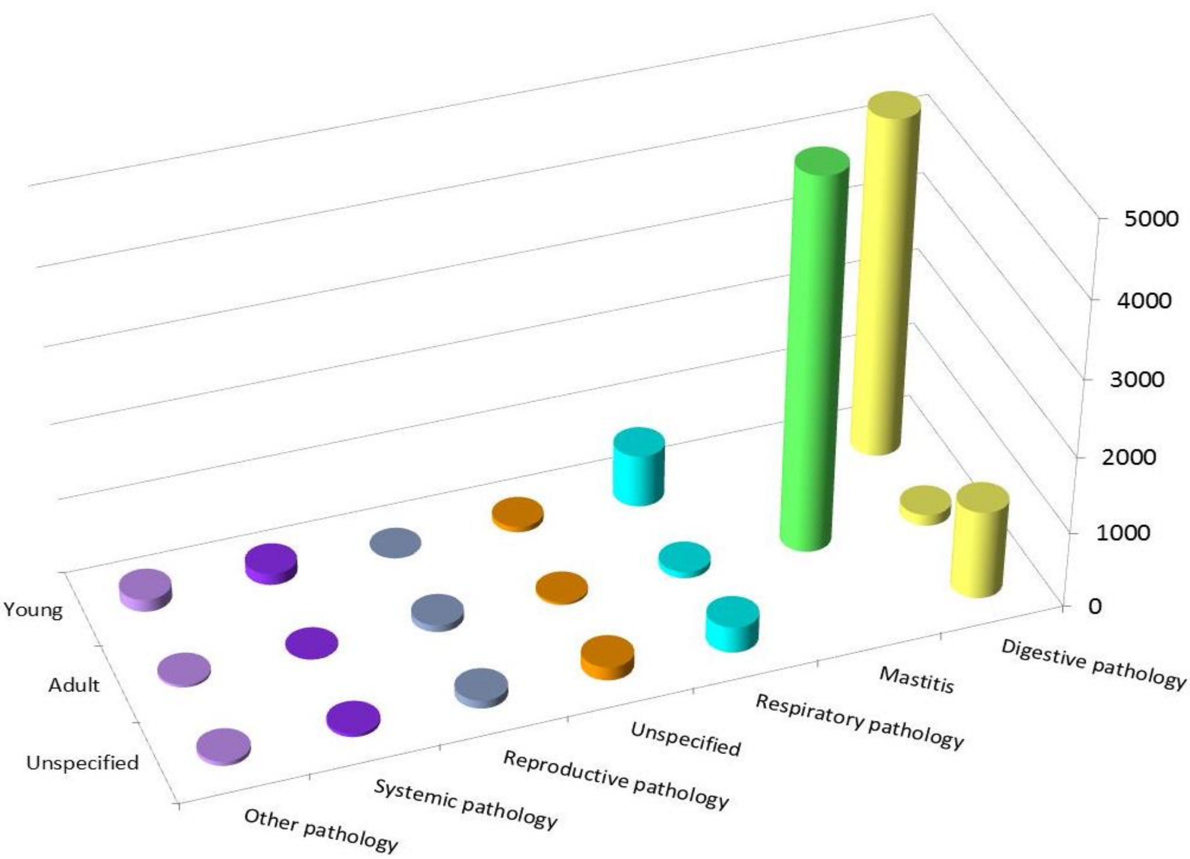


Figure 1 - Cattle 2016 – Number of antibiograms by age group and pathology

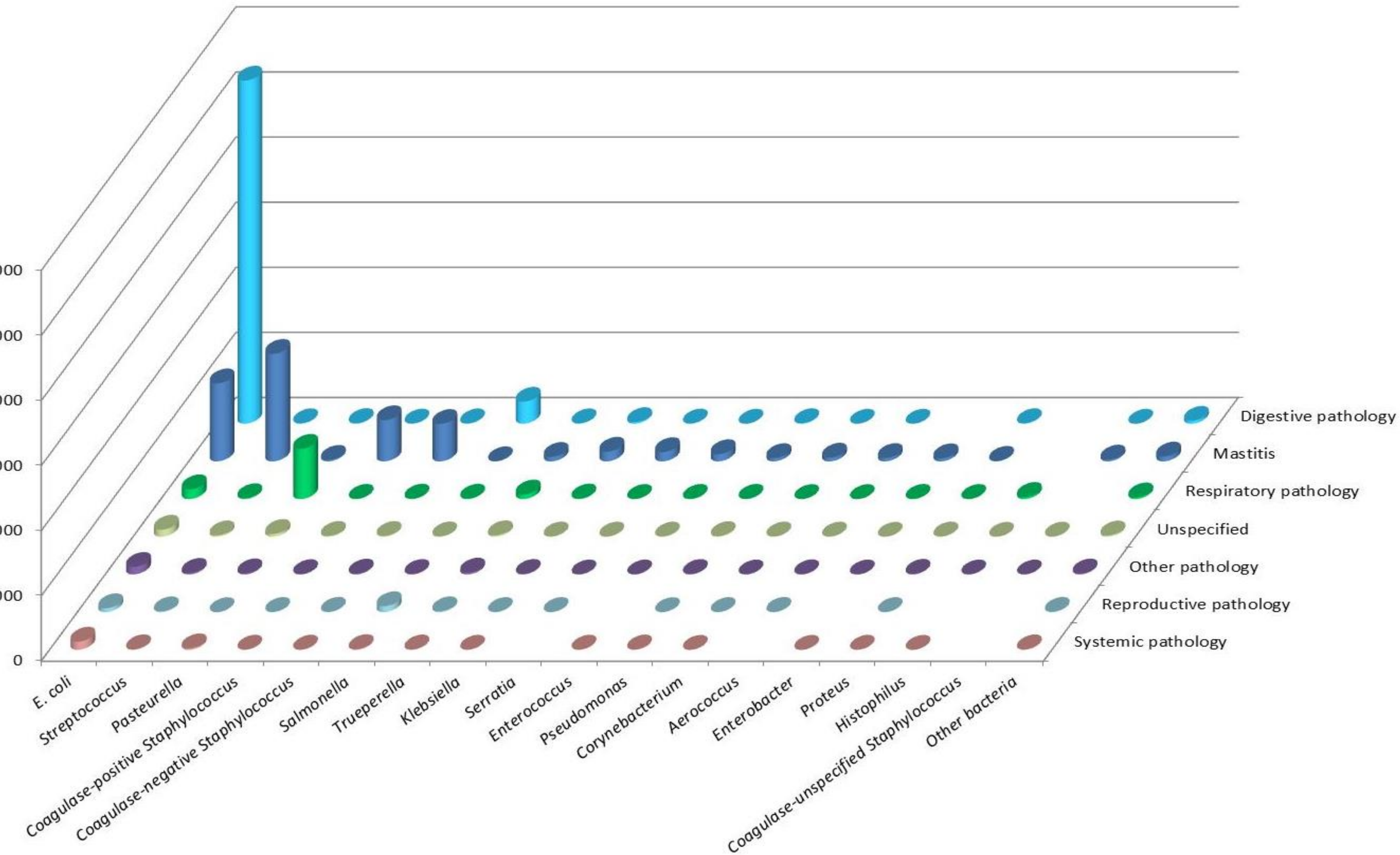


Note: *all values are detailed in table 1 (including other pathologies, representing less than 1%, grouped together)*

Table 1 - Cattle 2016 – Number of antibiograms by age group and pathology

Pathology N (%)	**Age group N (%)**			
	Young	Adult	Unspecified	**Total N *(%)***
Digestive pathology	4,426 *(34.94)*	146 *(1.15)*	1,161 *(9.17)*	**5,733 *(45.26)***
Mastitis		4,874 *(38.48)*		**4,874 *(38.48)***
Respiratory pathology	685 *(5.41)*	83 *(0.66)*	341 *(2.69)*	**1,109 *(8.76)***
Unspecified	74 *(0.58)*	34 *(0.27)*	179 *(1.41)*	**287 *(2.27)***
Reproductive pathology	4 *(0.03)*	93 *(0.73)*	107 *(0.84)*	**204 *(1.61)***
Systemic pathology	150 *(1.18)*	7 *(0.06)*	44 *(0.35)*	**201 *(1.59)***
Septicemia	57 *(0.45)*		6 *(0.05)*	**63 *(0.50)***
Omphalitis	42 *(0.33)*			**42 *(0.33)***
Kidney and urinary tract pathology	13 *(0.10)*	10 *(0.08)*	12 *(0.09)*	**35 *(0.28)***
Nervous system pathology	22 *(0.17)*	4 *(0.03)*	8 *(0.06)*	**34 *(0.27)***
Arthritis	14 *(0.11)*	6 *(0.05)*	13 *(0.10)*	**33 *(0.26)***
Skin and soft tissue infections	5 *(0.04)*	11 *(0.09)*	7 *(0.06)*	**23 *(0.18)***
Ocular pathology	3 *(0.02)*	2 *(0.02)*	5 *(0.04)*	**10 *(0.08)***
Otitis	2 *(0.02)*	2 *(0.02)*	6 *(0.05)*	**10 *(0.08)***
Cardiac pathology	6 *(0.05)*			**6 *(0.05)***
Muscle pathology			1 *(0.01)*	**1 *(0.01)***
Oral pathology	1 *(0.01)*			**1 *(0.01)***
Total N *(%)*	**5,504 *(43.45)***	**5,272 *(41.62)***	**1,890 *(14.92)***	**12,666 *(100.00)***

Figure 2 - Cattle 2016 – Number of antibiograms by bacteria and pathology (all age groups included)

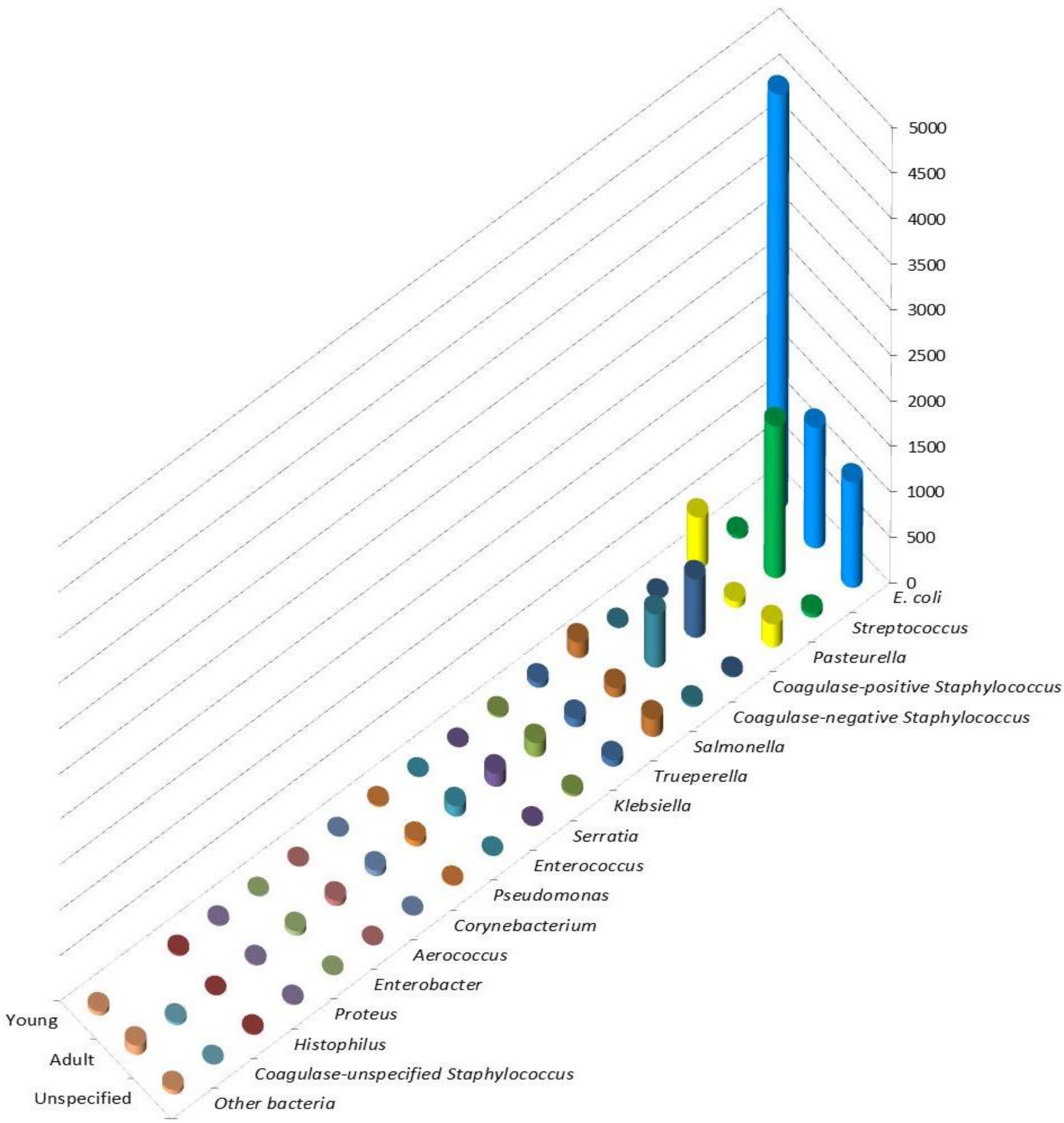


Note: *only values for pathologies >1% and bacterial groups having more than 30 occurrences are represented. Detailed values are presented in table 2 below.*

Table 2 - Cattle 2016 – Number of antibiograms by bacteria and pathology (all age groups included)

	Pathology N (%)																	
Bacteria N (%)	Digestive pathology	Mastitis	Respiratory pathology	Unspecified	Reproductive pathology	Systemic pathology	Septicemia	Omphalitis	Kidney and urinary tract pathology	Nervous system pathology	Arthritis	Skin and soft tissue infections	Ocular pathology	Otitis	Cardiac pathology	Muscle pathology	Oral pathology	**Total N (%)**
E. coli	5,271 *(41.62)*	1,199 *(9.47)*	150 *(1.18)*	108 *(0.85)*	60 *(0.47)*	125 *(0.99)*	47 *(0.37)*	13 *(0.10)*	18 *(0.14)*	21 *(0.17)*	8 *(0.06)*	3 *(0.02)*	1 *(0.01)*	1 *(0.01)*	3 *(0.02)*			**7,028 *(55.49)***
Streptococcus	7 *(0.06)*	1,651 *(13.03)*	14 *(0.11)*	22 *(0.17)*	13 *(0.10)*	8 *(0.06)*	1 *(0.01)*	12 *(0.09)*	2 *(0.02)*	3 *(0.02)*	4 *(0.03)*	1 *(0.01)*		1 *(0.01)*				**1,739 *(13.73)***
Pasteurella	10 *(0.08)*	23 *(0.18)*	772 *(6.10)*	43 *(0.34)*	1 *(0.01)*	23 *(0.18)*	5 *(0.04)*		2 *(0.02)*	2 *(0.02)*	3 *(0.02)*			1 *(0.01)*	3 *(0.02)*		1 *(0.01)*	**889 *(7.02)***
Coagulase-positive *Staphylococcus*	2 *(0.02)*	632 *(4.99)*	4 *(0.03)*	13 *(0.10)*	3 *(0.02)*	3 *(0.02)*		1 *(0.01)*				1 *(0.01)*	1 *(0.01)*	2 *(0.02)*				**662 *(5.23)***
Coagulase-negative *Staphylococcus*	6 *(0.05)*	575 *(4.54)*	7 *(0.06)*	13 *(0.10)*	5 *(0.04)*	3 *(0.02)*	2 *(0.02)*	2 *(0.02)*	1 *(0.01)*	3 *(0.02)*	2 *(0.02)*	2 *(0.02)*		1 *(0.01)*				**622 *(4.91)***
Salmonella	338 *(2.67)*	3 *(0.02)*	7 *(0.06)*	6 *(0.05)*	91 *(0.72)*	11 *(0.09)*	5 *(0.04)*		1 *(0.01)*	1 *(0.01)*								**463 *(3.66)***
Trueperella	6 *(0.05)*	69 *(0.54)*	70 *(0.55)*	23 *(0.18)*	13 *(0.10)*	6 *(0.05)*		5 *(0.04)*	1 *(0.01)*		13 *(0.10)*	9 *(0.07)*		1 *(0.01)*				**216 *(1.71)***
Klebsiella	25 *(0.20)*	149 *(1.18)*	9 *(0.07)*	5 *(0.04)*	2 *(0.02)*	2 *(0.02)*	1 *(0.01)*	3 *(0.02)*	3 *(0.02)*		1 *(0.01)*							**200 *(1.58)***
Serratia	3 *(0.02)*	142 *(1.12)*	2 *(0.02)*	3 *(0.02)*	2 *(0.02)*			1 *(0.01)*										**153 *(1.21)***
Enterococcus	1 *(0.01)*	111 *(0.88)*	3 *(0.02)*	4 *(0.03)*		2 *(0.02)*			1 *(0.01)*									**122 *(0.96)***
Pseudomonas	8 *(0.06)*	51 *(0.40)*	4 *(0.03)*	10 *(0.08)*	1 *(0.01)*	5 *(0.04)*			1 *(0.01)*		1 *(0.01)*	3 *(0.02)*	1 *(0.01)*	1 *(0.01)*				**86 *(0.68)***
Corynebacterium	1 *(0.01)*	57 *(0.45)*	1 *(0.01)*	4 *(0.03)*	2 *(0.02)*	1 *(0.01)*			1 *(0.01)*									**67 *(0.53)***
Aerococcus	1 *(0.01)*	52 *(0.41)*	1 *(0.01)*	3 *(0.02)*	4 *(0.03)*				2 *(0.02)*	1 *(0.01)*								**64 *(0.51)***
Enterobacter		48 *(0.38)*	4 *(0.03)*	1 *(0.01)*		1 *(0.01)*							1 *(0.01)*					**55 *(0.43)***
Proteus	8 *(0.06)*	9 *(0.07)*	2 *(0.02)*	5 *(0.04)*	2 *(0.02)*	2 *(0.02)*	1 *(0.01)*	5 *(0.04)*			1 *(0.01)*	2 *(0.02)*		1 *(0.01)*				**38 *(0.30)***
Histophilus			33 *(0.26)*	1 *(0.01)*		1 *(0.01)*												**35 *(0.28)***
Coagulase-unspecified *Staphylococcus*	1 *(0.01)*	28 *(0.22)*		3 *(0.02)*										1 *(0.01)*				**33 *(0.26)***
Other bacteria < 30 occurrences	45 *(0.36)*	75 *(0.59)*	26 *(0.21)*	20 *(0.16)*	5 *(0.04)*	8 *(0.06)*	1 *(0.01)*		2 *(0.02)*	3 *(0.02)*		2 *(0.02)*	6 *(0.05)*			1 *(0.01)*		**194 *(1.53)***
Total N *(%)*	**5,733 *(45.26)***	**4,874 *(38.48)***	**1,109 *(8.76)***	**287 *(2.27)***	**204 *(1.61)***	**201 *(1.59)***	**63 *(0.50)***	**42 *(0.33)***	**35 *(0.28)***	**34 *(0.27)***	**33 *(0.26)***	**23 *(0.18)***	**10 *(0.08)***	**10 *(0.08)***	**6 *(0.05)***	**1 *(0.01)***	**1 *(0.01)***	**12,666 *(100.00)***

Figure 3 - Cattle 2016 – 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 2016 – Number of antibiograms by bacteria and age group

	Age group N (%)			
Bacteria N (%)	Young	Adult	Unspecified	**Total N *(%)***
E. coli	4,544 *(35.88)*	1,325 *(10.46)*	1,159 *(9.15)*	**7,028 *(55.49)***
Streptococcus	28 *(0.22)*	1,669 *(13.18)*	42 *(0.33)*	**1,739 *(13.73)***
Pasteurella	561 *(4.43)*	73 *(0.58)*	255 *(2.01)*	**889 *(7.02)***
Coagulase-positive *Staphylococcus*	5 *(0.04)*	642 *(5.07)*	15 *(0.12)*	**662 *(5.23)***
Coagulase-negative *Staphylococcus*	11 *(0.09)*	585 *(4.62)*	26 *(0.21)*	**622 *(4.91)***
Salmonella	169 *(1.33)*	102 *(0.81)*	192 *(1.52)*	**463 *(3.66)***
Trueperella	56 *(0.44)*	90 *(0.71)*	70 *(0.55)*	**216 *(1.71)***
Klebsiella	21 *(0.17)*	153 *(1.21)*	26 *(0.21)*	**200 *(1.58)***
Serratia	3 *(0.02)*	144 *(1.14)*	6 *(0.05)*	**153 *(1.21)***
Enterococcus	5 *(0.04)*	112 *(0.88)*	5 *(0.04)*	**122 *(0.96)***
Pseudomonas	16 *(0.13)*	60 *(0.47)*	10 *(0.08)*	**86 *(0.68)***
Corynebacterium	4 *(0.03)*	61 *(0.48)*	2 *(0.02)*	**67 *(0.53)***
Aerococcus	3 *(0.02)*	58 *(0.46)*	3 *(0.02)*	**64 *(0.51)***
Enterobacter	1 *(0.01)*	50 *(0.39)*	4 *(0.03)*	**55 *(0.43)***
Proteus	14 *(0.11)*	14 *(0.11)*	10 *(0.08)*	**38 *(0.30)***
Histophilus	19 *(0.15)*	3 *(0.02)*	13 *(0.10)*	**35 *(0.28)***
Coagulas-unspecified Staphylococcus		28 *(0.22)*	5 *(0.04)*	**33 *(0.26)***
Other bacteria < 30 occurrences	44 *(0.35)*	103 *(0.81)*	47 *(0.37)*	**194 *(1.53)***
Total N *(%)*	**5,504 *(43.45)***	**5,272 *(41.62)***	**1,890 *(14.92)***	**12,666 *(100.00)***

Table 4 - Cattle 2016 – Digestive pathology – Young animals – *E. coli*: susceptibility to antibiotics (proportion) (N= 4,225)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*3,924*	**15**
Amoxicillin-Clavulanic ac.	*4,172*	**45**
Cephalexin	*3,466*	**79**
Cephalothin	*1,018*	**63**
Cefoxitin	*3,548*	**91**
Cefuroxime	*1,958*	**74**
Cefoperazone	*1,186*	**86**
Ceftiofur	*4,209*	**94**
Cefquinome 30 µg	*4,094*	**90**
Streptomycin 10 UI	*2,447*	**17**
Spectinomycin	*1,482*	**54**
Kanamycin 30 UI	*1,550*	**42**
Tobramycin	*116*	**79**
Gentamicin 10 UI	*4,222*	**81**
Neomycin	*2,918*	**51**
Netilmicin	*116*	**93**
Amikacine	*116*	**100**
Apramycin	*1,850*	**93**
Tetracycline	*4,037*	**24**
Doxycycline	*75*	**15**
Chloramphenicol	*274*	**59**
Florfenicol	*3,047*	**77**
Nalidixic ac.	*2,727*	**60**
Oxolinic ac.	*873*	**60**
Flumequine	*1,394*	**61**
Enrofloxacin	*3,791*	**80**
Marbofloxacin	*3,572*	**83**
Danofloxacin	*1,710*	**79**
Sulfonamides	*956*	**21**
Trimethoprim	*502*	**64**
Trimethoprim-Sulfonamides	*4,220*	**63**

Table 5 - Cattle 2016 – Mastitis – Adults – *E. coli:* susceptibility to antibiotics (proportion) (N= 1,199)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*1,111*	**68**
Amoxicillin-Clavulanic ac.	*1,194*	**78**
Cephalexin	*972*	**83**
Cephalothin	*388*	**89**
Cefoxitin	*939*	**98**
Cefuroxime	*580*	**89**
Cefoperazone	*838*	**98**
Ceftiofur	*1,044*	**98**
Cefquinome 30 µg	*1,134*	**99**
Streptomycin 10 UI	*712*	**80**
Spectinomycin	*263*	**94**
Kanamycin 30 UI	*518*	**90**
Tobramycin	*35*	**94**
Gentamicin 10 UI	*1,179*	**98**
Neomycin	*817*	**90**
Netilmicin	*34*	**97**
Amikacine	*34*	**100**
Apramycin	*396*	**99**
Tetracycline	*1,046*	**81**
Chloramphenicol	*97*	**93**
Florfenicol	*793*	**96**
Nalidixic ac.	*776*	**95**
Oxolinic ac.	*183*	**99**
Flumequine	*254*	**97**
Enrofloxacin	*1,022*	**97**
Marbofloxacin	*1,068*	**98**
Danofloxacin	*420*	**98**
Sulfonamides	*215*	**83**
Trimethoprim	*182*	**91**
Trimethoprim-Sulfonamides	*1,166*	**91**

Table 6 - Cattle 2016 – All pathologies and age groups included – *Salmonella* Typhimurium*:* susceptibility to antibiotics (proportion) (N= 182)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*155*	**15**
Amoxicillin-Clavulanic ac.	*180*	**38**
Cephalexin	*139*	**100**
Cephalothin	*58*	**98**
Cefoxitin	*156*	**99**
Cefuroxime	*79*	**94**
Cefoperazone	*69*	**36**
Ceftiofur	*182*	**99**
Cefquinome 30 µg	*161*	**100**
Streptomycin 10 UI	*109*	**10**
Spectinomycin	*85*	**35**
Kanamycin 30 UI	*76*	**97**
Gentamicin 10 UI	*182*	**98**
Neomycin	*151*	**99**
Apramycin	*106*	**98**
Tetracycline	*173*	**13**
Chloramphenicol	*42*	**26**
Florfenicol	*137*	**37**
Nalidixic ac.	*113*	**82**
Oxolinic ac.	*51*	**96**
Flumequine	*49*	**90**
Enrofloxacin	*174*	**98**
Marbofloxacin	*165*	**99**
Danofloxacin	*91*	**99**
Sulfonamides	*35*	**14**
Trimethoprim-Sulfonamides	*181*	**94**

Table 7 - Cattle 2016 – All pathologies and age groups included – *Salmonella* Mbandaka*:* susceptibility to antibiotics (proportion) (N= 64)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*62*	**94**
Amoxicillin-Clavulanic ac.	*64*	**94**
Cephalexin	*61*	**95**
Cephalothin	*43*	**98**
Cefoxitin	*64*	**94**
Cefuroxime	*45*	**89**
Cefoperazone	*48*	**100**
Ceftiofur	*64*	**97**
Cefquinome 30 µg	*61*	**97**
Streptomycin 10 UI	*49*	**88**
Kanamycin 30 UI	*49*	**96**
Gentamicin 10 UI	*64*	**97**
Neomycin	*60*	**100**
Tetracycline	*64*	**92**
Florfenicol	*61*	**100**
Nalidixic ac.	*47*	**98**
Enrofloxacin	*64*	**100**
Marbofloxacin	*60*	**100**
Danofloxacin	*56*	**100**
Sulfonamides	*43*	**95**
Trimethoprim	*40*	**100**
Trimethoprim-Sulfonamides	*64*	**100**

Table 8 - Cattle 2016 – All pathologies and age groups included – *Salmonella* Montevideo*:* susceptibility to antibiotics (proportion) (N= 81)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*75*	**96**
Amoxicillin-Clavulanic ac.	*80*	**98**
Cephalexin	*69*	**99**
Cephalothin	*46*	**98**
Cefoxitin	*81*	**99**
Cefuroxime	*44*	**95**
Cefoperazone	*64*	**98**
Ceftiofur	*81*	**99**
Cefquinome 30 µg	*79*	**99**
Streptomycin 10 UI	*63*	**87**
Spectinomycin	*30*	**87**
Kanamycin 30 UI	*64*	**92**
Gentamicin 10 UI	*81*	**98**
Neomycin	*75*	**99**
Apramycin	*36*	**97**
Tetracycline	*79*	**97**
Florfenicol	*79*	**100**
Nalidixic ac.	*53*	**98**
Enrofloxacin	*81*	**100**
Marbofloxacin	*74*	**100**
Danofloxacin	*67*	**100**
Sulfonamides	*52*	**98**
Trimethoprim	*35*	**100**
Trimethoprim-Sulfonamides	*81*	**100**

Table 9 - Cattle 2016 – Respiratory pathology – Young animals – *Pasteurella multocida:* susceptibility to antibiotics (proportion) (N= 305)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*294*	**98**
Amoxicillin-Clavulanic ac.	*284*	**98**
Cephalexin	*249*	**99**
Ceftiofur	*301*	**99**
Cefquinome 30 µg	*275*	**97**
Streptomycin 10 UI	*62*	**48**
Spectinomycin	*196*	**85**
Kanamycin 30 UI	*46*	**87**
Gentamicin 10 UI	*266*	**95**
Neomycin	*220*	**82**
Tetracycline	*298*	**67**
Doxycycline	*187*	**70**
Florfenicol	*295*	**100**
Nalidixic ac.	*88*	**91**
Oxolinic ac.	*189*	**78**
Flumequine	*219*	**82**
Enrofloxacin	*290*	**94**
Marbofloxacin	*281*	**99**
Danofloxacin	*211*	**89**
Trimethoprim-Sulfonamides	*303*	**96**

Table 10 - Cattle 2016 – Respiratory pathology – Young animals – *Mannheimia haemolytica:* susceptibility to antibiotics (proportion) (N= 181)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*167*	**96**
Amoxicillin-Clavulanic ac.	*159*	**97**
Cephalexin	*135*	**99**
Ceftiofur	*178*	**99**
Cefquinome 30 µg	*152*	**99**
Streptomycin 10 UI	*56*	**21**
Spectinomycin	*95*	**87**
Kanamycin 30 UI	*47*	**79**
Gentamicin 10 UI	*152*	**91**
Neomycin	*103*	**83**
Tetracycline	*177*	**79**
Doxycycline	*82*	**77**
Florfenicol	*174*	**99**
Nalidixic ac.	*77*	**77**
Oxolinic ac.	*78*	**86**
Flumequine	*102*	**91**
Enrofloxacin	*161*	**95**
Marbofloxacin	*167*	**99**
Danofloxacin	*106*	**97**
Trimethoprim-Sulfonamides	*179*	**99**

Table 11 - Cattle 2016 – Mastitis – Adults – *Serratia Marcescens:* susceptibility to antibiotics (proportion) (N= 115)

Antibiotic	*Total (N)*	**% S**
Amoxicillin-Clavulanic ac.	*115*	**13**
Cephalothin	*31*	**0**
Cefoxitin	*87*	**51**
Cefuroxime	*55*	**0**
Cefoperazone	*81*	**100**
Ceftiofur	*101*	**99**
Cefquinome 30 µg	*109*	**99**
Streptomycin 10 UI	*56*	**50**
Kanamycin 30 UI	*44*	**98**
Gentamicin 10 UI	*114*	**100**
Neomycin	*72*	**99**
Tetracycline	*91*	**11**
Florfenicol	*65*	**98**
Nalidixic ac.	*75*	**100**
Enrofloxacin	*93*	**100**
Marbofloxacin	*108*	**100**
Trimethoprim-Sulfonamides	*109*	**100**

Table 12 - Cattle 2016 – Mastitis – Adults – *Klebsiella pneumoniae:* susceptibility to antibiotics (proportion) (N= 90)

Antibiotic	*Total (N)*	**% S**
Amoxicillin-Clavulanic ac.	*90*	**87**
Cefoxitin	*63*	**100**
Cefuroxime	*39*	**100**
Cefoperazone	*68*	**97**
Ceftiofur	*71*	**100**
Cefquinome 30 µg	*87*	**100**
Streptomycin 10 UI	*52*	**87**
Gentamicin 10 UI	*90*	**99**
Neomycin	*58*	**98**
Apramycin	*30*	**100**
Tetracycline	*75*	**81**
Florfenicol	*43*	**100**
Nalidixic ac.	*68*	**99**
Enrofloxacin	*70*	**100**
Marbofloxacin	*81*	**100**
Trimethoprim-Sulfonamides	*85*	**94**

Table 13 - Cattle 2016 – Mastitis – Adults – Coagulase-positive *Staphylococcus*: susceptibility to antibiotics (proportion) (N= 632)

Antibiotic	*Total (N)*	**% S**
Penicillin	*629*	**76**
Cefoxitin	*585*	**91**
Oxacillin	*96*	**96**
Cefovecin	*43*	**98**
Erythromycin	*480*	**93**
Tylosin	*405*	**97**
Spiramycin	*614*	**97**
Lincomycin	*569*	**96**
Pirlimycin	*88*	**100**
Streptomycin 10 UI	*473*	**92**
Kanamycin 30 UI	*346*	**99**
Gentamicin 10 UI	*599*	**99**
Neomycin	*348*	**99**
Tetracycline	*572*	**93**
Florfenicol	*207*	**100**
Enrofloxacin	*503*	**99**
Marbofloxacin	*591*	**100**
Danofloxacin	*125*	**98**
Trimethoprim-Sulfonamides	*493*	**99**
Rifampicin	*169*	**98**

Table 14 - Cattle 2016 – Mastitis – Adults – Coagulase-negative *Staphycoccus*: susceptibility to antibiotics (proportion) (N= 575)

Antibiotic	*Total (N)*	**% S**
Penicillin	*569*	**72**
Cefoxitin	*520*	**93**
Oxacillin	*97*	**98**
Erythromycin	*487*	**85**
Tylosin	*346*	**88**
Spiramycin	*559*	**90**
Lincomycin	*548*	**79**
Pirlimycin	*64*	**84**
Streptomycin 10 UI	*373*	**85**
Kanamycin 30 UI	*353*	**96**
Gentamicin 10 UI	*552*	**99**
Neomycin	*355*	**98**
Tetracycline	*549*	**82**
Florfenicol	*240*	**97**
Enrofloxacin	*444*	**99**
Marbofloxacin	*499*	**99**
Danofloxacin	*183*	**97**
Sulfonamides	*32*	**100**
Trimethoprim-Sulfonamides	*452*	**98**
Rifampicin	*197*	**96**

Table 15 - Cattle 2016 – Mastitis – Adults – *Streptococcus uberis*: susceptibility to antibiotics (proportion) (N= 1,310)

Antibiotic	*Total (N)*	**% S**
Oxacillin	*1,056*	**81**
Erythromycin	*1,143*	**78**
Tulathromycin	*32*	**91**
Tylosin	*707*	**75**
Spiramycin	*1,246*	**79**
Lincomycin	*1,178*	**80**
Streptomycin 500 µg	*1,075*	**83**
Kanamycin 1000 µg	*878*	**92**
Gentamicin 500 µg	*1,106*	**97**
Tetracycline	*1,187*	**81**
Doxycycline	*90*	**84**
Chloramphenicol	*65*	**85**
Florfenicol	*582*	**95**
Enrofloxacin	*1,153*	**65**
Marbofloxacin	*1,080*	**85**
Danofloxacin	*189*	**43**
Trimethoprim-Sulfonamides	*1,219*	**86**
Rifampicin	*341*	**51**

Table 16 - Cattle 2016 – Mastitis – Adults – *Streptococcus dysgalactiae:* susceptibility to antibiotics (proportion) (N= 215)

Antibiotic	*Total (N)*	**% S**
Oxacillin	*176*	**97**
Erythromycin	*186*	**82**
Tylosin	*127*	**84**
Spiramycin	*203*	**91**
Lincomycin	*201*	**89**
Streptomycin 500 µg	*189*	**93**
Kanamycin 1000 µg	*159*	**92**
Gentamicin 500 µg	*196*	**99**
Tetracycline	*197*	**22**
Florfenicol	*86*	**97**
Enrofloxacin	*181*	**48**
Marbofloxacin	*171*	**94**
Danofloxacin	*32*	**19**
Trimethoprim-Sulfonamides	*197*	**89**
Rifampicin	*57*	**65**

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Annex 3

Sheep

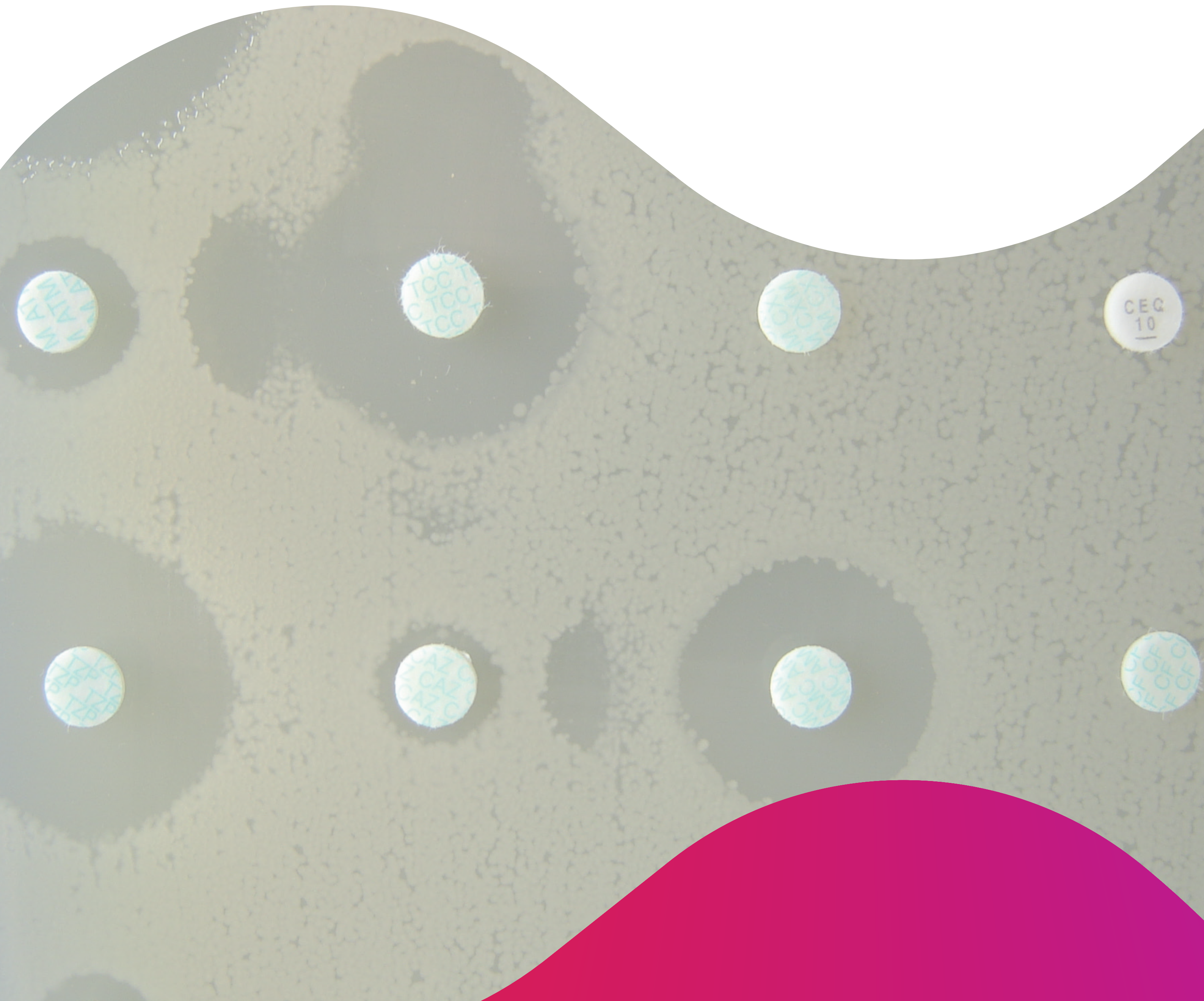
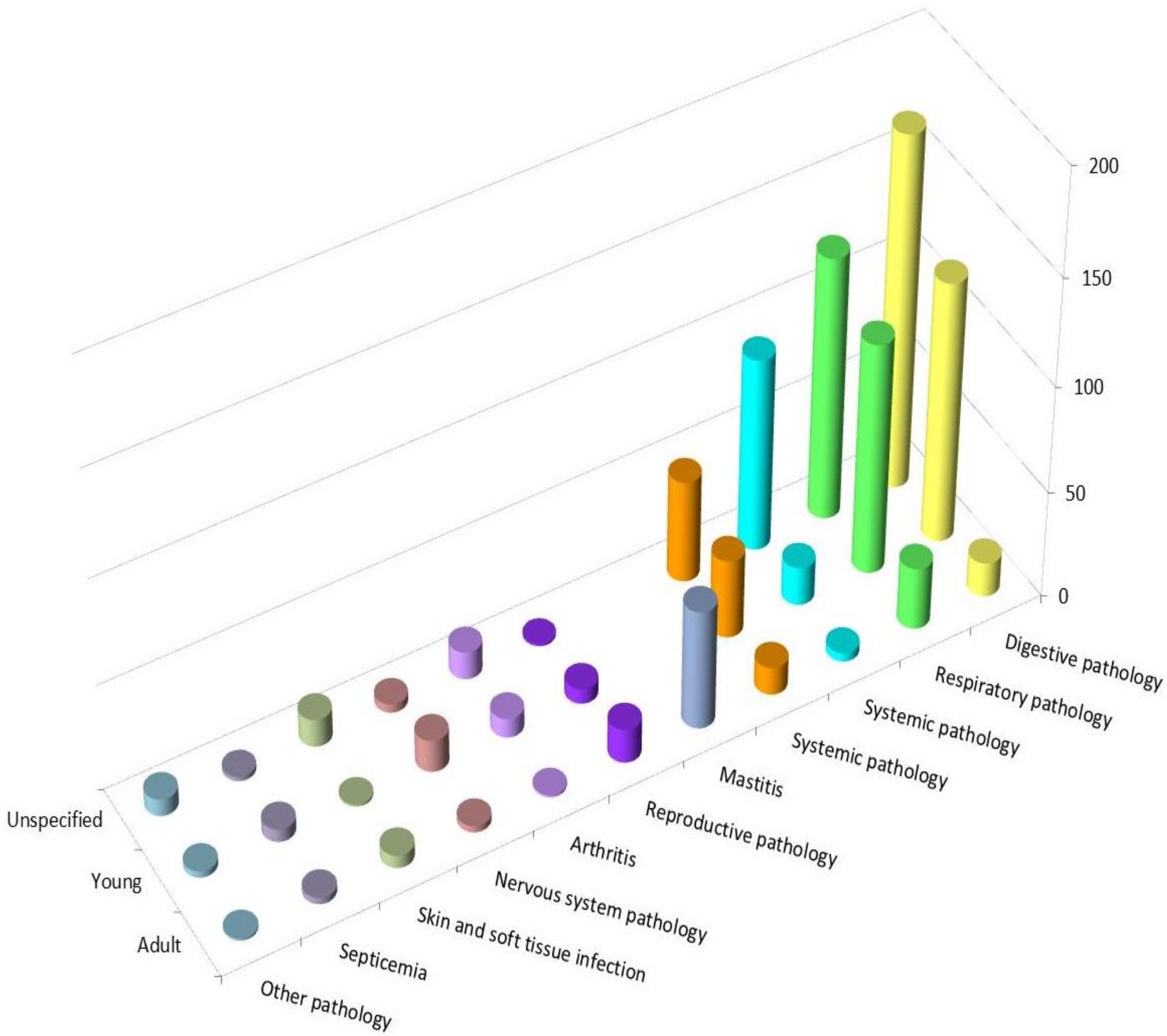


Figure 1 - Sheep 2016 – Number of antibiograms by age group and pathology

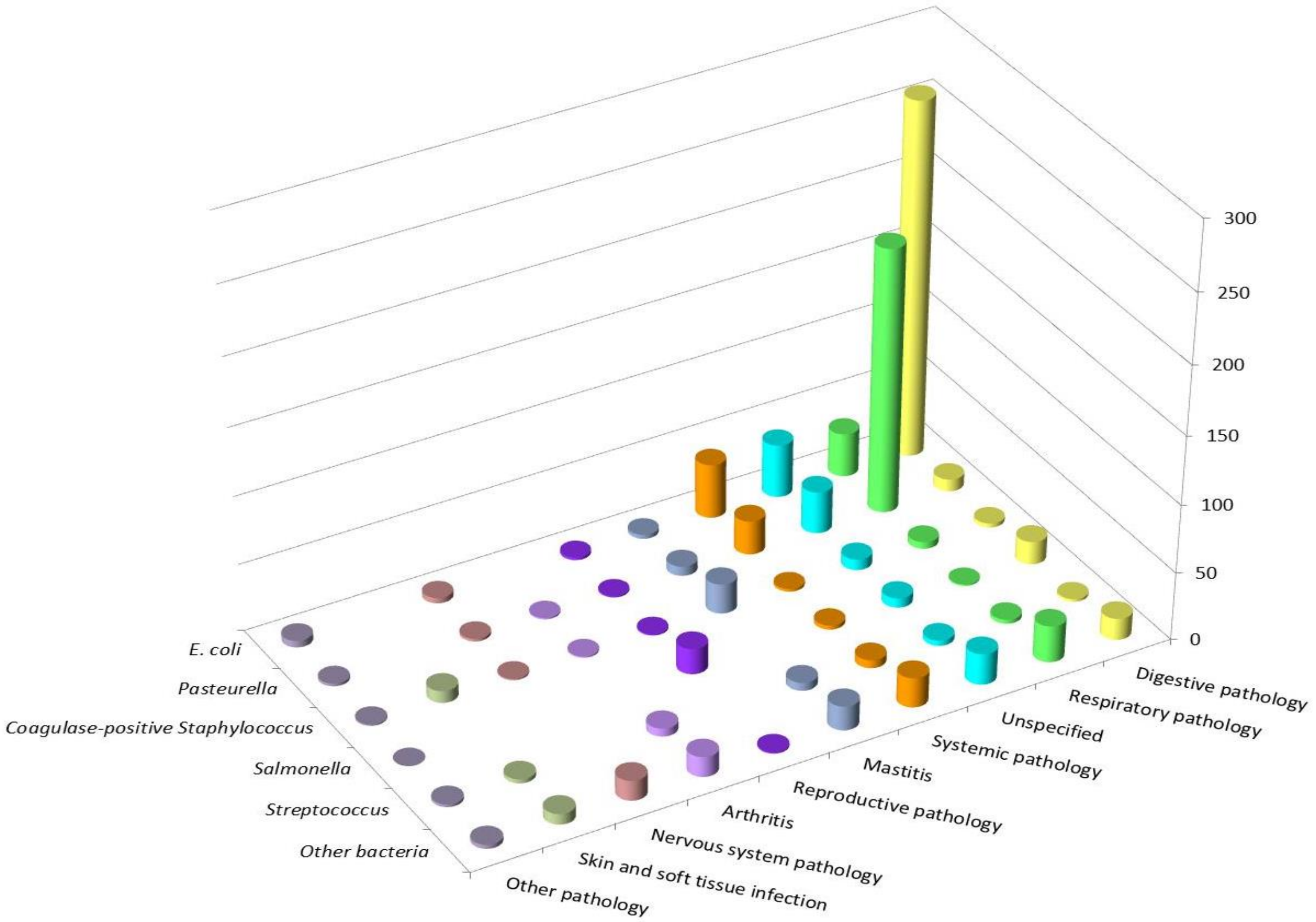


Note: *all values are detailed in table 1 (including other pathologies, representing less than 1%, grouped together)*

Table 1 - Sheep 2016 – Number of antibiograms by age group and pathology

	Age group N (%)			
Pathology N (%)	Unspecified	Young	Adult	**Total N *(%)***
Digestive pathology	167 *(17.6)*	123 *(13.0)*	16 *(1.7)*	**306 *(32.3)***
Respiratory pathology	124 *(13.1)*	109 *(11.5)*	29 *(3.1)*	**262 *(27.7)***
Unspecified	91 *(9.6)*	18 *(1.9)*	4 *(0.4)*	**113 *(11.9)***
Systemic pathology	48 *(5.1)*	37 *(3.9)*	13 *(1.4)*	**98 *(10.3)***
Mastitis			56 *(5.9)*	**56 *(5.9)***
Reproductive pathology	1 *(0.1)*	7 *(0.7)*	16 *(1.7)*	**24 *(2.5)***
Arthritis	13 *(1.4)*	9 *(1.0)*	1 *(0.1)*	**23 *(2.4)***
Nervous system pathology	4 *(0.4)*	15 *(1.6)*	3 *(0.3)*	**22 *(2.3)***
Skin and soft tissue infections	13 *(1.4)*	1 *(0.1)*	6 *(0.6)*	**20 *(2.1)***
Septicemia	2 *(0.2)*	6 *(0.6)*	3 *(0.3)*	**11 *(1.2)***
Cardiac pathology	2 *(0.2)*	3 *(0.3)*		**5 *(0.5)***
Kidney and urinary tract pathology	3 *(0.3)*			**3 *(0.3)***
Ocular pathology	1 *(0.1)*		1 *(0.1)*	**2 *(0.2)***
Oral pathology	1 *(0.1)*			**1 *(0.1)***
Muscle pathology	1 *(0.1)*			**1 *(0.1)***
Total N *(%)*	**471 *(49.7)***	**328 *(34.6)***	**148 *(15.6)***	**947 *(100.0)***

Figure 2 - Sheep 2016 – Number of antibiograms by bacterial group and pathology



Note: *only values for pathologies >1% and bacterial groups having more than 30 occurrences are represented. Detailed values are presented in table 2 below.*

Table 2 - Sheep 2016 – Number of antibiograms by bacterial group and pathology

Bacteria N (%)	Pathology N (%)																Total N (%)
	Digestive pathology	Respiratory pathology	Unspecified	Systemic pathology	Mastitis	Reproductive pathology	Arthritis	Nervous system pathology	Skin and soft tissue infections	Septicemia	Cardiac pathology	Kidney and urinary tract pathology	Ocular pathology	Oral pathology	Unspecified	Muscle pathology	
E. coli	259 *(27.3)*	32 *(3.4)*	39 *(4.1)*	40 *(4.2)*	3 *(0.3)*	2 *(0.2)*		4 *(0.4)*		6 *(0.6)*	3 *(0.3)*	1 *(0.1)*			1 *(0.1)*		**390 *(41.2)***
Pasteurella	9 *(1.0)*	194 *(20.5)*	31 *(3.3)*	25 *(2.6)*	7 *(0.7)*	1 *(0.1)*	1 *(0.1)*	2 *(0.2)*		1 *(0.1)*	1 *(0.1)*	1 *(0.1)*					**273 *(28.8)***
Coagulase-positive *Staphylococcus*	3 *(0.3)*	5 *(0.5)*	8 *(0.8)*	2 *(0.2)*	22 *(2.3)*	1 *(0.1)*	1 *(0.1)*	1 *(0.1)*	9 *(1.0)*							1 *(0.1)*	**53 *(5.6)***
Salmonella	17 *(1.8)*	1 *(0.1)*	7 *(0.7)*	3 *(0.3)*		19 *(2.0)*				1 *(0.1)*							**48 *(5.1)***
Streptococcus	2 *(0.2)*	3 *(0.3)*	4 *(0.4)*	6 *(0.6)*	6 *(0.6)*		6 *(0.6)*		3 *(0.3)*	1 *(0.1)*	1 *(0.1)*	1 *(0.1)*					**33 *(3.5)***
Other bacteria < 30 occurrences	16 *(1.7)*	27 *(2.9)*	23 *(2.4)*	22 *(2.3)*	18 *(1.9)*	1 *(0.1)*	15 *(1.6)*	15 *(1.6)*	8 *(0.8)*	2 *(0.2)*			2 *(0.2)*	1 *(0.1)*			**150 *(15.8)***
Total N *(%)*	**306 *(32.3)***	**262 *(27.7)***	**112 *(11.8)***	**98 *(10.3)***	**56 *(5.9)***	**24 *(2.5)***	**23 *(2.4)***	**22 *(2.3)***	**20 *(2.1)***	**11 *(1.2)***	**5 *(0.5)***	**3 *(0.3)***	**2 *(0.2)***	**1 *(0.1)***	**1 *(0.1)***	**1 *(0.1)***	**947 *(100.0)***

Table 3 - Sheep 2016 – Digestive pathology – *E. coli:* susceptibility to antibiotics (proportion) (N= 259)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*250*	**43**
Amoxicillin-Clavulanic ac.	*259*	**62**
Cephalexin	*240*	**85**
Cephalothin	*41*	**80**
Cefoxitin	*232*	**98**
Cefuroxime	*54*	**91**
Cefoperazone	*61*	**100**
Ceftiofur	*256*	**99**
Cefquinome 30 µg	*240*	**99**
Streptomycin 10 UI	*211*	**35**
Spectinomycin	*60*	**82**
Kanamycin 30 UI	*67*	**79**
Gentamicin 10 UI	*258*	**95**
Neomycin	*126*	**82**
Apramycin	*34*	**100**
Tetracycline	*252*	**41**
Florfenicol	*208*	**90**
Nalidixic ac.	*227*	**85**
Flumequine	*36*	**89**
Enrofloxacin	*243*	**92**
Marbofloxacin	*120*	**97**
Danofloxacin	*64*	**89**
Sulfonamides	*47*	**40**
Trimethoprim-Sulfonamides	*259*	**59**

Table 4 - Sheep 2016 – Respiratory pathology – All age groups – *Mannheimia haemolytica:* susceptibility to antibiotics (proportion) (N= 113)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*106*	**95**
Amoxicillin-Clavulanic ac.	*102*	**98**
Cephalexin	*91*	**100**
Cefoxitin	*62*	**98**
Ceftiofur	*113*	**99**
Cefquinome 30 µg	*92*	**98**
Streptomycin 10 UI	*81*	**49**
Gentamicin 10 UI	*99*	**84**
Neomycin	*47*	**40**
Tetracycline	*111*	**87**
Florfenicol	*105*	**99**
Nalidixic ac.	*96*	**93**
Enrofloxacin	*102*	**98**
Marbofloxacin	*61*	**100**
Danofloxacin	*35*	**94**
Trimethoprim-Sulfonamides	*112*	**96**

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Goats

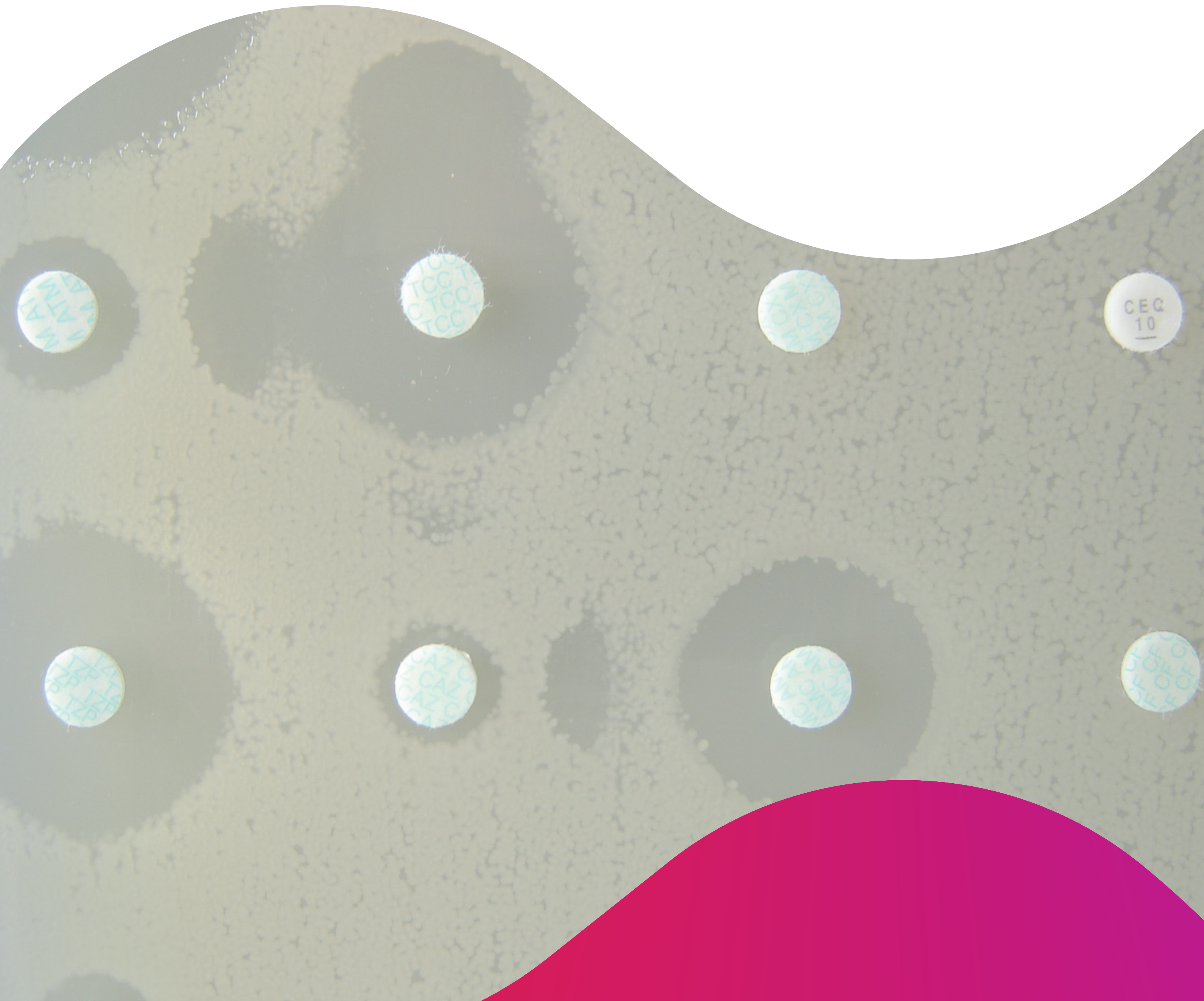
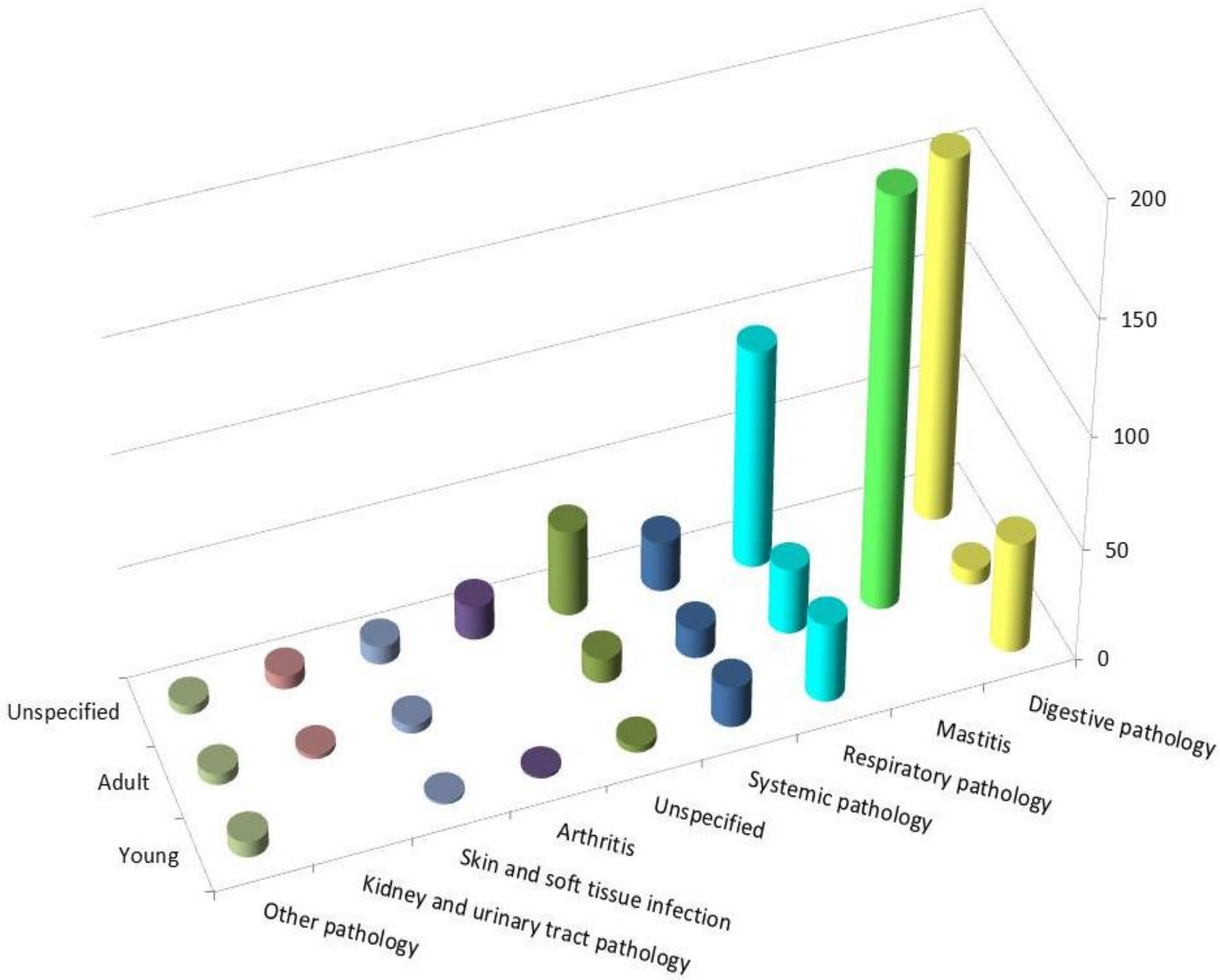


Figure 1 - Goats 2016 – Number of antibiograms by age group and pathology

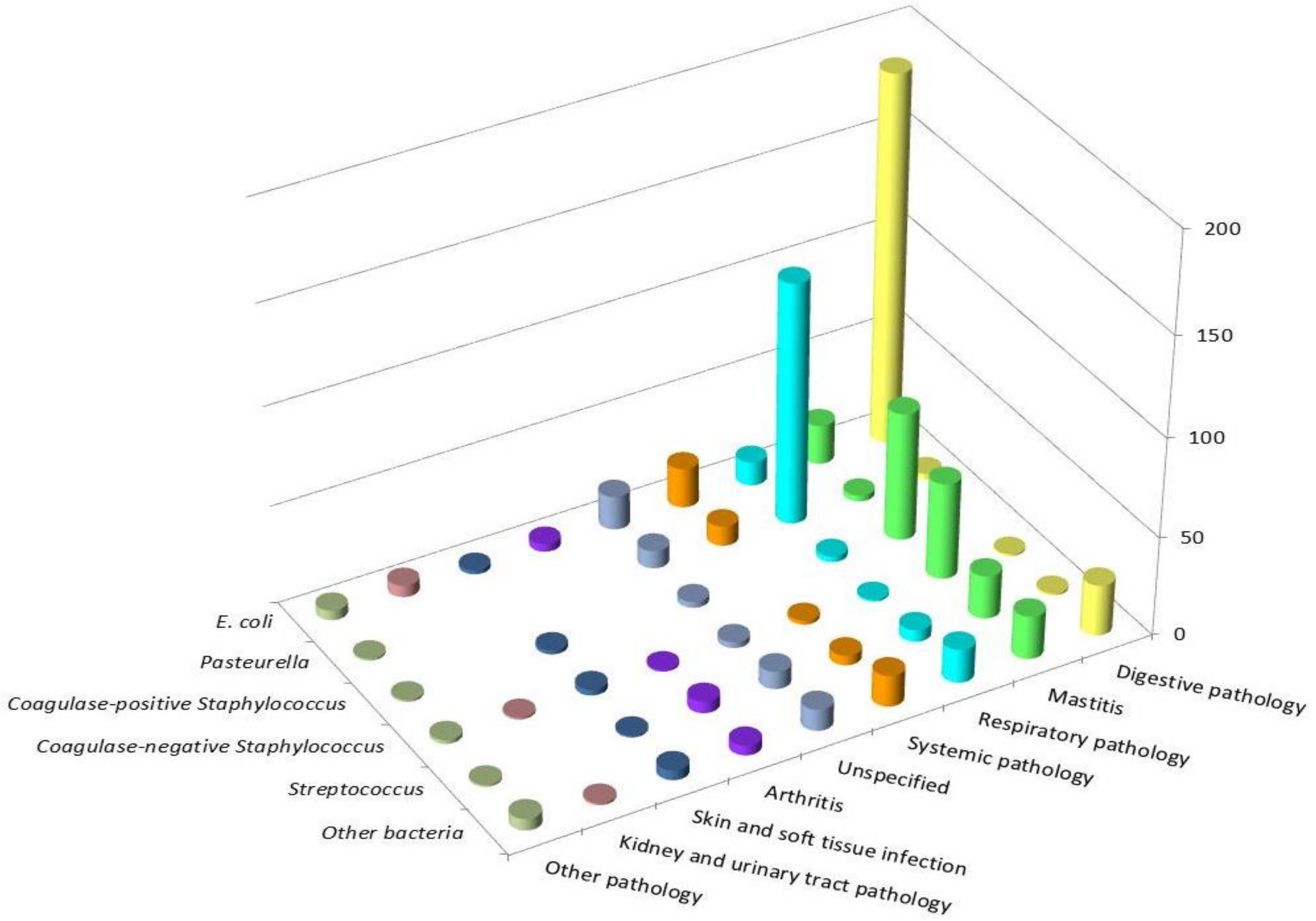


Note: *all values are detailed in table 1 (including other pathologies, representing less than 1%, grouped together)*

Table 1 - Goats 2016 – Number of antibiograms by age group and pathology

	Age group N (%)			
Pathology N (%)	Unspecified	Adult	Young	**Total N (%)**
Digestive pathology	160 *(22.3)*	7 *(1.0)*	49 *(6.8)*	**216** ***(30.2)***
Mastitis		181 *(25.3)*		**181** ***(25.3)***
Respiratory pathology	97 *(13.5)*	29 *(4.1)*	35 *(4.9)*	**161** ***(22.5)***
Systemic pathology	22 *(3.1)*	13 *(1.8)*	18 *(2.5)*	**53** ***(7.4)***
Unspecified	38 *(5.3)*	11 *(1.5)*	3 *(0.4)*	**52** ***(7.3)***
Arthritis	15 *(2.1)*		1 *(0.1)*	**16** ***(2.2)***
Skin and soft tissue infections	8 *(1.1)*	4 *(0.6)*	1 *(0.1)*	**13** ***(1.8)***
Kidney and urinary tract pathology	6 *(0.8)*	2 *(0.3)*		**8** ***(1.1)***
Nervous system pathology		3 *(0.4)*	2 *(0.3)*	**5** ***(0.7)***
Reproductive pathology	1 *(0.1)*	2 *(0.3)*	2 *(0.3)*	**5** ***(0.7)***
Septicemia			2 *(0.3)*	**2** ***(0.3)***
Cardiac pathology	2 *(0.3)*			**2** ***(0.3)***
Bone pathology	1 *(0.1)*			**1** ***(0.1)***
Ocular pathology			1 *(0.1)*	**1** ***(0.1)***
Total N ***(%)***	**350** ***(48.9)***	**252** ***(35.2)***	**114** ***(15.9)***	**716** ***(100.0)***

Figure 2 - Goats 2016 – Number of antibiograms by bacterial group and pathology



Note: *only values for pathologies >1% and bacterial groups having more than 30 occurrences are represented. Detailed values are presented in table 2 below.*

Table 2 - Goats 2016 – Number of antibiograms by bacterial group and pathology

	Pathology N (%)														
Bacteria N (%)	Digestive pathology	Mastitis	Respiratory pathology	Systemic pathology	Unspecified	Arthritis	Skin and soft tissue infections	Kidney and urinary tract pathology	Nervous system pathology	Reproductive pathology	Septicemia	Cardiac pathology	Bone pathology	Ocular pathology	**Total N *(%)***
E. coli	185 *(25.8)*	20 *(2.8)*	12 *(1.7)*	20 *(2.8)*	17 *(2.4)*	4 *(0.6)*	2 *(0.3)*	6 *(0.8)*	1 *(0.1)*	1 *(0.1)*	1 *(0.1)*	2 *(0.3)*			**271 *(37.8)***
Pasteurella	3 *(0.4)*	3 *(0.4)*	122 *(17.0)*	10 *(1.4)*	9 *(1.3)*								1 *(0.1)*		**148 *(20.7)***
Coagulase-positive Staphylococcus		65 *(9.1)*	3 *(0.4)*		3 *(0.4)*		2 *(0.3)*			1 *(0.1)*					**74 *(10.3)***
Coagulase-negative Staphylococcus	1 *(0.1)*	49 *(6.8)*	1 *(0.1)*	2 *(0.3)*	3 *(0.4)*	1 *(0.1)*	3 *(0.4)*	1 *(0.1)*		1 *(0.1)*				1 *(0.1)*	**63 *(8.8)***
Streptococcus	1 *(0.1)*	22 *(3.1)*	6 *(0.8)*	5 *(0.7)*	9 *(1.3)*	6 *(0.8)*	1 *(0.1)*		1 *(0.1)*						**51 *(7.1)***
Other bacteria < 30 occurrences	26 *(3.6)*	22 *(3.1)*	17 *(2.4)*	16 *(2.2)*	11 *(1.5)*	5 *(0.7)*	5 *(0.7)*	1 *(0.1)*	3 *(0.4)*	2 *(0.3)*	1 *(0.1)*				**109 *(15.2)***
Total N *(%)*	**216 *(30.2)***	**181 *(25.3)***	**161 *(22.5)***	**53 *(7.4)***	**52 *(7.3)***	**16 *(2.2)***	**13 *(1.8)***	**8 *(1.1)***	**5 *(0.7)***	**5 *(0.7)***	**2 *(0.3)***	**2 *(0.3)***	**1 *(0.1)***	**1 *(0.1)***	**716 *(100.0)***

Table 3 - Goats 2016 – All pathologies and age groups included – *E. coli:* susceptibility to antibiotics (proportion) (N= 271)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*256*	**43**
Amoxicillin-Clavulanic ac.	*264*	**71**
Cephalexin	*229*	**86**
Cephalothin	*138*	**91**
Cefoxitin	*227*	**97**
Cefuroxime	*144*	**95**
Cefoperazone	*139*	**96**
Ceftiofur	*269*	**97**
Cefquinome 30 µg	*256*	**97**
Streptomycin 10 UI	*220*	**41**
Spectinomycin	*141*	**74**
Kanamycin 30 UI	*150*	**73**
Gentamicin 10 UI	*271*	**88**
Neomycin	*211*	**77**
Apramycin	*39*	**100**
Tetracycline	*253*	**40**
Florfenicol	*223*	**91**
Nalidixic ac.	*223*	**75**
Enrofloxacin	*260*	**80**
Marbofloxacin	*217*	**78**
Danofloxacin	*163*	**75**
Sulfonamides	*32*	**31**
Trimethoprim-Sulfonamides	*268*	**62**

Table 4 - Goats 2016 – All pathologies and age groups included – *Pasteurella*: susceptibility to antibiotics (proportion) (N= 148)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*132*	**86**
Amoxicillin-Clavulanic ac.	*126*	**92**
Cephalexin	*106*	**97**
Cephalothin	*61*	**98**
Cefoxitin	*83*	**90**
Cefuroxime	*57*	**100**
Cefoperazone	*59*	**90**
Ceftiofur	*142*	**99**
Cefquinome 30 µg	*124*	**91**
Streptomycin 10 UI	*111*	**37**
Spectinomycin	*60*	**37**
Kanamycin 30 UI	*72*	**40**
Gentamicin 10 UI	*128*	**81**
Neomycin	*89*	**53**
Tetracycline	*144*	**87**
Florfenicol	*129*	**96**
Nalidixic ac.	*108*	**86**
Flumequine	*33*	**79**
Enrofloxacin	*139*	**89**
Marbofloxacin	*115*	**96**
Danofloxacin	*79*	**73**
Trimethoprim-Sulfonamides	*145*	**81**

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Annex 5

Pigs

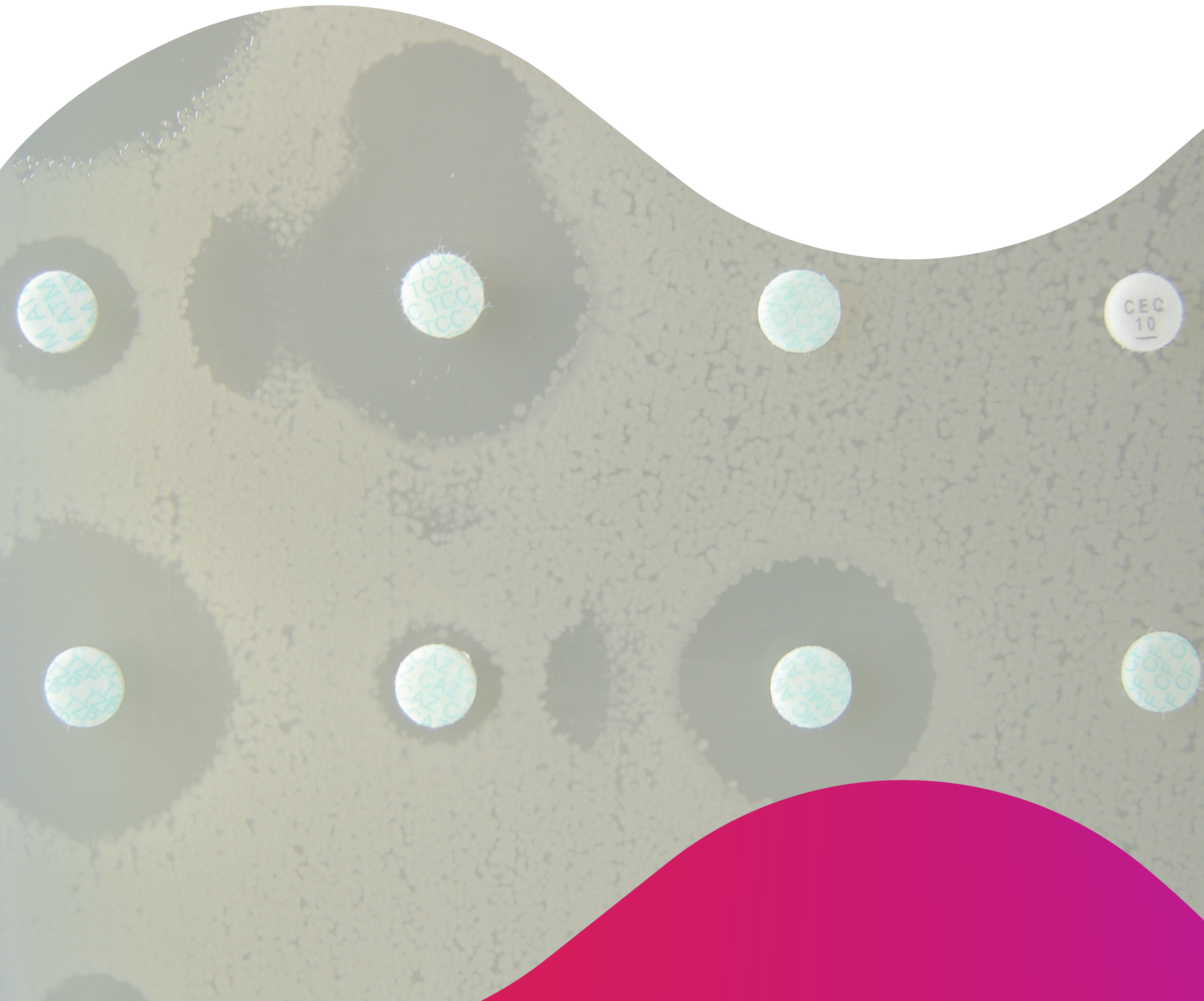


Figure 1 - Pigs 2016 – Antibiogram proportions by animal category

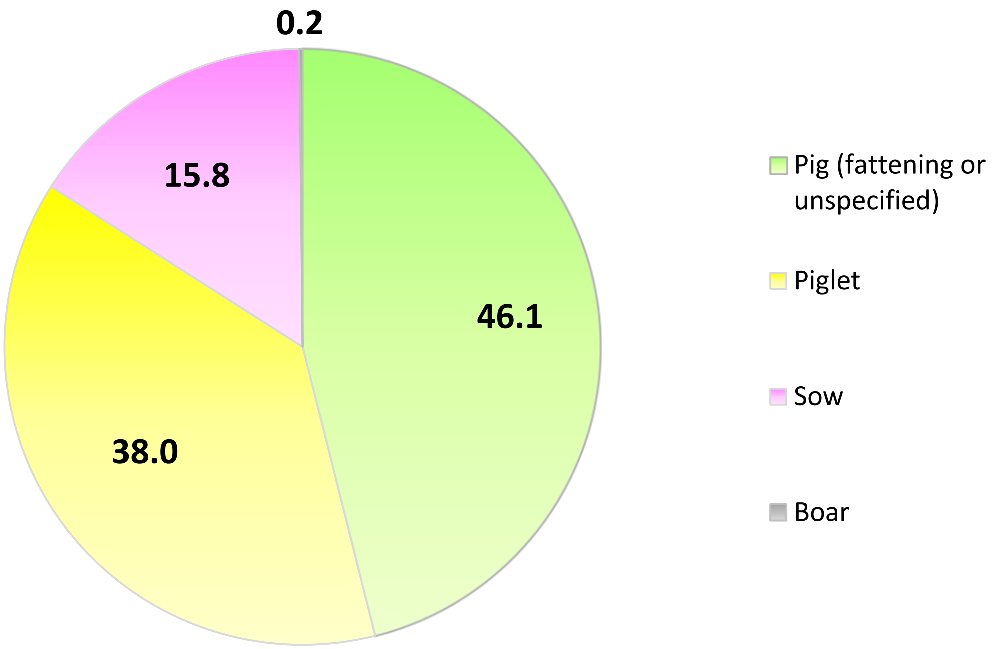


Figure 2 - Pigs 2016 – Number of antibiograms by pathology and animal category

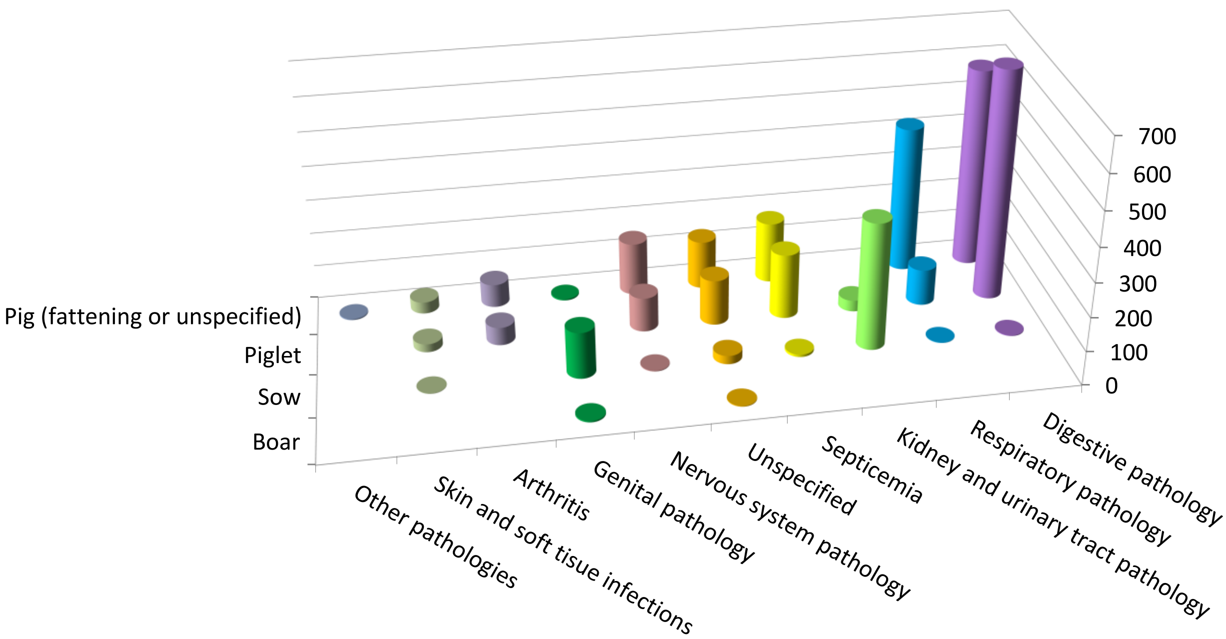
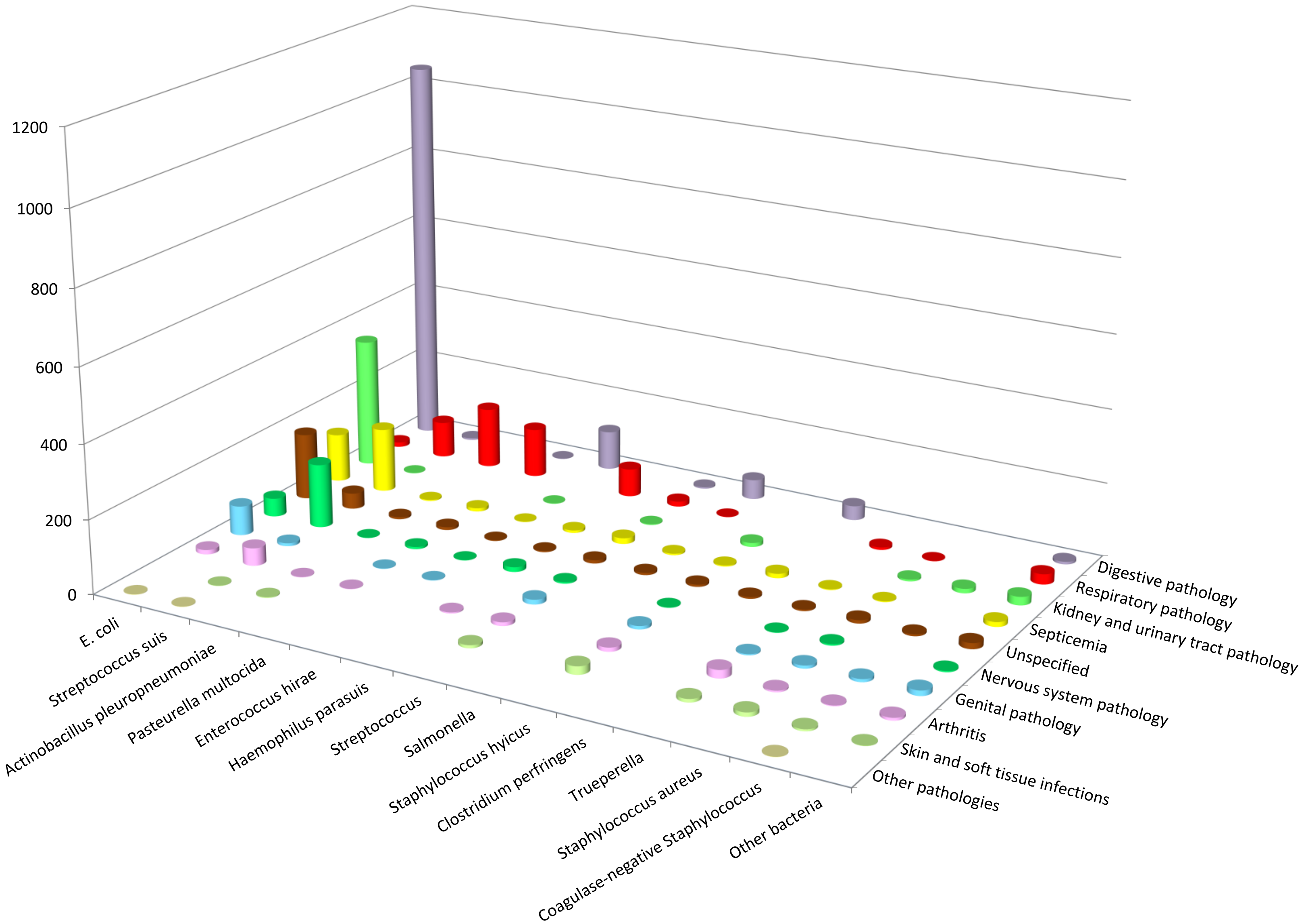


Table 1 - Pigs 2016 – Number of antibiograms by pathology and animal category

Age group or physiological stage N (%)	**Pathology N *(%)***										
	Digestive pathology	Respiratory pathology	Kidney and urinary tract pathology	Septicemia	Unspecified	Nervous system pathology	Genital pathology	Arthritis	Skin and soft tissue infections	Other	**Total N** *(%)*
Pig (fattening or unspecified)	588 *(16.88)*	431 *(12.37)*		180 *(5.17)*	142 *(4.08)*	155 *(4.45)*	4 *(0.11)*	68 *(1.95)*	34 *(0.98)*	3 *(0.09)*	**1,605** *(46.08)*
Piglet	678 *(19.47)*	107 *(3.07)*	33 *(0.95)*	192 *(5.51)*	134 *(3.85)*	101 *(2.90)*		53 *(1.52)*	24 *(0.69)*		**1,322** *(37.96)*
Sow	2 *(0.06)*	1 *(0.03)*	375 *(10.77)*	7 *(0.20)*	25 *(0.72)*	2 *(0.06)*	137 *(3.93)*		1 *(0.03)*		**550** *(15.79)*
Boar					2 *(0.06)*		4 *(0.11)*				**6** *(0.17)*
Total N *(%)*	**1,268 *(36.41)***	**539 *(15.48)***	**408 *(11.71)***	**379 *(10.88)***	**303 *(8.70)***	**258 *(7.41)***	**145 *(4.16)***	**121 *(3.47)***	**59 *(1.69)***	**3 *(0.09)***	**3,483 *(100.00)***

Figure 3 - Pigs 2016 – 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 2016 – 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 soft tissue infections	Other	**Total N *(%)***
E. coli	1,051 *(30.18)*	13 *(0.37)*	353 *(10.13)*	132 *(3.79)*	181 *(5.20)*	50 *(1.44)*	80 *(2.30)*	12 *(0.34)*		1 *(0.03)*	**1,873 *(53.78)***
Streptococcus suis	5 *(0.14)*	99 *(2.84)*	1 *(0.03)*	175 *(5.02)*	43 *(1.23)*	174 *(5.00)*	8 *(0.23)*	48 *(1.38)*	1 *(0.03)*	1 *(0.03)*	**555 *(15.93)***
Actinobacillus pleuropneumoniae		165 *(4.74)*		3 *(0.09)*	6 *(0.17)*	1 *(0.03)*		1 *(0.03)*	2 *(0.06)*		**178 *(5.11)***
Pasteurella multocida	1 *(0.03)*	134 *(3.85)*		9 *(0.26)*	8 *(0.23)*	6 *(0.17)*	1 *(0.03)*	1 *(0.03)*			**160 *(4.59)***
Enterococcus hirae	107 *(3.07)*		1 *(0.03)*	1 *(0.03)*	2 *(0.06)*	1 *(0.03)*	1 *(0.03)*				**113 *(3.24)***
Haemophilus parasuis		77 *(2.21)*		7 *(0.20)*	3 *(0.09)*	13 *(0.37)*		3 *(0.09)*			**103 *(2.96)***
Streptococcus	4 *(0.11)*	14 *(0.40)*	2 *(0.06)*	16 *(0.46)*	9 *(0.26)*	4 *(0.11)*	13 *(0.37)*	10 *(0.29)*	8 *(0.23)*		**80 *(2.30)***
Salmonella	54 *(1.55)*	1 *(0.03)*		4 *(0.11)*	6 *(0.17)*						**65 *(1.87)***
Staphylococcus hyicus			11 *(0.32)*	3 *(0.09)*	6 *(0.17)*	1 *(0.03)*	9 *(0.26)*	11 *(0.32)*	22 *(0.63)*		**63 *(1.81)***
Clostridium perfringens	39 *(1.12)*			12 *(0.34)*	5 *(0.14)*						**56 *(1.61)***
Trueperella		7 *(0.20)*		2 *(0.06)*	4 *(0.11)*	1 *(0.03)*	3 *(0.09)*	22 *(0.63)*	9 *(0.26)*		**48 *(1.38)***
Staphylococcus aureus		1 *(0.03)*	5 *(0.14)*	2 *(0.06)*	9 *(0.26)*	4 *(0.11)*	8 *(0.23)*	4 *(0.11)*	11 *(0.32)*		**44 *(1.26)***
Coagulase-negative *Staphylococcus*			12 *(0.34)*		5 *(0.14)*		8 *(0.23)*	2 *(0.06)*	5 *(0.14)*	1 *(0.03)*	**33 *(0.95)***
Other bacteria < 30 occurrences	7 *(0.20)*	28 *(0.80)*	23 *(0.66)*	13 *(0.37)*	16 *(0.46)*	3 *(0.09)*	14 *(0.40)*	7 *(0.20)*	1 *(0.03)*		**112 *(3.22)***
Total N (%)	**1,268 *(36.41)***	**539 *(15.48)***	**408 *(11.71)***	**379 *(10.88)***	**303 *(8.70)***	**258 *(7.41)***	**145 *(4.16)***	**121 *(3.47)***	**59 *(1.69)***	**3 *(0.09)***	**3,483 *(100.00)***

Table 3 - Pigs 2016 – All pathologies and age groups included – *E. coli*: susceptibility to antibiotics (proportion) (N= 1,873)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*1,830*	**43**
Amoxicillin-Clavulanic ac.	*1,735*	**81**
Cephalexin	*985*	**87**
Cephalothin	*441*	**90**
Cefoxitin	*1,454*	**96**
Cefuroxime	*322*	**93**
Cefoperazone	*324*	**97**
Ceftiofur	*1,870*	**98**
Cefquinome 30 µg	*548*	**97**
Streptomycin 10 UI	*304*	**38**
Spectinomycin	*1,542*	**67**
Gentamicin 10 UI	*1,718*	**90**
Neomycin	*1,688*	**84**
Apramycin	*1,630*	**91**
Tetracycline	*1,556*	**29**
Florfenicol	*1,724*	**90**
Nalidixic ac.	*774*	**74**
Oxolinic ac.	*1,163*	**74**
Flumequine	*948*	**76**
Enrofloxacin	*1,759*	**90**
Marbofloxacin	*1,505*	**92**
Danofloxacin	*440*	**88**
Trimethoprim	*383*	**44**
Trimethoprim-Sulfonamides	*1,852*	**45**

Table 4 - Pigs 2016 – Digestive pathology – Piglets (post-weaning included) – *E. coli*: susceptibility to antibiotics (proportion) (N= 559)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*538*	**44**
Amoxicillin-Clavulanic ac.	*527*	**82**
Cephalexin	*399*	**87**
Cefoxitin	*424*	**96**
Ceftiofur	*557*	**97**
Cefquinome 30 µg	*121*	**96**
Spectinomycin	*520*	**67**
Gentamicin 10 UI	*542*	**90**
Neomycin	*556*	**83**
Apramycin	*551*	**92**
Tetracycline	*412*	**31**
Florfenicol	*517*	**89**
Oxolinic ac.	*442*	**74**
Flumequine	*135*	**73**
Enrofloxacin	*557*	**89**
Marbofloxacin	*529*	**91**
Trimethoprim-Sulfonamides	*544*	**42**

Table 5 - Pigs 2016 – Kidney and urinary tract pathology – Sows – *E. coli*: susceptibility to antibiotics (proportion) (N= 325)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*320*	**42**
Amoxicillin-Clavulanic ac.	*226*	**74**
Cephalexin	*125*	**80**
Cefoxitin	*181*	**94**
Ceftiofur	*325*	**99**
Spectinomycin	*170*	**76**
Gentamicin 10 UI	*226*	**96**
Neomycin	*181*	**91**
Apramycin	*171*	**96**
Tetracycline	*311*	**29**
Florfenicol	*310*	**92**
Nalidixic ac.	*124*	**69**
Oxolinic ac.	*257*	**74**
Enrofloxacin	*220*	**86**
Marbofloxacin	*319*	**92**
Trimethoprim-Sulfonamides	*324*	**47**

Table 6 - Pigs 2016 – All pathologies included – *Actinobacillus pleuropneumoniae*: susceptibility to antibiotics (proportion) (N= 178)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*176*	**94**
Amoxicillin-Clavulanic ac.	*108*	**100**
Ceftiofur	*177*	**100**
Tilmicosin	*170*	**92**
Tetracycline	*128*	**85**
Florfenicol	*170*	**100**
Enrofloxacin	*121*	**99**
Marbofloxacin	*150*	**99**
Trimethoprim-Sulfonamides	*177*	**94**

Table 7 - Pigs 2016 – All pathologies included – *Pasteurella multocida*: susceptibility to antibiotics (proportion) (N= 160)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*142*	**100**
Amoxicillin-Clavulanic ac.	*124*	**99**
Ceftiofur	*156*	**100**
Tilmicosin	*150*	**99**
Tetracycline	*139*	**93**
Florfenicol	*150*	**99**
Enrofloxacin	*132*	**100**
Marbofloxacin	*119*	**100**
Trimethoprim-Sulfonamides	*159*	**84**

Table 8 - Pigs 2016 – All pathologies included – *Streptococcus suis*: susceptibility to antibiotics (proportion) (N= 555)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*514*	**100**
Oxacillin	*350*	**95**
Erythromycin	*467*	**32**
Tylosin	*395*	**31**
Spiramycin	*419*	**36**
Lincomycin	*484*	**33**
Streptomycin 500 µg	*349*	**95**
Kanamycin 1000 µg	*241*	**96**
Gentamicin 500 µg	*465*	**100**
Tetracycline	*360*	**19**
Trimethoprim-Sulfonamides	*555*	**80**

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Annex 6
Poultry

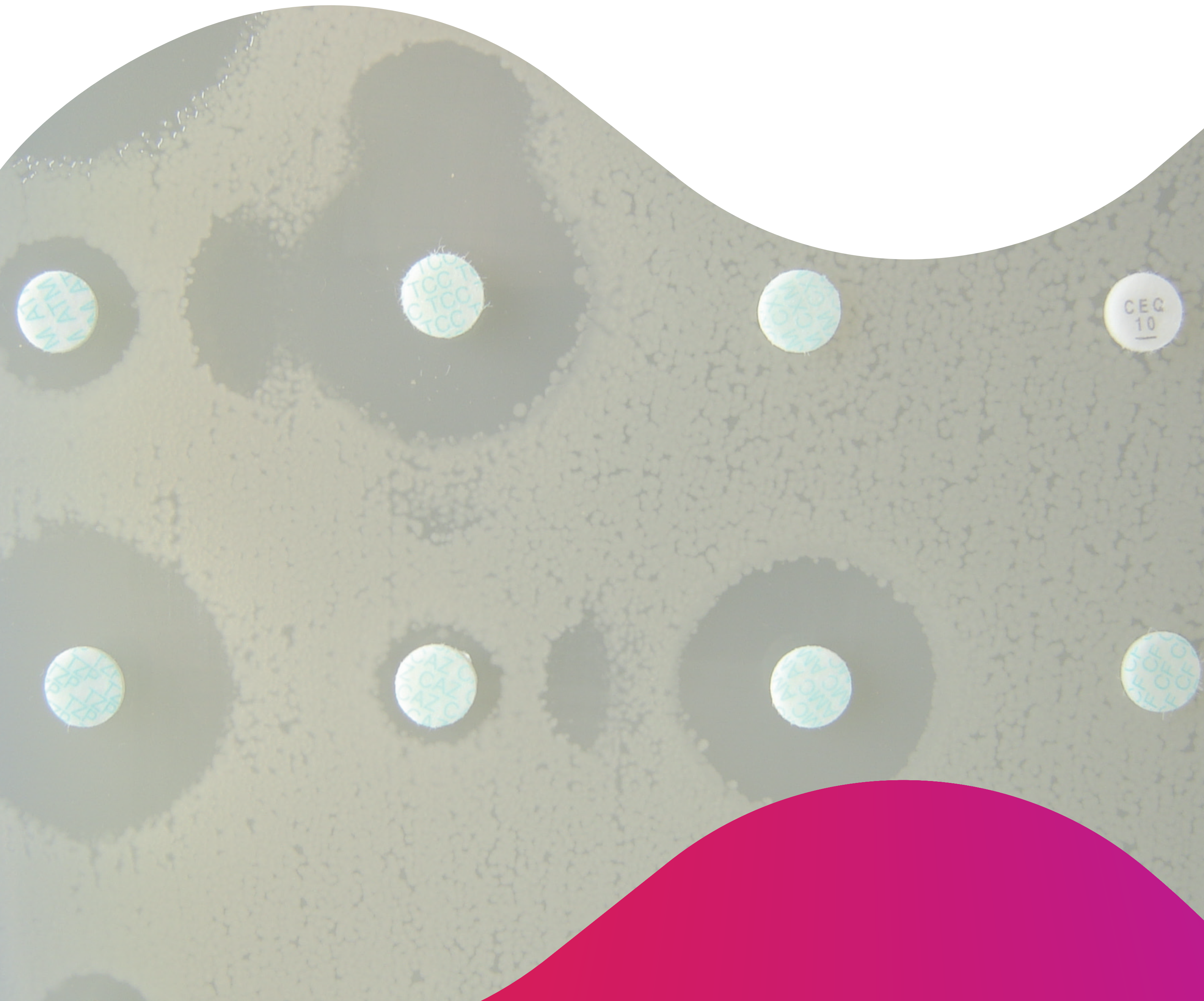
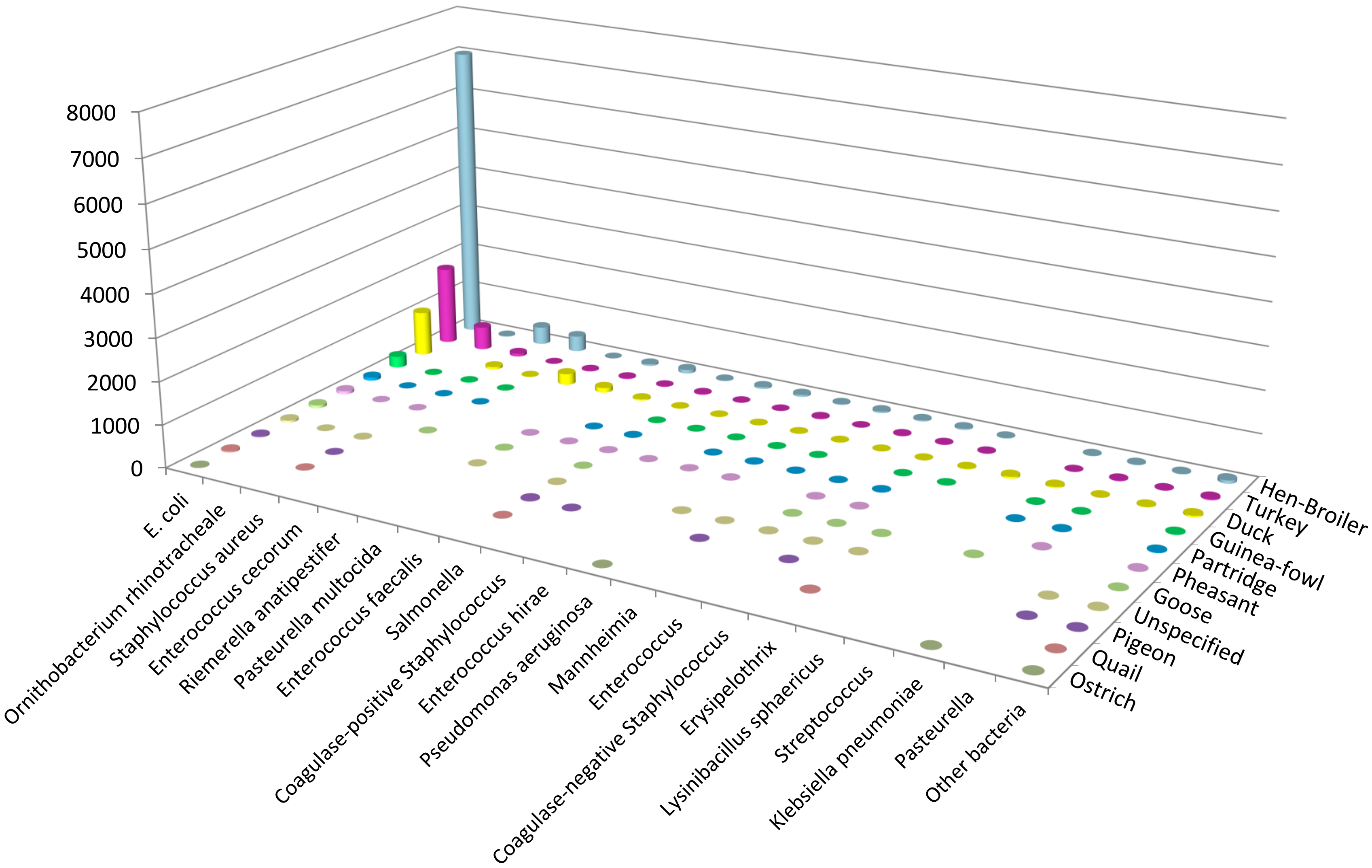


Figure 1 - Poultry 2016 – Number of antibiograms by bacteria and animal



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

Table 1, part 1 - Poultry 2016 – Number of antibiograms by bacteria and animal

	Animal species N *(%)*											
Bacteria N ***(%)***	Hen-broiler	Turkey	Duck	Guinea-fowl	Partridge	Pheasant	Goose	Unspecified	Pigeon	Quail	Ostrich	**Total N** ***(%)***
E. coli	7,024 *(52.11)*	1,867 *(13.85)*	1065 *(7.90)*	268 *(1.99)*	76 *(0.56)*	73 *(0.54)*	66 *(0.49)*	45 *(0.33)*	25 *(0.19)*	30 *(0.22)*	10 *(0.07)*	**10,549** ***(78.26)***
Ornithobacterium rhinotracheale	16 *(0.12)*	554 *(4.11)*		6 *(0.04)*	2 *(0.01)*	1 *(0.01)*		2 *(0.01)*				**581** ***(4.31)***
Staphylococcus aureus	421 *(3.12)*	73 *(0.54)*	58 *(0.43)*	13 *(0.10)*	3 *(0.02)*	2 *(0.01)*		4 *(0.03)*	2 *(0.01)*	4 *(0.03)*		**580** ***(4.30)***
Enterococcus cecorum	374 *(2.77)*	4 *(0.03)*	4 *(0.03)*	2 *(0.01)*	1 *(0.01)*		2 *(0.01)*					**387** ***(2.87)***
Riemerella anatipestifer	1 *(0.01)*	17 *(0.13)*	266 *(1.97)*									**284** ***(2.11)***
Pasteurella multocida	41 *(0.30)*	21 *(0.16)*	115 *(0.85)*			2 *(0.01)*	4 *(0.03)*	1 *(0.01)*				**184** ***(1.36)***
Enterococcus faecalis	91 *(0.68)*	12 *(0.09)*	30 *(0.22)*		3 *(0.02)*	2 *(0.01)*						**138** ***(1.02)***
Salmonella	16 *(0.12)*	17 *(0.13)*	6 *(0.04)*	3 *(0.02)*	8 *(0.06)*	4 *(0.03)*	2 *(0.01)*	1 *(0.01)*	17 *(0.13)*	1 *(0.01)*		**75** ***(0.56)***
Coagulase-positive *Staphylococcus*	45 *(0.33)*	6 *(0.04)*	3 *(0.02)*	5 *(0.04)*		1 *(0.01)*			1 *(0.01)*			**61** ***(0.45)***
Enterococcus hirae	49 *(0.36)*	3 *(0.02)*	3 *(0.02)*	1 *(0.01)*	1 *(0.01)*	1 *(0.01)*						**58** ***(0.43)***
Pseudomonas aeruginosa	20 *(0.15)*	20 *(0.15)*	4 *(0.03)*	4 *(0.03)*	5 *(0.04)*	1 *(0.01)*		2 *(0.01)*			1 *(0.01)*	**57** ***(0.42)***
Mannheimia	40 *(0.30)*	2 *(0.01)*	3 *(0.02)*	2 *(0.01)*	1 *(0.01)*			1 *(0.01)*	1 *(0.01)*			**50** ***(0.37)***
Enterococcus	27 *(0.20)*	12 *(0.09)*	2 *(0.01)*		1 *(0.01)*	3 *(0.02)*	2 *(0.01)*	1 *(0.01)*				**48** ***(0.36)***
Coagulase-negative *Staphylococcus*	30 *(0.22)*	8 *(0.06)*	1 *(0.01)*	2 *(0.01)*	3 *(0.02)*	1 *(0.01)*	1 *(0.01)*	1 *(0.01)*	1 *(0.01)*			**48** ***(0.36)***

Table 1, part 2 - Poultry 2016 – Number of antibiograms by bacteria and animal

	Animal species N *(%)*											
Bacteria N ***(%)***	Hen-chicken	Turkey	Duck	Guinea-fowl	Partridge	Pheasant	Goose	Unspecified	Pigeon	Quail	Ostrich	**Total N** ***(%)***
Erysipelothrix	12 *(0.09)*	11 *(0.08)*	11 *(0.08)*	4 *(0.03)*			4 *(0.03)*	1 *(0.01)*		1 *(0.01)*		**44** ***(0.33)***
Lysinibacillus sphaericus			43 *(0.32)*									**43** ***(0.32)***
Streptococcus	8 *(0.06)*	1 *(0.01)*	27 *(0.20)*	1 *(0.01)*	1 *(0.01)*		4 *(0.03)*					**42** ***(0.31)***
Klebsiella pneumoniae	11 *(0.08)*	13 *(0.10)*	2 *(0.01)*	1 *(0.01)*	6 *(0.04)*	1 *(0.01)*					1 *(0.01)*	**35** ***(0.26)***
Pasteurella	13 *(0.10)*	5 *(0.04)*	10 *(0.07)*					2 *(0.01)*	3 *(0.02)*			**33** ***(0.24)***
Other bacteria *< 30 occurrences*	76 *(0.56)*	30 *(0.22)*	36 *(0.27)*	9 *(0.07)*	8 *(0.06)*	5 *(0.04)*	2 *(0.01)*	7 *(0.05)*	7 *(0.05)*	1 *(0.01)*	2 *(0.01)*	**183** ***(1.36)***
Total N **(%)**	**8,315** ***(61.68)***	**2,676** ***(19.85)***	**1,689** ***(12.53)***	**321** ***(2.38)***	**119** ***(0.88)***	**97** ***(0.72)***	**87** ***(0.65)***	**68** ***(0.50)***	**57** ***(0.42)***	**37** ***(0.27)***	**14** ***(0.10)***	**13,480** ***(100.00)***

Table 2 - Hens and broilers 2016 – All pathologies included - *E. coli*: susceptibility to antibiotics (proportion) (N=7,024)

Antibiotic	Total (N)	% S
Amoxicillin	6,975	**64**
Amoxicillin-Clavulanic ac.	5,332	**87**
Cephalexin	2,292	**91**
Cephalothin	2,781	**96**
Cefoxitin	5,042	**97**
Cefuroxime	418	**96**
Cefoperazone	376	**96**
Ceftiofur	6,531	**98**
Cefquinome 30 µg	2,047	**99**
Spectinomycin	2,602	**81**
Gentamicin 10 UI	6,245	**94**
Neomycin	3,480	**98**
Apramycin	*3,309*	**100**
Tetracycline	*5,707*	**58**
Florfenicol	*4,777*	**99**
Nalidixic ac.	*5,271*	**58**
Oxolinic ac.	*2,706*	**54**
Flumequine	*5,948*	**58**
Enrofloxacin	*6,975*	**93**
Marbofloxacin	*810*	**94**
Danofloxacin	*383*	**88**
Sulfonamides	*152*	**61**
Trimethoprim	*3,052*	**77**
Trimethoprim-Sulfonamides	*6,980*	**74**

Table 3 – Laying hens (table eggs and hatching eggs) 2016 – All pathologies included - *E. coli*: susceptibility to antibiotics (proportion) (N= 2,534)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*2,502*	**72**
Amoxicillin-Clavulanic ac.	*2,015*	**89**
Cephalexin	*468*	**87**
Cephalothin	*1,492*	**97**
Cefoxitin	*1,955*	**97**
Ceftiofur	*2,434*	**98**
Cefquinome 30 µg	*398*	**99**
Spectinomycin	*527*	**75**
Gentamicin 10 UI	*2,341*	**92**
Neomycin	*1,574*	**99**
Apramycin	*1,507*	**100**
Tetracycline	*2,043*	**65**
Florfenicol	*1,745*	**99**
Nalidixic ac.	*2,208*	**65**
Oxolinic ac.	*492*	**61**
Flumequine	*2,194*	**64**
Enrofloxacin	*2,500*	**96**
Trimethoprim	*1,599*	**82**
Trimethoprim-Sulfonamides	*2,503*	**83**

Table 4 – Broilers 2016 – All pathologies included - *E. coli*: susceptibility to antibiotics (proportion) (N= 3,902)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*3,887*	**59**
Amoxicillin-Clavulanic ac.	*2,800*	**85**
Cephalexin	*1,377*	**92**
Cephalothin	*1,207*	**95**
Cefoxitin	*2,582*	**97**
Cefuroxime	*158*	**97**
Ceftiofur	*3,511*	**97**
Cefquinome 30 µg	*1,339*	**98**
Spectinomycin	*1,697*	**82**
Gentamicin 10 UI	*3,354*	**95**
Neomycin	*1,406*	**98**
Apramycin	*1,365*	**100**
Tetracycline	*3,161*	**56**
Florfenicol	*2,560*	**99**
Nalidixic ac.	*2,876*	**53**
Oxolinic ac.	*1,854*	**53**
Flumequine	*3,428*	**54**
Enrofloxacin	*3,889*	**92**
Marbofloxacin	*303*	**93**
Danofloxacin	*155*	**87**
Sulfonamides	*114*	**60**
Trimethoprim	*1,392*	**71**
Trimethoprim-Sulfonamides	*3,890*	**69**

Table 5 - Turkeys 2016 – All pathologies included - *E. coli*: susceptibility to antibiotics (proportion) (N= 1,867)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*1,864*	**51**
Amoxicillin-Clavulanic ac.	*1,274*	**85**
Cephalexin	*806*	**90**
Cephalothin	*354*	**97**
Cefoxitin	*1,155*	**99**
Ceftiofur	*1,793*	**99**
Cefquinome 30 µg	*502*	**99**
Spectinomycin	*642*	**91**
Gentamicin 10 UI	*1,478*	**98**
Neomycin	*432*	**99**
Apramycin	*409*	**100**
Tetracycline	*1,345*	**58**
Florfenicol	*933*	**99**
Nalidixic ac.	*1,426*	**78**
Oxolinic ac.	*889*	**82**
Flumequine	*1,499*	**78**
Enrofloxacin	*1,864*	**95**
Marbofloxacin	*136*	**95**
Trimethoprim	*714*	**80**
Trimethoprim-Sulfonamides	*1,864*	**75**

Table 6 - Ducks 2016 – All pathologies included - *E. coli*: susceptibility to antibiotics (proportion) (N= 1,065)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*1,061*	**46**
Amoxicillin-Clavulanic ac.	*809*	**70**
Cephalexin	*486*	**86**
Cephalothin	*321*	**93**
Cefoxitin	*780*	**99**
Ceftiofur	*928*	**98**
Cefquinome 30 µg	*475*	**97**
Spectinomycin	*639*	**90**
Gentamicin 10 UI	*912*	**96**
Neomycin	*345*	**97**
Apramycin	*384*	**97**
Tetracycline	*1,019*	**34**
Florfenicol	*868*	**99**
Nalidixic ac.	*806*	**69**
Oxolinic ac.	*564*	**73**
Flumequine	*1,010*	**69**
Enrofloxacin	*1,059*	**95**
Trimethoprim	*400*	**58**
Trimethoprim-Sulfonamides	*1,061*	**60**

Table 7 - Hens and broilers 2016 – All pathologies included - *Staphylococcus aureus*: susceptibility to antibiotics (proportion) (N= 421)

Antibiotic	*Total (N)*	**% S**
Penicillin G	*279*	**92**
Cefoxitin	*393*	**92**
Erythromycin	*351*	**97**
Tylosin	*377*	**98**
Spiramycin	*231*	**98**
Lincomycin	*396*	**95**
Gentamicin 10 UI	*259*	**99**
Neomycin	*207*	**99**
Tetracycline	*377*	**86**
Enrofloxacin	*414*	**93**
Trimethoprim-Sulfonamides	*417*	**98**

Table 8 - Hens and broilers 2016 – All pathologies included – *Enterococcus cecorum*: susceptibility to antibiotics (proportion) (N= 374)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*371*	**99**
Erythromycin	*217*	**38**
Tylosin	*220*	**39**
Spiramycin	*173*	**44**
Lincomycin	*305*	**36**
Gentamicin 500 µg	*154*	**95**
Tetracycline	*239*	**6**
Trimethoprim-Sulfonamides	*373*	**33**

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Annex 7
Rabbits

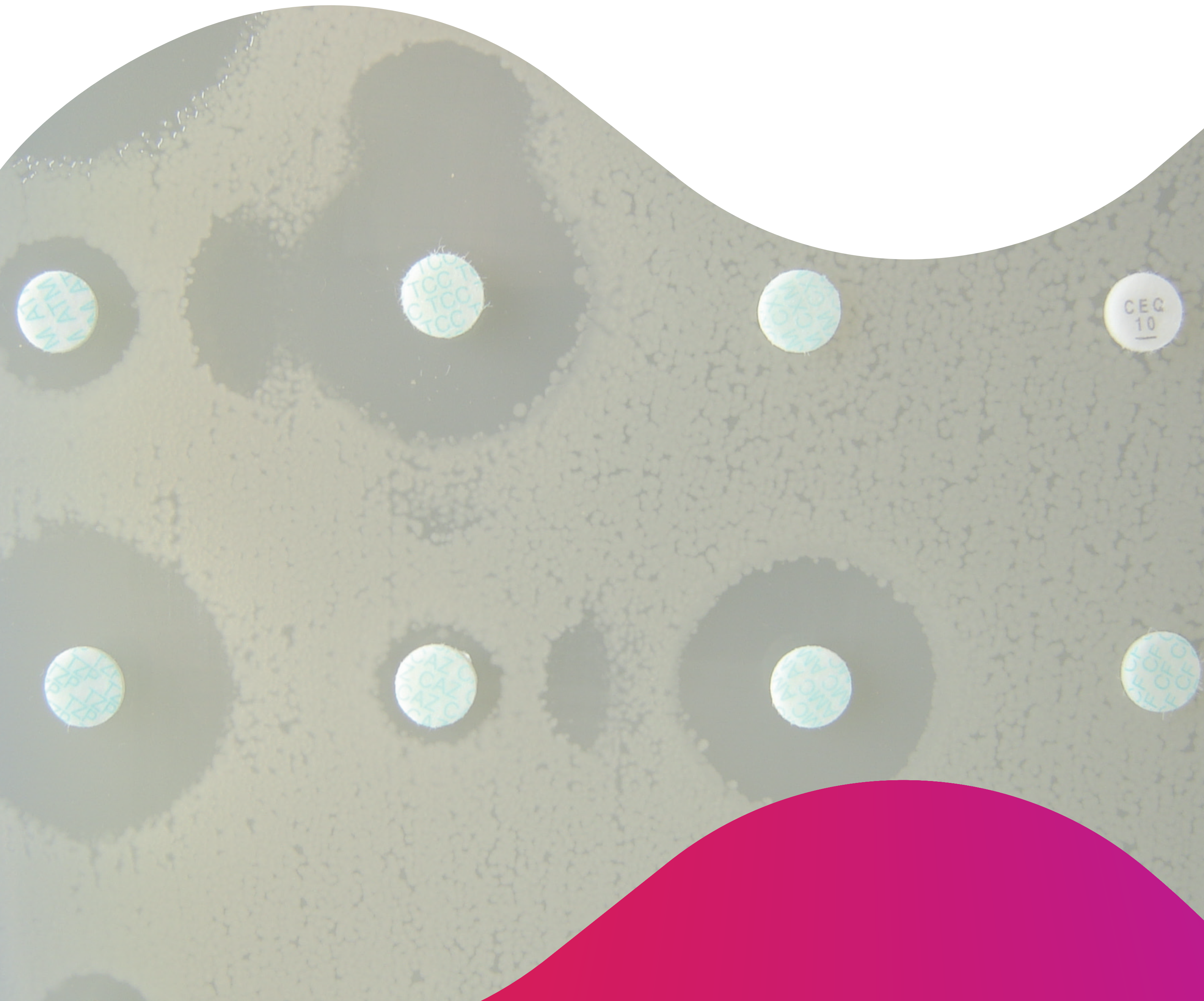
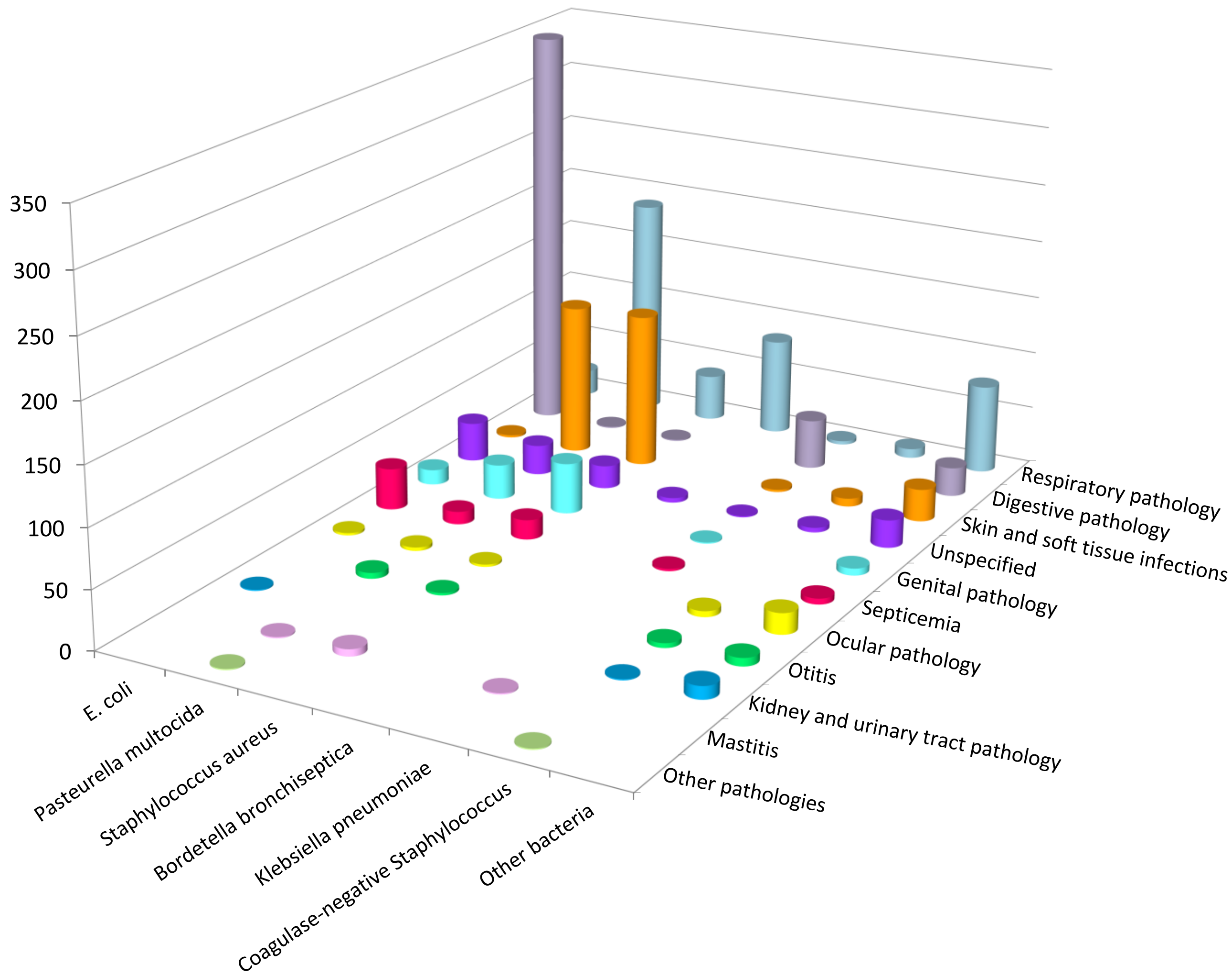


Figure 1 - Rabbits 2016 – Number of antibiograms by bacteria and pathology



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

Table 1 - Rabbits 2016 – Number of antibiograms by bacteria and pathology

	Pathology N *(%)*											
Bacteria N ***(%)***	Respiratory pathology	Digestive pathology	Skin and soft tissue infections	Unspecified	Genital pathology	Septicemia	Ocular pathology	Otitis	Kidney and urinary tract pathology	Mastitis	Other	**Total N** ***(%)***
E. coli	22 *(1.47)*	348 *(23.29)*	2 *(0.13)*	34 *(2.28)*	13 *(0.87)*	36 *(2.41)*	2 *(0.13)*		1 *(0.07)*			**458** ***(30.66)***
Pasteurella multocida	189 *(12.65)*	1 *(0.07)*	131 *(8.77)*	26 *(1.74)*	30 *(2.01)*	11 *(0.74)*	3 *(0.20)*	5 *(0.33)*		1 *(0.07)*	1 *(0.07)*	**398** ***(26.64)***
Staphylococcus aureus	40 *(2.68)*	1 *(0.07)*	134 *(8.97)*	20 *(1.34)*	44 *(2.95)*	17 *(1.14)*	2 *(0.13)*	2 *(0.13)*		6 *(0.40)*		**266** ***(17.80)***
Bordetella bronchiseptica	84 *(5.62)*			4 *(0.27)*								**88** ***(5.89)***
Klebsiella pneumoniae	3 *(0.20)*	43 *(2.88)*	2 *(0.13)*	1 *(0.07)*	1 *(0.07)*	2 *(0.13)*				1 *(0.07)*		**53** ***(3.55)***
Coagulase-negative *Staphylococcus*	8 *(0.54)*		7 *(0.47)*	4 *(0.27)*			5 *(0.33)*	4 *(0.27)*	1 *(0.07)*		1 *(0.07)*	**30** ***(2.01)***
Other bacteria < 30 occurrences	77 *(5.15)*	25 *(1.67)*	28 *(1.87)*	24 *(1.61)*	6 *(0.40)*	5 *(0.33)*	18 *(1.20)*	7 *(0.47)*	11 *(0.74)*			**201** ***(13.45)***
Total N (%)	**423** ***(28.31)***	**418** ***(27.98)***	**304** ***(20.35)***	**113** ***(7.56)***	**94** ***(6.29)***	**71** ***(4.75)***	**30** ***(2.01)***	**18** ***(1.20)***	**13** ***(0.87)***	**8** ***(0.54)***	**2** ***(0.13)***	**1,494** ***(100.00)***

Table 2 - Rabbits 2016 - All pathologies included - *E. coli*: susceptibility to antibiotics (proportion) (N = 458)

Antibiotic	*Total (N)*	% S
Amoxicillin	*269*	**48**
Amoxicillin-Clavulanic ac.	*282*	**67**
Cephalexin	*231*	**76**
Cefoxitin	*260*	**95**
Ceftiofur	*394*	**99**
Cefquinome 30 µg	*201*	**100**
Streptomycin 10 UI	*207*	**51**
Spectinomycin	*328*	**90**
Gentamicin 10 UI	*452*	**87**
Neomycin	*443*	**81**
Apramycin	*408*	**85**
Tetracycline	*437*	**20**
Florfenicol	*111*	**96**
Nalidixic ac.	*304*	**77**
Flumequine	*236*	**80**
Enrofloxacin	*451*	**93**
Marbofloxacin	*198*	**97**
Danofloxacin	*183*	**90**
Trimethoprim	*101*	**33**
Trimethoprim-Sulfonamides	*444*	**32**

Table 3 - Rabbits 2016 – All pathologies included - *Pasteurella multocida*: susceptibility to antibiotics (proportion) (N= 398)

Antibiotic	*Total (N)*	% S
Ceftiofur	*189*	**99**
Tilmicosin	*357*	**93**
Spectinomycin	*202*	**96**
Gentamicin 10 UI	*357*	**98**
Neomycin	*143*	**95**
Tetracycline	*384*	**98**
Florfenicol	*121*	**100**
Flumequine	*244*	**96**
Enrofloxacin	*357*	**99**
Marbofloxacin	*141*	**99**
Danofloxacin	*206*	**99**
Trimethoprim-Sulfonamides	*396*	**97**

Table 4 - Rabbits 2016 – All pathologies included - *Staphylococcus aureus*: susceptibility to antibiotics (proportion) (N= 266)

Antibiotic	*Total (N)*	% S
Penicillin G	*173*	**87**
Cefoxitin	*222*	**96**
Erythromycin	*217*	**39**
Spiramycin	*233*	**42**
Gentamicin 10 UI	*259*	**55**
Tetracycline	*259*	**39**
Enrofloxacin	*233*	**90**
Trimethoprim-Sulfonamides	*265*	**57**

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Annex 8

Fish

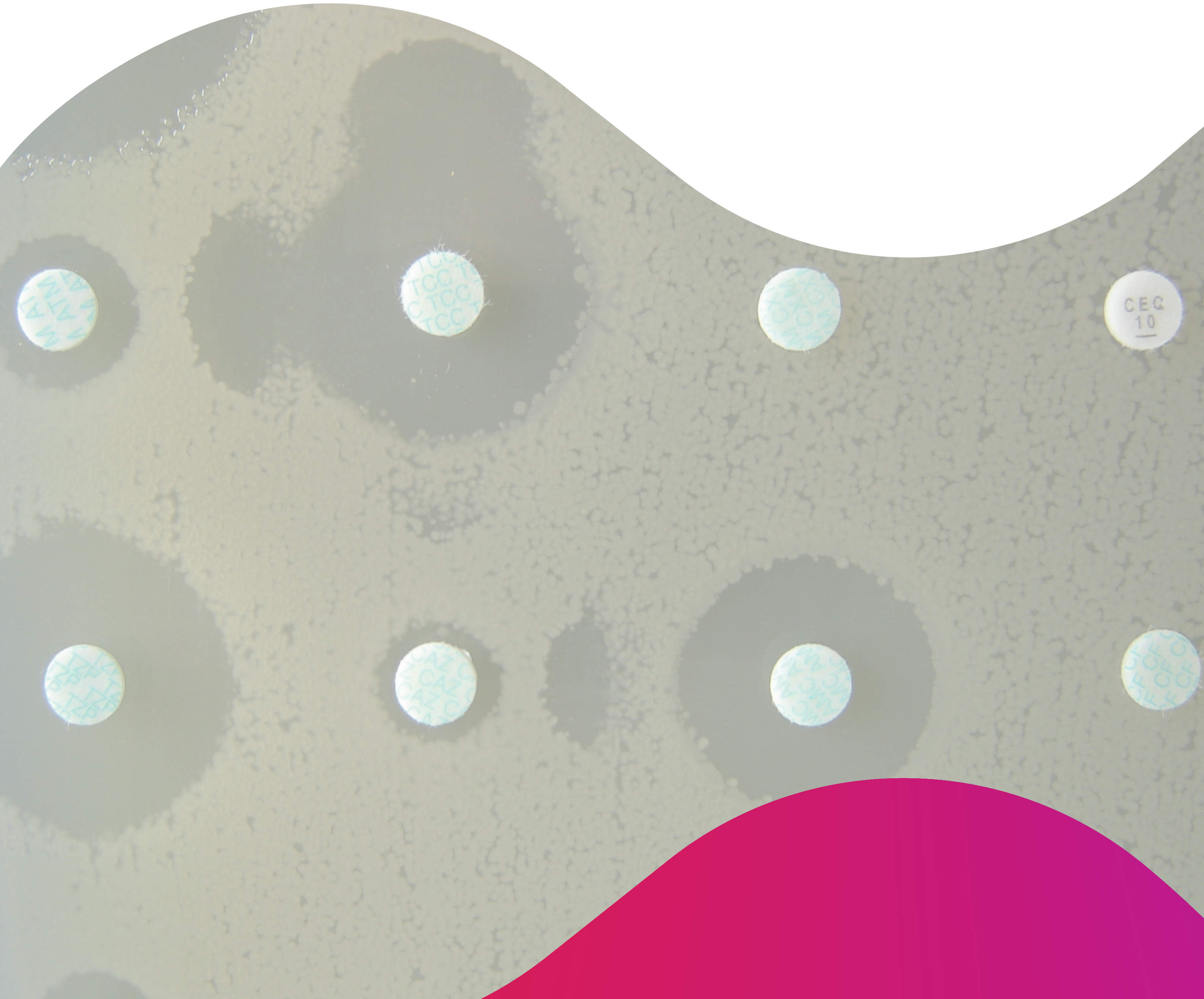

Figure 1 - Fish 2016 – Antibiogram proportions by animal species

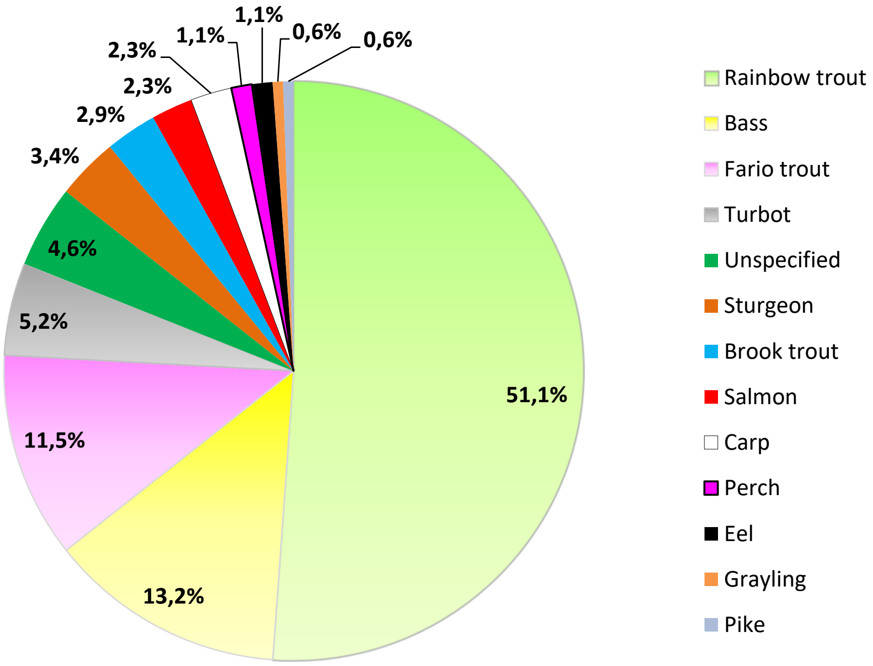

Table 1 - Fish 2016 – Number of antibiograms by bacteria and pathology

	Pathology N *(%)*			
Bacteria N *(%)*	Unspecified	Septicemia	Skin and soft tissue infections	**Total N *(%)***
Aeromonas salmonicida	83 *(47.7)*	21 *(12.1)*		**104 *(59.8)***
Aeromonas	12 *(6.9)*	5 *(2.9)*	4 *(2.3)*	**21 *(12.1)***
Vibrio	16 *(9.2)*	3 *(1.7)*		**19 *(10.9)***
Yersinia ruckeri	12 *(6.9)*	1 *(0.6)*	1 *(0.6)*	**14 *(8.1)***
Carnobacterium	4 *(2.3)*	3 *(1.7)*		**7 *(4.0)***
Lactococcus	2 *(1.1)*			**2 *(1.1)***
Chryseobacterium			1 *(0.6)*	**1 *(0.6)***
Plesiomonas shigelloides	1 *(0.6)*			**1 *(0.6)***
Hafnia alvei		1 *(0.6)*		**1 *(0.6)***
Streptococcus		1 *(0.6)*		**1 *(0.6)***
Tenacibaculum			1 *(0.6)*	**1 *(0.6)***
Pseudomonas			1 *(0.6)*	**1 *(0.6)***
Edwardsiella tarda		1 *(0.57)*		**1 *(0.6)***
Total N (%)	**130 *(74.7)***	**36 *(20.7)***	**8 *(4.6)***	**174 *(100.0)***

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Annex 9

Horses

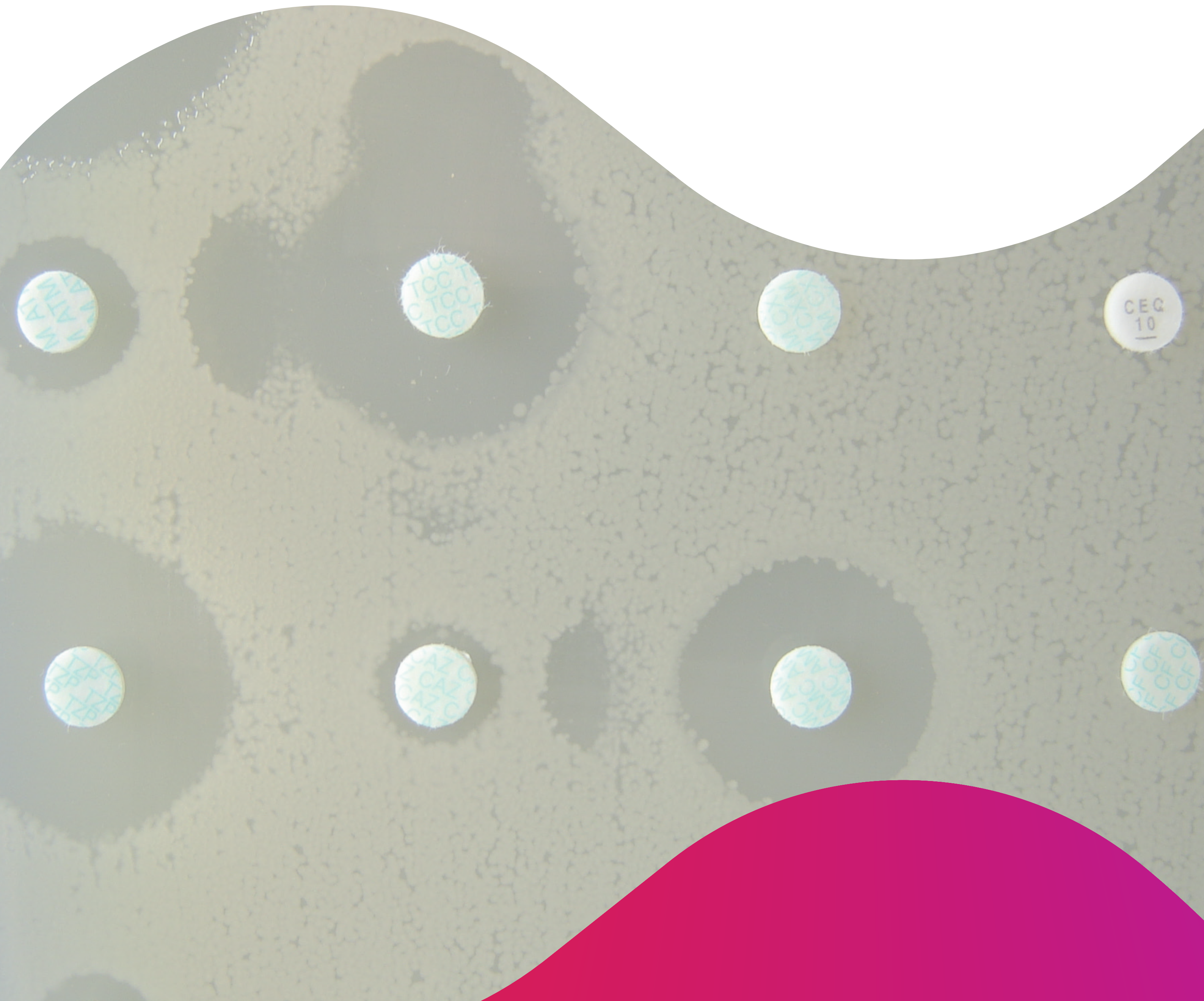
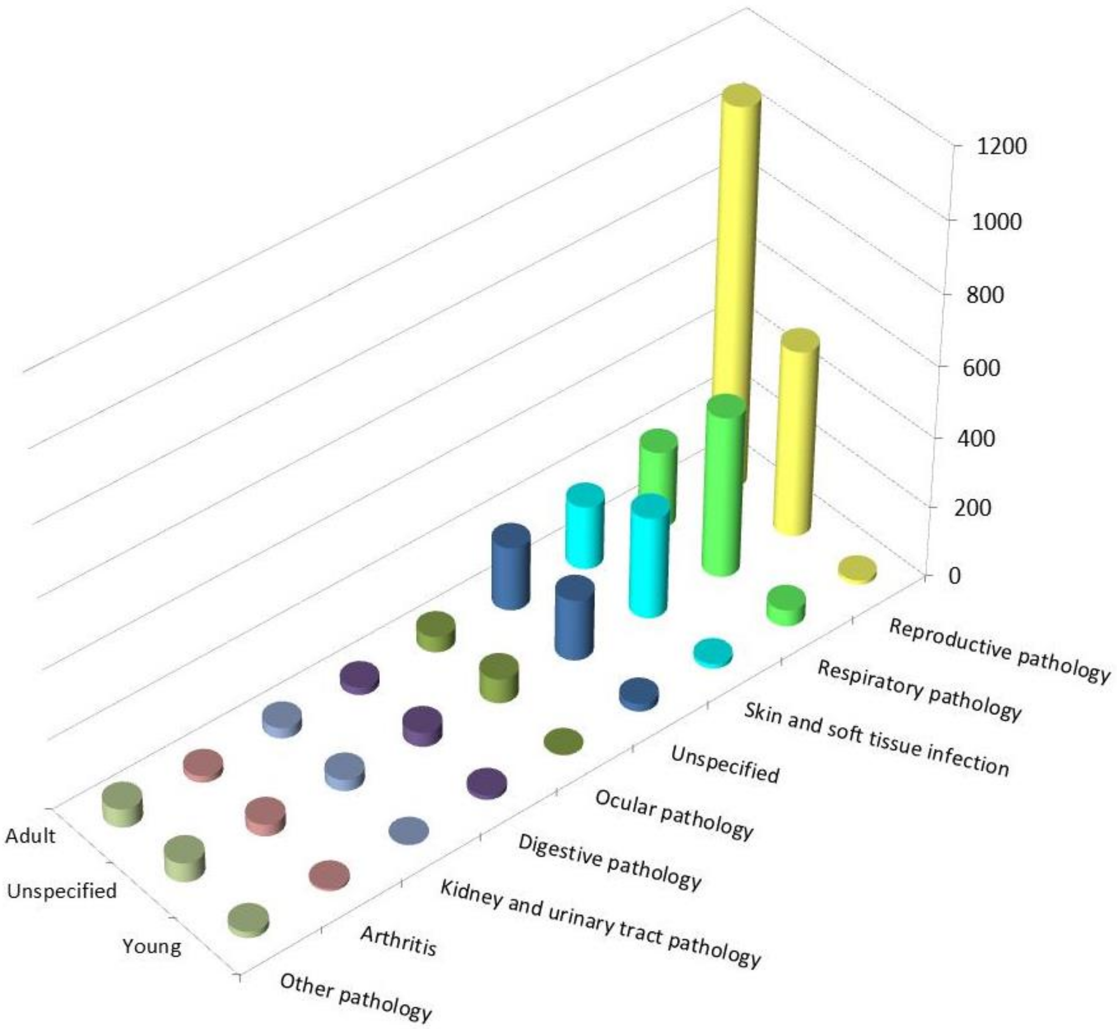


Figure 1 - Horses 2016 – Number of antibiograms by age group and pathology

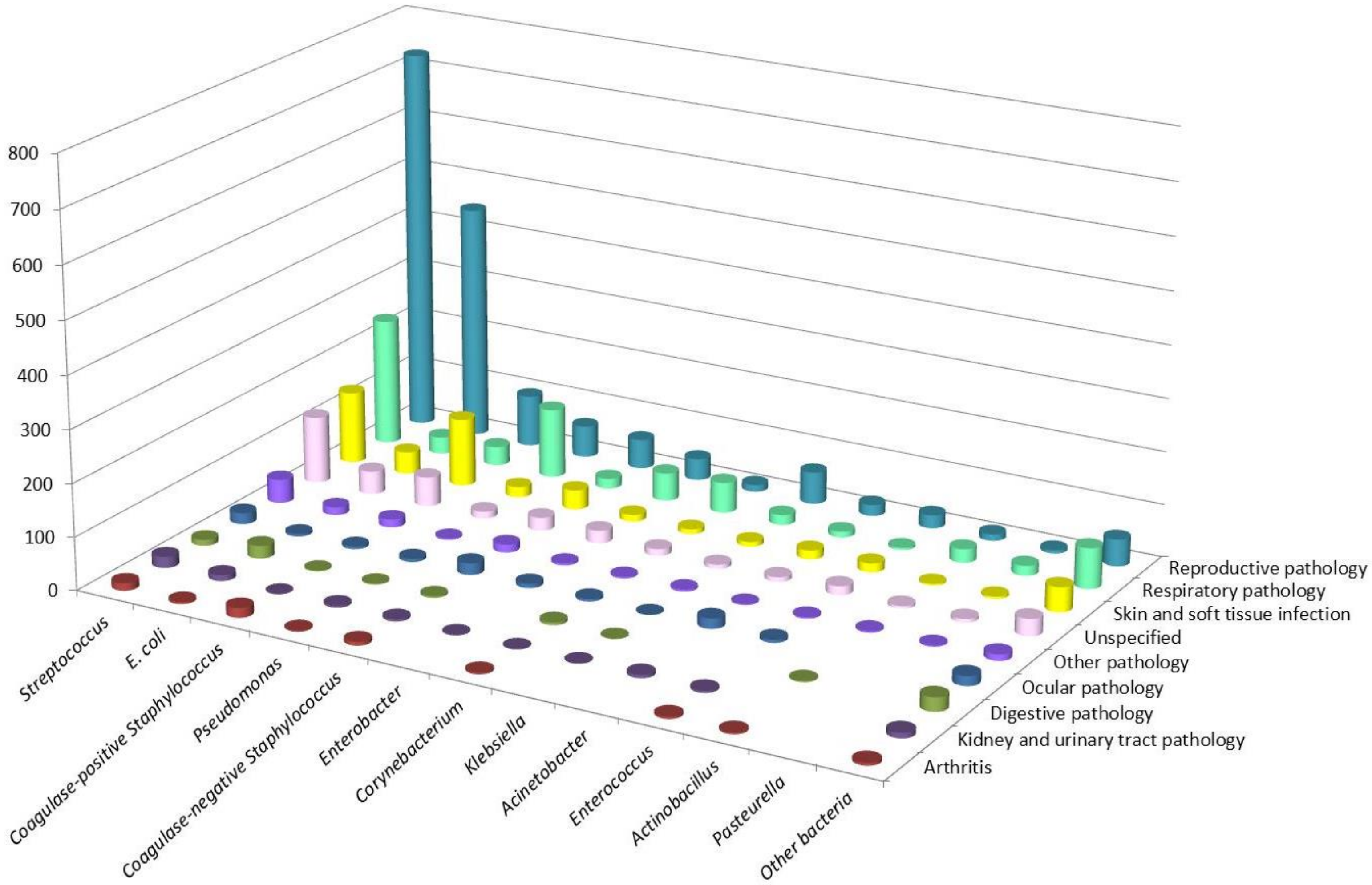


Note: *all values are detailed in table 1 (including other pathologies, representing less than 1%, grouped together)*

Table 1 - Horses 2016 – Number of antibiograms by age group and pathology

	Age group N (%)			
Pathology N (%)	Adult	Unspecified	Young	**Total N** ***(%)***
Reproductive pathology	1,077 *(29.47)*	532 *(14.56)*	13 *(0.36)*	**1,622** ***(44.38)***
Respiratory pathology	222 *(6.07)*	459 *(12.56)*	47 *(1.29)*	**728** ***(19.92)***
Skin and soft tissue infections	181 *(4.95)*	290 *(7.93)*	13 *(0.36)*	**484** ***(13.24)***
Unspecified	182 *(4.98)*	175 *(4.79)*	22 *(0.60)*	**379** ***(10.37)***
Ocular pathology	45 *(1.23)*	70 *(1.92)*	1 *(0.03)*	**116** ***(3.17)***
Digestive pathology	22 *(0.60)*	41 *(1.12)*	13 *(0.36)*	**76** ***(2.08)***
Kidney and urinary tract pathology	30 *(0.82)*	33 *(0.90)*	1 *(0.03)*	**64** ***(1.75)***
Arthritis	19 *(0.52)*	34 *(0.93)*	7 *(0.19)*	**60** ***(1.64)***
Bone pathology	9 *(0.25)*	27 *(0.74)*		**36** ***(0.98)***
Mastitis	20 *(0.55)*			**20** ***(0.55)***
Systemic pathology	9 *(0.25)*	10 *(0.27)*	1 *(0.03)*	**20** ***(0.55)***
Omphalitis			15 *(0.41)*	**15** ***(0.41)***
Cardiovascular disease	3 *(0.08)*	8 *(0.22)*		**11** ***(0.30)***
Otitis	5 *(0.14)*	5 *(0.14)*		**10** ***(0.27)***
Oral pathology	5 *(0.14)*	2 *(0.05)*		**7** ***(0.19)***
Cardiac pathology		3 *(0.08)*		**3** ***(0.08)***
Septicemia			2 *(0.05)*	**2** ***(0.05)***
Muscle pathology	2 *(0.05)*			**2** ***(0.05)***
Total N ***(%)***	**1,831** ***(50.10)***	**1,689** ***(46.21)***	**135** ***(3.69)***	**3,655** ***(100.00)***

Figure 2 - Horses 2016 – Number of antibiograms by bacterial group and pathology



Note: *only values for pathologies >1% and bacterial groups having more than 30 occurrences are represented. Detailed values are presented in table 2 below.*

Table 2 - Horses 2016 – Number of antibiograms by bacterial group and pathology

	Pathology N (%)																		
Bacteria N (%)	Reproductive pathology	Respiratory pathology	Skin and soft tissue infections	Unspecified	Ocular pathology	Digestive pathology	Kidney and urinary tract pathology	Arthritis	Bone pathology	Mastitis	Systemic pathology	Omphalitis	Cardiovascular disease	Otitis	Oral pathology	Cardiac pathology	Septicemia	Muscle pathology	**Total N *(%)***
Streptococcus	731 *(20.00)*	242 *(6.62)*	137 *(3.75)*	127 *(3.47)*	21 *(0.57)*	11 *(0.30)*	21 *(0.57)*	14 *(0.38)*	11 *(0.30)*	11 *(0.30)*	4 *(0.11)*	8 *(0.22)*	3 *(0.08)*	3 *(0.08)*	2 *(0.05)*	1 *(0.03)*	2 *(0.05)*		**1,349 *(36.91)***
E. coli	447 *(12.23)*	32 *(0.88)*	42 *(1.15)*	44 *(1.20)*	5 *(0.14)*	24 *(0.66)*	11 *(0.30)*	4 *(0.11)*	3 *(0.08)*	3 *(0.08)*	2 *(0.05)*	3 *(0.08)*	1 *(0.03)*	1 *(0.03)*	1 *(0.03)*	1 *(0.03)*			**624 *(17.07)***
Coagulase-positive *Staphylococcus*	98 *(2.68)*	36 *(0.98)*	129 *(3.53)*	56 *(1.53)*	5 *(0.14)*	2 *(0.05)*	1 *(0.03)*	18 *(0.49)*	3 *(0.08)*	2 *(0.05)*	4 *(0.11)*	2 *(0.05)*	2 *(0.05)*	1 *(0.03)*				1 *(0.03)*	**360 *(9.85)***
Pseudomonas	60 *(1.64)*	132 *(3.61)*	20 *(0.55)*	13 *(0.36)*	6 *(0.16)*	2 *(0.05)*	4 *(0.11)*	2 *(0.05)*	1 *(0.03)*		1 *(0.03)*							1 *(0.03)*	**242 *(6.62)***
Coagulase-negative *Staphylococcus*	56 *(1.53)*	19 *(0.52)*	37 *(1.01)*	25 *(0.68)*	22 *(0.60)*	3 *(0.08)*	4 *(0.11)*	7 *(0.19)*	7 *(0.19)*	1 *(0.03)*	2 *(0.05)*		3 *(0.08)*	2 *(0.05)*					**188 *(5.14)***
Enterobacter	41 *(1.12)*	53 *(1.45)*	13 *(0.36)*	24 *(0.66)*	8 *(0.22)*		1 *(0.03)*				2 *(0.05)*			2 *(0.05)*					**144 *(3.94)***
Corynebacterium	13 *(0.36)*	58 *(1.59)*	9 *(0.25)*	13 *(0.36)*	5 *(0.14)*	5 *(0.14)*	1 *(0.03)*	3 *(0.08)*	2 *(0.05)*		1 *(0.03)*								**110 *(3.01)***
Klebsiella	61 *(1.67)*	19 *(0.52)*	9 *(0.25)*	8 *(0.22)*	1 *(0.03)*	1 *(0.03)*	1 *(0.03)*			2 *(0.05)*					2 *(0.05)*				**104 *(2.85)***
Acinetobacter	21 *(0.57)*	11 *(0.30)*	17 *(0.47)*	9 *(0.25)*	19 *(0.52)*		6 *(0.16)*				1 *(0.03)*		1 *(0.03)*						**85 *(2.33)***
Enterococcus	25 *(0.68)*	4 *(0.11)*	17 *(0.47)*	17 *(0.47)*	6 *(0.16)*		4 *(0.11)*	4 *(0.11)*		1 *(0.03)*		1 *(0.03)*				1 *(0.03)*			**80 *(2.19)***
Actinobacillus	12 *(0.33)*	26 *(0.71)*	3 *(0.08)*	5 *(0.14)*		2 *(0.05)*		3 *(0.08)*	3 *(0.08)*										**54 *(1.48)***
Pasteurella	6 *(0.16)*	19 *(0.52)*	4 *(0.11)*	6 *(0.16)*					1 *(0.03)*						1 *(0.03)*				**37 *(1.01)***
Other bacteria < 30 occurrences	51 *(1.40)*	77 *(2.11)*	47 *(1.29)*	32 *(0.88)*	18 *(0.49)*	26 *(0.71)*	10 *(0.27)*	5 *(0.14)*	5 *(0.14)*		3 *(0.08)*	1 *(0.03)*	1 *(0.03)*	1 *(0.03)*	1 *(0.03)*				**278 *(7.61)***
Total N *(%)*	**1,622 *(44.38)***	**728 *(19.92)***	**484 *(13.24)***	**379 *(10.37)***	**116 *(3.17)***	**76 *(2.08)***	**64 *(1.75)***	**60 *(1.64)***	**36 *(0.98)***	**20 *(0.55)***	**20 *(0.55)***	**15 *(0.41)***	**11 *(0.30)***	**10 *(0.27)***	**7 *(0.19)***	**3 *(0.08)***	**2 *(0.05)***	**2 *(0.05)***	**3,655 *(100.00)***

Table 3 - Horses 2016 – Reproductive pathology – All ages groups included –*E. coli*: susceptibility to antibiotics (proportion) (N= 447)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*445*	**64**
Amoxicillin-Clavulanic ac.	*446*	**72**
Cephalexin	*97*	**82**
Cephalothin	*37*	**68**
Cefoxitin	*165*	**96**
Cefuroxime	*54*	**80**
Cefoperazone	*43*	**98**
Ceftiofur	*446*	**96**
Cefquinome 30 µg	*447*	**97**
Streptomycin 10 UI	*296*	**70**
Kanamycin 30 UI	*432*	**93**
Gentamicin 10 UI	*447*	**96**
Neomycin	*206*	**86**
Amikacine	*344*	**99**
Apramycin	*34*	**100**
Tetracycline	*304*	**83**
Florfenicol	*84*	**99**
Nalidixic ac.	*289*	**99**
Oxolinic ac.	*143*	**95**
Flumequine	*363*	**97**
Enrofloxacin	*445*	**99**
Marbofloxacin	*440*	**99**
Danofloxacin	*56*	**98**
Trimethoprim-Sulfonamides	*447*	**75**

Table 4 - Horses 2016 – Respiratory pathology – All ages groups included –*E. coli*: susceptibility to antibiotics (proportion) (N= 32)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*31*	**58**
Amoxicillin-Clavulanic ac.	*32*	**84**
Ceftiofur	*32*	**94**
Cefquinome 30 µg	*32*	**91**
Streptomycin 10 UI	*30*	**67**
Kanamycin 30 UI	*31*	**87**
Gentamicin 10 UI	*32*	**91**
Tetracycline	*31*	**81**
Enrofloxacin	*32*	**97**
Marbofloxacin	*32*	**100**
Trimethoprim-Sulfonamides	*32*	**72**

Table 5 - Horses 2016 – Skin and soft tissue infections – All ages groups included – Tous *E. coli*: susceptibility to antibiotics (proportion) (N= 42)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*42*	**71**
Amoxicillin-Clavulanic ac.	*42*	**74**
Cefoxitin	*30*	**93**
Ceftiofur	*42*	**90**
Cefquinome 30 µg	*42*	**90**
Streptomycin 10 UI	*42*	**57**
Kanamycin 30 UI	*41*	**88**
Gentamicin 10 UI	*42*	**86**
Tetracycline	*42*	**69**
Nalidixic ac.	*40*	**88**
Enrofloxacin	*42*	**93**
Marbofloxacin	*42*	**93**
Trimethoprim-Sulfonamides	*42*	**57**

Table 6 - Horses 2016 – All pathologies and ages groups included – *Klebsiella*: susceptibility to antibiotics (proportion) (N= 104)

Antibiotic	*Total (N)*	**% S**
Amoxicillin-Clavulanic ac.	*104*	**87**
Cephalothin	*32*	**88**
Cefoxitin	*71*	**97**
Cefuroxime	*31*	**87**
Cefoperazone	*39*	**95**
Ceftiofur	*104*	**92**
Cefquinome 30 µg	*103*	**95**
Streptomycin 10 UI	*78*	**86**
Kanamycin 30 UI	*89*	**96**
Gentamicin 10 UI	*104*	**90**
Neomycin	*55*	**96**
Amikacine	*40*	**100**
Tetracycline	*84*	**76**
Florfenicol	*56*	**100**
Nalidixic ac.	*77*	**88**
Flumequine	*53*	**85**
Enrofloxacin	*103*	**94**
Marbofloxacin	*99*	**99**
Danofloxacin	*31*	**100**
Trimethoprim-Sulfonamides	*104*	**77**

Table 7 - Horses 2016 – All pathologies and ages groups included – *Enterobacter:* susceptibility to antibiotics (proportion) (N= 144)

Antibiotic	*Total (N)*	**% S**
Amoxicillin-Clavulanic ac.	*144*	**56**
Cephalexin	*82*	**55**
Cefoxitin	*111*	**50**
Ceftiofur	*144*	**90**
Cefquinome 30 µg	*137*	**93**
Streptomycin 10 UI	*109*	**83**
Kanamycin 30 UI	*116*	**90**
Gentamicin 10 UI	*144*	**90**
Neomycin	*44*	**95**
Amikacine	*46*	**96**
Tetracycline	*116*	**86**
Florfenicol	*71*	**96**
Nalidixic ac.	*128*	**92**
Flumequine	*52*	**87**
Enrofloxacin	*144*	**94**
Marbofloxacin	*129*	**99**
Trimethoprim-Sulfonamides	*139*	**88**

Table 8 - Horses 2016 – Skin and soft tissue infections – All age groups included –*Staphylococcus aureus*: susceptibility to antibiotics (proportion) (N= 96)

Antibiotic	*Total (N)*	**% S**
Penicillin	*95*	**62**
Cefoxitin	*87*	**77**
Oxacillin	*74*	**95**
Erythromycin	*95*	**96**
Streptomycin 10 UI	*92*	**84**
Kanamycin 30 UI	*89*	**80**
Gentamicin 10 UI	*96*	**83**
Tetracycline	*93*	**82**
Enrofloxacin	*90*	**100**
Marbofloxacin	*96*	**100**
Trimethoprim-Sulfonamides	*96*	**94**
Rifampicin	*77*	**97**

Table 9 - Horses 2016 – Reproductive pathology – All age groups included – *Streptococcus groupe C and Streptococcus zooepidemicus:* susceptibility to antibiotics (proportion) (N= 593)

Antibiotic	*Total (N)*	**% S**
Oxacillin	*541*	**98**
Erythromycin	*593*	**93**
Tulathromycin	*32*	**97**
Tylosin	*61*	**97**
Spiramycin	*191*	**99**
Lincomycin	*134*	**92**
Streptomycin 500 µg	*532*	**94**
Kanamycin 1000 µg	*506*	**94**
Gentamicin 500 µg	*535*	**99**
Tetracycline	*521*	**26**
Florfenicol	*65*	**100**
Enrofloxacin	*593*	**24**
Marbofloxacin	*570*	**80**
Danofloxacin	*32*	**16**
Trimethoprim-Sulfonamides	*568*	**90**
Rifampicin	*535*	**57**

Table 10 - Horses 2016 – Respiratory pathology – All age groups included – *Streptococcus:* susceptibility to antibiotics (proportion) (N= 242)

Antibiotic	*Total (N)*	**% S**
Oxacillin	*237*	**95**
Erythromycin	*241*	**97**
Spiramycin	*107*	**97**
Lincomycin	*87*	**92**
Streptomycin 500 µg	*205*	**96**
Kanamycin 1000 µg	*199*	**99**
Gentamicin 500 µg	*209*	**100**
Tetracycline	*211*	**38**
Enrofloxacin	*239*	**32**
Marbofloxacin	*219*	**76**
Trimethoprim-Sulfonamides	*238*	**75**
Rifampicin	*195*	**62**

Table 11 - Horses 2016 – Skin and soft tissue infections – All age groups included – *Streptococcus:* susceptibility to antibiotics (proportion) (N= 137)

Antibiotic	*Total (N)*	**% S**
Oxacillin	*134*	**97**
Erythromycin	*135*	**93**
Streptomycin 500 µg	*130*	**97**
Kanamycin 1000 µg	*127*	**98**
Gentamicin 500 µg	*132*	**99**
Tetracycline	*137*	**32**
Enrofloxacin	*131*	**27**
Marbofloxacin	*128*	**76**
Trimethoprim-Sulfonamides	*135*	**83**
Rifampicin	*117*	**45**

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Annex 10

Dogs

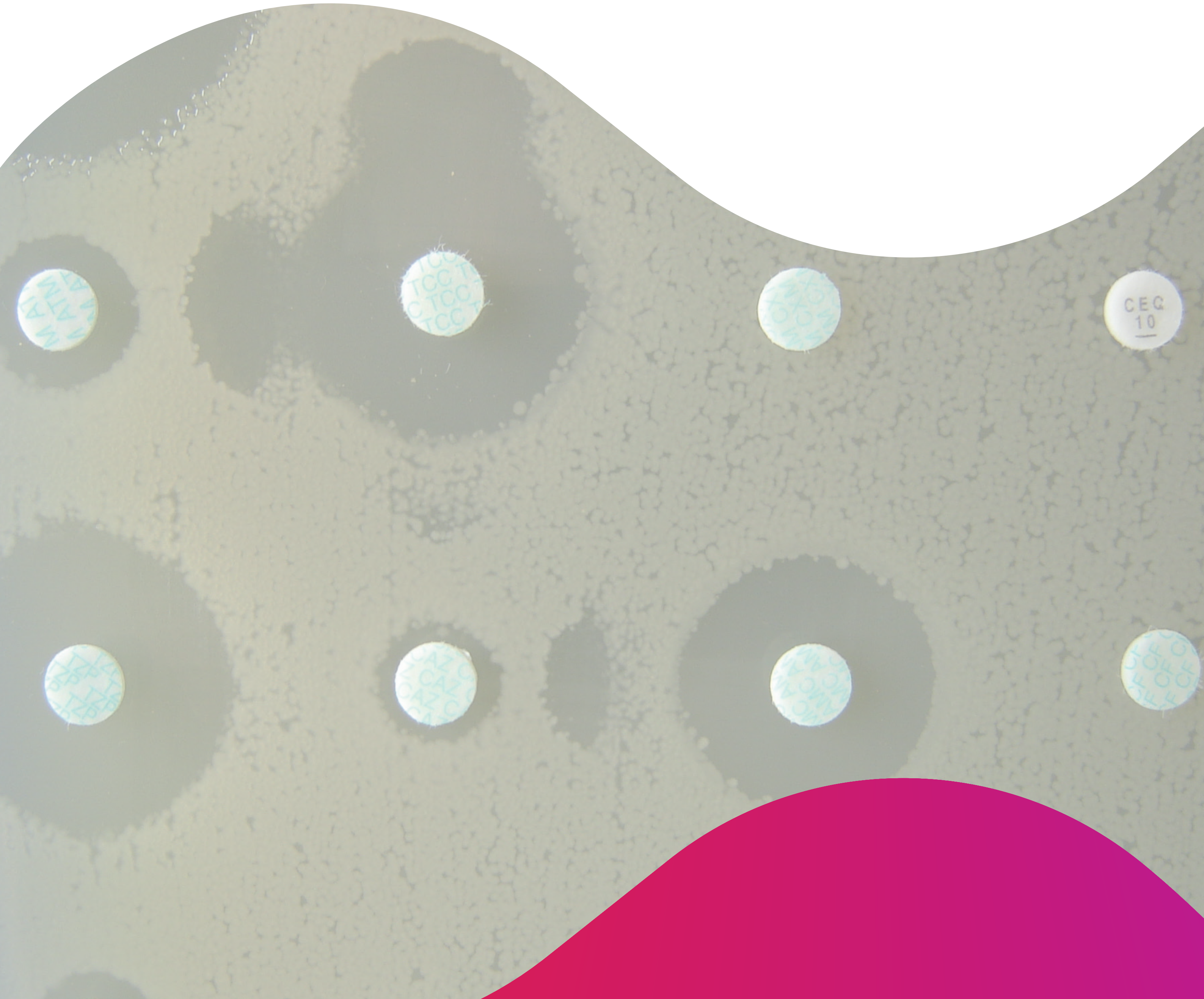
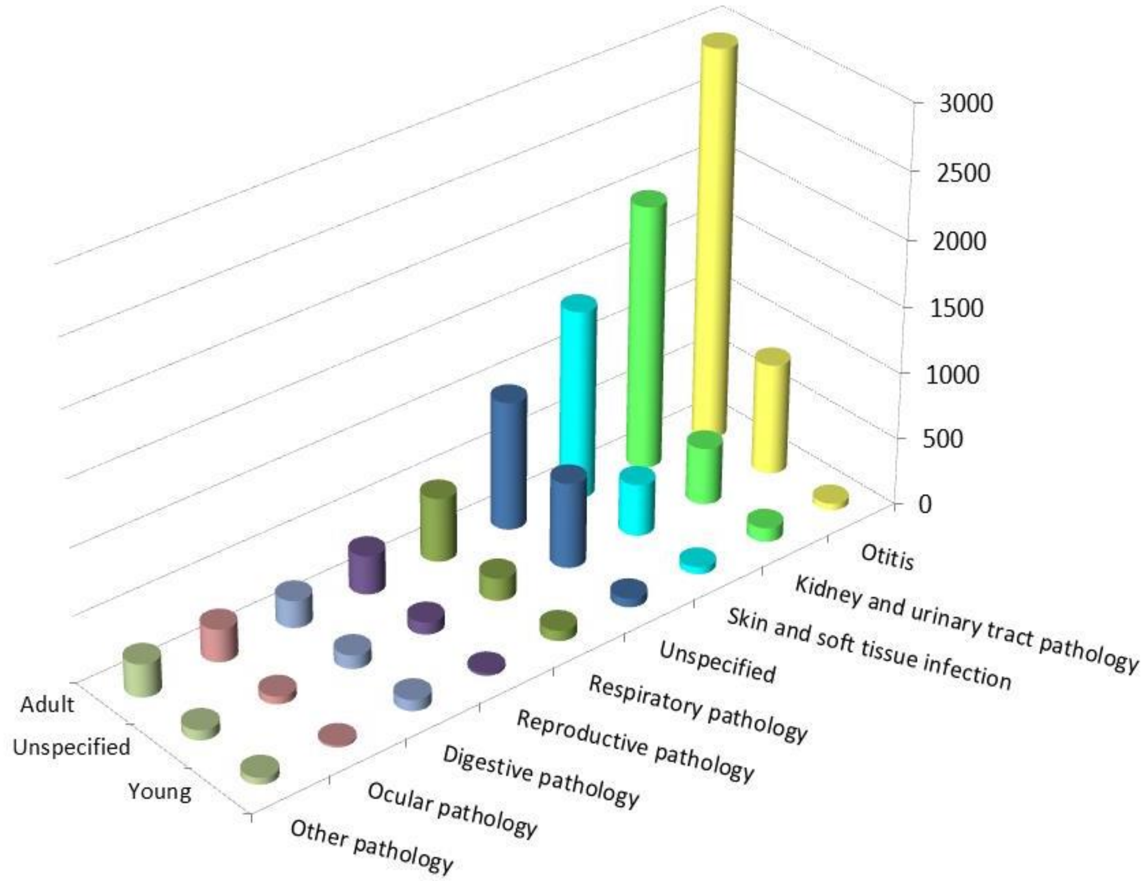


Figure 1 - Dogs 2016 – Number of antibiograms by age group and pathology

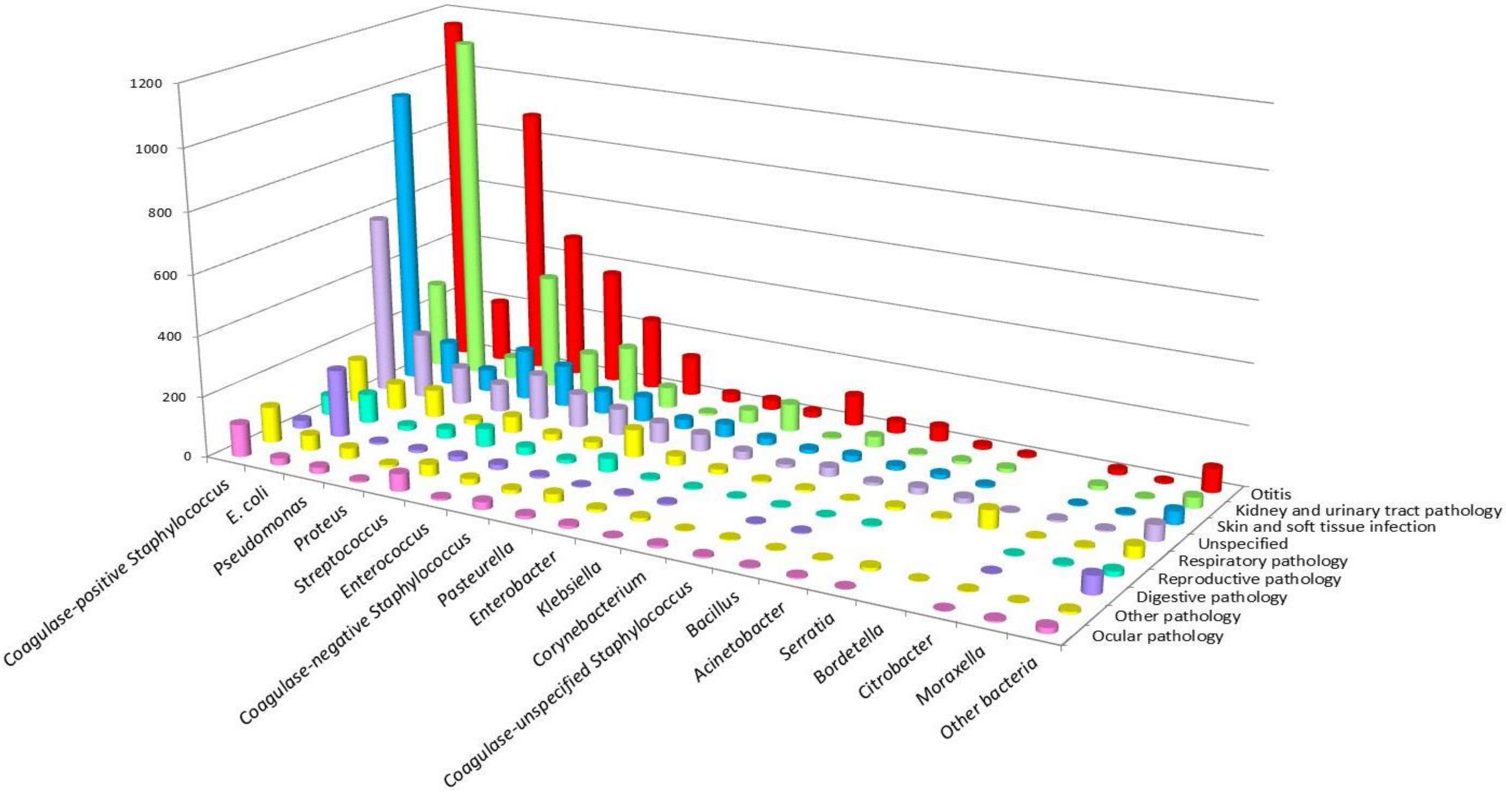


Note: *all values are detailed in table 1 (including other pathologies, representing less than 1%, grouped together)*

Table 1 - Dogs 2016 – Number of antibiograms by age group and pathology

	Age group N (%)			
Pathology N (%)	Adult	Unspecified	Young	**Total N *(%)***
Otitis	2,955 *(24.36)*	839 *(6.92)*	50 *(0.41)*	**3,844 *(31.68)***
Kidney and urinary tract pathology	1,993 *(16.43)*	429 *(3.54)*	105 *(0.87)*	**2,527 *(20.83)***
Skin and soft tissue infections	1,427 *(11.76)*	390 *(3.21)*	52 *(0.43)*	**1,869 *(15.41)***
Unspecified	971 *(8.00)*	642 *(5.29)*	65 *(0.54)*	**1 678 *(13.83)***
Respiratory pathology	481 *(3.96)*	168 *(1.38)*	78 *(0.64)*	**727 *(5.99)***
Reproductive pathology	291 *(2.40)*	92 *(0.76)*	21 *(0.17)*	**404 *(3.33)***
Digestive pathology	205 *(1.69)*	103 *(0.85)*	83 *(0.68)*	**391 *(3.22)***
Ocular pathology	246 *(2.03)*	58 *(0.48)*	15 *(0.12)*	**319 *(2.63)***
Arthritis	82 *(0.68)*	25 *(0.21)*	10 *(0.08)*	**117 *(0.96)***
Bone pathology	83 *(0.68)*	28 *(0.23)*	4 *(0.03)*	**115 *(0.95)***
Oral pathology	57 *(0.47)*	12 *(0.10)*	3 *(0.02)*	**72 *(0.59)***
Systemic pathology	6 *(0.05)*	6 *(0.05)*	27 *(0.22)*	**39 *(0.32)***
Mastitis	14 *(0.12)*			**14 *(0.12)***
Nervous system pathology	4 *(0.03)*	1 *(0.01)*	3 *(0.02)*	**8 *(0.07)***
Septicemia		1 *(0.01)*	3 *(0.02)*	**4 *(0.03)***
Cardiac pathology		3 *(0.02)*		**3 *(0.02)***
Muscle pathology			1 *(0.01)*	**1 *(0.01)***
Total N *(%)*	**8,815 *(72.66)***	**2,797 *(23.05)***	**520 *(4.29)***	**12,132 *(100.00)***

Figure 2 - Dogs 2016 – Number of antibiograms by bacteria and pathology



Note: *only values for pathologies >1% and bacterial groups having more than 30 occurrences are represented. Detailed values are presented in table 2 below.*

Table 2, part 1 - Dogs 2016 – Number of antibiograms by bacteria and pathology

Bacteria N (%)	Pathology N (%)																	Total N (%)
	Otitis	Kidney and urinary tract pathology	Skin and soft tissue infections	Unspecified	Respiratory pathology	Reproductive pathology	Digestive pathology	Ocular pathology	Arthritis	Bone pathology	Oral pathology	Systemic pathology	Mastitis	Nervous system pathology	Septicemia	Cardiac pathology	Muscle pathology	
Coagulase-positive *Staphylococcus*	1,158 *(9.55)*	285 *(2.35)*	974 *(8.03)*	589 *(4.85)*	144 *(1.19)*	65 *(0.54)*	27 *(0.22)*	107 *(0.88)*	49 *(0.40)*	45 *(0.37)*	16 *(0.13)*	2 *(0.02)*	4 *(0.03)*		2 *(0.02)*			**3,467** ***(28.58)***
E. coli	203 *(1.67)*	1,136 *(9.36)*	142 *(1.17)*	214 *(1.76)*	87 *(0.72)*	96 *(0.79)*	223 *(1.84)*	23 *(0.19)*	11 *(0.09)*	10 *(0.08)*	5 *(0.04)*	17 *(0.14)*	6 *(0.05)*	1 *(0.01)*	1 *(0.01)*			**2,175** ***(17.93)***
Pseudomonas	881 *(7.26)*	73 *(0.60)*	72 *(0.59)*	124 *(1.02)*	92 *(0.76)*	16 *(0.13)*	7 *(0.06)*	21 *(0.17)*	9 *(0.07)*	12 *(0.10)*	11 *(0.09)*	3 *(0.02)*				1 *(0.01)*		**1,322** ***(10.90)***
Proteus	478 *(3.94)*	377 *(3.11)*	165 *(1.36)*	93 *(0.77)*	17 *(0.14)*	32 *(0.26)*	10 *(0.08)*	6 *(0.05)*	3 *(0.02)*	3 *(0.02)*	2 *(0.02)*		1 *(0.01)*					**1 187** ***(9.78)***
Streptococcus	374 *(3.08)*	136 *(1.12)*	137 *(1.13)*	150 *(1.24)*	54 *(0.45)*	61 *(0.50)*	16 *(0.13)*	57 *(0.47)*	15 *(0.12)*	6 *(0.05)*	6 *(0.05)*	8 *(0.07)*	1 *(0.01)*	1 *(0.01)*	1 *(0.01)*			**1 023** ***(8.43)***
Enterococcus	235 *(1.94)*	181 *(1.49)*	76 *(0.63)*	111 *(0.91)*	23 *(0.19)*	26 *(0.21)*	17 *(0.14)*	7 *(0.06)*	3 *(0.02)*	9 *(0.07)*	3 *(0.02)*	1 *(0.01)*	2 *(0.02)*	2 *(0.02)*				**696** ***(5.74)***
Coagulase-negative *Staphylococcus*	129 *(1.06)*	69 *(0.57)*	83 *(0.68)*	87 *(0.72)*	23 *(0.19)*	13 *(0.11)*	8 *(0.07)*	25 *(0.21)*	4 *(0.03)*	4 *(0.03)*	2 *(0.02)*	1 *(0.01)*		2 *(0.02)*				**450** ***(3.71)***
Pasteurella	27 *(0.22)*	8 *(0.07)*	32 *(0.26)*	67 *(0.55)*	92 *(0.76)*	45 *(0.37)*	3 *(0.02)*	11 *(0.09)*	8 *(0.07)*	3 *(0.02)*	16 *(0.13)*	2 *(0.02)*						**314** ***(2.59)***
Enterobacter	33 *(0.27)*	44 *(0.36)*	43 *(0.35)*	56 *(0.46)*	32 *(0.26)*	7 *(0.06)*	5 *(0.04)*	10 *(0.08)*	1 *(0.01)*	8 *(0.07)*		1 *(0.01)*						**240** ***(1.98)***
Klebsiella	19 *(0.16)*	91 *(0.75)*	23 *(0.19)*	27 *(0.22)*	17 *(0.14)*	5 *(0.04)*	6 *(0.05)*	2 *(0.02)*	1 *(0.01)*	5 *(0.04)*	5 *(0.04)*	1 *(0.01)*						**202** ***(1.67)***
Corynebacterium	100 *(0.82)*	6 *(0.05)*	13 *(0.11)*	13 *(0.11)*	8 *(0.07)*	3 *(0.02)*		9 *(0.07)*	2 *(0.02)*									**154** ***(1.27)***
Coagulase-unspecified *Staphylococcus*	38 *(0.31)*	36 *(0.30)*	21 *(0.17)*	30 *(0.25)*	8 *(0.07)*	4 *(0.03)*	3 *(0.02)*	6 *(0.05)*	3 *(0.02)*	1 *(0.01)*	1 *(0.01)*							**151** ***(1.24)***
Bacillus	48 *(0.40)*	6 *(0.05)*	14 *(0.12)*	10 *(0.08)*	3 *(0.02)*	2 *(0.02)*	4 *(0.03)*	4 *(0.03)*	1 *(0.01)*	1 *(0.01)*								**93** ***(0.77)***
Acinetobacter	13 *(0.11)*	10 *(0.08)*	15 *(0.12)*	22 *(0.18)*	11 *(0.09)*	5 *(0.04)*		5 *(0.04)*	1 *(0.01)*		1 *(0.01)*					1 *(0.01)*		**84** ***(0.69)***

Table 2, part 2 - Dogs 2016 – Number of antibiograms by bacteria and pathology

	Pathology N (%)																
Bacteria N (%)	Otitis	Kidney and urinary tract pathology	Skin and soft tissue infections	Unspecified	Respiratory pathology	Reproductive pathology	Digestive pathology	Ocular pathology	Arthritis	Bone pathology	Oral pathology	Systemic pathology	Mastitis	Nervous system pathology	Septicemia	Cardiac pathology	Muscle pathology	**Total N *(%)***
Serratia	8 *(0.07)*	14 *(0.12)*	7 *(0.06)*	18 *(0.15)*	6 *(0.05)*			2 *(0.02)*	5 *(0.04)*	6 *(0.05)*								**66 *(0.54)***
Bordetella				2 *(0.02)*	62 *(0.51)*							1 *(0.01)*		1 *(0.01)*				**66 *(0.54)***
Citrobacter	16 *(0.13)*	15 *(0.12)*	3 *(0.02)*	7 *(0.06)*	3 *(0.02)*	2 *(0.02)*	2 *(0.02)*	1 *(0.01)*		1 *(0.01)*	2 *(0.02)*							**52 *(0.43)***
Moraxella	6 *(0.05)*	4 *(0.03)*	5 *(0.04)*	5 *(0.04)*	5 *(0.04)*	5 *(0.04)*		5 *(0.04)*		1 *(0.01)*								**36 *(0.30)***
Other bacteria < 30 occurrences	78 *(0.64)*	36 *(0.30)*	44 *(0.36)*	53 *(0.44)*	40 *(0.33)*	17 *(0.14)*	60 *(0.49)*	18 *(0.15)*	1 *(0.01)*		2 *(0.02)*	2 *(0.02)*		1 *(0.01)*		1 *(0.01)*	1 *(0.01)*	**354 *(2.92)***
Total N *(%)*	**3,844 *(31.68)***	**2,527 *(20.83)***	**1,869 *(15.41)***	**1,678 *(13.83)***	**727 *(5.99)***	**404 *(3.33)***	**391 *(3.22)***	**319 *(2.63)***	**117 *(0.96)***	**115 *(0.95)***	**72 *(0.59)***	**39 *(0.32)***	**14 *(0.12)***	**8 *(0.07)***	**4 *(0.03)***	**3 *(0.02)***	**1 *(0.01)***	**12,132 *(100.00)***

Table 3 - Dogs 2016 – Kidney and urinary tract pathology – All age groups included – *E. coli:* susceptibility to antibiotics (proportion) (N= 1,136)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*1,077*	**64**
Amoxicillin-Clavulanic ac.	*1,133*	**71**
Cephalexin	*1,108*	**79**
Cephalothin	*95*	**52**
Cefoxitin	*520*	**88**
Cefuroxime	*98*	**59**
Cefoperazone	*126*	**89**
Cefovecin	*507*	**92**
Ceftiofur	*1,112*	**94**
Cefquinome 30 µg	*520*	**93**
Streptomycin 10 UI	*571*	**72**
Kanamycin 30 UI	*395*	**91**
Tobramycin	*457*	**95**
Gentamicin 10 UI	*1,109*	**96**
Neomycin	*310*	**93**
Apramycin	*38*	**92**
Tetracycline	*935*	**85**
Doxycycline	*217*	**49**
Chloramphenicol	*627*	**87**
Florfenicol	*374*	**93**
Nalidixic ac.	*571*	**83**
Oxolinic ac.	*61*	**93**
Flumequine	*199*	**83**
Enrofloxacin	*1,123*	**87**
Marbofloxacin	*1,122*	**88**
Danofloxacin	*71*	**97**
Pradofloxacin	*30*	**77**
Sulfonamides	*68*	**81**
Trimethoprim	*32*	**88**
Trimethoprim-Sulfonamides	*1,126*	**86**

Table 4 - Dogs 2016 – Skin and soft tissue infections – All age groups included – *E. coli:* susceptibility to antibiotics (proportion) (N= 142)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*139*	**62**
Amoxicillin-Clavulanic ac.	*142*	**68**
Cephalexin	*136*	**79**
Cefoxitin	*69*	**97**
Cefovecin	*70*	**90**
Ceftiofur	*140*	**92**
Cefquinome 30 µg	*66*	**97**
Streptomycin 10 UI	*63*	**75**
Kanamycin 30 UI	*47*	**98**
Tobramycin	*65*	**94**
Gentamicin 10 UI	*139*	**99**
Neomycin	*41*	**93**
Tetracycline	*126*	**79**
Chloramphenicol	*79*	**87**
Florfenicol	*55*	**100**
Nalidixic ac.	*77*	**94**
Enrofloxacin	*141*	**89**
Marbofloxacin	*138*	**92**
Trimethoprim-Sulfonamides	*141*	**82**

Table 5 - Dogs 2016 – Otitis – All age groups included – *E. coli*: susceptibility to antibiotics (proportion) (N= 203)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*192*	**66**
Amoxicillin-Clavulanic ac.	*199*	**77**
Cephalexin	*192*	**76**
Cefoxitin	*120*	**91**
Cefovecin	*82*	**88**
Ceftiofur	*197*	**95**
Cefquinome 30 µg	*116*	**97**
Streptomycin 10 UI	*110*	**82**
Kanamycin 30 UI	*79*	**99**
Tobramycin	*57*	**88**
Gentamicin 10 UI	*199*	**95**
Neomycin	*70*	**91**
Tetracycline	*183*	**88**
Chloramphenicol	*87*	**83**
Florfenicol	*104*	**91**
Nalidixic ac.	*129*	**87**
Flumequine	*30*	**97**
Enrofloxacin	*199*	**92**
Marbofloxacin	*200*	**93**
Trimethoprim-Sulfonamides	*201*	**90**

Table 6 - Dogs 2016 – All pathologies and age groups included –*Pasteurella*: susceptibility to antibiotics (proportion) (N= 314)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*298*	**93**
Amoxicillin-Clavulanic ac.	*312*	**95**
Cephalexin	*303*	**91**
Cefoxitin	*40*	**88**
Cefovecin	*128*	**92**
Ceftiofur	*279*	**96**
Cefquinome 30 µg	*129*	**95**
Streptomycin 10 UI	*157*	**62**
Kanamycin 30 UI	*117*	**83**
Tobramycin	*109*	**93**
Gentamicin 10 UI	*311*	**94**
Neomycin	*98*	**78**
Tetracycline	*257*	**94**
Doxycycline	*87*	**89**
Chloramphenicol	*143*	**99**
Florfenicol	*115*	**98**
Nalidixic ac.	*135*	**82**
Flumequine	*57*	**86**
Enrofloxacin	*310*	**96**
Marbofloxacin	*303*	**99**
Danofloxacin	*50*	**98**
Trimethoprim	*48*	**83**
Trimethoprim-Sulfonamides	*267*	**92**

Table 7 - Dogs 2016 – Otitis – All age groups included – Coagulase-positive *Staphylococcus:* susceptibility to antibiotics (proportion) (N= 1,158)

Antibiotic	*Total (N)*	**% S**
Penicillin	*1,108*	**29**
Cefoxitin	*985*	**92**
Oxacillin	*657*	**95**
Cefovecin	*447*	**91**
Erythromycin	*1099*	**72**
Tylosin	*150*	**76**
Spiramycin	*811*	**74**
Lincomycin	*780*	**73**
Streptomycin 10 UI	*719*	**70**
Kanamycin 30 UI	*436*	**72**
Gentamicin 10 UI	*1,128*	**88**
Neomycin	*411*	**75**
Tetracycline	*1,126*	**65**
Doxycycline	*52*	**79**
Chloramphenicol	*504*	**72**
Florfenicol	*209*	**98**
Enrofloxacin	*825*	**88**
Marbofloxacin	*1,140*	**90**
Danofloxacin	*110*	**87**
Pradofloxacin	*83*	**84**
Trimethoprim-Sulfonamides	*1,111*	**89**
Fusidic ac.	*790*	**94**
Rifampicin	*190*	**97**

Table 8 - Dogs 2016 – Skin and soft tissue infections – All age groups included – Coagulase-positive *Staphylococcus:* susceptibility to antibiotics (proportion) (N= 974)

Antibiotic	*Total (N)*	**% S**
Penicillin	*931*	**18**
Cefoxitin	*883*	**89**
Oxacillin	*547*	**90**
Cefovecin	*479*	**84**
Erythromycin	*923*	**62**
Tylosin	*144*	**67**
Spiramycin	*588*	**66**
Lincomycin	*609*	**67**
Pristinamycin	*31*	**97**
Streptomycin 10 UI	*515*	**64**
Kanamycin 30 UI	*339*	**65**
Tobramycin	*50*	**82**
Gentamicin 10 UI	*954*	**89**
Neomycin	*345*	**76**
Tetracycline	*911*	**61**
Doxycycline	*87*	**82**
Chloramphenicol	*469*	**75**
Florfenicol	*134*	**100**
Enrofloxacin	*792*	**83**
Marbofloxacin	*950*	**86**
Danofloxacin	*106*	**91**
Pradofloxacin	*84*	**93**
Trimethoprim-Sulfonamides	*934*	**82**
Fusidic ac.	*614*	**96**
Rifampicin	*133*	**93**

Table 9 - Dogs 2016 – Kidney and urinary tract pathology – All age groups included – Coagulase-positive *Staphylococcus:* susceptibility to antibiotics (proportion) (N= 285)

Antibiotic	*Total (N)*	**% S**
Penicillin	*269*	**24**
Cefoxitin	*244*	**90**
Oxacillin	*145*	**97**
Cefovecin	*110*	**93**
Erythromycin	*256*	**66**
Tylosin	*34*	**91**
Spiramycin	*188*	**73**
Lincomycin	*201*	**72**
Streptomycin 10 UI	*178*	**72**
Kanamycin 30 UI	*138*	**73**
Gentamicin 10 UI	*278*	**90**
Neomycin	*95*	**83**
Tetracycline	*264*	**59**
Chloramphenicol	*105*	**76**
Florfenicol	*38*	**100**
Enrofloxacin	*199*	**87**
Marbofloxacin	*277*	**91**
Trimethoprim-Sulfonamides	*281*	**85**
Fusidic ac.	*147*	**96**
Rifampicin	*58*	**97**

Table 10 - Dogs 2016 – Otitis – All age groups included – *Streptococcus*: susceptibility to antibiotics (proportion) (N= 374)

Antibiotic	*Total (N)*	**% S**
Ampicillin	*61*	**89**
Oxacillin	*356*	**85**
Cefovecin	*71*	**75**
Erythromycin	*364*	**76**
Tylosin	*74*	**84**
Spiramycin	*330*	**86**
Lincomycin	*314*	**77**
Streptomycin 500 µg	*282*	**92**
Kanamycin 1000 µg	*262*	**97**
Gentamicin 500 µg	*337*	**98**
Tetracycline	*363*	**34**
Chloramphenicol	*91*	**65**
Florfenicol	*74*	**92**
Enrofloxacin	*363*	**48**
Marbofloxacin	*358*	**78**
Trimethoprim-Sulfonamides	*362*	**78**
Rifampicin	*98*	**50**

Table 11 - Dogs 2016 – Skin and soft tissue infections – All age groups included – *Streptococcus*: susceptibility to antibiotics (proportion) (N= 137)

Antibiotic	*Total (N)*	**% S**
Oxacillin	*123*	**92**
Erythromycin	*130*	**70**
Spiramycin	*87*	**84**
Lincomycin	*101*	**79**
Streptomycin 500 µg	*93*	**94**
Kanamycin 1000 µg	*81*	**96**
Gentamicin 500 µg	*126*	**96**
Tetracycline	*112*	**36**
Chloramphenicol	*42*	**81**
Enrofloxacin	*132*	**46**
Marbofloxacin	*126*	**82**
Trimethoprim-Sulfonamides	*117*	**86**

Table 12 - Dogs 2016 – All pathologies and age groups included – *Proteus mirabilis*: susceptibility to antibiotics (proportion) (N= 1,132)

Antibiotic	*Total (N)*	**% S**
Amoxicillin-Clavulanic ac.	*1,129*	**89**
Cephalexin	*1,098*	**83**
Cephalothin	*60*	**97**
Cefoxitin	*412*	**90**
Cefuroxime	*89*	**92**
Cefovecin	*576*	**97**
Ceftiofur	*1,100*	**97**
Cefquinome 30 µg	*422*	**96**
Streptomycin 10 UI	*429*	**67**
Kanamycin 30 UI	*316*	**78**
Tobramycin	*581*	**91**
Gentamicin 10 UI	*1,120*	**89**
Neomycin	*264*	**87**
Apramycin	*36*	**92**
Chloramphenicol	*697*	**59**
Florfenicol	*350*	**97**
Nalidixic ac.	*505*	**82**
Oxolinic ac.	*54*	**94**
Flumequine	*142*	**86**
Enrofloxacin	*1,119*	**87**
Marbofloxacin	*1,120*	**97**
Danofloxacin	*85*	**91**
Sulfonamides	*34*	**71**
Trimethoprim-Sulfonamides	*1,121*	**77**

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Annex 11

Cats

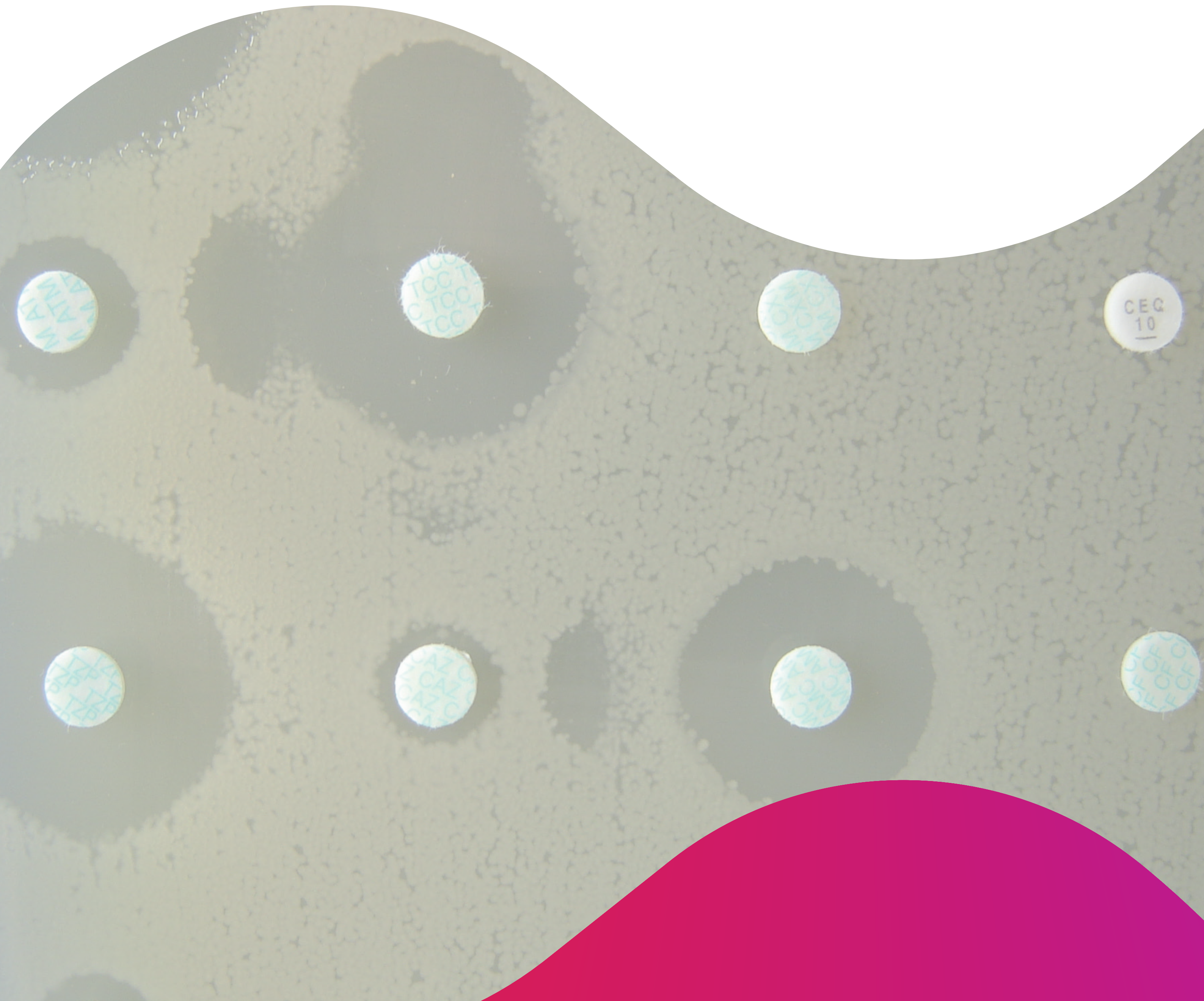
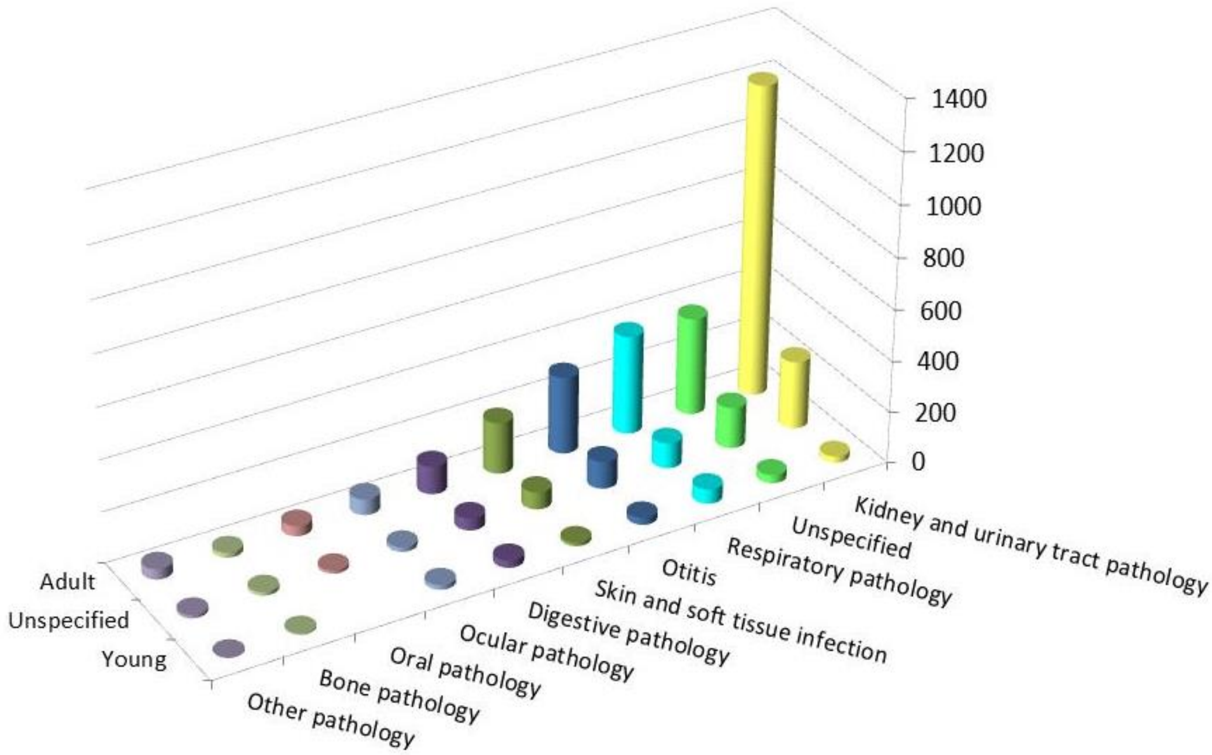


Figure 1 - Cats 2016 – Number of antibiograms by age group and pathology

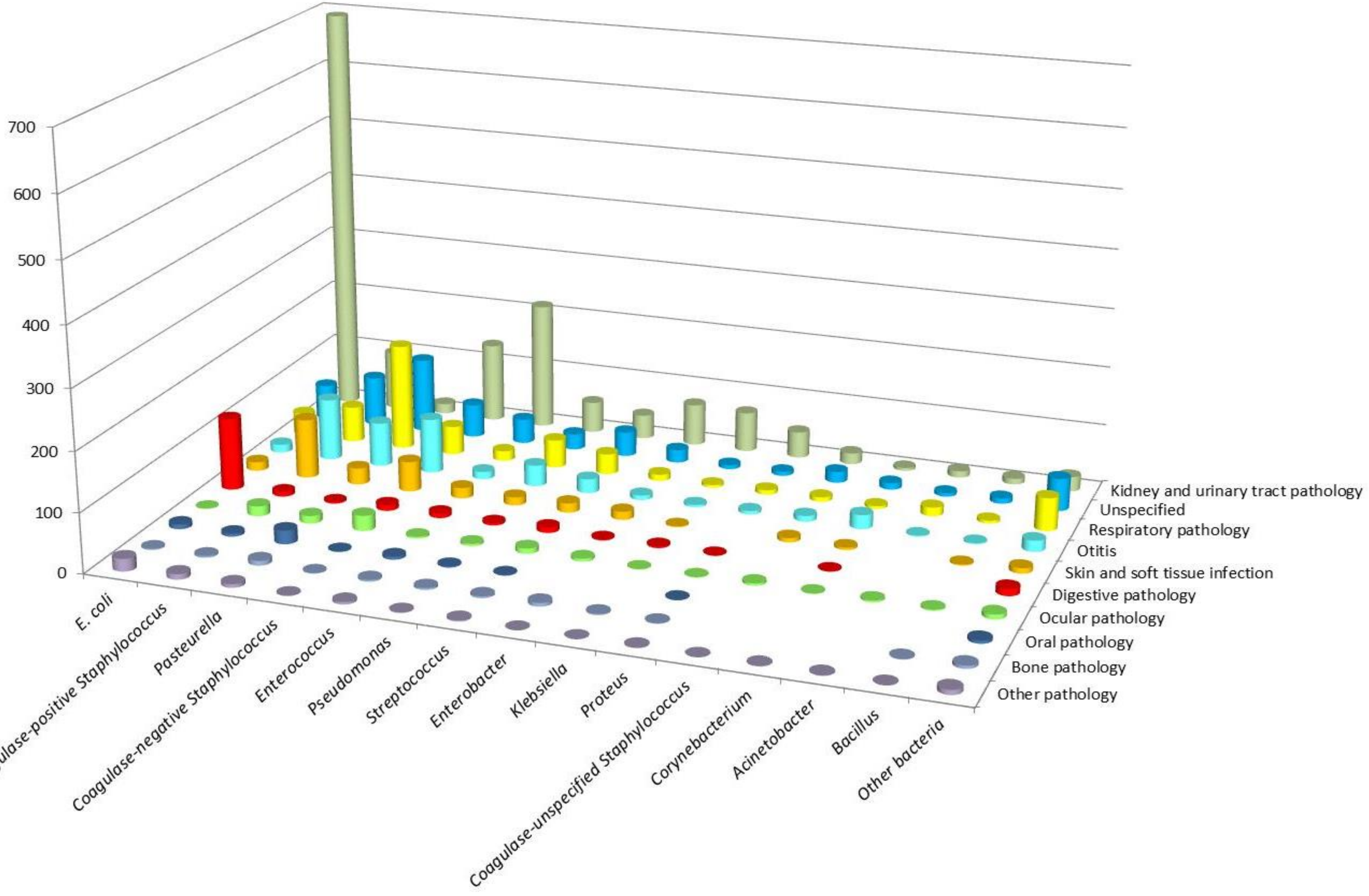


***Note:** all values are detailed in table 1 (including other pathologies, representing less than 1%, grouped together)*

Table 1 - Cats 2016 – Number of antibiograms by age group and pathology

Pathology N (%)	Age group N (%) Adult	Unspecified	Young	Total N (%)
Kidney and urinary tract pathology	1,218 *(32.32)*	266 *(7.06)*	25 *(0.66)*	**1,509** ***(40.05)***
Unspecified	381 *(10.11)*	161 *(4.27)*	32 *(0.85)*	**574** ***(15.23)***
Respiratory pathology	387 *(10.27)*	99 *(2.63)*	57 *(1.51)*	**543** ***(14.41)***
Otitis	302 *(8.01)*	106 *(2.81)*	27 *(0.72)*	**435** ***(11.54)***
Skin and soft tissue infections	201 *(5.33)*	67 *(1.78)*	13 *(0.35)*	**281** ***(7.46)***
Digestive pathology	109 *(2.89)*	47 *(1.25)*	28 *(0.74)*	**184** ***(4.88)***
Ocular pathology	62 *(1.65)*	18 *(0.48)*	18 *(0.48)*	**98** ***(2.60)***
Oral pathology	39 *(1.04)*	12 *(0.32)*		**51** ***(1.35)***
Bone pathology	19 *(0.50)*	14 *(0.37)*	5 *(0.13)*	**38** ***(1.01)***
Arthritis	15 *(0.40)*	5 *(0.13)*		**20** ***(0.53)***
Reproductive pathology	13 *(0.35)*	4 *(0.11)*		**17** ***(0.45)***
Systemic pathology	9 *(0.24)*	2 *(0.05)*	2 *(0.05)*	**13** ***(0.35)***
Cardiac pathology	1 *(0.03)*	1 *(0.03)*		**2** ***(0.05)***
Muscle pathology	1 *(0.03)*			**1** ***(0.03)***
Mastitis	1 *(0.03)*			**1** ***(0.03)***
Nervous system pathology	1 *(0.03)*			**1** ***(0.03)***
Total N *(%)*	**2,759 *(73.22)***	**802 *(21.28)***	**207 *(5.49)***	**3,768 *(100.00)***

Figure 2 - Cats 2016 – Number of antibiograms by bacteria and pathology



Note: *only values for pathologies >1% and bacterial groups having more than 30 occurrences are represented. Detailed values are presented in table 2 below.*

Table 2 - Cats 2016 – Number of antibiograms by bacteria and pathology

	Pathology N (%)																
Bacteria N (%)	Kidney and urinary tract pathology	Unspecified	Respiratory pathology	Otitis	Skin and soft tissue infections	Digestive pathology	Ocular pathology	Oral pathology	Bone pathology	Arthritis	Reproductive pathology	Systemic pathology	Cardiac pathology	Muscle pathology	Mastitis	Nervous system pathology	**Total N (%)**
E. coli	693 *(18.39)*	59 *(1.57)*	39 *(1.04)*	14 *(0.37)*	15 *(0.40)*	123 *(3.26)*	1 *(0.03)*	8 *(0.21)*	2 *(0.05)*	1 *(0.03)*	13 *(0.35)*	6 *(0.16)*			1 *(0.03)*		**975** ***(25.88)***
Coagulase-positive *Staphylococcus*	100 *(2.65)*	84 *(2.23)*	61 *(1.62)*	105 *(2.79)*	101 *(2.68)*	8 *(0.21)*	17 *(0.45)*	5 *(0.13)*	3 *(0.08)*	8 *(0.21)*		1 *(0.03)*					**493** ***(13.08)***
Pasteurella	17 *(0.45)*	127 *(3.37)*	181 *(4.80)*	75 *(1.99)*	28 *(0.74)*	3 *(0.08)*	13 *(0.35)*	23 *(0.61)*	8 *(0.21)*	6 *(0.16)*							**481** ***(12.77)***
Coagulase-negative *Staphylococcus*	135 *(3.58)*	57 *(1.51)*	49 *(1.30)*	93 *(2.47)*	51 *(1.35)*	10 *(0.27)*	26 *(0.69)*	1 *(0.03)*	1 *(0.03)*	1 *(0.03)*							**424** ***(11.25)***
Enterococcus	216 *(5.73)*	42 *(1.11)*	17 *(0.45)*	13 *(0.35)*	18 *(0.48)*	8 *(0.21)*	3 *(0.08)*	5 *(0.13)*	3 *(0.08)*	1 *(0.03)*	1 *(0.03)*	2 *(0.05)*					**329** ***(8.73)***
Pseudomonas	53 *(1.41)*	27 *(0.72)*	48 *(1.27)*	36 *(0.96)*	14 *(0.37)*	4 *(0.11)*	4 *(0.11)*	2 *(0.05)*	3 *(0.08)*	1 *(0.03)*							**192** ***(5.10)***
Streptococcus	41 *(1.09)*	42 *(1.11)*	35 *(0.93)*	24 *(0.64)*	16 *(0.42)*	9 *(0.24)*	9 *(0.24)*	1 *(0.03)*	3 *(0.08)*		1 *(0.03)*		1 *(0.03)*				**182** ***(4.83)***
Enterobacter	71 *(1.88)*	22 *(0.58)*	11 *(0.29)*	8 *(0.21)*	14 *(0.37)*	2 *(0.05)*	5 *(0.13)*		6 *(0.16)*								**139** ***(3.69)***
Klebsiella	68 *(1.80)*	7 *(0.19)*	5 *(0.13)*	4 *(0.11)*	2 *(0.05)*	3 *(0.08)*	1 *(0.03)*		2 *(0.05)*								**92** ***(2.44)***
Proteus	45 *(1.19)*	7 *(0.19)*	8 *(0.21)*	6 *(0.16)*		1 *(0.03)*	1 *(0.03)*	1 *(0.03)*	1 *(0.03)*					1 *(0.03)*			**71** ***(1.88)***
Coagulase-unspecified *Staphylococcus*	19 *(0.50)*	19 *(0.50)*	8 *(0.21)*	10 *(0.27)*	7 *(0.19)*		4 *(0.11)*										**67** ***(1.78)***
Corynebacterium	5 *(0.13)*	11 *(0.29)*	5 *(0.13)*	24 *(0.64)*	4 *(0.11)*	1 *(0.03)*	1 *(0.03)*				1 *(0.03)*						**52** ***(1.38)***
Acinetobacter	11 *(0.29)*	6 *(0.16)*	15 *(0.40)*	2 *(0.05)*			3 *(0.08)*					1 *(0.03)*					**38** ***(1.01)***
Bacillus	10 *(0.27)*	9 *(0.24)*	5 *(0.13)*	2 *(0.05)*	2 *(0.05)*		2 *(0.05)*		1 *(0.03)*								**31** ***(0.82)***
Other bacteria < 30 occurrences	25 *(0.66)*	55 *(1.46)*	56 *(1.49)*	19 *(0.50)*	9 *(0.24)*	12 *(0.32)*	8 *(0.21)*	5 *(0.13)*	5 *(0.13)*	2 *(0.05)*	1 *(0.03)*	3 *(0.08)*	1 *(0.03)*			1 *(0.03)*	**202** ***(5.36)***
Total N (%)	**1,509** ***(40.05)***	**574** ***(15.23)***	**543** ***(14.41)***	**435** ***(11.54)***	**281** ***(7.46)***	**184** ***(4.88)***	**98** ***(2.60)***	**51** ***(1.35)***	**38** ***(1.01)***	**20** ***(0.53)***	**17** ***(0.45)***	**13** ***(0.35)***	**2** ***(0.05)***	**1** ***(0.03)***	**1** ***(0.03)***	**1** ***(0.03)***	**3,768** ***(100.00)***

Table 3 - Cats 2016 – All pathologies and age groups included – *E. coli:* susceptibility to antibiotics (proportion) (N= 975)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*918*	**67**
Amoxicillin-Clavulanic ac.	*971*	**78**
Cephalexin	*943*	**85**
Cephalothin	*73*	**60**
Cefoxitin	*457*	**94**
Cefuroxime	*92*	**71**
Cefoperazone	*108*	**92**
Cefovecin	*399*	**90**
Ceftiofur	*957*	**95**
Cefquinome 30 µg	*471*	**95**
Streptomycin 10 UI	*514*	**78**
Kanamycin 30 UI	*353*	**95**
Tobramycin	*366*	**96**
Gentamicin 10 UI	*959*	**97**
Neomycin	*272*	**91**
Apramycin	*54*	**100**
Tetracycline	*809*	**84**
Doxycycline	*187*	**58**
Chloramphenicol	*483*	**91**
Florfenicol	*373*	**99**
Nalidixic ac.	*475*	**89**
Oxolinic ac.	*36*	**97**
Flumequine	*177*	**93**
Enrofloxacin	*963*	**94**
Marbofloxacin	*945*	**94**
Danofloxacin	*66*	**98**
Sulfonamides	*44*	**73**
Trimethoprim-Sulfonamides	*968*	**89**

Table 4 - Cats 2016 – Kidney and urinary tract pathology – All age groups included – *E. coli:* susceptibility to antibiotics (proportion) (N= 693)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*659*	**73**
Amoxicillin-Clavulanic ac.	*691*	**81**
Cephalexin	*677*	**86**
Cephalothin	*45*	**58**
Cefoxitin	*286*	**93**
Cefuroxime	*42*	**57**
Cefoperazone	*64*	**92**
Cefovecin	*308*	**90**
Ceftiofur	*685*	**94**
Cefquinome 30 µg	*285*	**95**
Streptomycin 10 UI	*349*	**81**
Kanamycin 30 UI	*234*	**95**
Tobramycin	*297*	**96**
Gentamicin 10 UI	*681*	**98**
Neomycin	*165*	**93**
Tetracycline	*561*	**86**
Doxycycline	*152*	**58**
Chloramphenicol	*382*	**92**
Florfenicol	*230*	**99**
Nalidixic ac.	*332*	**92**
Flumequine	*102*	**95**
Enrofloxacin	*687*	**95**
Marbofloxacin	*680*	**95**
Sulfonamides	*33*	**76**
Trimethoprim-Sulfonamides	*690*	**90**

Table 5 - Cats 2016 – Respiratory pathology – All age groups included – *Pasteurella:* susceptibility to antibiotics (proportion) (N= 181)

Antibiotic	*Total (N)*	**% S**
Amoxicillin	*172*	**94**
Amoxicillin-Clavulanic ac.	*179*	**97**
Cephalexin	*171*	**98**
Cefovecin	*82*	**98**
Ceftiofur	*161*	**96**
Cefquinome 30 µg	*73*	**97**
Streptomycin 10 UI	*78*	**44**
Kanamycin 30 UI	*52*	**69**
Tobramycin	*69*	**72**
Gentamicin 10 UI	*177*	**89**
Neomycin	*53*	**55**
Tetracycline	*166*	**96**
Doxycycline	*30*	**87**
Chloramphenicol	*92*	**98**
Florfenicol	*75*	**100**
Nalidixic ac.	*94*	**97**
Enrofloxacin	*175*	**97**
Marbofloxacin	*175*	**99**
Trimethoprim-Sulfonamides	*172*	**90**

Table 6 - Cats 2016 – All pathologies and age groups included – Coagulase-positive *Staphylococcus*: susceptibility to antibiotics (proportion) (N= 493)

Antibiotic	*Total (N)*	**% S**
Penicillin	*466*	**38**
Cefoxitin	*416*	**76**
Oxacillin	*255*	**84**
Cefovecin	*172*	**78**
Erythromycin	*460*	**69**
Tylosin	*48*	**81**
Spiramycin	*341*	**82**
Lincomycin	*353*	**78**
Streptomycin 10 UI	*313*	**76**
Kanamycin 30 UI	*211*	**79**
Gentamicin 10 UI	*483*	**87**
Neomycin	*153*	**82**
Tetracycline	*457*	**79**
Doxycycline	*37*	**95**
Chloramphenicol	*199*	**85**
Florfenicol	*52*	**100**
Enrofloxacin	*321*	**76**
Marbofloxacin	*480*	**83**
Danofloxacin	*48*	**85**
Pradofloxacin	*31*	**77**
Trimethoprim-Sulfonamides	*471*	**87**
Fusidic ac.	*317*	**92**
Rifampicin	*99*	**92**

Tableau 7 - Cats 2016 – Otitis – All pathologies and age groups included – Coagulase-positive *Staphylococcus*: susceptibility to antibiotics (proportion) (N= 105)

Antibiotic	*Total (N)*	**% S**
Penicillin	*102*	**54**
Cefoxitin	*94*	**89**
Oxacillin	*58*	**95**
Cefovecin	*35*	**91**
Erythromycin	*100*	**81**
Spiramycin	*85*	**86**
Lincomycin	*82*	**84**
Streptomycin 10 UI	*77*	**79**
Kanamycin 30 UI	*43*	**86**
Gentamicin 10 UI	*105*	**94**
Neomycin	*36*	**89**
Tetracycline	*103*	**83**
Chloramphenicol	*38*	**87**
Enrofloxacin	*63*	**90**
Marbofloxacin	*105*	**94**
Trimethoprim-Sulfonamides	*102*	**92**
Fusidic ac.	*75*	**96**

Tableau 8 - Cats 2016 – Skin and soft tissue infections – All pathologies and age groups included – Coagulase-positive *Staphylococcus*: susceptibility to antibiotics (proportion) (N= 101)

Antibiotic	*Total (N)*	**% S**
Penicillin	*93*	**35**
Cefoxitin	*84*	**76**
Oxacillin	*43*	**88**
Cefovecin	*31*	**90**
Erythromycin	*94*	**72**
Spiramycin	*72*	**88**
Lincomycin	*77*	**87**
Streptomycin 10 UI	*68*	**79**
Kanamycin 30 UI	*40*	**90**
Gentamicin 10 UI	*100*	**93**
Neomycin	*37*	**97**
Tetracycline	*93*	**89**
Chloramphenicol	*38*	**89**
Enrofloxacin	*66*	**88**
Marbofloxacin	*101*	**91**
Trimethoprim-Sulfonamides	*94*	**91**
Fusidic ac.	*66*	**91**

Tableau 9 - Cats 2016 – Kidney and urinary tract pathology – All pathologies and age groups included – Coagulase-positive *Staphylococcus*: susceptibility to antibiotics (proportion) (N= 100)

Antibiotic	*Total (N)*	**% S**
Penicillin	*96*	**29**
Cefoxitin	*86*	**66**
Oxacillin	*58*	**74**
Cefovecin	*35*	**57**
Erythromycin	*95*	**66**
Spiramycin	*52*	**75**
Lincomycin	*63*	**75**
Streptomycin 10 UI	*48*	**75**
Kanamycin 30 UI	*45*	**60**
Gentamicin 10 UI	*94*	**76**
Tetracycline	*89*	**71**
Chloramphenicol	*47*	**89**
Enrofloxacin	*72*	**56**
Marbofloxacin	*99*	**63**
Trimethoprim-Sulfonamides	*98*	**76**
Fusidic ac.	*59*	**97**

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