BelVet-SAC

Belgian Veterinary Surveillance of Antibacterial Consumption

National consumption report

2016

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Summary

This eighth BelVet-SAC report covers the results of the data collection on veterinary antibacterial consumption in Belgium in 2016. It includes as such the consumption data of antibiotics in food producing animals as well as companion animals. The denominator for animal production was the biomass (in kg) calculated as the sum of the amount of meat of beef, pork , poultry and small ruminant produced in 2016 plus the number of dairy cattle present in Belgium times their metabolic weight per head.

The BelVet-Sac 2016 results are encouraging in the way that the positive evolution seen in 2012, 2013 and 2015 (with a respective reduction of -6,9% ; -6,3% ; -4,7% in mg substance/kg biomass) which was temporarily disrupted in 2014 (increase of +1,1% mg/kg biomass), was observed again in 2016 with **a reduction of -4,8% in mg substance/kg biomass in comparison with 2015**. In absolute numbers this relates to a decrease in the use of antimicrobial compounds of –6,9% subdivided in a decrease of **-1.5% in pharmaceuticals and -29.0% in antibacterial premixes** combined with a decrease of the biomass of 2,1% in 2016 versus 2015.

For the majority of the antimicrobial classes, a decrease in use is observed in 2016. This was very pronounced for the quinolones (-57,5 %) but also quite substantial for tetracyclines (-15,2%), macrolides (-11,4%) and polymyxins (-9.9%). For the latter compound, this is already the 4th year in a row that a substantial reduction is observed. **When comparing to 2012 (before authorization of ZnO) the polymyxin use has dropped with 54,5%.**

When looking at the use according to the different AMCRA - color classes, a reduction in all three classes (Yellow: -6,6%; Orange: -2,8% and Red: -53,1%) is observed. Especially the very substantial reduction **of molecules of critical importance for human medicine** (grouped in the category of the **"Red"** antibacterials - such as the cephalosporines of the 3th and 4th generation and the (fluoro)quinolones - **of -53,1%** is a very positive evolution. This is most likely the result of the introduction of the new legislation (RD of 21 July 2016) which introduced strict conditions to the use of the "Red molecules" in food producing animals from 8th of August 2016 onwards.

Regarding total consumption, **a cumulative reduction of 20,0% is achieved** since 2011 (used as reference year for the AMCRA 2020 goals). This is the result of a reduction of 15,27% in antibacterial pharmaceuticals and 38,2% in antibacterial premixes. Although this result is promising, it also means that we are **still 30,0 % away from achieving the AMCRA 2020 goal of 50% reduction.** This means that in the following years (2017-2020) an annual reduction of more than 8% is required. This clearly will demand additional efforts from all stakeholders involved. The reduction in use of **medicated premixes** in 2016 was very remarkable. **The cumulative reduction in use of antibacterial premixes since 2011 is now 38,2%** indicating that in the year 2017 a further reduction of 11,8% is required to achieve the goal of 50% reduction by the end of 2017. Finally the spectacular decrease in use of critically important

antimicrobials for human medicine is also very promising and clearly illustrates the effect of the concept of co-regulation where new legislation is produced in collaboration with all partners involved. **In comparison to 2011 the cumulative reduction of use of Red molecules is currently 56,1%.**

For the first time, an overview is included in the BelVet-Sac report with the amounts and fraction of sales of antibiotics per authorised target species.

Also, some tables are included for the first time about the use of **antibiotics in companion animals** (mainly by sales of tablets) and this for the three last reported years. These figures are presented without any denominator. Penicillins and cephalosporins represent in 2016 approx. 65,0 % of all sales in cats and dogs whereas critically Important molecules of the 'Red class' represent 3,5 % of total sales. Reduction in use of "red molecules" is rather marginally which is likely due to the fact that companion animals are not concerned by the new legislation (RD of 21 July 2016). To obtain a reduction in use of critically important antimicrobials here, additional effort might be required.

These results do strengthen us in the believe the AMCRA 2020 goals remain feasible but yet substantial additional efforts will be required in the remaining years.

Samenvatting

Dit achtste BelVet-SAC verslag bevat de resultaten van de gegevensverzameling rond het gebruik van antibacteriële middelen bij dieren in België in het jaar 2016. Het betreft dus data over het gebruik van antibacteriële middelen bij zowel voedselproducerende dieren als gezelschapsdieren. Om het gebruik in verhouding tot het aantal aanwezige dieren te kunnen plaatsen, wordt als noemer de biomassa gebruikt, berekend als de som van de in 2016 in België geproduceerde kilogrammen vlees van runderen, varkens, pluimvee en kleine herkauwers aangevuld met het aantal aanwezige melkkoeien vermenigvuldigd met hun metabool gewicht.

De BelVet-SAC resultaten voor 2016 zijn bemoedigend in die zin dat de positieve evolutie opgetekend in 2012, 2013 en 2015 (met een respectieve daling van -6,9%, -6,3%, -4,7% in mg stof/kg biomassa), die in 2014 tijdelijk werd verstoord (stijging van + 1,1% mg/kg biomassa), in 2016 opnieuw werd waargenomen met een **daling van -4,8% in mg /kg biomassa in vergelijking met het jaar 2015**. In absolute cijfers komt dit overeen met een daling van het gebruik van antimicrobiële substanties met -6,9%, verdeeld in een daling van **-1,5% in farmaceutica en -29,0% in antibacteriële voormengsels** gecombineerd met een daling van de biomassa met 2,1% in 2016 versus 2015.

In 2016 werd voor de meeste antibacteriële klassen een daling van het gebruik vastgesteld. Dit was zeer uitgesproken voor chinolonen (-57,5%), maar ook aanzienlijk voor tetracyclines (-15,2%), macroliden (-11, 4%) en polymyxinen (-9,9%). Voor deze laatste verbinding is dit al het 4de opeenvolgende jaar dat er een aanzienlijke daling wordt waargenomen. **In vergelijking met het jaar 2012 (vóór de goedkeuring van ZnO) is het gebruik van polymyxine met 54,5% gedaald.**

Wanneer wordt gekeken naar het gebruik volgens de verschillende AMCRA-kleurcodes, wordt een daling in alle drie de klassen vastgesteld (geel: -6,6%, oranje: -2,8% en rood: -53,1%). Vooral de zeer aanzienlijke daling van **moleculen die van kritiek belang zijn voor de humane geneeskunde** (gegroepeerd in de categorie van de “**rode**” antibacteriële middelen - zoals cefalosporines van de 3de en 4de generatie en fluorochinolonen met **-53,1%** is een uitermate positieve trend. Dit is hoogstwaarschijnlijk te danken aan de invoering van de nieuwe wetgeving (K.B. van 21 juli 2016) die vanaf 8 augustus 2016 strikte voorwaarden oplegt voor het gebruik van “rode moleculen” bij voedselproducerende dieren.

Wat het totale verbruik betreft, kan sinds 2011 (referentiejaar voor de AMCRA 2020 doelstellingen) een **cumulatieve daling van 20,0%** worden vastgesteld. Dit is het gevolg van een daling van 15,27% in antibacteriële farmaceutica en 38,2% in antibacteriële voormengsels. Hoewel dit resultaat veelbelovend is, betekent dit ook dat we **nog steeds 30,0% verwijderd zijn van het doel van de AMCRA 2020 doelstelling, nl. een daling met 50%**. Dit betekent dat in de komende jaren (2017-2020) een jaarlijkse daling van meer dan 8% nodig is. Dit zal duidelijk extra inspanningen vergen van alle betrokken partijen. In 2016 was het verminderde gebruik van gemedicineerde voormengsels zeer opmerkelijk. **De cumulatieve daling van het gebruik van antibacteriële voormengsels sinds 2011 ligt nu op 38,2%**, wat betekent dat in 2017 een verdere daling met 11,8% nodig is om tegen eind 2017 de vooropgestelde daling met 50% te verwezenlijken. Tot slot is de spectaculaire afname van het gebruik van antibiotica die van kritiek belang zijn voor de humane geneeskunde ook veelbelovend. Deze daling illustreert het effect van het concept van co-regulering, waarbij nieuwe wetgeving wordt opgesteld in samenwerking met alle betrokkenen. **In vergelijking met 2011 bedraagt de cumulatieve daling van het gebruik van rode moleculen momenteel 56,1%.**

Voor het eerst bevat het BelVet-Sac verslag ook een overzicht van de hoeveelheden en de fractie van de omzet van antibiotica per vergunde doeldiersoort(en).

Er werden voor het eerst ook een aantal tabellen opgenomen over het gebruik van **antibiotica bij gezelschapsdieren** (hoofdzakelijk via omzet van tabletten) en dit voor de drie laatst gerapporteerde jaren. Deze cijfers worden zonder enige noemer weergegeven. In 2016 waren penicillines en cefalosporinen goed voor ca. 65,0% van de totale omzet bij katten en honden, terwijl moleculen van kritiek belang uit de “rode klasse” goed waren voor 3,5% van de totale omzet. De daling van het gebruik van “rode moleculen” is vrij marginaal, wat waarschijnlijk te wijten is aan het feit dat de nieuwe wetgeving (K.B. van 21 juli 2016) niet van toepassing is op gezelschapsdieren. Om het gebruik van kritiek belangrijke antibiotica te doen dalen, zullen wellicht extra inspanningen nodig zijn.

Deze resultaten sterken ons in de overtuiging dat de AMCRA 2020 doelstellingen haalbaar zijn. Wel zullen er in de resterende jaren nog aanzienlijke bijkomende inspanningen moeten worden geleverd.

Résumé

Ce huitième rapport BelVet-SAC porte sur les résultats de la collecte de données relatives à la consommation d'antibactériens vétérinaires en Belgique en 2016. Il comprend telles quelles les données de consommation d'antibiotiques pour les animaux producteurs de denrées alimentaires ainsi que pour les animaux de compagnie. Le dénominateur pour la production animale était la biomasse (en kg) calculée comme la somme de la quantité de viande de bœuf, porc, volaille et petits ruminants produite en 2016, plus le nombre de vaches laitières présentes en Belgique fois leur poids métabolique par tête.

Les résultats BelVet-Sac 2016 sont encourageants dans le sens que l'évolution positive observée en 2012, 2013 et 2015 (avec une réduction respective de -6,9% ; -6,3% ; -4,7% en mg de substance/kg de biomasse) qui s'était temporairement interrompue en 2014 (augmentation de +1,1% mg/kg de biomasse), a de nouveau été observée en 2016 avec une **réduction de -4,8% en mg de substance/kg de biomasse par rapport à 2015**. En chiffres absolus, cela correspond à une diminution de l'utilisation de composés antimicrobiens de -6,9%, subdivisée en une diminution de **-1,5% des produits pharmaceutiques et -29,0% des prémélanges antibactériens** combinée à une diminution de la biomasse de 2,1% en 2016 par rapport à 2015.

Pour la majorité des classes d'antimicrobiens, une diminution de l'utilisation de ceux-ci a été observée en 2016. Celle-ci était très prononcée pour les quinolones (-57,5 %) mais également particulièrement importante pour les tétracyclines (-15,2%), macrolides (-11,4%) et polymyxines (-9.9%). Pour le dernier composé, c'est déjà la 4e année consécutive qu'on observe une réduction substantielle. **Par rapport à 2012 (avant l'autorisation du ZnO), la consommation de polymyxine a diminué de 54,5%.**

Lorsque l'on regarde l'utilisation en fonction des différentes classes de couleur AMCRA, on observe une réduction dans chacune des trois classes (jaune : -6,6% ; orange : -2,8% et rouge : -53,1%). La réduction très importante de **molécules d'importance critique pour la médecine humaine** (regroupées dans la catégorie des antibactériens « **rouges** » - tels que les céphalosporines de 3e et 4e génération et les (fluoro)quinolones, de **-53,1%**, constitue en particulier une évolution très positive. C'est très probablement le résultat de l'introduction de la nouvelle législation (AR du 21 juillet 2016) qui a introduit des conditions strictes pour l'utilisation des « molécules rouges » chez les animaux producteurs de denrées alimentaires à partir du 8 août 2016.

En ce qui concerne la consommation totale, une **réduction cumulée de 20,0% a été réalisée** depuis 2011 (utilisée comme année de référence pour les objectifs 2020 de l'AMCRA). C'est le résultat d'une réduction de 15,27% pour les produits pharmaceutiques antibactériens et de 38,2% pour les prémélanges antibactériens. Bien que ce résultat soit prometteur, cela signifie également qu'il reste **encore une marge de 30,0 % pour réaliser l'objectif AMCRA 2020 de**

50% de réduction. Cela signifie que, dans les prochaines années (2017-2020), une réduction annuelle de plus de 8% est exigée. Cela exigera clairement des efforts supplémentaires de la part de tous les stakeholders impliqués. Cette réduction de l'utilisation de **prémélanges médicamenteux** en 2016 était très remarquable. La réduction cumulée de l'utilisation de prémélanges antibactériens depuis 2011 est maintenant de 38,2%, ce qui indique qu'en 2017, une réduction supplémentaire de 11,8% est exigée pour réaliser l'objectif de 50% de réduction d'ici fin 2017. En fin de compte, la diminution spectaculaire de l'utilisation d'antimicrobiens d'importance critique pour la médecine humaine est également très prometteuse et illustre clairement l'effet du concept de coréglementation, quand une nouvelle législation est produite en collaboration avec tous les partenaires impliqués. **Par rapport à 2011, la réduction cumulée de l'utilisation de molécules rouges est actuellement de 56,1%.**

Pour la première fois, un aperçu des quantités et de la part de ventes d'antibiotiques par espèce(s) cible(s) autorisée(s) est inclus dans le rapport BelVet-Sac.

Certains tableaux relatifs à l'utilisation d'**antibiotiques chez les animaux de compagnie** (principalement par ventes de comprimés) sont inclus pour la première fois et ce pour les trois dernières années déclarées. Ces chiffres sont présentés sans aucun dénominateur. Les pénicillines et céphalosporines représentent en 2016 approx. 65,0 % de toutes les ventes chez les chats et chiens tandis que les molécules d'importance critique de la « classe rouge » représentent 3,5 % des ventes totales. La réduction de l'utilisation de « molécules rouges » est plutôt très légère, ce qui est probablement dû au fait que les animaux de compagnie ne sont pas concernés par la nouvelle législation (AR du 21 juillet 2016). Pour obtenir ici une réduction de l'utilisation d'antimicrobiens d'importance critique, un effort supplémentaire pourrait être nécessaire.

Ces résultats nous renforcent dans la croyance que les objectifs AMCRA 2020 restent réalisables mais des efforts supplémentaires substantiels seront toutefois nécessaires dans les années qu'il reste.

Preface

Antibacterials are valuable tools in the preservation of animal health and animal welfare, and must be used responsibly as they may save lives and prevent animal suffering. However, The use of antibacterials invariably leads to selection of bacteria that are resistant against the substance used. Resistance can then spread in populations and the environment.
Antibacterial consumption in animals selects for antibacterial resistant bacteria in animals, leading to therapy failure in bacterial infections. Yet it might also jeopardize human health through transfer of resistant bacteria or their resistance genes from animals to humans via direct or indirect contact.

Today, antibacterial consumption and its link to antibacterial resistance in humans and animals is a worldwide point of concern. The World Health Organization has indicated the follow up of antibacterial resistance as one of the top priorities for the coming years. In 2013, the world economic forum has indicated the emergence of antibacterial resistance a global threat with the ability of destabilizing health systems, profound cost implications for economic systems and for the stability of social systems. In May 2015 the World Health Assembly unanimously adopted the Global Action Plan[1] (GAP) on Antimicrobial Resistance developed by the World Health Organization (WHO) with the contribution of the Food and Agricultural Organization (FAO) and the World Organization for Animal Health (OIE), calling all Member States of the World Health Organization to put in place national action plans against AMR by mid-2017.

Given the importance in securing both public as animal health and since it is by far the leading driver for antibacterial resistance, it is crucial to measure the level of Antibacterial consumption and antibacterial resistance in animals. This is moreover also required at the European level where consumption data of antibacterials in veterinary medicine are collected by EMA (European Medicines Agency) in the framework of the ESVAC (European Surveillance of veterinary Antibacterial Consumption) project. Therefore the data collected and presented in this report also fit into the European commitments of Belgium. This eighth BelVet-SAC report gives an overview of the consumption of antibacterials in veterinary medicine in Belgium in 2016 and describes evolutions in use since 2011.

1 http://apps.who.int/gb/ebwha/pdf_files/WHA68/A68_ACONF1Rev1-en.pdf?ua=1

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Materials and Methods

Data collection

1. Antibacterials for veterinary use

a. Antibacterial pharmaceuticals

Sales data of all products in all pharmaceutical formulations registered on the Belgian market that contain antibacterials were aggregated. These data were asked from the 25 wholesaler-distributors that are registered for supplying veterinarians and pharmacies in Belgium with veterinary medicines during the observation period. The distributors are obliged by law (article 12sexies, Law on medicines 25th March 1964; Articles 221 and 228 Royal Decree 14th December 2006 on medicines for human and veterinary use) to keep record of all sales and to deliver these records to the competent authority of the Belgian authority (Federal Agency for Medicines and Health Products) on demand. They were asked by letter dd. Januari 2017 to upload the required data via a secured web-application (www.belvetsac.ugent.be). The required data consisted of **all veterinary antibacterials sold in the year 2016 to a veterinarian or pharmacist in Belgium**. In Belgium, Antibacterial products are only available on prescription or by delivery from the veterinarian. Belgian veterinarians can both use antibacterial products in their daily practice, or sell them to animal owners (fig. 1). Sales from one wholesaler-distributor to another were excluded from the input data to prevent double counting. A pre-filled list of antibacterial containing veterinary medicinal products authorized and marketed on the Belgian market was provided, together with its market authorization holder and national code, formulation and package form. The wholesaler-distributor only needed to provide the number of packages sold for each product per year.

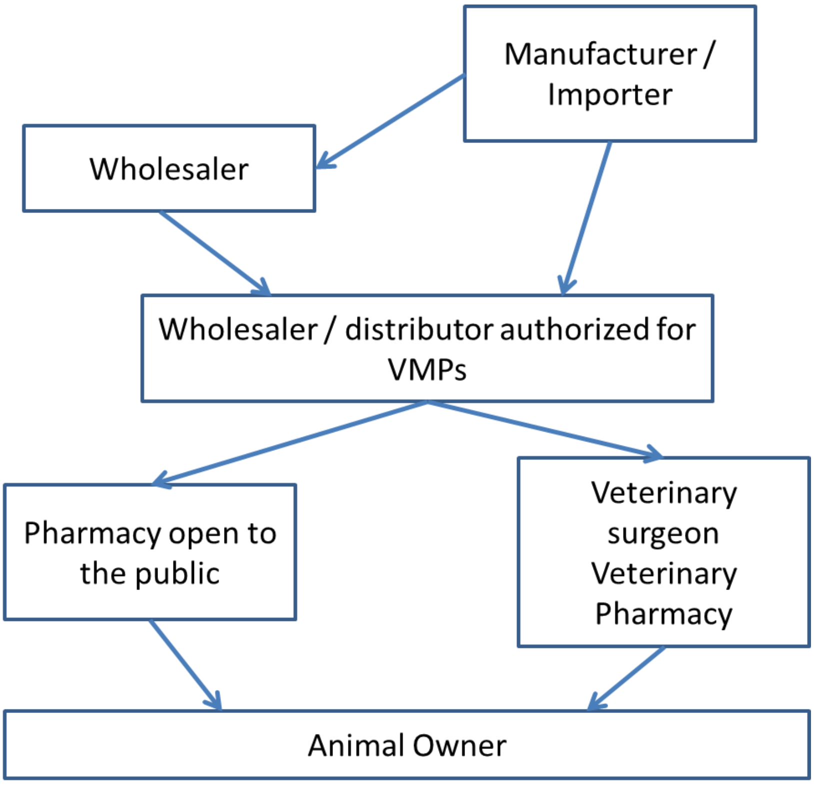

Figure 1. Distribution of Veterinary Medicinal products in Belgium.

b. Antibacterial premixes

As Antibacterial premixes can be purchased by feed mills directly from the producers or wholesalers (not necessarily through wholesaler-distributors) (fig. 2) also data on medicated feed were collected. This was done by contacting all Belgian compound feed producers that are licensed to produce medicated feed[2] (n=52). They received a list of registered and marketed Antibacterial containing premixes. The feed mills were asked by letter dd. January 2016 to upload the required data, on legal basis of article 12sexies Law on medicines 25th March 1964; Article 221 and 228 Royal Decree 14th December 2006 on medicines for human and veterinary use. This data on medicated feed delivered at Belgian farms in 2016 was also submitted via the secure web-application[3]. Producers of medicated feed were asked to provide **data on the use of Antibacterial containing premixes as well as ZnO containing premixes for the year 2016**. Antibacterial and ZnO premixes can only be incorporated into medicated feed on prescription of a veterinarian.

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[2] http://www.favv-afsca.be/bo-documents/Inter_R0-1002_3_dierlijke_producten_erkende_bedrijven.PDF
[3] www.BELVET-SAC.ugent.be

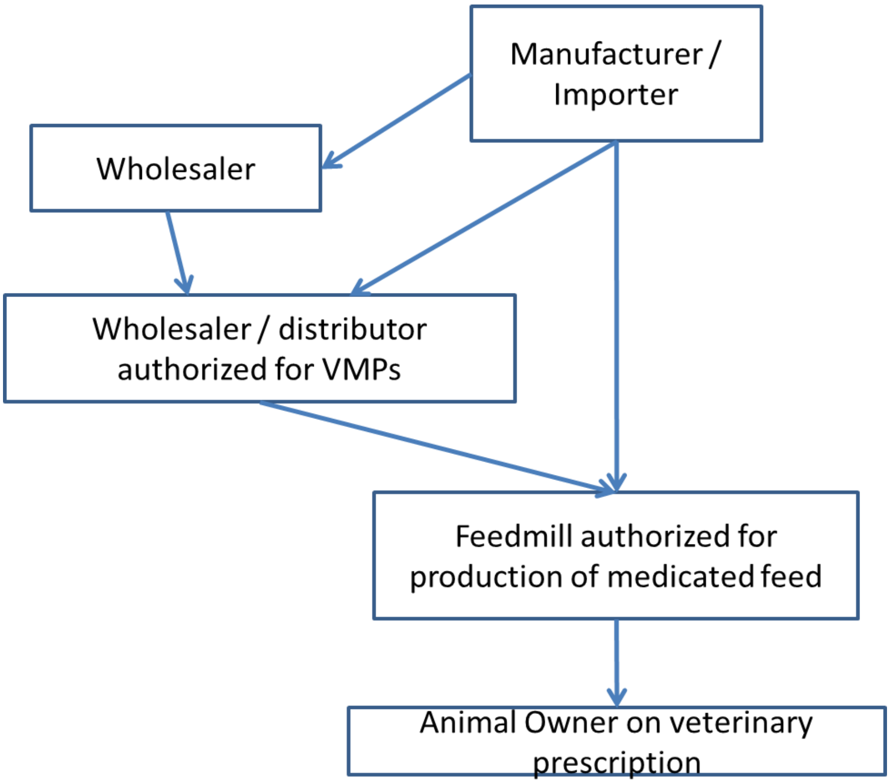


Figure 2. Distribution of Veterinary premixes in Belgium.

c. *Antibacterial classes included*

Table 1 provides an overview of the groups of Antibacterial agents covered in the BelVet-SAC data-collection system, together with the corresponding ATCvet codes. The ATCvet codes included in each Antibacterial class are listed in appendix A.

In the BelVet-SAC data collection all antibacterials used for veterinary medicine are covered (Table 1). No antibacterials are excluded which is in contrast to the ESVAC reporting system where antibacterials for dermatological use and for use in sensory organs are excluded. This explains why consumption data as presented in the report may slightly divert from what is reported for Belgium in the ESVAC report.

Since the use of Zinc Oxide (ZnO) is authorized in Belgium since September 2013 data on Zinc Oxide were also collected and are presented separately.

Table 1. groups of Antibacterial agents covered in the data collection and corresponding ATCvet codes.

Groups of Antibacterial agents	ATCvet codes
Antibacterial agents for intestinal use	QA07AA; QA07AB
Antibacterial agents for dermatological use	QD06A; QD06BA
Antibacterial agents for intrauterine use	QG51AA; QG51AC; QG51AE; QG51AX QG51BA; QG51BC; QG51BE
Antibacterial agents for systemic use	QJ01
Antibacterial agents for intramammary use	QJ51
Antibacterial agents for use in sensory organs	QS01AA; QS01AB QS02AA QS03AA
Antibacterial agents for use as antiparasitic	QP51AG

2. Animal population

Animal population data to calculate the produced biomass were derived from the Eurostat website[4].

From these animal population data, biomass (in kg) was calculated, according to Grave et al., (2010), as the sum of the amount of meat of beef, pork, poultry and small ruminants produced that year in Belgium plus the number of dairy cattle present in Belgium times 500 kg of metabolic weight per head.

Data analysis

The total number of packages sold per product for all wholesalers was linked to a for that purpose developed database that contained all additional product information in accordance with the ESVAC recommendations. This additional information consisted of:

- the different active antibacterial substances the product contains per ml for liquids or mg for solids
- the weight per substance
- the number of units in one package
- for active substances expressed in International Units: the conversion factor to mg
- calculated from the above: the total amount of active substance (per active substance) in one package

[4] http://epp.eurostat.ec.europa.eu/portal/page/portal/agriculture/data/main_tables

- the ATC vet code for each (combination of) active substance(s) required for the ESVAC (European Surveillance of Veterinary Antibacterial Consumption) reporting

Through this extra information, the number of packages sold can be converted to the amount of active substance used.

All sales data on antibacterial feed premixes included in the data from wholesaler-distributors were excluded from the above data-source to prevent double counting. Data concerning antibacterial premixes from medicated feed producers were added to the data on pharmaceuticals from wholesaler-distributors to account for total coverage of veterinary antibacterial consumption in Belgium.

As in the previous reports (BELVET-SAC 2007-2009; BELVET-SAC 2010; BELVET-SAC 2011; BELVET-SAC 2012, BELVET-SAC 2013, BELVET-SAC 2014, BELVET-SAC 2015)[5], yearly consumption figures were put versus biomass as a yearly adjusted denominator according to the methodology described by Grave et al. (2010). The animal species included were based upon the vast majority of the biomass present (estimated to be 93% of the total biomass present in Belgium). It should however be made clear that the calculation of the biomass does not contain other animal species such as horses, rabbits and companion animals (dogs, cats, …) (estimated to be 7% of the biomass present in Belgium), whereas the collected data on antibacterial use also covers the use in these species. The biomass also includes animals slaughtered in Belgium but raised in other countries and it excludes animals raised in Belgium but slaughtered abroad.

Data validation

1. External data validation

To check for correctness and completeness the collected data on premixes were compared to data collected by the compound feed producing industry[6]. The datasets do not provide exactly the same information as the used data collection methodology is slightly different. However, trends and evolutions in the different datasets can be compared. If large discrepancies were observed data validity was further investigated and corrected, if needed.

2. Internal data validation

For each of the data entries of the wholesaler-distributor or compound feed producers results were compared with the data entries of the previous years by the same companies. If large,

[5] http://www.BELVET-SAC.ugent.be/pages/home/
[6] www.bemefa.be

unexpected, discrepancies were observed between the data provided in the subsequent years data validity was further investigated and corrected, if needed.

Results

Response rate and data validation

All the 25 wholesaler-distributors, requested to deliver their sales data on veterinary antibacterial products sold in 2016 responded. All 52 compound feed producers, licensed for the production of medicated feed responded. Two feed mills indicated not to have produced any medicated feed while 50 feed producers delivered the data on antibacterial premixes incorporated in medicated feed to be used in Belgium. Based on the response rate data coverage is assumed to be 100%.

As the years progress companies providing data get more and more accustomed to the system. This year, in contrast to previous years, the internal data validation step did not identify unexpected data entries. Therefore no additional data corrections were needed.

In the cross-validation of the data with the databases with BEMEFA comparable amounts and trends were found as presented in this report again indicating that the results presented for premixes are likely to be a good representation of reality.

Number of antibacterial pharmaceuticals and premixes available on the Belgian market

Table 2 provides an overview of the number of antibacterial pharmaceuticals and the number of antibacterial premixes available on the Belgian market since 2009 according to the commented compendium of the Belgian Centre for Pharmacotherapeutic Information[7].

Table 2. Armatorium of antibacterial products on the Belgian market in between 2009 and 2015.

	2009	2010	2011	2012	2013	2014	2015	2016
Number of Antibacterial pharmaceuticals on the market	283	292	282	308	294	298	339	329
Number of Antibacterial premixes on the market	20	21	23	22	23	21	21	19
Total number of Antibacterial products on the market	303	313	305	330	317	319	360	348

The only new antibacterials registered on the market in the last 5 years are gamithromycin (2009), tildipirosin (2011), pradofloxacine (2011), fusidic acid (2014) and thiamfenicol (2015). The observed variation in available products is largely due to the marketing of new formulations or new generic products based on existing active substances.

[7] www.bcfi-vet.be

Animal biomass produced in Belgium

The produced biomass was calculated based on the Eurostat data for the years 2011-2016 as described above (Table 3).

Table 3. Animal Biomass produced in Belgium between 2011 and 2016

Animal biomass	2011	2012	2013	2014	2015	2016
Meat (ton)						
Pork	1 108 255	1 109 610	1 130 570	1 118 330	1 124 310	1 060 540
Beef	272 286	262 280	249 910	257 670	267 880	278 360
Poultry[a]	402 753	410 215	388 090	433 270	452 940	461 250
Sheep/goat[b]	2 438	2 163	2 410	2 560	2 720	3 020
Total biomass from meat production	**1 785 732**	**1 784 268**	**1 770 980**	**1 811 830**	**1 847 850**	**1 803 170**
Dairy cattle						
Dairy cattle (number)	510 600	503 500	515 990	519 090	528 780	529 780
Dairy cattle metabolic weight (ton)	255 300	251 750	257 995	259 545	264 390	264 890
Total biomass (ton)	**2 041 032**	**2 036 018**	**2 028 975**	**2 071 375**	**2 112 240**	**2 068 060**
Evolution since previous year	**-0.58%**	**-0.25%**	**-0.36%**	**+2.09%**	**+1.97%**	**-2.09%**

[a] data on biomass of poultry production between 2008 and 2012 were retrospectively changed in the Eurostat database. The data presented in this report are in agreement with what is currently available in the Eurostat database and differ slightly from what was presented in previous BELVET-SAC reports.

[b] the biomass of sheep and goat was added to the total biomass for the first time in 2016. In all calculations and tables the new biomass (including sheep and goat) was adapted retrospectively to assure a correct evolution over time.

A **decrease in biomass production of 2,1%** is observed between 2015 and 2016.

Total consumption of Antibacterial drugs for veterinary use in Belgium

The total consumption of antibacterial drugs for veterinary use in Belgium is presented in Figure 3 in tons of active substance per given year since the start of the data collection (2007). The total amount is subdivided into antibacterial pharmaceuticals and antibacterial compounds contained in antibacterial premixes incorporated into medicated feed intended to be used in Belgium.

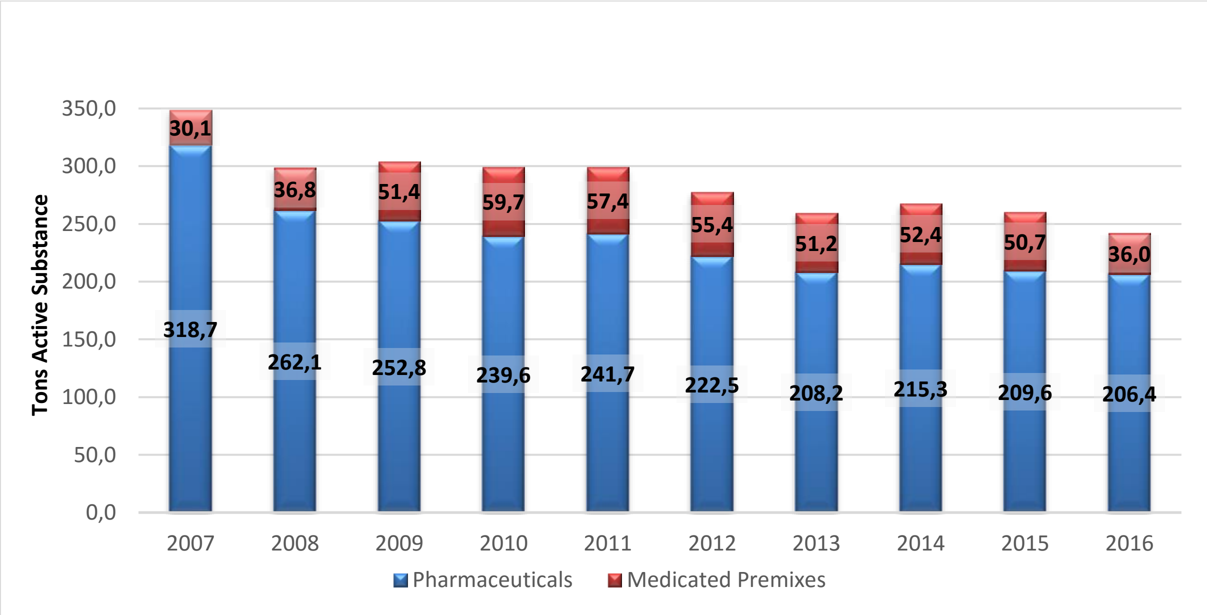


Figure 3. Total national consumption of antibacterial compounds for veterinary use in Belgium for the years 2007-2016 (tons active substance)

As 2011 has been selected as the reference year for all reduction initiatives (see further), further analysis shows the evolution from this year onwards.

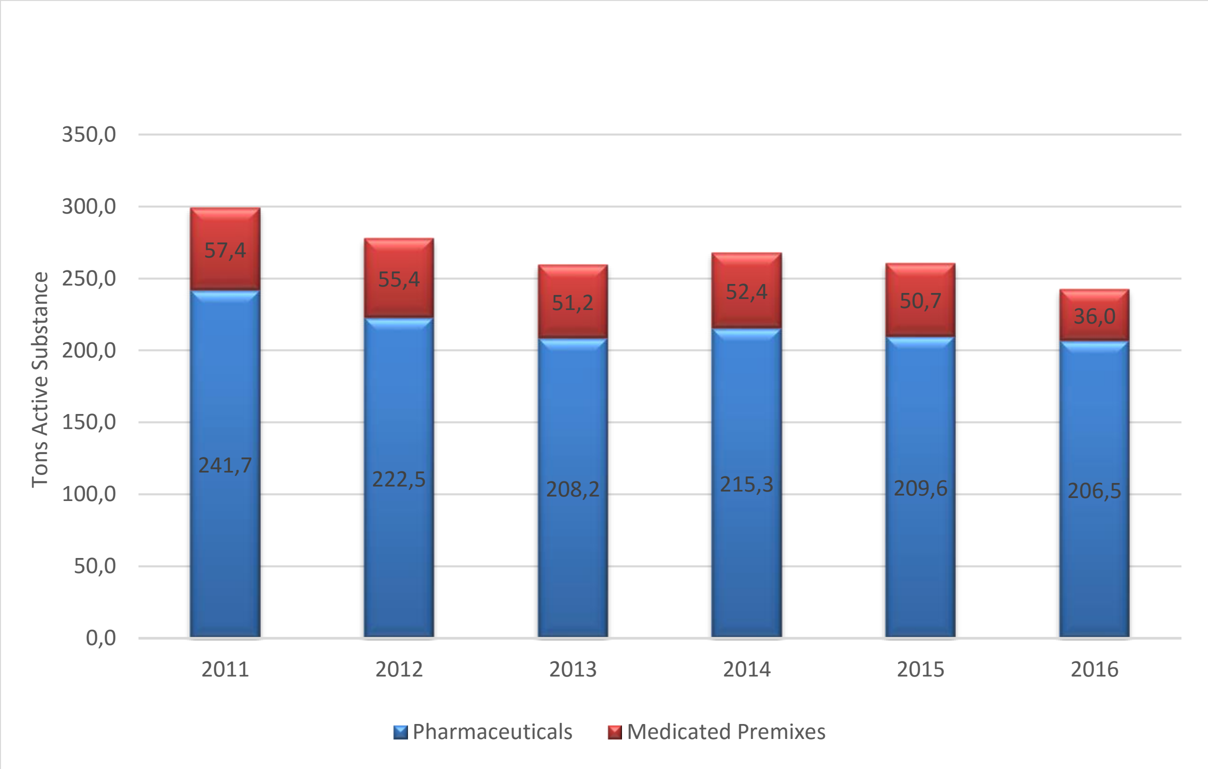


Figure 4. Total national consumption of antibacterial compounds for veterinary use in Belgium for the years 2011-2016 (tons active substance)

Between 2015 and 2016, there was a **decrease of 6,9%** in the total consumption of antibacterials in veterinary medicine in Belgium (242 371,1 kg in 2016; 260 285,8 kg in 2015). The use of antibacterial **pharmaceuticals decreased with 1,5%** between 2015 and 2016, and the use of **antibacterial premixes decreased with 29,0%.** After the slight increase in 2014, the decreasing trend which started again in 2015 clearly continued in 2016. Since 2011 (reference year for reduction initiative) a decrease of 19,0 % is realized in absolute volumes.

Figures 5 and 6 show these data separately for the antibacterial pharmaceuticals and the antibacterial premixes.

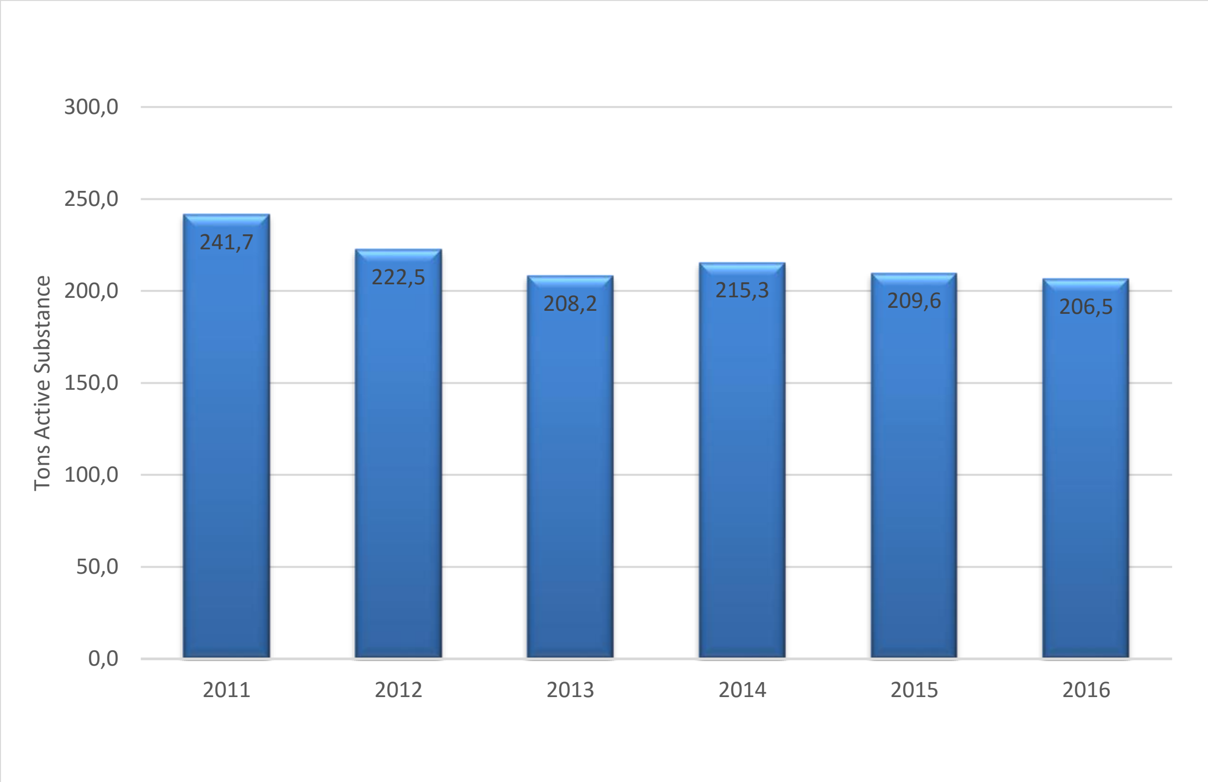


Figure 5. National consumption of antibacterial pharmaceuticals for veterinary use in Belgium for the years 2011-2016 (tons active substance)

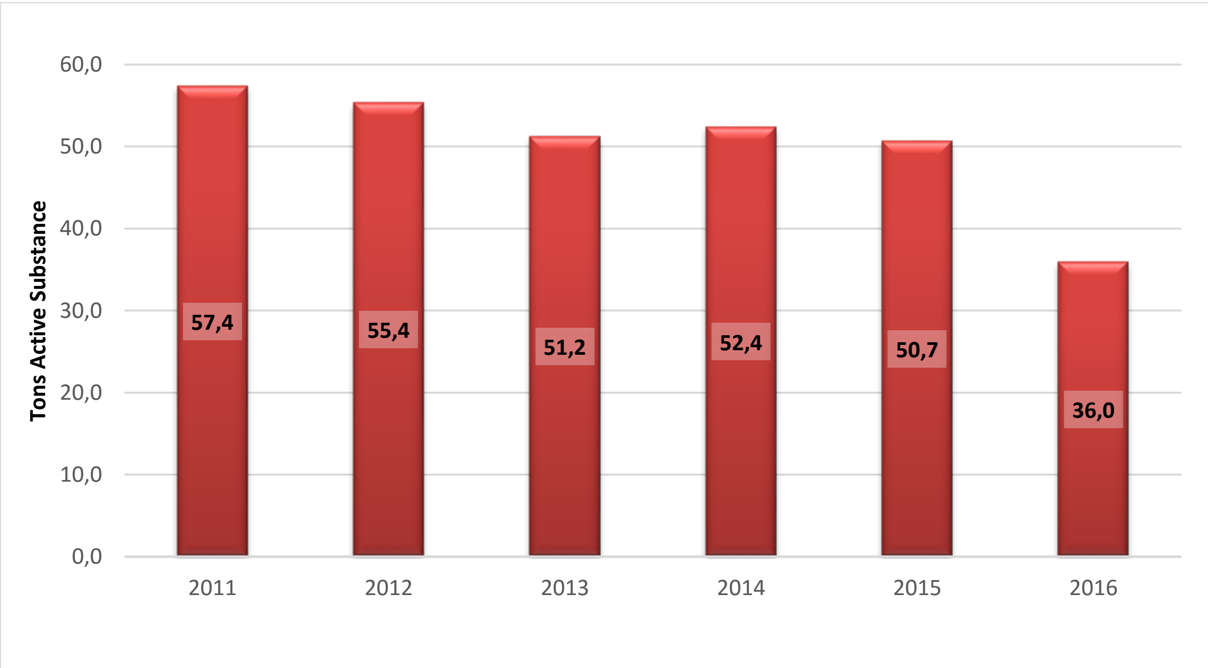


Figure 6. National consumption of antibacterial premixes in Belgium for the years 2011-2016 (tons active substance)

After an increase in use of antibacterial premixes between 2007 and 2010, the decreasing trend firstly observed in 2011 continued till 2013. In 2014 this decrease came to an end and a small increase was observed. Since 2015 the decrease resumed and accelerated further in 2016.

Since 2011 the data collection system allows to differentiate the animal species of destination for the antibacterial premixes. In 2016, 99,3% of the antibacterial premixes went to pig feed and only 0,7% was used in poultry or rabbit feed.

Since September 2013 the use of Zinc oxide in therapeutic doses (corresponding to 2500 ppm of Zn) in piglets for two weeks after weaning is allowed. In 2013, the first 4 months of allowance, 8075 kg of active substance of Zinc Oxide was used in Belgium. In 2014 the use further increased to 81 964 kg, in 2015 to 87 199 kg and in 2016 the total use of ZnO dropped to 74 388 kg (decrease with 14,7%) as is presented in figure 7.

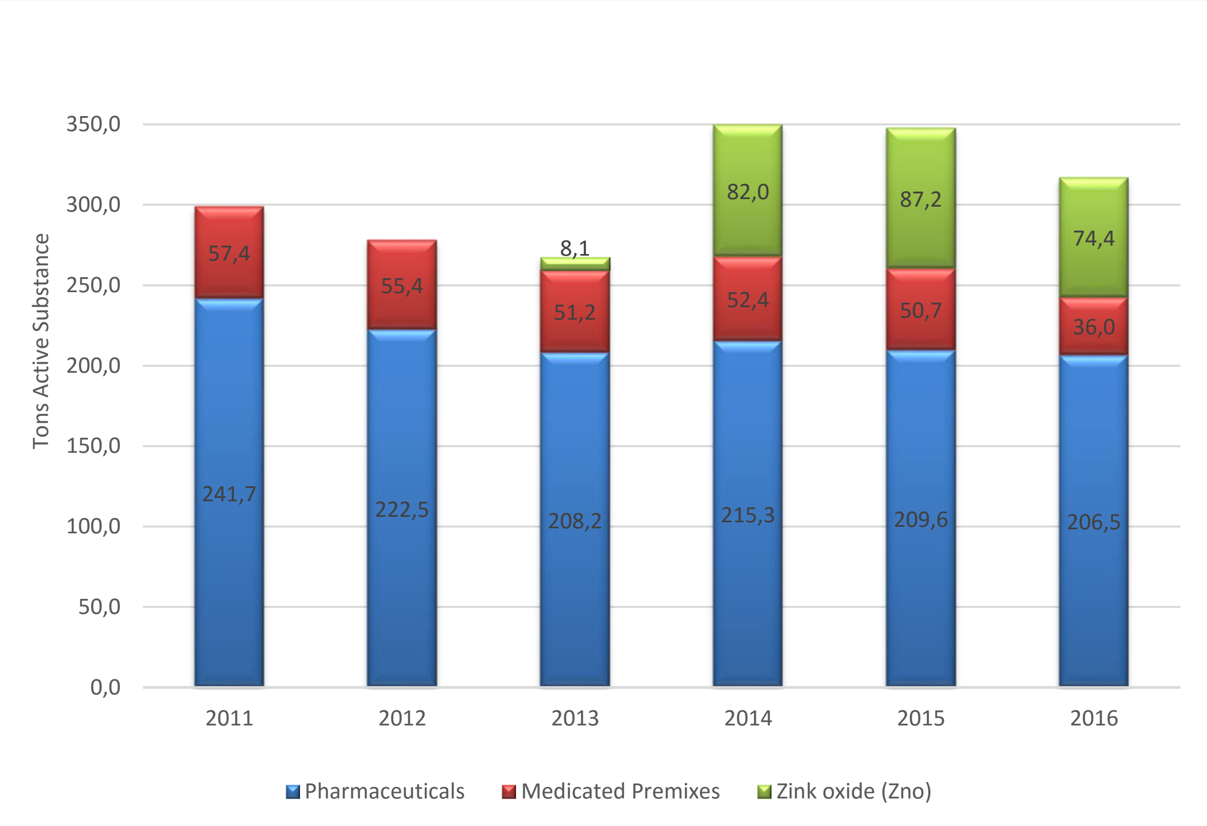


Figure 7. Total national consumption of antibacterial compounds for veterinary use in Belgium plus the use of ZnO for the years 2011-2016 (tons active substance)

Antibacterial use versus biomass

As described above, the total biomass production in 2016 in Belgium has decreased with 2,1% in comparison to 2015. As a consequence the decreasing trends in use observed in absolute values are somewhat moderated in the relative numbers. For 2015, the mg of active substance used in relation to the kg biomass produced was 123,2 mg/kg whereas in 2016 this is 117,3 mg/kg. This means **a decrease of 4,8% in comparison to 2015.** Split into the different application routes, an increase of 0,6% is observed in the antibacterial pharmaceuticals and a reduction of 27,5% in the antibacterial premixes.

Figure 8 presents these data, again subdivided into antibacterial pharmaceuticals and antibacterial premixes.

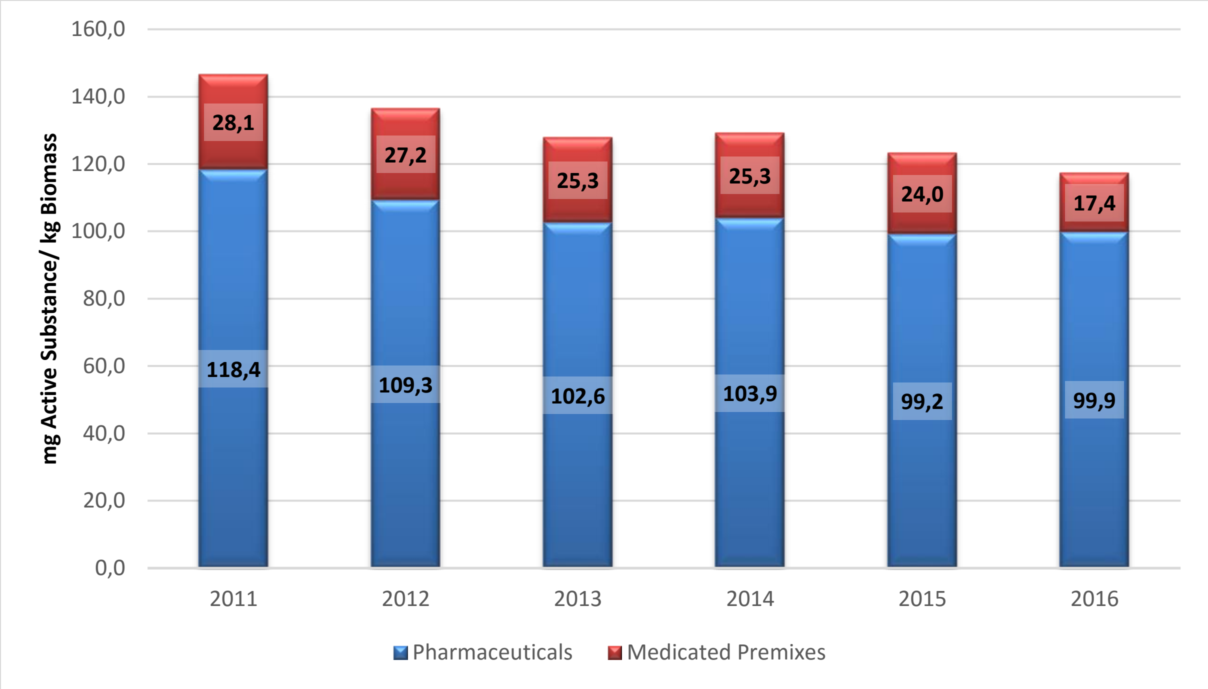


Figure 8. Total mg of active substance used per kg biomass produced in Belgium for 2011-2016.

In 2016 the decreasing trend (-4,8%) as seen in 2015 (-4,7%), 2012 (-6,9%) and 2013 (-6,3%) is continued after the limited increase (+1,1%) observed in 2014. When using 2011 as a reference (see AMCRA 2020 objectives), a cumulative reduction of 20,0% is achieved, distributed over a reduction of 15,8% in antibacterial pharmaceuticals and 38,3% in antibacterial premixes (Fig. 9).

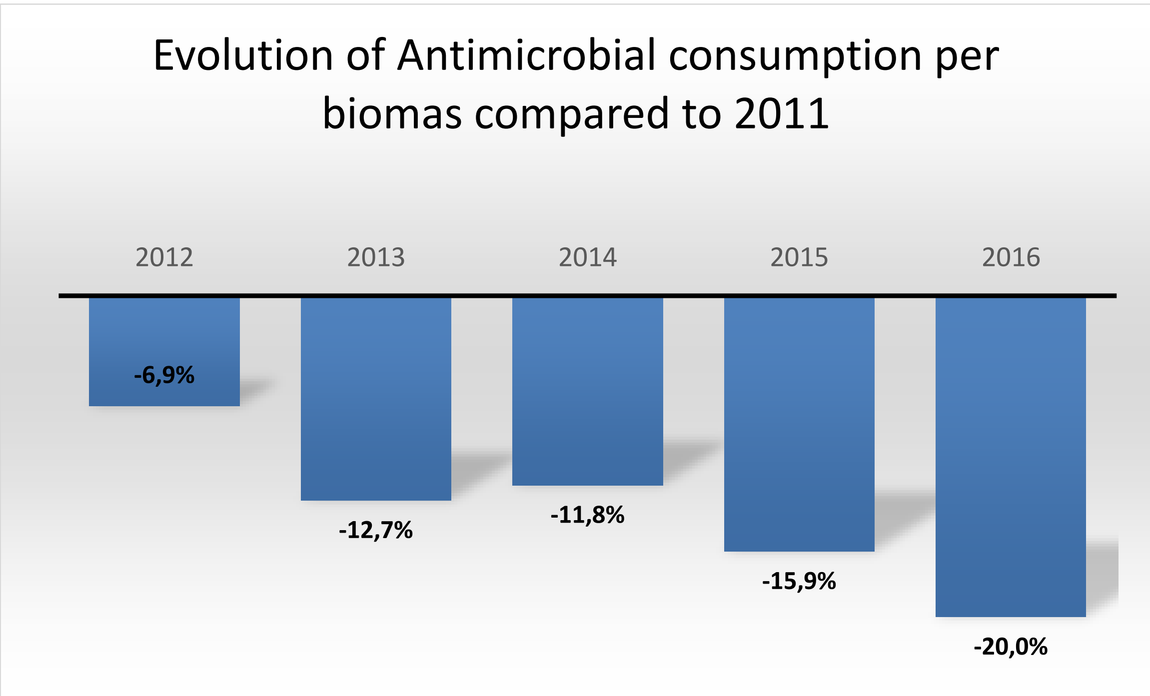


Figure 9. Evolution of antimicrobial consumption per kg biomass produced in Belgium with 2011 as reference year.

Positioning of Belgium in comparison to the EU member states.

Since a number of years the European Medicines Agency (EMA) runs the European Surveillance of antibacterial Consumption (ESVAC) project that aims at collection of Antibacterial usage data in all EU member states in a comparable manner allowing to evaluate trends and compare usage between countries. The data collected in Belgium and presented in the annual BELVET-SAC reports are also collected in the framework of this EU wide ESVAC data collection effort.

In 2016, the sixth ESVAC report, presenting results on antibacterial usage in 29 EU /EEA countries in the year 2014 was released (EMA, 2016). In this report the **antibacterial consumption in animals in these 29 countries in 2014 is presented in relation to the animal production in the country.**

In figure 10 the results of the 29 countries included in the sixth ESVAC report are presented in mg active substance used and the animal production quantified by means of the Population Correction Unit (PCU) which is comparable to the biomass used in this BELVET-SAC report but also includes small ruminants and horses and corrects more thoroughly for import and export.

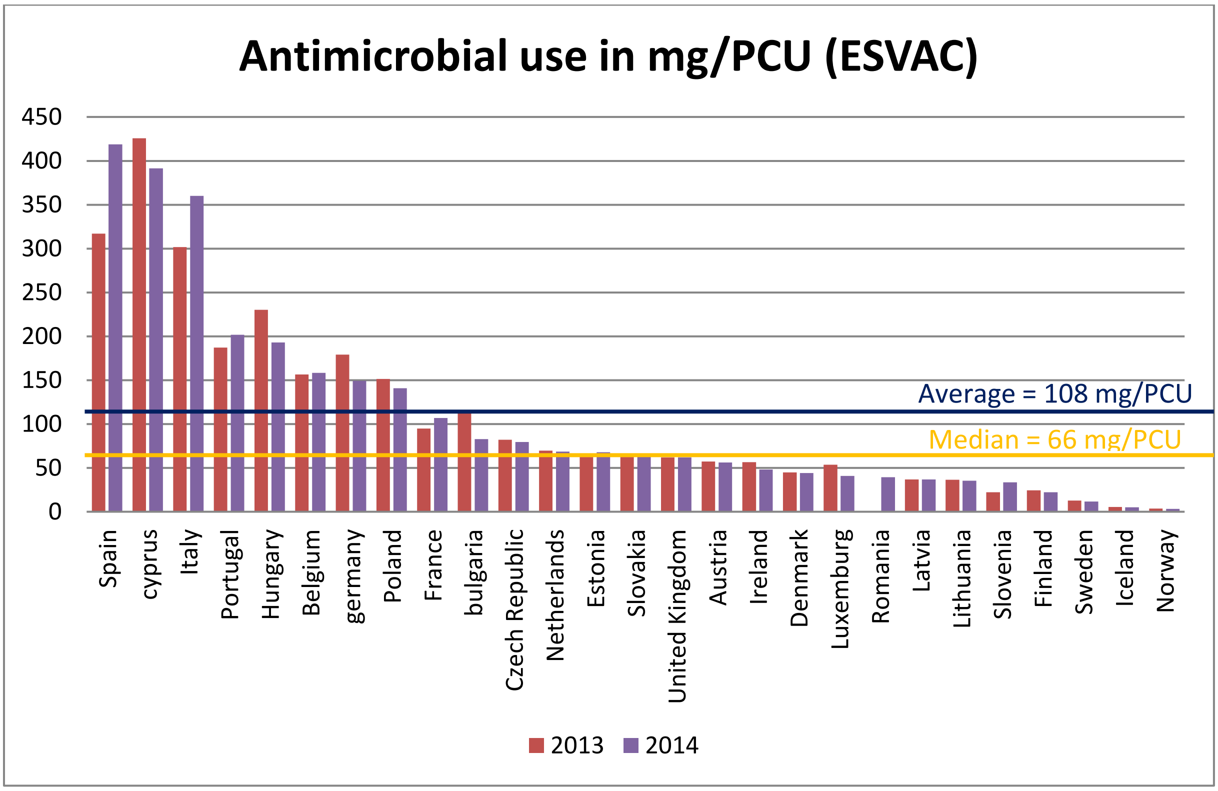


Figure 10. Sales for food-producing species, including horses, in mg/PCU, of the various veterinary Antibacterial classes, by country between 2013-2014 (source: 5°, 6° ESVAC report on Sales of veterinary Antibacterial agents).

When looking at figure 10 it can be observed that Belgium resides at the sixth position in terms of Antibacterial usage expressed in mg/PCU in 2014.

Species specific antibacterial use

As mentioned before, a majority of the antibacterial products available on the Belgian market is registered for multiple species. In table 4 an overview is given of total sales and proportion of total sales according to the authorized target species.

Table 4. Antibacterial use of pharmaceuticals per authorized species.

				2016	
				Mg	**%**
	Su			53 731 749 285	26,0%
	Su	Av		47 264 156 100	22,9%
Bo	Su	Av		41 450 982 500	20,0%
Bo	Su			37 360 112 675	18,1%
		Av		9 047 295 000	4,4%
Bo	Su	Ov		8 307 075 780	4,0%
Bo				3 009 485 651	1,5%
Bo	Su	Ov +		2 664 049 021	1,3%
		Ca/Fe		2 212 785 249	1,1%
Bo	Su	Ca/Fe		402 214 197	0,2%
Bo	Su	Eq		282 000 000	0,1%
	Su	Ov		232 645 150	0,1%
Bo		Av		221 000 000	0,1%
Bo		Ca/Fe		207 535 000	0,1%
		other		106 480 908	0,1%
Bo	Su	Eq	Ca/Fe	72 300 000	<0,1%
		Eq		70 632 000	<0,1%
Bo		Ov		56 400 000	<0,1%
Bo		Eq		41 264 000	<0,1%
	Su	Ca/Fe		40 170 000	<0,1%
		Ov		1 226 862	<0,1%
	Su	Ov	Ca/Fe	300 000	<0,1%
				206 781 859 376	1

Av = poultry, Bo = cattle, Ca/Fe = dogs and cats, Eq = horses, Ov = sheep, Ov + = sheep, goats and other, Su = pigs, other = pigeons, rabbits, snakes and perching birds

Antibacterials that are registered solely for the use in pigs are most used (26,0%) followed by antibacterials registered for both pigs and poultry (22,9%). The third most used antibacterial pharmaceuticals are the ones registered for cattle, pigs and poultry (20,0%). As the usage in companion animals (dogs and cats) is concerned only the category of products that are solely registered for these species can be attributed with certainty to this group. In the next chapter , the evolution in sales for this particular group of products is further described.

Antibacterial pharmaceuticals in dogs and cats

In 2016, 2212,79 kilograms active compound was used in dogs and cats. From 2014 to 2015 and 2015 to 2016 there is an increase of 1,4% and 1,2% respectively in the consumption of antibacterial pharmaceuticals in dogs and cats.

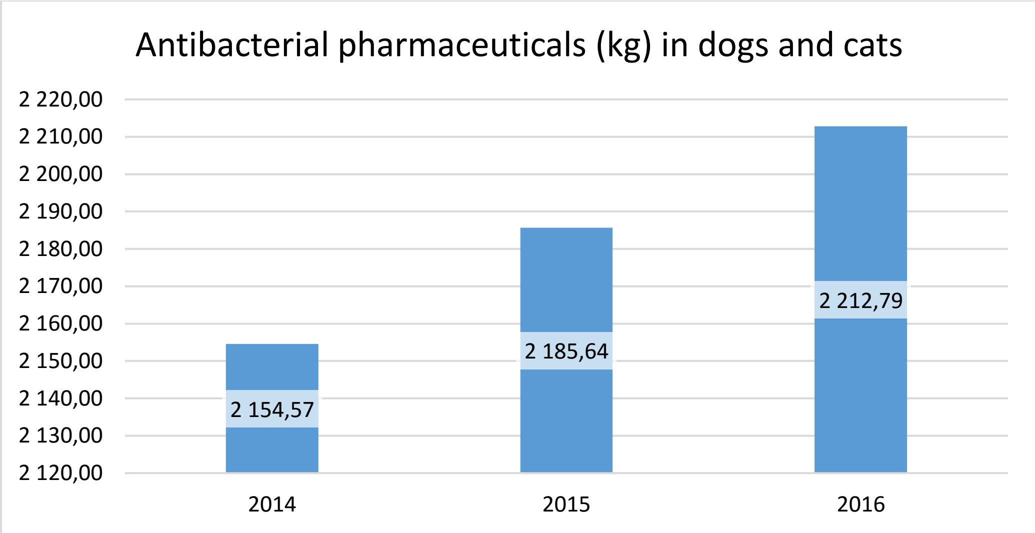
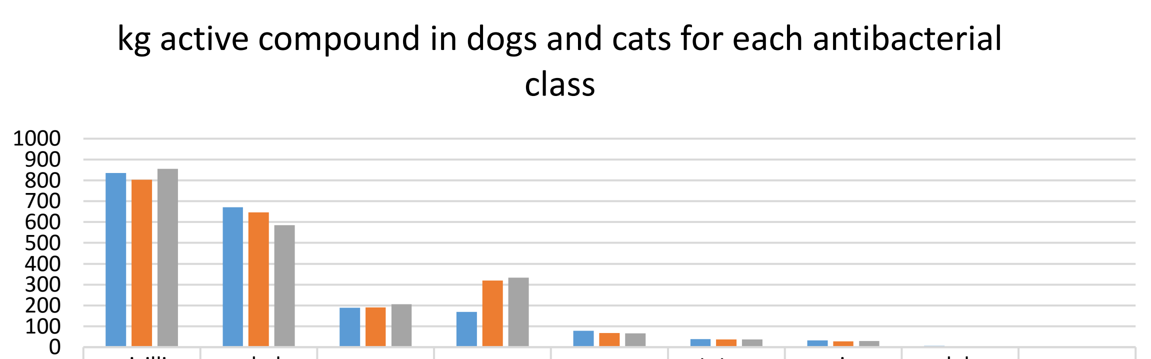


Figure 11. Evolution of antibacterial pharmaceuticals only registered for dogs and cats between 2014 and 2016

The most commonly used antibacterial pharmaceuticals in 2016 are the orange colour-coded compounds (1462,24 kg). Since 2014 there is an increase in the use of these compounds, with a difference of +6% from 2015 till 2016. The red and yellow compounds decreased from 2014 onwards, with a difference of -2% and -7% respectively from 2015 till 2016.

Penicillines (855,79 kg) are the most used antibacterial compound in dogs and cats, followed by cephalosporines (584,54 kg) and macrolides (332,71 kg). Enzyme-inhibitors (205,57 kg), solely clavulanate in combination with amoxicillin, are also commonly used.



	penicillines	cephalo-sporins	enzyme-inhibitor	macrolides	quinolones	tetra-cyclines	amino-glycosides	sulpho-namides	polymixins
2014	836,10	671,52	189,13	169,31	79,22	39,18	32,39	6,12	0,96
2015	802,98	646,13	191,15	318,97	67,55	37,22	28,26	0,00	0,89
2016	855,79	584,54	205,57	332,71	65,54	37,32	30,01	0,00	0,83

Figure 12. Decomposition of antibacterial pharmaceuticals only registered for dogs and cats between into their different antibacterial classes.

Antibacterial use per class of Antibacterial compounds

1. Total consumption (Antibacterial pharmaceuticals and premixes)

In Figure 13 the total consumption of antibacterials per class (ATC level 3 or 4) is presented.

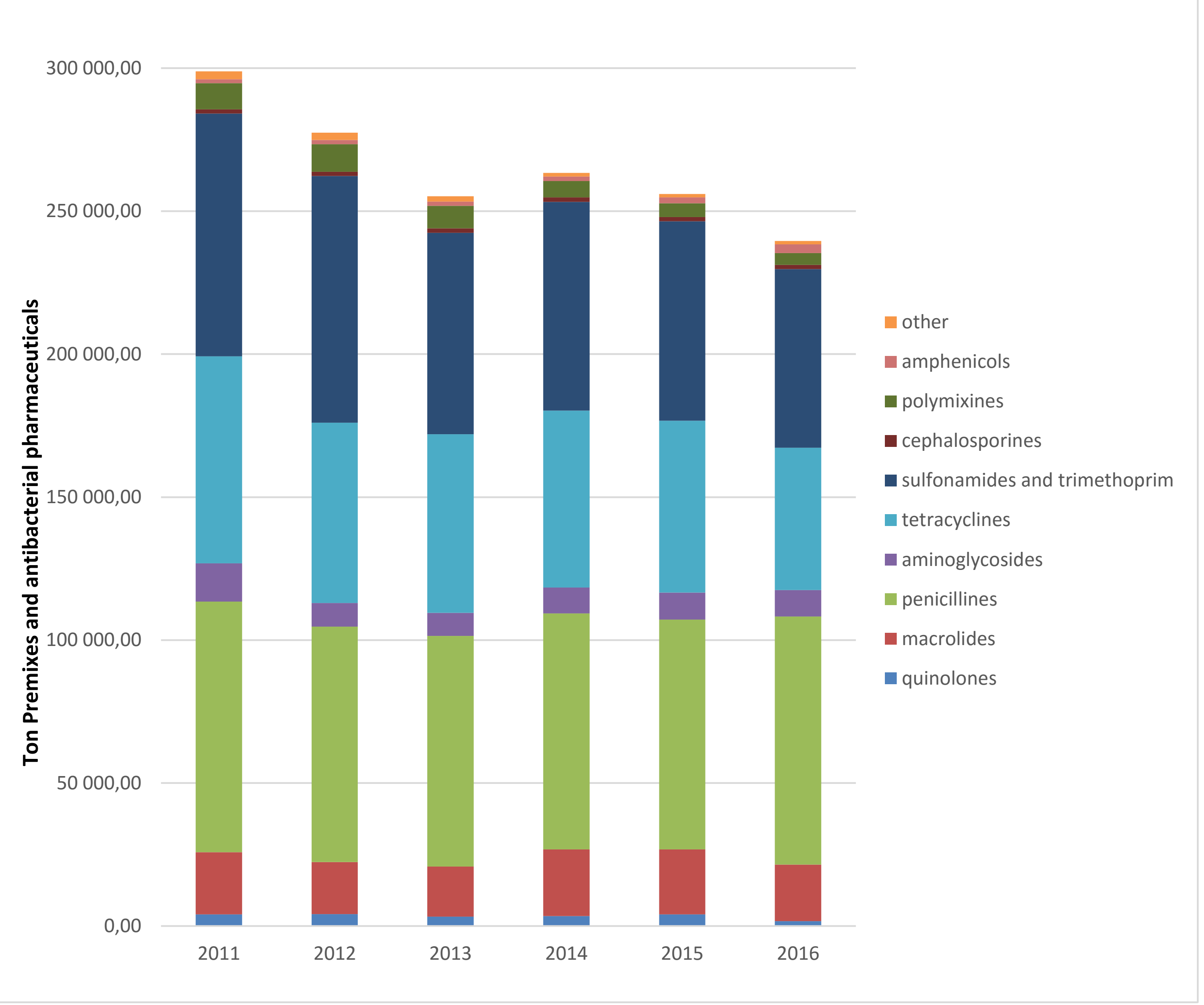


Figure 13. Total Antibacterial use per class of antibacterials from 2011 to 2016.

In 2016, the most used group of antibacterials were the penicillines (86,8 tons; 35,8%) followed by the sulphonamides and trimethoprim (65,3 tons; 27,0%) and the tetracyclines (49,8 tons; 20,6%). 2016 is the fourth year in a row where the penicillines have become the most used compound. In table 6 the evolution of the used products per antimicrobial class in mg/kg biomass in the last 5 years is presented.

Table 5. The evolution of use of antimicrobial products per antimicrobial class since 2011.

	Totaal						evolution					
Class AB Mg/kg Biomass	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**'11 » '12**	**'12 » '13**	**'13 » '14**	**'14 » '15**	**'15 » '16**	**2016%**
penicillins	43,05	40,50	39,83	39,86	38,04	41,97	-5,9%	-1,7%	0,1%	-4,6%	10,3%	35,79
sulphonam & trimethoprim	41,60	42,37	36,75	37,34	35,03	31,59	1,9%	-13,3%	1,6%	-6,2%	-9,8%	26,95
tetracyclines	35,50	30,95	30,76	29,88	28,45	24,13	-12,8%	-0,6%	-2,8%	-4,8%	-15,2%	20,58
macrolides	10,70	8,93	8,63	11,26	10,78	9,56	-16,5%	-3,4%	30,5%	-4,2%	-11,4%	8,15
aminosydes	6,45	4,08	3,99	4,34	4,47	4,48	-36,7%	-2,4%	8,8%	3,1%	0,1%	3,82
polymixins	4,46	4,73	3,88	2,73	2,25	2,03	6,1%	-18,0%	-29,6%	-17,6%	-9,9%	1,73
fenicols	0,66	0,71	0,75	0,78	0,99	1,45	6,2%	5,8%	4,6%	26,5%	47,3%	1,24
quinolones	2,00	2,07	1,63	1,69	1,92	0,81	3,4%	-21,1%	3,2%	13,7%	-57,5%	0,69
cephalosporins	0,73	0,75	0,76	0,77	0,72	0,68	2,9%	1,0%	2,0%	-6,9%	-5,2%	0,58
other	1,36	1,27	0,90	0,61	0,57	0,55	-6,7%	-28,9%	-32,3%	-6,1%	-3,8%	0,47
Total mg/kg Biomas	**146,51**	**136,37**	**127,87**	**129,26**	**123,23**	**117,26**	**-6,92%**	**-6,23%**	**1,08%**	**-4,67%**	**-4,85%**	**100**
Totaal biomass	2 041 032	2 036 018	2 028 975	2 071 375	2 112 240	2 068 060	**-0,25%**	**-0,35%**	**2,09%**	**1,97%**	**-2,09%**	

In 2016 the use of penicillins, the most used compound, increased with more than 10%, while the use of sulphonamides and trimethoprim and tetracyclines, second and third most used compounds, decreased with 9,8% and 15,2% respectively. While the use of quinolones in 2015 increased substantially(+16,0%), in 2016 an immense decrease of 57,5% is observed. This decrease is driven by a decrease of flumequine (-72,2%), enrofloxacine (-43,8%) and marbofloxacine (-39,2%) (table 6). The large increased use in fenicols (+47,3%) is due to an increase in use of florfenicol, mainly in the antibacterial premixes. The decreased use of polymyxines (almost entirely colistin sulphate) is seen for the fourth year in a row which is likely due to the start of the use of zinc oxide as an alternative for colistin use in the treatment of post weaning diarrhea in piglets. When comparing to 2012 (before authorization of ZnO) the polymyxine use has dropped with 54,5%. Use of premixes based on colistin sulphate dropped with nearly 82 % vs 2012.

AMCRA (center of expertise on Antimicrobial Consumption and Resistance in Animals)[8] produced its first guides in 2013 on responsible antibacterial consumption and made them available online since 2016. In these guides, the different antibacterial classes available in veterinary medicine are given a color to differentiate them in terms of importance for human and animal health. The ranking of importance is based on the WHO list on antibacterial with importance for human health[9] and the lists produced by the World Animal Health Organization (OIE) indicating the importance of antibacterials for veterinary health[10]. When producing these lists, priority was given to human health.

The group of yellow products contains the antibacterial classes with the lowest importance for human medicine in terms of resistance selection and transfer and therefore no additional restrictions, on top of the legal requirements, are suggested for the use of these compounds. The yellow group contains the majority of the penicillins, the sulphonamides (and diaminopyrimidines), the cephalosporins of the first generation and the phenicols.

The group of orange products are of higher importance for human medicine and should therefore be used restrictively and only after good diagnostics allowing to target the therapy. The orange group contains the highest amount of different molecules including all available macrolides, the polymyxins, the aminoglycosides, the tetracyclines and the aminopenicillins.

The red group of products are the products of the highest importance for human medicine and therefore their use should be avoided in veterinary medicine as much as possible. AMCRA

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[8] www.amcra.be
[9] http://apps.who.int/iris/bitstream/10665/77376/1/9789241504485_eng.pdf
[10] http://web.oie.int/downld/Antibacterials/OIE_list_Antibacterials.pdf

advises to use these molecules only under very strict regulations. This group contains the cephalosporins of the 3° and 4° generation and the fluoroquinolones.

In figure 14 the evolution of use of the different color groups of antibacterials over the last 4 years is presented. From this figure it can be seen that the orange group is the most widely used group whereas the red molecules are only limitedly used when expressed in mg active substance per kg biomass. Yet the red molecules are generally more modern molecules with a high potency and therefore a low molecular weight in relation to their treatment potential. In 2016 a decrease in all groups is seen, with a huge decrease in the red group. This large reduction is very promising, after the small increase in the use of red molecules in 2015. In comparison to 2011 (reference year) the reduction of red molecules is 56,1% whereas a reduction of 75% is aimed by 2020.

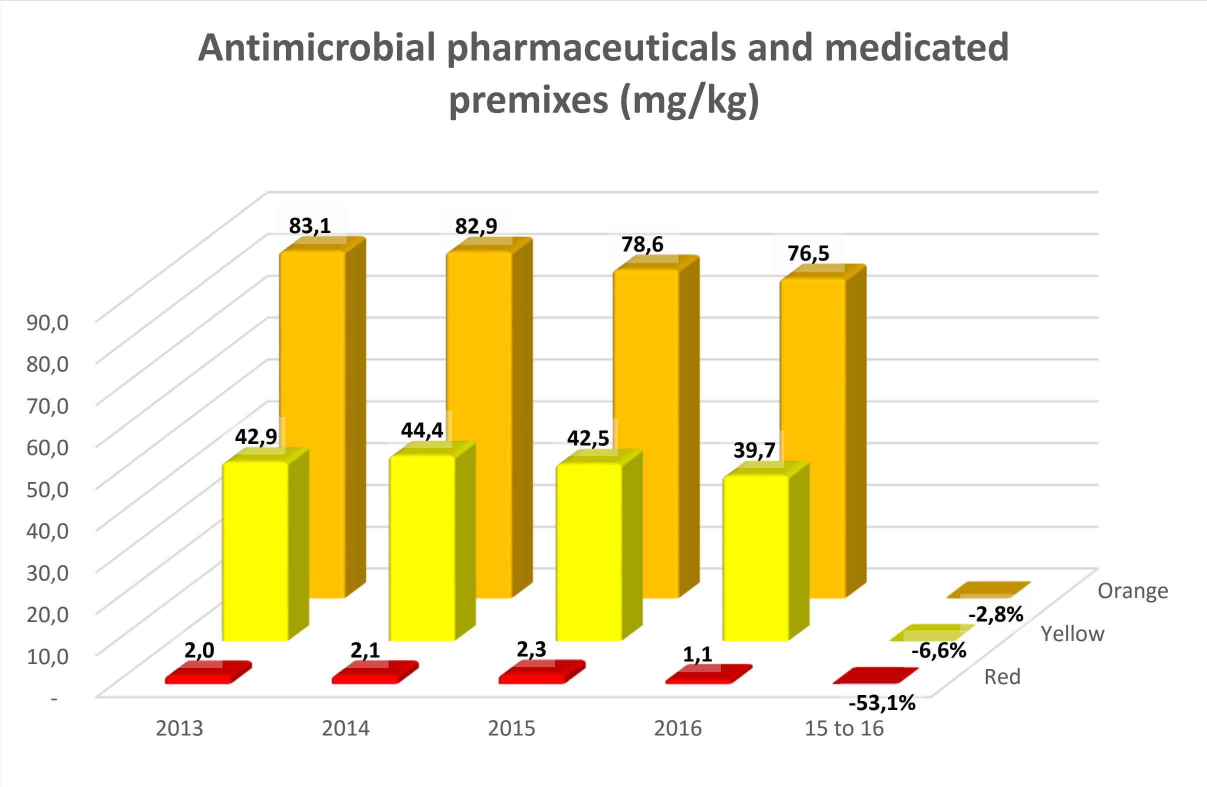

Figure 14: Evolution in the antibacterial consumption (mg/kg) per antibacterial color group between 2013 and 2016.

When the same figure is made for the products that are exclusively registered for dogs and cats (Fig. 15) a different evolution is observed with only a minor decrease in use of the red molecules (-2%) and an increase in use of the orange molecules of -7%. As the biomass of dogs and cats in Belgium is unknown it is difficult to relate this data to any change in biomass of these species.

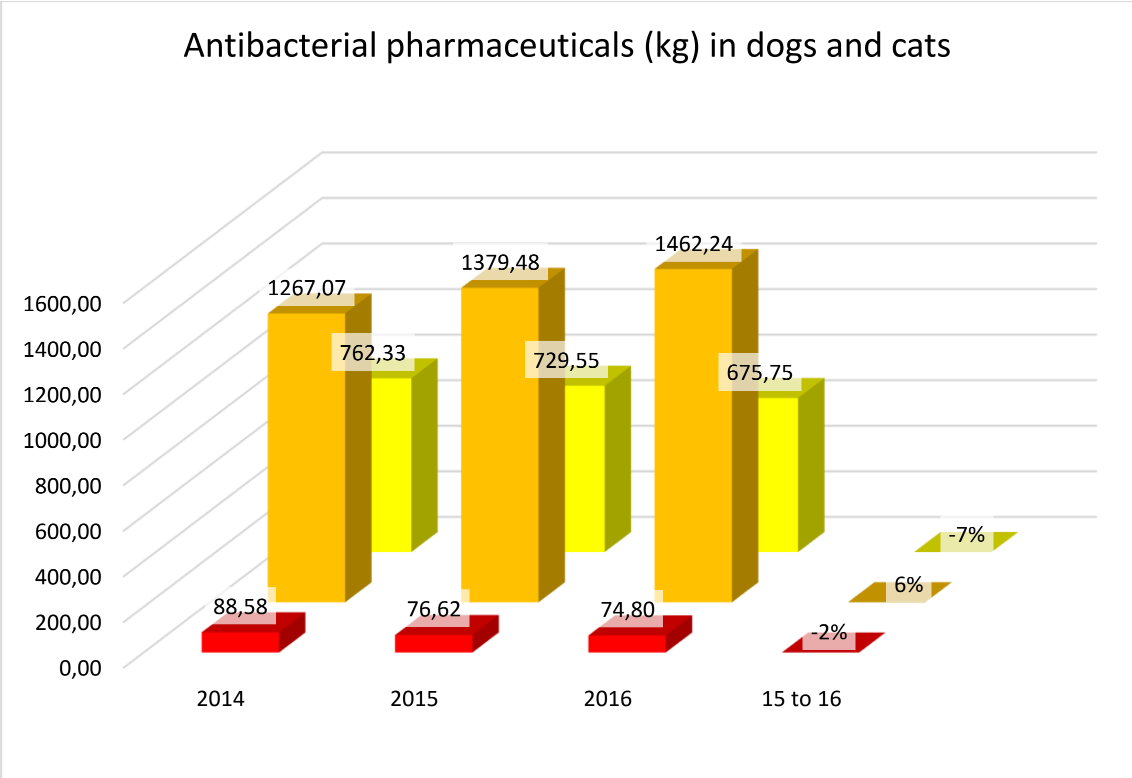

Figure 15: Evolution in the antibacterial consumption (kg active compound) per antibacterial color group in antibacterial compounds exclusively registered for use in dogs and cats between 2014 and 2016.

2. Antibacterial pharmaceuticals

In Figure 16 the consumption of antibacterials per class (ATC level 3 or 4) is presented for the pharmaceuticals.

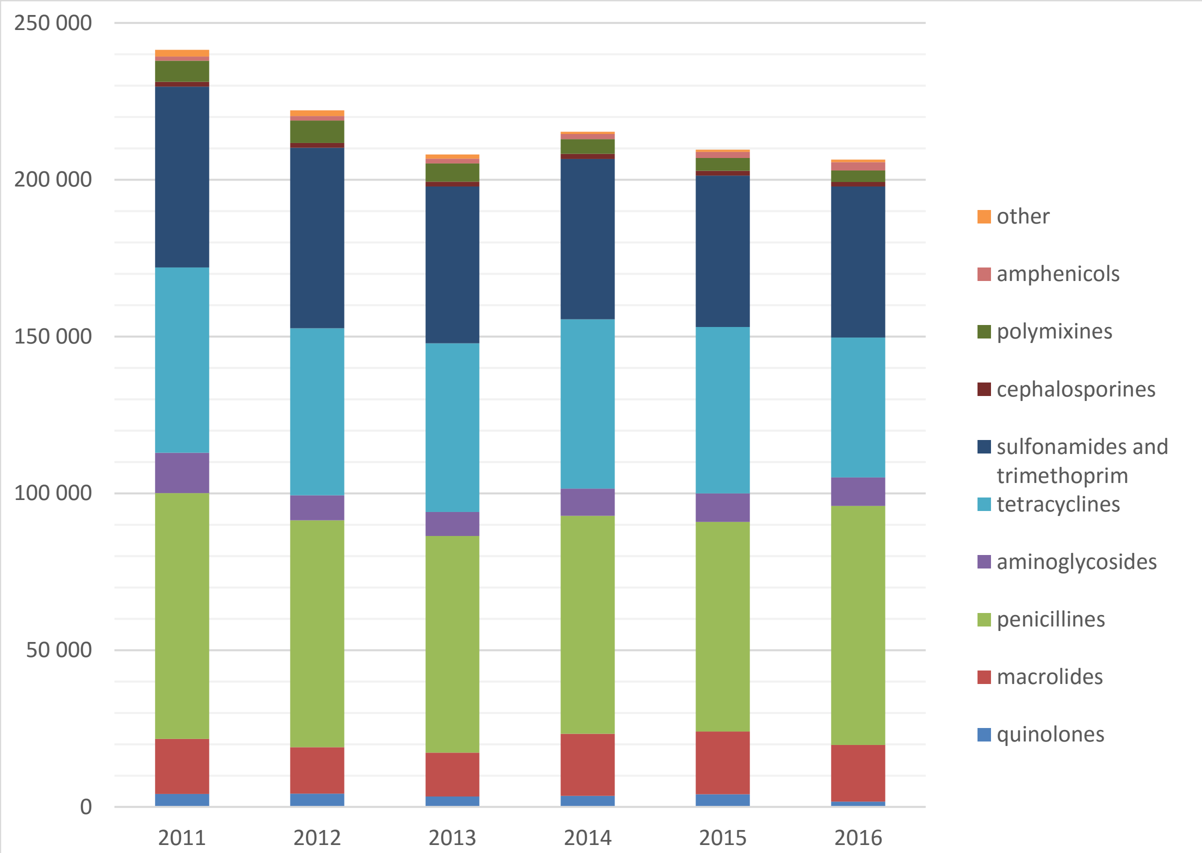

Figure 16. Use of antibacterial pharmaceuticals per class of antibacterials between 2011 and 2016.

3. Antibacterial premixes

In Figure 17 the consumption of antibacterials per class (ATC level 3 or 4) is presented for the antibacterial premixes.

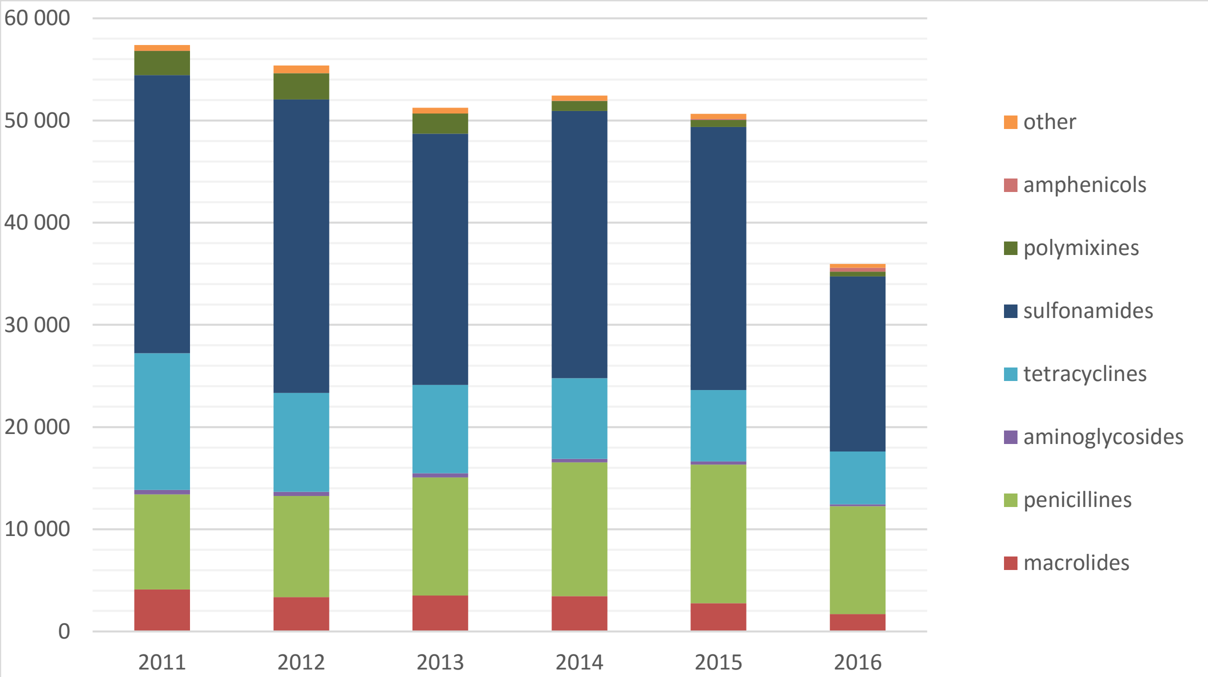

Figure 17. Use of antibacterial premixes per class of antibacterials between 2011 and 2016.

Antibacterial use per active substance

Table 6 gives the amounts used per individual active substance, grouped per class of antibacterials.

Table 6: Antibacterial use per active substance

		Total (kg)					Antimicrobial pharmaceuticals (kgKG)					Medicated premixes (kg)				
Class	Antimicrobial compound	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
cephalosporins 1G	cefalexine	698,6	674,9	767,7	740,4	837,3	698,6	674,9	767,7	740,4	837,3					
cephalosporins 1G	cefalonium	10,4	13,8	12,3	12,8	12,2	10,4	13,8	12,3	12,8	12,2					
cephalosporins 1G	cefapirine	10,1	5,2	12,8	20,7	31,7	10,1	5,2	12,8	20,7	31,7					
cephalosporins 1G	cefazoline	1,0	10,0	16,7	15,6	17,7	1,0	10,0	16,7	15,6	17,7					
fenicols	chlooramfenicol	0,1	0,0	0,0	0,0	0,0	0,1	0,0	0,0	0,0	0,0					
fenicols	florfenicol	1.435,4	1.513,3	1.616,1	2.084,5	3 006,5	1.435,4	1.512,7	1.580,3	1.984,1	2 632,3	0,0	0,6	35,8	100,5	374,1
other	metronidazol	87,5	92,4	94,0	92,5	100,5	87,5	92,4	94,0	92,5	100,5					
other	tiamuline	2.373,7	1.547,5	1.047,6	1.032,3	994,2	1.692,4	1.028,2	615,7	548,3	640,4	681,3	519,3	431,8	484,0	353,8
other	valnemuline	69,3	38,7	59,3	11,2	0,0	0,0	0,0	0,0	0,0	0,0	69,3	38,7	59,3	11,2	0,0
other	zink bacitracine	27,3	33,0	39,2	48,6	23,3	27,3	33,0	39,2	48,6	23,3					
penicillines	cloxacilline	415,9	379,9	393,4	337,7	286,9	415,9	379,9	393,4	337,7	286,9					
penicillines	fenoxymethylpenicilline	385,5	294,2	378,3	537,0	796,4	385,5	294,2	378,3	537,0	796,4					
penicillines	nafcilline	0,0	12,0	7,1	7,2	6,3	0,0	12,0	7,1	7,2	6,3					
penicillines	benethamine penicilline		10,5	8,1	10,2	22,1		10,5	8,1	10,2	22,1					
penicillines	penethamaat	314,4	293,9	6,8	146,1	184,8	314,4	293,9	6,8	146,1	184,8					
penicillines	procaïne benzylpenicilline	12.205,4	7.507,7	10.113,0	10.508,4	10 359,3	12.205,4	7.507,7	10.113,0	10.508,4	10 359,3					
sulphonamides	sulfachloorpyridazine natrium	555,3	724,8	847,0	1.098,2	1 094,5	555,3	724,8	847,0	1.098,2	1 094,5					
sulphonamides	sulfadiazine	70.439,3	60.689,0	62.414,9	59.403,3	51 631,2	46.519,0	40.196,5	40.610,9	37.954,0	37 350,2	23.920,3	20.492,5	21.804,0	21.449,3	14 281,0
sulphonamides	sulfadimidine natrium	178,3	1,8	0,0	0,0	0,0	178,3	1,8	0,0	0,0	0,0					
sulphonamides	sulfadoxine	519,9	458,9	511,7	587,9	922,8	519,9	458,9	511,7	587,9	922,8					
sulphonamides	sulfamethoxazol	107,3	101,3	660,9	557,6	785,4	107,3	101,3	660,9	557,6	785,4					
sulphonamides	sulfanilamide	11,0	11,0	0,0	0,0	0,0	11,0	11,0	0,0	0,0	0,0					
sulphonamides	trimethoprim	14.462,4	12.570,1	12.911,8	12.351,8	10 906,3	9.678,4	8.471,6	8.551,0	8.061,9	8 050,1	4.784,1	4.098,5	4.360,8	4.289,9	2 856,2

amino(glyco)sides	apramycine	198,4	158,5	141,6	97,9	79,5	95,6	60,1	54,6	37,0	26,3	102,8	98,4	87,0	60,9	53,2
amino(glyco)sides	dihydrostreptomycine	0,3	12,6	9,0	7,2	6,3	0,3	12,6	9,0	7,2	6,3					
amino(glyco)sides	gentamicine	127,1	127,3	126,5	129,2	136,1	127,1	127,3	126,5	129,2	136,1					
amino(glyco)sides	kanamycine	23,2	18,0	17,6	23,7	22,7	23,2	18,0	17,6	23,7	22,7					
amino(glyco)sides	neomycine	1.266,9	1.036,7	765,9	336,0	683,8	1.266,9	1.036,7	765,9	336,0	683,8					
amino(glyco)sides	paromomycine	2.619,3	2.533,6	2.690,6	2.368,1	1 878,4	2.619,3	2.533,6	2.690,6	2.368,1	1 878,4					
amino(glyco)sides	spectinomycine	4.076,2	4.197,7	5.224,8	6.471,5	6 437,2	3.765,5	3.883,4	4.959,9	6.217,7	6 320,8	310,7	314,2	264,9	253,7	116,4
amino(glyco)sides	framycetinesulfaat	2,4	5,3	6,5	6,3	11,3	2,4	5,3	6,5	6,3	11,3					
Macrolides	clindamycine	137,4	144,3	148,1	144,1	142,7	137,4	144,3	148,1	144,1	142,7					
Macrolides	erythromycine	0,0	0,0	0,6	0,9	0,0	0,0	0,0	0,6	0,9	0,0					
Macrolides	gamithromycine	18,4	20,4	20,2	20,3	32,9	18,4	20,4	20,2	20,3	32,9					
Macrolides	lincomycine	5.218,0	4.425,1	4.803,0	5.631,8	4 582,0	4.516,1	3.962,1	4.538,0	5.378,0	4 465,6	702,0	463,0	265,0	253,7	116,4
Macrolides	pirlimycine	0,4	0,4	0,4	0,4	0,2	0,4	0,4	0,4	0,4	0,2					
Macrolides	spiramycine	22,0	23,8	75,5	248,0	195,4	22,0	23,8	75,5	248,0	195,4					
Macrolides	tilmicosine	2.917,1	4.118,1	4.380,1	4.159,7	3 785,5	1.446,0	2.361,3	2.467,2	2.540,3	2 637,1	1.471,1	1.756,9	1.912,9	1.619,4	1 148,4
Macrolides	tulathromycine	70,4	109,5	100,7	111,1	133,1	70,4	109,5	100,7	111,1	133,1					
Macrolides	tylosine	9.763,1	8.456,0	13.475,3	12.041,0	10 581,1	8.573,5	7.173,4	12.201,5	11.151,5	10 149,1	1.189,6	1.282,6	1.273,9	889,5	432,0
Macrolides	tildipirosine	20,3	34,0	39,6	44,5	48,9	20,3	34,0	39,6	44,5	48,9					
Macrolides	tylvalosin	24,7	172,4	275,7	377,9	259,8	24,7	172,4	275,7	377,9	259,8					
other	rifaximin	20,3	115,3	23,1	24,8	21,4	20,3	115,3	23,1	24,8	21,4					
penicillines	amoxicilline	68.667,1	71.897,2	71.420,3	68.575,2	74 840,9	58.782,2	60.332,5	58.319,6	55.025,6	64 267,8	9.884,9	11.564,7	13.100,7	13.549,7	10 573,1
penicillines	amoxicilline-clav	188,8	181,3	215,1	222,2	244,3	188,8	181,3	215,1	222,2	244,3					
penicillines	ampicilline	290,8	240,3	234,7	233,3	297,8	290,8	240,3	234,7	233,3	297,8					
polymyxins	polymyxine B sulfaat	1,0	0,1	1,0	0,9	0,8	1,0	0,1	1,0	0,9	0,8					
polymyxins	colistinesulfaat	9.634,8	7.875,4	5.658,1	4.755,6	4 195,0	7.064,1	5.896,1	4.693,9	4.060,3	3 719,4	2.570,7	1.979,3	964,3	695,3	475,59
tetracyclines	chloortetracycline	1.364,2	749,5	633,1	588,2	717,2	578,5	370,8	510,8	526,1	680,1	785,7	378,7	122,3	62,1	37,1

tetracyclines	doxycycline	45.903,8	49.961,7	50.664,6	49.134,3	38 130,4	38.136,6	42.168,4	43.263,6	42.364,9	33 120,0	7.767,2	7.793,3	7.401,0	6.769,4	5 010,4
tetracyclines	oxytetracycline	15.738,2	11.699,9	10.603,4	10.369,3	11 052,0	14.609,0	11.231,0	10.259,4	10.199,8	10 926,9	1.129,1	468,9	344,0	169,5	125,1
(fluoro)quinolones	danofloxacine	68,7	67,3	69,1	60,0	42,5	68,7	67,3	69,1	60,0	42,5					
(fluoro)quinolones	difloxacine	9,2	7,6	0,7	0,0	0,0	9,2	7,6	0,7	0,0	0,0					
(fluoro)quinolones	enrofloxacine	1.088,3	1.361,0	1.411,2	1.280,7	719,3	1.088,3	1.361,0	1.411,2	1.280,7	719,3					
(fluoro)quinolones	flumequine	2.734,0	1.534,5	1.564,5	2.197,5	610,6	2.734,0	1.534,5	1.564,5	2.197,5	610,6					
(fluoro)quinolones	ibafloxacine	0,7	1,0	-0,0	0,0	0,0	0,7	1,0	-0,0	0,0	0,0					
(fluoro)quinolones	marbofloxacine	307,5	335,1	438,2	504,0	306,6	307,5	335,1	438,2	504,0	306,6					
(fluoro)quinolones	orbifloxacine	2,3	2,8	3,4	3,1	3,0	2,3	2,8	3,4	3,1	3,0					
(fluoro)quinolones	pradofloxacine	6,1	5,7	4,7	3,4	2,9	6,1	5,7	4,7	3,4	2,9					
cephalosporins 3G	cefoperazon	3,9	6,1	5,5	6,5	5,9	3,9	6,1	5,5	6,5	5,9					
cephalosporins 3G	cefovecin	9,7	8,6	9,3	9,1	9,3	9,7	8,6	9,3	9,1	9,3					
cephalosporins 3G	ceftiofur	594,5	624,5	598,4	537,1	366,6	594,5	624,5	598,4	537,1	366,6					
cephalosporins 4G	cefquinome	201,6	197,2	180,7	179,9	132,6	201,6	197,2	180,7	179,9	132,6					

Discussion

In the context of the increasing (awareness on) antibacterial resistance development, comparable data and evolutions on antibacterial consumption are of utmost importance. This annual BELVET-SAC report is now published for the eight time and describes the antibacterial use in animals in Belgium in 2016 and the evolution since 2011.

As in the previous reports data were collected at the level of the wholesaler-distributors for the antibacterial pharmaceuticals and at the level of the compound feed producers for the antibacterial premixes. This level both warrants the most complete data and is the closest possible level to the end-user that is practically achievable at this moment. To improve data quality and correctness all data were validated against the data provided in the previous years and data collected by the sector organizations.

Although the collected data are valuable and show essential overall antibacterial consumption trends, it is important to realize that the data are also very crude and some sources of bias may be present. First of all it would be useful to have data where antibacterial consumption can be attributed to the different animal species. This would allow to monitor and refine trends per species. Equally it would be better to have data on the number of treatments that can be attributed to an animal during its live span (or any set period of time) rather than the amount of kg of a given compound consumed since the number of treatments is more relevant in relation to the development of antibacterial resistance than the total amount of antibacterials consumed. Since 2014 collection of data on antibacterial consumption at herd level started in the pig sector (AB-Register) and first trends in use in the pig sector based on this data are now available and have an added value to the BELVET-SAC data. More recently the per species data collection through the SANITEL-MED system has been launched (2016). In the near future this system will provide its first species specific consumption data for pigs, poultry and veal calves. This information will not replace the BELVET-SAC data but will surely provide much more in depth insight and allow more targeted objectives and / or interventions.

Another possible source of bias is the fact that we cannot be absolutely sure that all products sold in Belgium by the wholesaler-distributors are also used in Belgium. Veterinarians living near the country borders may also use medicines bought in Belgium to treat animals abroad. Again this effect will be excluded once data is collected at herd level in the SANITEL-MED system. Also the dependency on the biomass factor may influence the result. This means that changes regarding the net import of slaughter animals (increasing or decreasing biomass in BE) will have an influence on the outcome.

For the 2016 BELVET-SAC results, it is encouraging to see that the positive evolution seen in 2012, 2013 and 2015 (with a respective reduction of -6,9%; -6,3%; -4,7%) in mg substance/kg biomass) which was temporarily disrupted in 2014 (increase of +1,1% mg/kg biomass), was observed again in 2016 with **a reduction of -4,8% in mg substance/kg biomass in comparison with 2015**. In absolute numbers this relates to a decrease in the use of antimicrobial compounds of –6,9% subdivided in a decrease of **-1.5% in pharmaceuticals and -29.0% in antibacterial premixes**. This is to be combined with a decrease of the biomass of 2,1% in 2016. When aggregating the effect of these subsequent efforts over the years, a **total reduction of -20%** (mg active substance / kg biomass) **in comparison with 2011** is already achieved**.** In 2016, especially the very substantial reduction in use of antibacterial premixes is very positive. This is likely the result of the increased efforts by the compound feed producers who have introduced a number of additional auto-regulating measures to reduce the use of antibacterial premixes combined with the withdrawal of some premixes from the market by one pharmaceutical company.

When looking more in detail to the different types of antibacterials used, it is observed that, as in the previous years, the penicillines (35,8%) form the largest group of consumed antimicrobials, followed by the sulphonamides (27,0%) and tetracyclines (20,6%). For the majority of the antimicrobial classes, a decrease in use is observed in 2016. This was most pronounced for the quinolones (-57,5 %) but also very substantial for tetracyclines (-15,2%), macrolides (-11,4%) and polymyxins (-9.9%). For the latter this is already the 4^{th} year in a row that a substantial reduction is observed. **When comparing to 2012 (before authorization of ZnO) the polymyxin use has dropped with 54,5%.** Use of premixes based on colistin sulphate dropped with nearly 82 % since 2012. This year a remarkable increase (+10,3%) in use of penicillines (mainly due to amoxicilline) and fenicols (+47.3% almost exclusively florfenicol) is observed. These increases are likely the result of a shift towards the yellow (florfenicol) and orange (amoxicilline) molecules as replacement of the previously used red molecules such as the (fluoro)quinolones and 3^{th} and 4^{th} generation of cephalosporines.

When looking at the use according to the different color classes a reduction in all three classes (yellow -6,6%; Orange -2,8% and red -53,1%) is observed. Especially the very substantial reduction in use **of molecules of critical importance for human medicine** (grouped in the category of the "red" antibacterials such as the cephalosporines of the 3^{th} and 4^{th} generation and the (fluoro)quinolones **of -53,1%** is a very positive evolution. This is most likely the result of the introduction of the new legislation (RD of 21 July 2016) which has introduced very strict limitations to the use of these "red molecules" in food producing animals from August 2016 onwards. Moreover this legislation was already preceded by autoregulation measures in guidelines of different quality labels in pig production. It is anticipated that in 2017, when the legislation will have its effect during the entire year, a further reduction in use of these red molecules will be observed.

As a result of the covenant between the government and all parties involved in the field of antimicrobial use in animals, signed in June 2016, the **AMCRA 2020 goals (reduction of 50 % of total use by 2020; reduction of 50 % of premix use by 2017 and reduction of 75% of "red" antimicrobials by 2020)** have now also been adopted and supported by the Belgian government. As a result, the pressure to achieve these goals has now substantially increased. At the same time the governmental support to help in achieving the goals has also increased.

When looking at the 2016 results in relation to the AMCRA 2020 goals it is very clear that there is still a huge work to be done. As the total consumption is concerned **a cumulative reduction of 20,0% is achieved** since 2011 (2011 is used as reference year for the AMCRA 2020 goals). This is the result of an reduction of 15,27% in antibacterial pharmaceuticals and 38,2% in antibacterial premixes. Although this result is promising, it also means that we are **still 30,0 % away from achieving this goal.** This means that in the following ' years (2017-2020) an annual reduction of over 8% is required. This clearly will require additional efforts from all partners involved. For this surely the SANITEL-MED data will be of utmost value and will need to be used to identify high users (both farers and vets) which then need to be actively approached to achieve substantial reductions.

As already indicated, the reduction in **medicated premixes in 2016** was remarkable.
The cumulative reduction since 2011 is now 38,2% indicating that in the year 2017 a further reduction of 11,8% is required to achieve the goal of 50% reduction by the end of 2017. **Therefore,** the concerned parties will need to continue the implemented efforts and maybe even add a few additional measures.
Finally the spectacular decrease in use of critically important antimicrobials for human medicine is also very promising and clearly illustrates the effect of the concept of co-regulation where new legislation is produced in collaboration between all involved partners. It is also very positive to see that the decrease in use of red molecules has not been compensated with a very steep increase in use of several other molecules nor did it result in the observation of untreatable health problem in food producing animals. **In comparison with 2011, the cumulative reduction of use of red molecules is currently 56,1%.** This is still 18,9% away from the goal of a reduction of 75% by 2020. It is believed that with the implementation of the new legislation during the whole year of 2017 this goal will probably already be attained in 2017.

When looking specifically at the sales of products solely registered for dogs and cats, it is remarkably to see that reduction in use of "red molecules" is only marginally in these species. Companion animals are not concerned by the new legislation. Obviously also in these species a reduction in use of critically important antimicrobials is warranted. Additional effort in the field of the companion animals might be necessary.

Conclusion

This report shows promising results especially regarding the use of critical important antimicrobials and antibacterial premixes. Also for the overall consumption, a further reduction could be observed. These evolutions strengthen us in the believe that the AMCRA

2020 goals remain feasible, yet substantial additional efforts will be required in the remaining 4 years.

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Koninklijk besluit betreffende de voorwaarden voor het gebruik van geneesmiddelen door de dierenartsen en door de verantwoordelijken van de dieren 21 JULI 2016.

Appendix

Appendix A. ATCvet codes included in the different classes of Antibacterials

Class of Antibacterials	ATCvet codes included
aminoglycosides	QJ01FF01
	QJ01GB03; QJ01GB90
	QS01AA11
	QD06AX04
	QS02AA14; QS02AA57
	QG51AA04
	QA07AA06
	QJ51RG01
	QJ51CE59
	QJ01XX04
other	QJ01XX10
	QJ01XQ01; QJ01XQ02
	QJ51XX01
	QJ01RA04
cephalosporins	QJ01DB01
	QJ01DD90; QJ01DD91
	QJ51DB01; QJ51DB04; QJ51DB90
	QJ01DE90
	QJ51DE90
	QG51AX02
	QJ51DD12
	QJ51RD01
amphenicols	QJ01BA90
	QS01AA01
macrolides	QJ01FA02; QJ01FA90; QJ01FA92; QJ01FA91; QJ01FA94; QJ01FA95
	QJ01FF02; QJ01FF52
	QJ51RF03
	QJ51FF90
penicillins	QJ01CA01; QJ01CA04; QJ01CA51
	QJ51RC26
	QJ01CR02
	QJ51CF02
	QJ01CE02; QJ01CE09; QJ01CE30; QJ01CE90
	QJ51CA51
polymixins	QJ01XB01
	QA07AA10
	QS02AA11
pyrimidins	QJ01EW10; QJ01EW13
	QJ01EA01

quinolones	QJ01MA90; QJ01MA92; QJ01MA93; QJ01MA94; QJ01MA95; QJ01MA96
	QJ01MB07
sulfonamides and trimethoprim	QJ01EW09; QJ01EW11; QJ01EW12
	QJ01EQ03
tetracyclines	QJ01AA02; QJ01AA03; QJ01AA06
	QD06AA02; QD06AA03