Belgian Veterinary Surveillance of Antibacterial Consumption

National consumption report

2015

Summary

This Seventh BelVetSAC report, covers the results of the data collection on veterinary antibacterial consumption in Belgium in the year 2015. It includes thus consumption data for farm animals as well as companion animals. The denominator for animal production was the biomass (in kg) calculated as the sum of the amount of beef, pork and poultry meat produced in 2014, plus the number of dairy cattle present in Belgium times their metabolic weight per head.

As the 2015 results on total consumption are concerned, it is promising to see that the positive evolution seen in 2012 and 2013 (with a respective reduction of -6,9% and -6,3% in mg substance/kg biomass), which was stopped in 2014 (increase of +1,1% mg/kg biomass), has now been taken up again with **a reduction of -4,7% mg substance/kg biomass in comparison to 2014**. In total use this relates to a decrease in the use of antimicrobial compounds of -2,8% (-2,6% pharmaceuticals and -3,4% antibacterial premixes) in combination with an increase of the biomass of 2,0%.

In 2015 a decrease in use in most antimicrobial classes was observed with the largest reduction for the polymixines (-16,0 %). This continued reduction in use of polymixines is likely due to start of the use of zinc oxide. When comparing to 2012 (before authorization of ZnO) the polymixine use has dropped with 51%. For aminosides (+4,4%), quinolones (+16,0%) and fenicols (+31,9%) and increased use is observed in 2015.

Unfortunately, in 2015 **the use of "red" molecules of critical importance for human medicine (= 3° and 4° generation cephalosporines and fluoroquinolones) has further increased with 9,4%.** This increase is entirely due to the increased use of flumequine wheres the use of 3° and 4° generation cephalosporines has decreased.

When looking at the 2015 results in relation to the AMCRA 2020 goals, which were recently also adopted by the Belgian government through a covenant with all parties concerned, it is very clear that there is still a huge work to be done. As the total consumption is concerned **a cumulative reduction of 15,9% is achieved** since 2011 (used as reference year for the AMCRA 2020 goals). This means that we are **still 34,1% away from achieving the goal of -50% by 2020.** This also means that in the following 5 years (2016-2020) an annual reduction of 7% is required.

When focusing on **medicated premixes the reduction achieved in 2015 in comparison to 2011 is 14,7%.** This is still 35,3% away from the goal (-50% by 2017). **This also means that in the following 2 years (2016-2017) an annual reduction of 18% is required.** Therefore the concerned parties will need to substantially increase efforts and take strict measures otherwise it is unlikely that this goal will be achieved.

Finally the increased use of critically important antimicrobials for human medicine is also a very alarming evolution which urgently needs to be turned backwards. **In comparison to 2011 the reduction in use of red molecules is only 6,4%** whereas a reduction 75% is aimed at by 2020. This means that during the next 5 year (2016-2020) a yearly reduction of approx. 10 % of the use of critical molecules has to be realised to obtain this goal.

It is anticipated that the new legislation which implements criteria for the use of critical important antimicrobials will help to inforce the prudent use of antibiotics and still achieve the goal in 2020.

Samenvatting

Dit zevende BelVetSAC rapport omvat de resultaten van het gebruik van antibacteriële middelen bij dieren in België in 2015. Het betreft dus data over het gebruik van antibacteriële middelen bij zowel landbouwhuisdieren als gezelschapsdieren. Om het gebruik in verhouding tot het aantal aanwezige dieren te kunnen plaatsen wordt als noemer de biomassa berekend als de som van de geproduceerde kilogrammen varkens-, pluimvee- en rundveevlees in België in 2014 aangevuld met het aantal aanwezige melkkoeien vermenigvuldigd met hun metabool gewicht.

Wat het totale gebruik betreft, is het hoopgevend te zien dat de positieve evolutie die werd opgemerkt in 2012 en 2013 (met een respectievelijke daling van -6,9% en -6,3% in mg product/kg biomassa), en die in 2014 niet kon worden doorgezet (stijging van 1.1% mg/kg biomassa), in 2015 opnieuw wordt opgepikt met een **reductie van -4,7% mg product/kg biomassa in vergelijking met 2014**. In kg gebruikt product komt dit overeen met een reductie van -2,8% (-2,6% farmaceuticals en -3,4% voor de premixen) in combinatie met een stijging van de biomassa van 2,0%.

In 2015 werd een daling in gebruik bij de meeste verschillende types antibacteriële middelen vastgesteld. De grootste reductie werd gezien voor de polymixines (-16,0 %). Deze aanhoudende reductie van het gebruik van de polymixines is waarschijnlijk een gevolg van de toelating tot gebruik van zink oxide als gemedicineerd voormengsel. In vergelijking met 2012 (voor de toelating van zink oxide) is het polymixine gebruik gedaald met 51%. Voor de aminosiden (+4,4%), quinolones (+16,0%) and fenicolen (+31,9%) werd een stijging opgemerkt in 2015. Jammer genoeg is in 2015 ook het **gebruik van de "rode" moleculen die van kritisch belang zijn voor de humane geneeskunde (Fluoroquinolones en Cefalosporines van de 3e en 4e generatie) verder gestegen met 9,4%.** Deze stijging is volledig toe te schrijven aan een stijging in het gebruik van flumequine terwijl het gebruik van 3° en 4° generatie cefalosporines is gedaald.

Wanneer we de 2015 data uitzetten tegenover de AMCRA 2020 doelstellingen, die recent ook door de Belgische overheid werden aangenomen, is het duidelijk dat er nog een lange weg te gaan is. Wat betreft de totale consumptie is er sinds 2011 (referentiejaar) een **cumulatieve reductie van 15,9% gerealiseerd**. Dit wil zeggen dat we **nog 34,1% verwijderd zijn van de doelstelling** (-50% tegen 2020). Dit wil eveneens zeggen dat in de komende 5 jaar (2016-2020) er een jaarlijkse reductie van 7% moet gerealiseerd worden om de doelstelling te halen.

Wanneer we naar de **gemedicineerde voormengsels** kijken zien we dat er in 2015 een **cumulatieve reductie van 14,7%** is gerealiseerd in vergelijking met 2011 wat nog 35,3% verwijderd is van de doelstelling (-50% in 2017). Dit wil eveneens **zeggen dat in de komende 2 jaar (2016-2017) een jaarlijkse reductie van 18% noodzakelijk is**. Om dit te realiseren zullen alle betrokken partijen een substantiële verhoging van de inspanningen moeten realiseren en

strikte maatregelen moeten nemen anders is het weinig waarschijnlijk dat de doelstelling zal gehaald worden.

Tenslotte is de verdere stijging in het gebruik van de kritische belangrijke antibiotica voor de humane geneeskunde een alarmerende evolutie die dringend moet teruggedraaid worden. **In vergelijking met 2011 is de reductie in gebruik van "rode" moleculen slechts 6,4%** terwijl een reductie van 75% tegen 2020 wordt nagestreefd. Dit impliceert dat in de komende 5 jaar (2016-2020) er een jaarlijkse reductie van 10% in het gebruik van de kritische antibiotica moet gerealiseerd worden om deze doelstelling te halen.

Er kan verwacht worden dat de wettelijk voorziene gebruiksvoorwaarden voor deze kritische antibiotica, zullen helpen om prudent use principes inzake antibiotica gebruik te versterken en alsnog de 2020 doelstelling te bereiken.

Résumé

Ce septième rapport BelVetSAC comprend les résultats de l'utilisation d'antibactériens chez les animaux en Belgique en 2015. Il s'agit donc de données relatives à l'utilisation de substances antibactériennes tant chez les animaux d'élevage que les animaux de compagnie. Pour pouvoir comparer l'utilisation par rapport au nombre d'animaux présents, on utilise comme dénominateur la biomasse calculée comme la somme des kilogrammes de viande de porcs, volailles et bovins produits en Belgique en 2014 additionnée du nombre de vaches laitières présentes multiplié par leur poids métabolique.

En ce qui concerne l'utilisation totale, il est prometteur de voir que l'évolution positive qui a été notée en 2012 et 2013 (avec une baisse respective de -6,9% et -6,3% en mg produit/kg biomasse), et qui n'a pu être poursuivie en 2014 (augmentation de 1,1% mg/kg biomasse), a de nouveau repris en 2015 avec une **réduction de -4,7% mg produit/kg biomasse par rapport à 2014**. En kg de produit utilisé, cela correspond à une réduction de -2,8% (-2,6% de produits pharmaceutiques et -3,4% pour les prémélanges) en combinaison avec une augmentation de la biomasse de 2,0%.

En 2015, une diminution de l'utilisation de la plupart des différents types d'antibactériens a été constatée. La principale réduction a été observée pour les polymixines (-16,0 %). Cette réduction continue de l'utilisation de polymixines est probablement une conséquence de l'autorisation de l'utilisation de l'oxyde de zinc comme prémélange médicamenteux. Par rapport à 2012 (pour l'autorisation de l'oxyde de zinc), l'utilisation de polymixine a diminué de 51%. Pour les aminosides (+4,4%), quinolones (+16,0%) et phénicols (+31,9%), on a enregistré une augmentation en 2015. Malheureusement, en 2015, l'**utilisation des molécules « rouges » qui sont cruciales pour la médecine humaine a encore augmenté de 9,4%.** Cette augmentation est entièrement due à une augmentation de l'utilisation du flumequine tandis que l'utilisation des céphalosporines de 3° et 4° générations a baissé.

Lorsque nous comparons les données de 2015 aux objectifs AMCRA 2020, qui ont également récemment été adoptés par les autorités belges, il est clair qu'il reste encore un bon bout de chemin à faire. En ce qui concerne la consommation totale, une **réduction cumulative de 15,9%** a été réalisée depuis 2011 (année de référence). Cela veut dire que nous sommes **encore à 34,1% de l'objectif** (-50% d'ici 2020). Cela veut également dire que, dans les 5 prochaines années (2016-2020), une réduction annuelle de 7% doit être réalisée pour atteindre l'objectif.

Lorsque nous regardons les **prémélanges médicamenteux**, on observe que, en 2015, une **réduction cumulative de 14,7%** a été réalisée par rapport à 2011, ce qui est encore à 35,3% de l'objectif (-50% en 2017). Cela veut également **dire que, dans les 2 prochaines années (2016-2017), une réduction annuelle de 18% est nécessaire**. Pour réaliser cela, toutes les

parties concernées devront réaliser une augmentation substantielle de leurs efforts et prendre des mesures strictes, autrement il est peu probable que l'objectif soit atteint.

Enfin, la poursuite de l'augmentation de l'utilisation des antibiotiques d'importance critique pour la médecine humaine constitue une évolution alarmante qui doit d'urgence être inversée. **Par rapport à 2011, la réduction de l'utilisation des molécules « rouges » est seulement de 6,4%** tandis qu'une réduction de 75% est visée pour 2020. Cela implique que, dans les 5 prochaines années (2016-2020), une réduction annuelle de 10% de l'utilisation d'antibiotiques critiques doit être réalisée pour atteindre cet objectif.

On peut s'attendre à ce que les conditions d'utilisation prévues par la loi pour ces antibiotiques critiques aideront à renforcer ces principes d'utilisation prudente en matière d'utilisation d'antibiotiques et à atteindre encore l'objectif 2020.

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 seventh BelVetSAC report gives an overview of the consumption of antibacterials in veterinary medicine in Belgium in 2015 and describes evolutions in use since 2011.

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

Contents

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Materials and Methods

Data collection

1. Antibacterials 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. Februari 2016 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 2015 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.

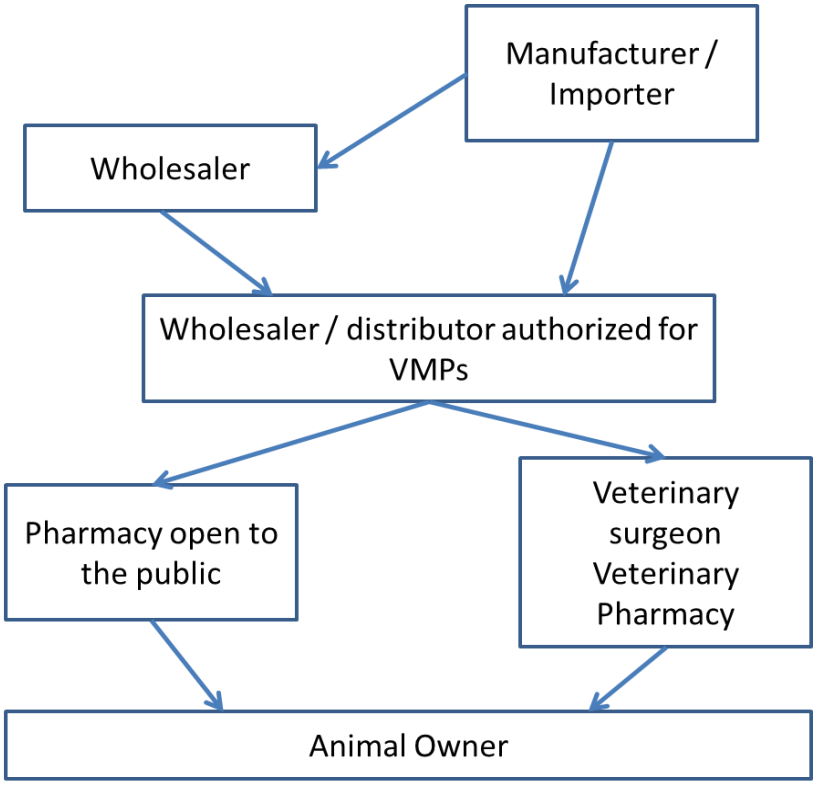

Figure 1. Distribution of Veterinary Medicinal products in Belgium.

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=57). They received a list of registered and marketed Antibacterial containing premixes. The feed mills were asked by letter dd. February 2015 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 2015 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 2015**. Antibacterial and ZnO premixes can only be incorporated into medicated feed on prescription of a veterinarian.

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

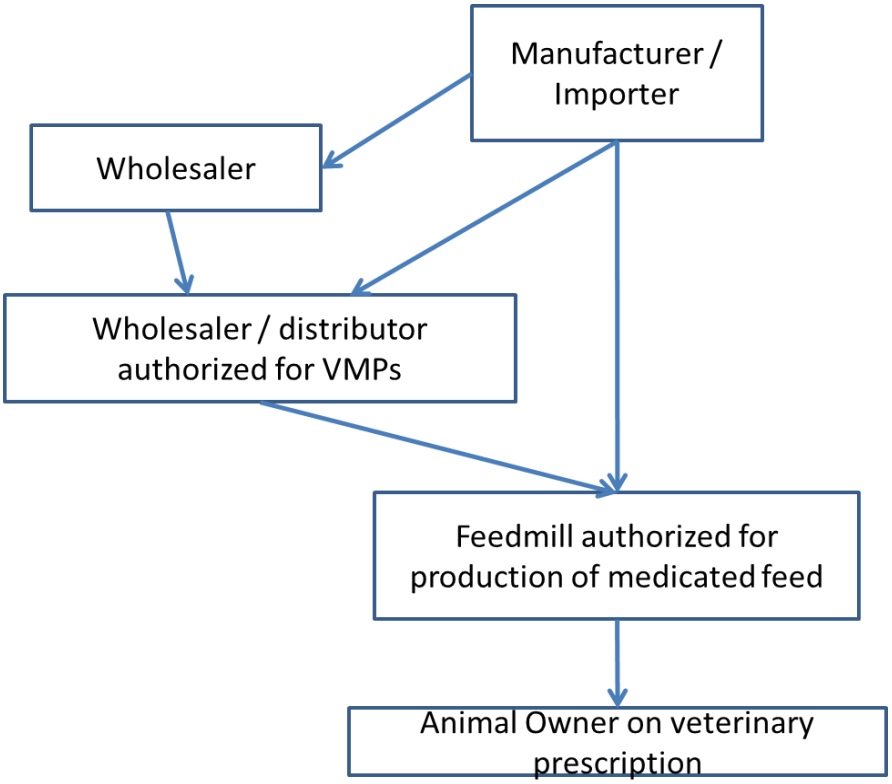

Figure 2. Distribution of Veterinary premixes in Belgium.

c. Antibacterial classes included

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

In the BelVetSAC 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 data as presented in the report may partially 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 beef, pork and poultry meat 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 (BelVetSAC 2007-2009; BelVetSAC 2010; BelVetSAC 2011; BelVetSAC 2012, BelVetSAC 2013, BelVetSAC 2014)[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 92% 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, small ruminants and companion animals (dogs, cats, …) (estimated to be 8% 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.

The fact that many antibacterial products are registered for use in different animal species and that there are currently no data available on the proportions of products used in the different species makes extrapolation up to animal species difficult. The Market Authorization Holders of the products do provide estimated proportions to be included in the product related pharmacovigilance periodic safety update reports, yet these estimates are not always at hand, and are often based on limited data. For these reasons it was not feasible to use these data for this report. Currently in Belgium, both private (AB register) and governmental (SANITEL MED) herd level based data collection systems are set up that will allow for reporting of usage data at animal species level.

For antibacterial premixes, already today we know for what animal species they are intended (only pigs, poultry and rabbits receive medicate feed) therefore we can further distinguish the use of antibacterial premixes.

[5] http://www.belvetsac.ugent.be/pages/home/

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

[6] www.bemefa.be

Results

Response rate and data validation

All the 25 wholesaler-distributors, requested to deliver their sales data on veterinary antibacterial products sold in 2015 responded. All 57 compound feed producers, licensed for the production of medicated feed responded. Of these 6 indicated not to have produced any medicated feed and 51 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
Number of Antibacterial pharmaceuticals on the market	283	292	282	308	294	298	**339**
Number of Antibacterial premixes on the market	20	21	23	22	23	21	**21**
Total number of Antibacterial products on the market	303	313	305	330	317	319	**360**

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 2008-2013 as described above (Table 3).

Table 3. Animal Biomass produced in Belgium between 2011 and 2015

Animal biomass	2011	2012	2013	2014	2015
Meat (ton)					
Pork	1 108 255	1 109 610	1 130 570	1 118 330	1 124 310
Beef	272 286	262 280	249 910	257 670	267 880
Poultry[a]	402 753	410 215	388 090	433 270	452 940
Total biomass from meat production	**1 783 294**	**1 782 105**	**1 768 570**	**1 809 270**	**1 845 130**
Dairy cattle					
Dairy cattle (number)	510 600	503 500	515 990	519 090	528 780
Dairy cattle metabolic weight (ton)	255 300	251 750	257 995	259 545	264 390
Total biomass (ton)	**2 038 594**	**2 033 855**	**2 026 565**	**2 068 815**	**2 109 520**

[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 BelVetSAC reports.

An **increase in biomass production of 2,0%** is observed between 2014 and 2015.

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 the part of antibacterial pharmaceuticals and the part of antibacterial compounds contained in antibacterial premixes incorporated into medicated feed intended to be used in Belgium.

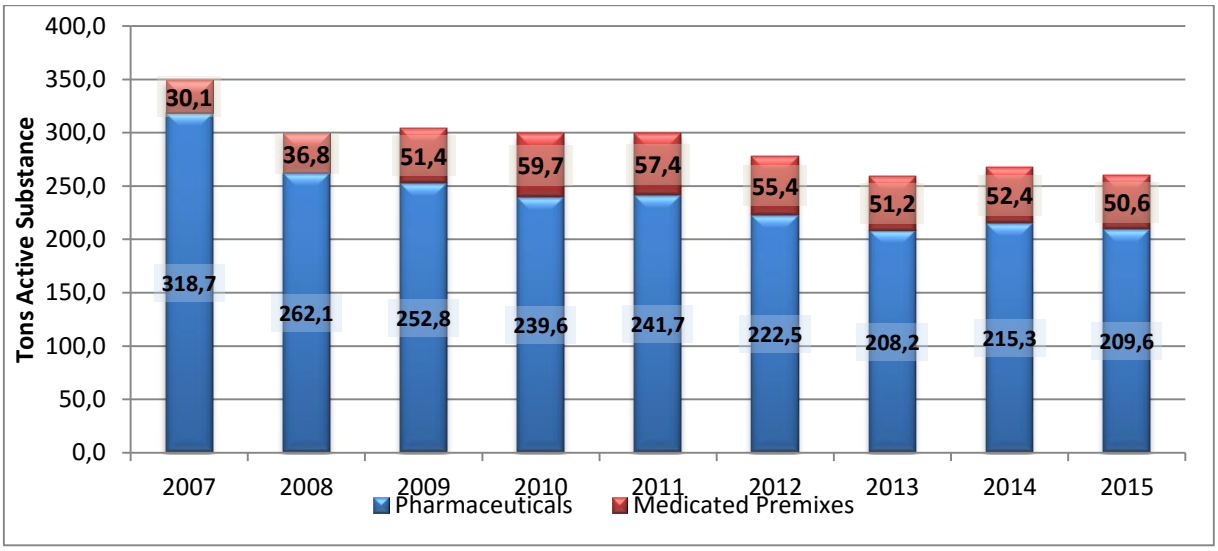

Figure 3. Total national consumption of antibacterial compounds for veterinary use in Belgium for the years 2007-2015 (tons active substance)

As The amount of data presented in figure 3 becomes too much to allow for a good overview and as it 2011 has been selected as the reference year for all reduction initiatives (see further), it was decided to present all further data evolutions from 2011 onwards.

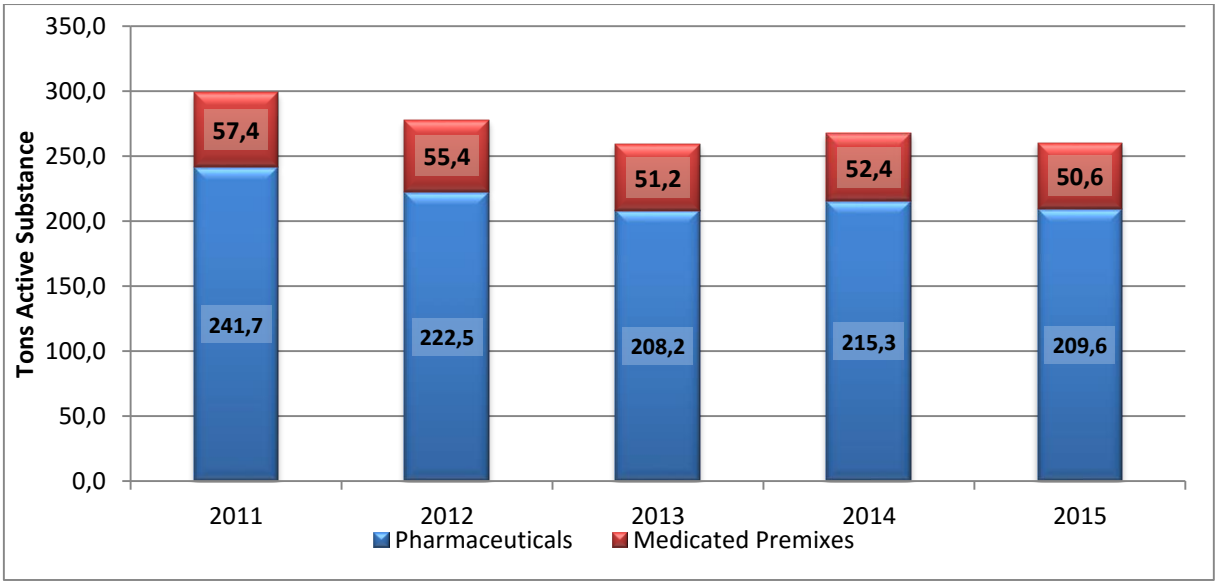

Figure 4. Total national consumption of antibacterial compounds for veterinary use in Belgium for the years 2011-2015 (tons active substance)

Between 2014 and 2015, there was a **decrease of 2,8%** in the total consumption of antibacterials in veterinary medicine in Belgium (260 271,7 kg in 2015; 267 744,0 kg in 2014). The use of antibacterial **pharmaceuticals decreased with 2,6%** between 2014 and 2015, and the use of **antibacterial premixes decreased with 3,4%.** When looking at the trend from 2007 onwards (start data collection) a decrease of 25.4% in total consumption is observed. After the slight increase in 2014, the decreasing trend is again taken up in 2015.

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

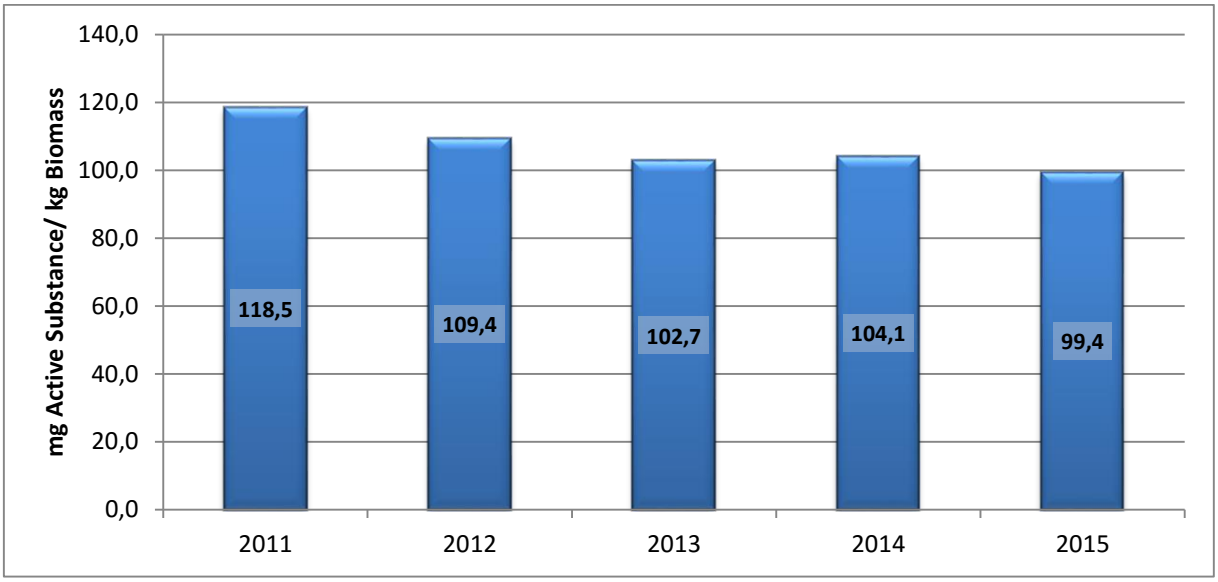

Figure 5. National consumption of antibacterial pharmaceuticals for veterinary use in Belgium for the years 2011-2015 (tons active substance)

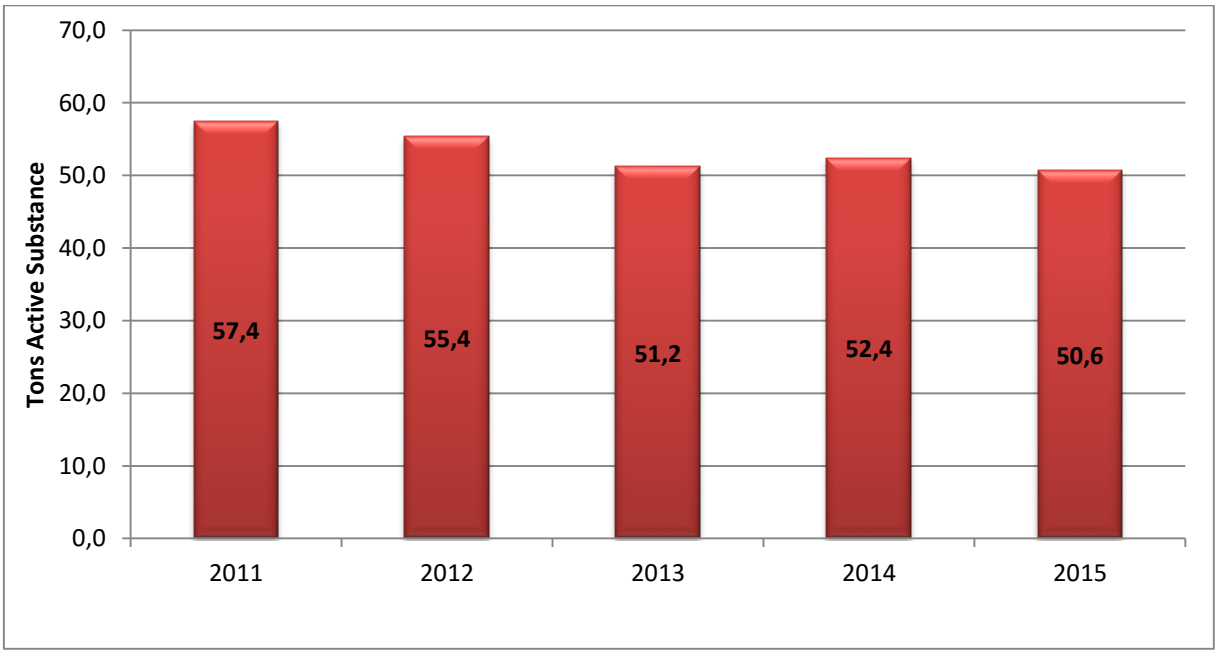

Figure 6. National consumption of antibacterial premixes in Belgium for the years 2011-2015 (tons active substance)

After an increase in use of Antibacterial premixes between 2007 and 2010, the decreasing trend firstly observed in 2011 continued to 2013. In 2014 this decrease came to an end and first small increase was observed again. In 2015 again a small decrease is observed. Since 2011 the data collection system allows to differentiate the animal species of destination for the Antibacterial premixes. Over these years more than **99,6% of the antibacterial premixes go to pig feed**. In 2015 only 0,4% 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 and in **2015 the total use of ZnO was 87 199 kg** as is presented in figure 7.

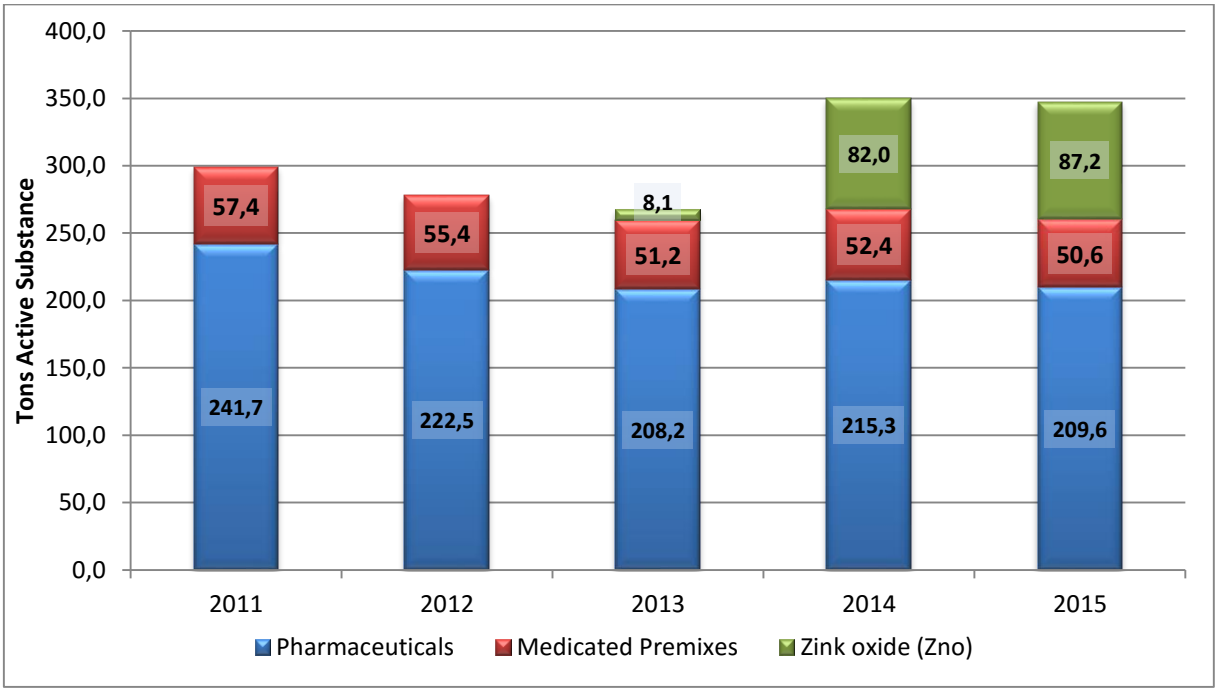

Figure 7. Total national consumption of antibacterial compounds for veterinary use in Belgium plus the use of ZnO for the years 2011-2015 (tons active substance)

Antibacterial use versus biomass

As described above, the total biomass production in 2015 in Belgium has increased with 2,0% in comparison to 2014. As a consequence the decreasing trends in use observed in absolute values are somewhat magnified in the relative numbers. For 2014, the mg of active substance used in comparison to the kg biomass produced was 129,4 mg/kg in 2015 this was 123,4 mg/kg. This is **a decrease of 4,7% in comparison to 2014.** Split into the different application routes, a reduction of 4.5% is observed in the antibacterial pharmaceuticals and a reduction of 5,3% in the antibacterial premixes.

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

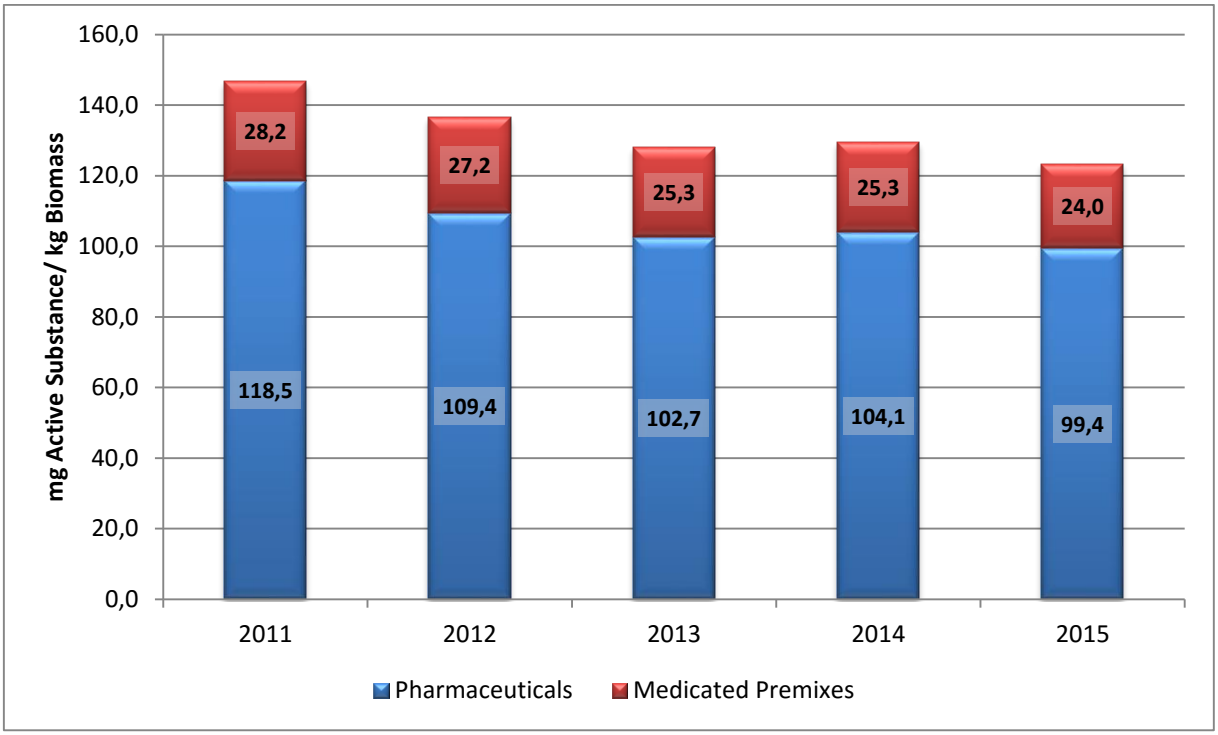

Figure 8. Total mg of active substance used per kg biomass produced in Belgium for 2011-2015.

In 2015 the decreasing trend (-4.7%) observed in 2012(-6,9%) and 2013 (-6,3%) is taken up again after the limited increase (+1,1%) observed in 2014. When using 2011 as a reference (see AMCRA 2020 objectives), a cumulative reduction of 15,9% is achieved, distributed over a reduction of 16,2% in antibacterial pharmaceuticals and 14,7% in antibacterial premixes (Fig. 9). Between 2007 and 2015 a total decrease of 26,8% is seen.

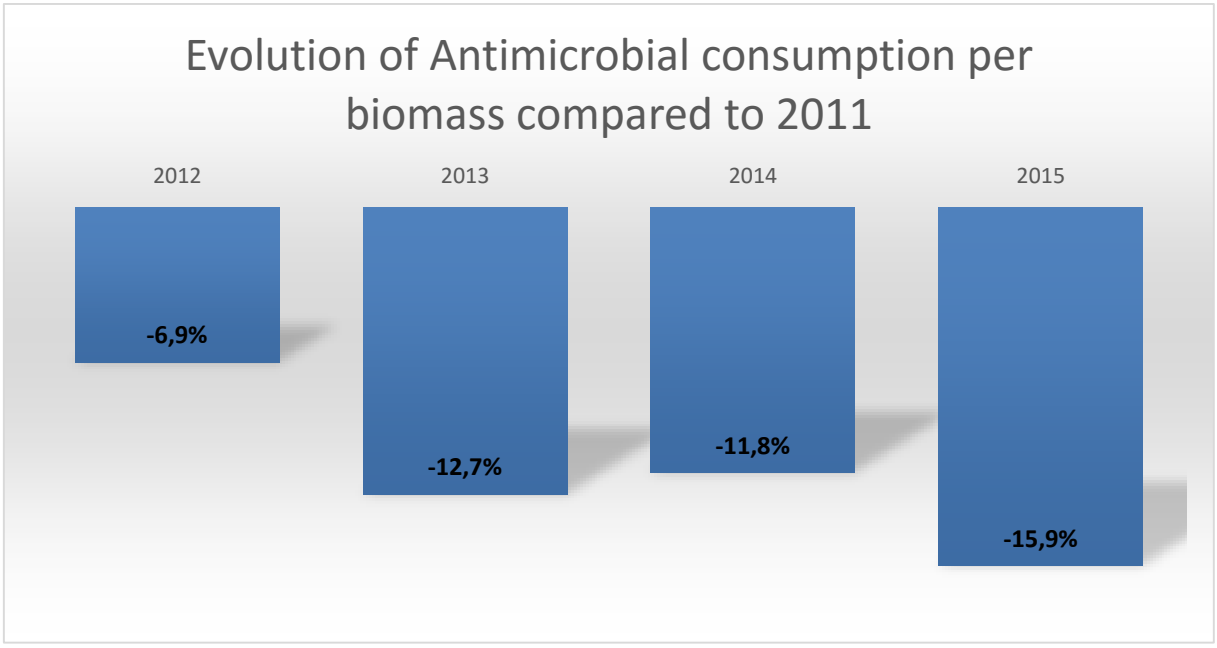

Figure 9. Evolution of antimicrobial consumption per kg biomass produced in Belgium with 2011 as reference year.

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 BelVetSAC reports are also collected in the framework of this EU wide ESVAC data collection effort.

In 2015, the fifth ESVAC report, presenting results on antibacterial usage in 26 EU /EEA countries in the year 2013 was released (EMA, 2015). In this report the **antibacterial consumption in animals in these 26 countries in 2013 is presented in relation to the animal production in the country.**

In figure 10 the results of the 26 countries included in the fifth 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 BelVetSAC report but also includes small ruminants and horses and corrects more thoroughly for import and export.

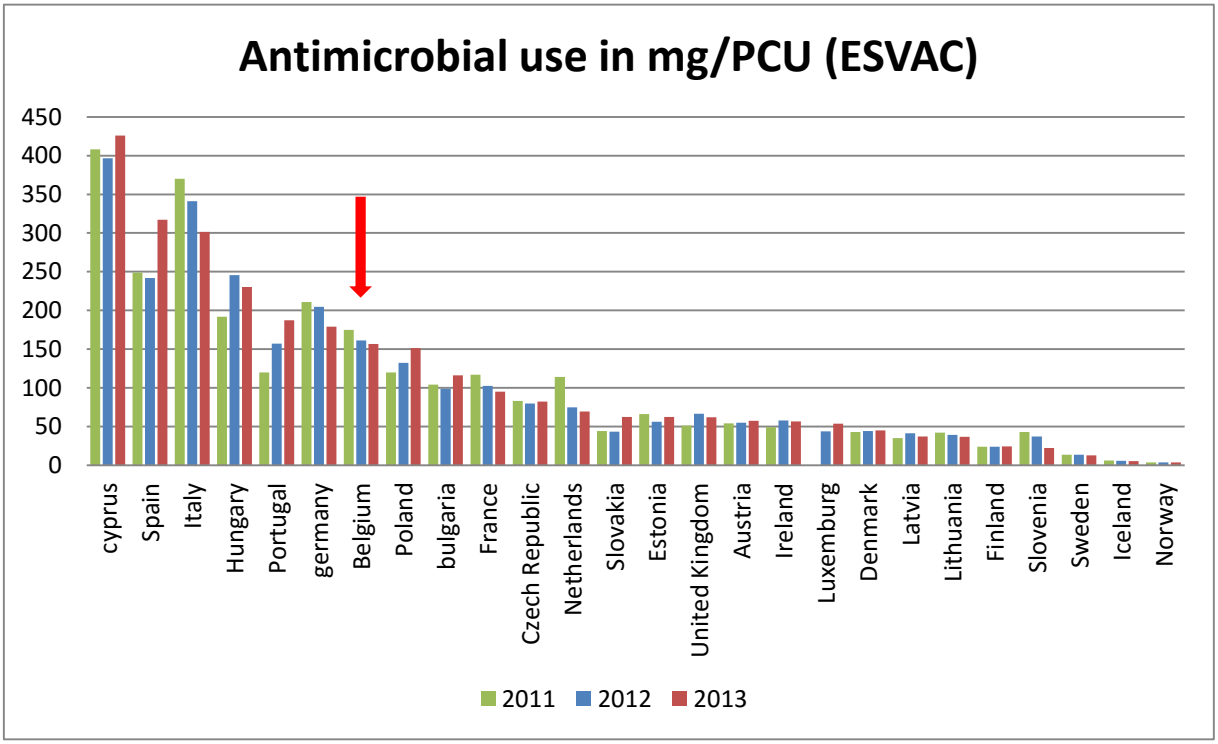

Figure 10. Sales for food-producing species, including horses, in mg/PCU, of the various veterinary Antibacterial classes, by country between 2011-2013 (source: 3°, 4°, 5° ESVAC report on Sales of veterinary Antibacterial agents).

When looking at figure 10 it can be observed that Belgium resides at the seventh position in terms of Antibacterial usage expressed in mg/PCU in 2013. This indicates that many EU countries are using substantially less antibacterials in relation to the magnitude of their animal

production. The increase in antibacterial consumption observed in 2014 (see BelVetSac report 2014) could negatively influence this situation. This effect will likely be enlarged due to the fact that more and more EU countries are taking measures and organize campaigns to reduce Antibacterial usage and therefore will likely improve their situation. Only when the new 2015 data will be included (only in the 7° ESVAC report to be expected in 2018) the situation may improve again a little.

Antibacterial use per class of Antibacterial compounds

1. Total consumption (Antibacterial pharmaceuticals and premixes)

In Figure 11 the total consumption of antibacterials per class (ATC level 3 or 4) is presented.

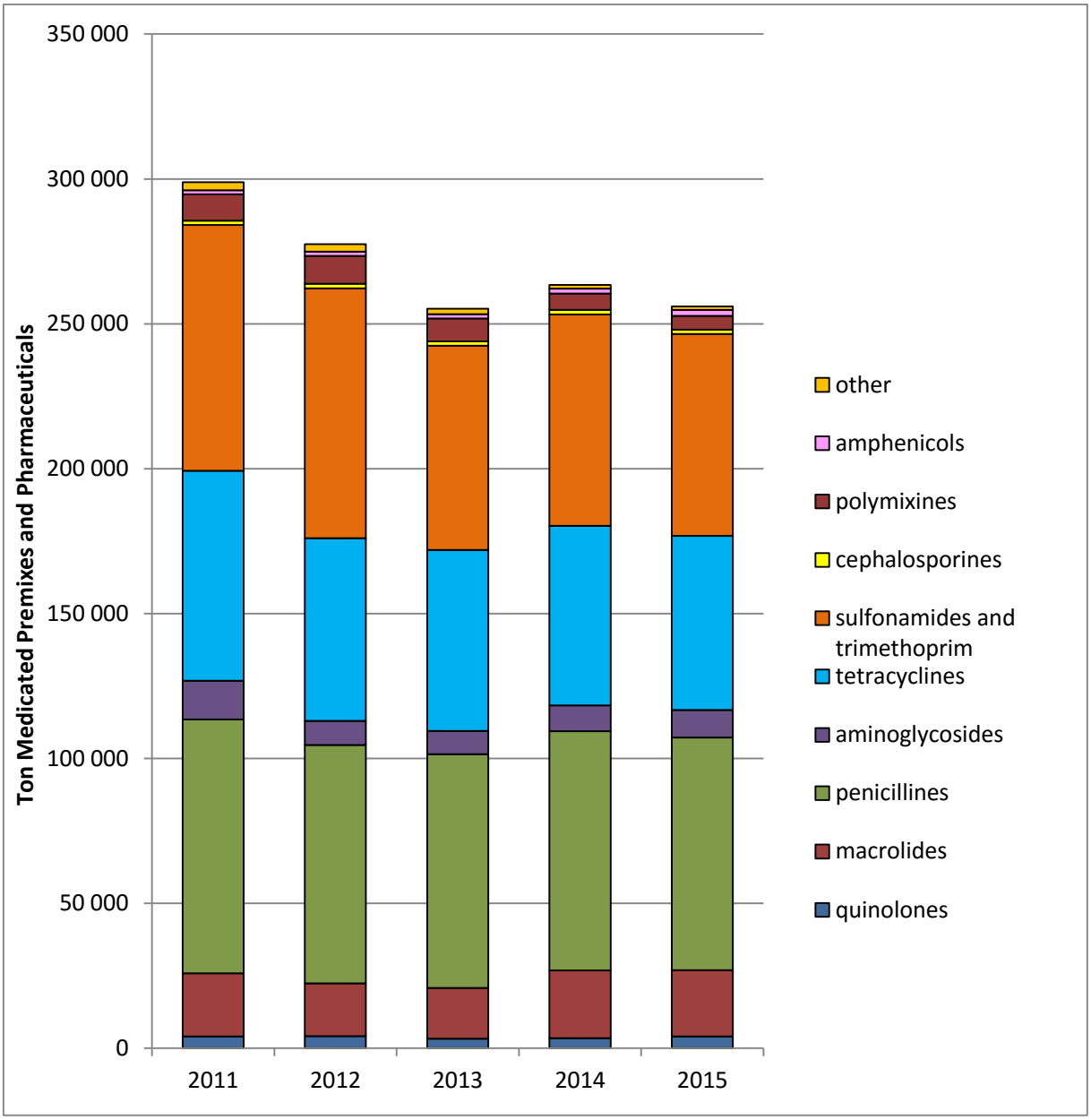

Figure 11. Total Antibacterial use per class of antibacterials from 2011 to 2015.

In 2015, the most used group of antibacterials were the penicillines (80,4 tons; 30,98%) followed by the sulphonamides and trimethoprim (74,0 tons; 28,4%) and the tetracyclines (60,1 tons; 23,1%) (Table 4). 2015 is the third year in a row where the penicillines have become the most used compound. In table 4 the evolution of the used products per antimicrobial class in the last 4 years is presented.

Table 4. The evolution of use of antimicrobial products per antimicrobial class since 2011.

	Totaal					evolution				
Class	**2011**	**2012**	**2013**	**2014**	**2015**	**'11 » '12**	**'12 » '13**	**'13 » '14**	**'14 » '15**	**2015%**
penicillins	87 863,3	82 467,8	80 816,9	82 561,7	80 354,7	-6,1%	-2,0%	2,2%	-2,7%	30,87
sulphonam & trimethoprim	84 902,8	86 273,5	74 556,9	77 346,2	73 998,7	1,6%	-13,6%	3,7%	-4,3%	28,43
tetracyclines	72 454,1	63 006,2	62 411,1	61 901,1	60 091,8	-13,0%	-0,9%	-0,8%	-2,9%	23,09
macrolides	21 843,0	18 191,8	17 503,9	23 319,2	22 779,5	-16,7%	-3,8%	33,2%	-2,3%	8,75
aminosydes	13 166,9	8 313,9	8 089,6	8 982,6	9 439,9	-36,9%	-2,7%	11,0%	5,1%	3,63
polymixins	9 102,7	9 635,8	7 875,5	5 659,1	4 756,5	5,9%	-18,3%	-28,1%	-16,0%	1,83
quinolones	4 088,5	4 216,9	3 315,1	3 491,7	4 048,7	3,1%	-21,4%	5,3%	16,0%	1,56
fenicols	1 354,4	1 435,5	1 513,3	1 616,1	2 084,5	6,0%	5,4%	6,8%	29,0%	0,80
cephalosporins	1 489,7	1 529,8	1 540,4	1 603,6	1 522,1	2,7%	0,7%	4,1%	-5,1%	0,58
other	2 771,0	2 578,1	1 827,0	1 263,2	1 209,4	-7,0%	-29,1%	-30,9%	-4,3%	0,46
Totaal (kg)	**299 037**	**277 649**	**259 450**	**267 744**	**260 286**	**-7,15%**	**-6,55%**	**3,20%**	**-2,79%**	100

In 2015 the use of the three most used compounds (penicillins, sulphonamides and trimethoprim and tetracyclines) reduced with 2,7%; 3,4% and 2,9% respectively. For Quinolones and phenicols a remarkable increased is observed whereas for polymixins a further decreasing trend is observed. The increased use of quinolones is almost solely due to an increase in the use of flumequine (see table 6). The increased use in fenicols is due to an increase in use of florfenicol. The decreased use of polymixines (almost entirely colistin sulphate) is seen for the third year in a row which is likely due to 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 polymixine use has dropped with 51%.

In 2013 AMCRA (center of expertise on Antimicrobial Consumption and Resistance in Animals)[8] has produced it first guides on responsible antibacterial consumption (AMCRA, 2013). 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 used in veterinary medicine with importance for human health[9] and the lists produces by the world animal health organization (OIE) concerning the importance of antibacterials for veterinary health[10]. When producing the 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 polymixins, 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 advises to use these molecules only under very strict regulations. This group contains the cephalosporins of the 3° and 4° generation and the fluoroquinolones.

[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

In figure 12 the evolution of use of the different color groups of antibacterials over the last 3 years is presented. From this figure it can be seen that the orange groups 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 2015 a decrease in use in orange and yellow groups is observed whereas an increase in red molecules of 9,4% is seen. This last increase is entirely due to the increased use of flumequine. Obviously the increase in use in the red molecules is most worrisome. In comparison to 2011 (reference year) the reduction of red molecules is only 6,4% whereas a reduction 75% is aimed at by 2020.

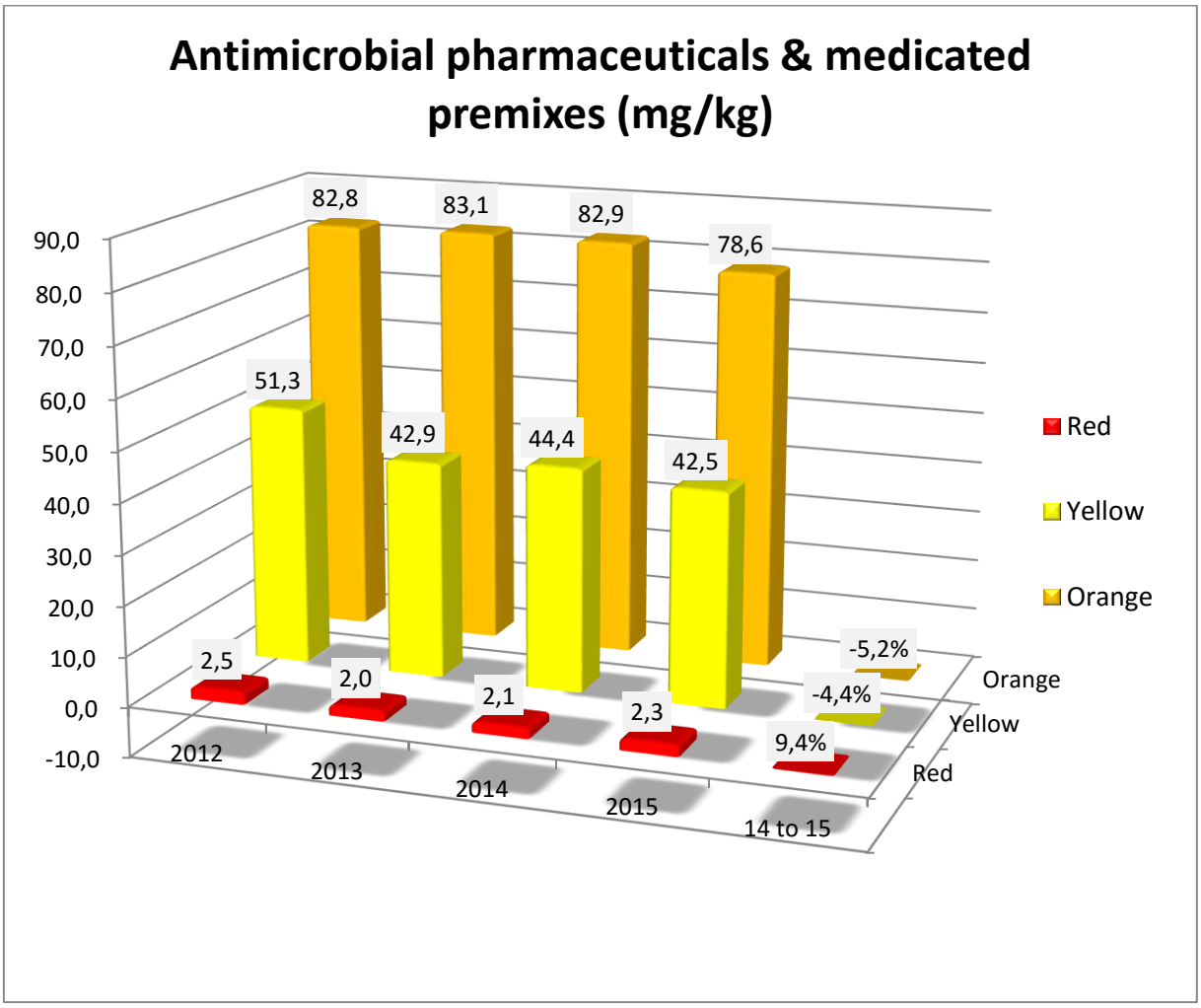

Figure 12: Evolution in the antibacterial consumption (mg/kg) per antibacterial color group between 2013 and 2015.

2. Antibacterial pharmaceuticals

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

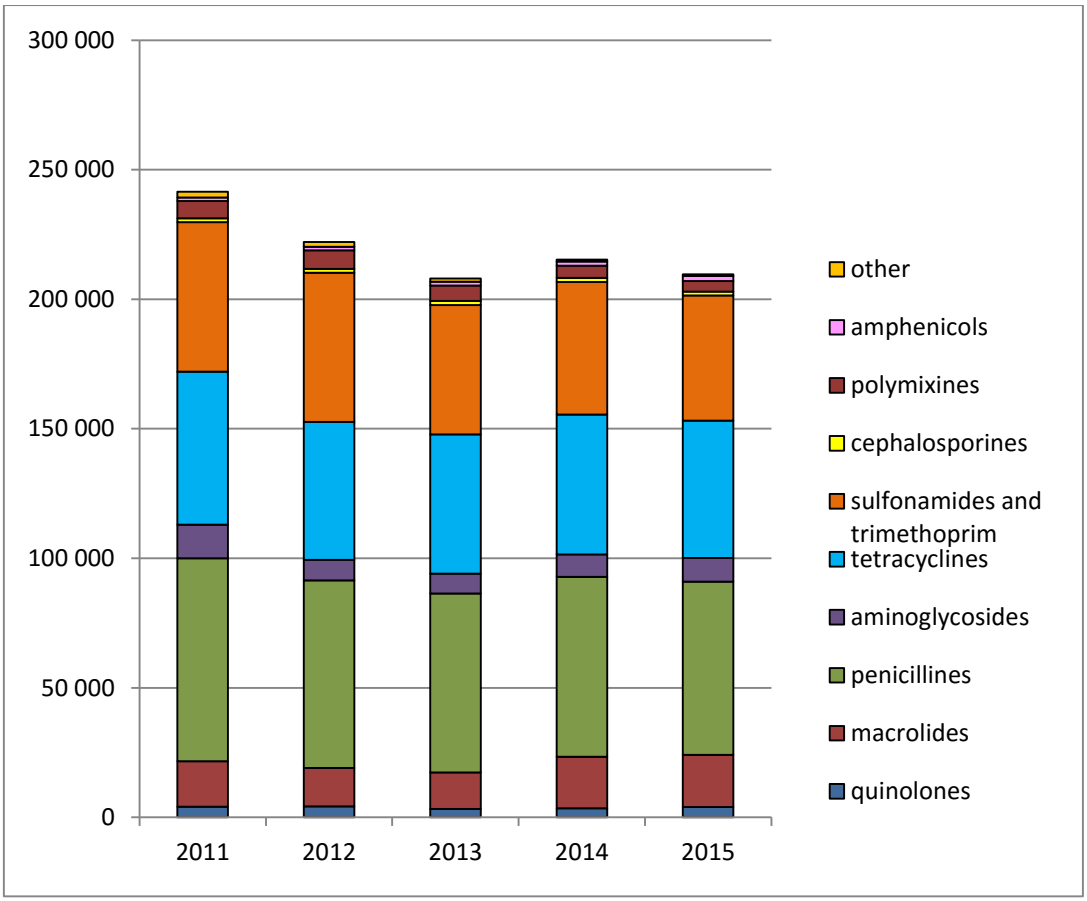

Figure 13. Use of antibacterial pharmaceuticals per class of antibacterials between 2011 and 2015.

3. Antibacterial premixes

In Figure 14 the consumption of antibacterials per class (ATC level 3 or 4) is presented for the Antibacterial premixes.

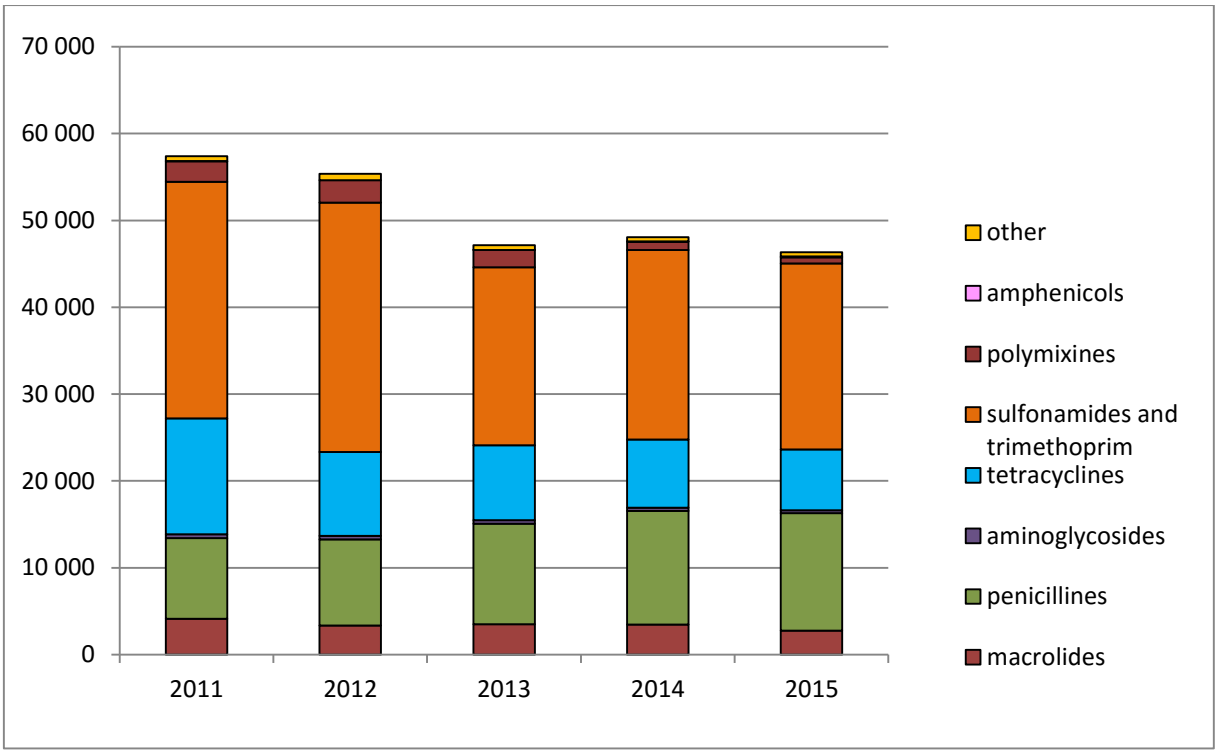

Figure 14. Use of antibacterial premixes per class of antibacterials between 2011 and 2015.

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	2012	2013	2014	2015	2012	2013	2014	2015
cephalosporins 1G	cefalexine	698,6	674,9	767,7	740,4	698,6	674,9	767,7	740,4				
cephalosporins 1G	cefalonium	10,4	13,8	12,3	12,8	10,4	13,8	12,3	12,8				
cephalosporins 1G	cefapirine	10,1	5,2	12,8	20,7	10,1	5,2	12,8	20,7				
cephalosporins 1G	cefazoline	1,0	10,0	16,7	15,6	1,0	10,0	16,7	15,6				
fenicols	chlooramfenicol	0,1	0,0	0,0	0,0	0,1	0,0	0,0	0,0				
fenicols	florfenicol	1.435,4	1.513,3	1.616,1	2.084,5	1.435,4	1.512,7	1.580,3	1.984,1	0,0	0,6	35,8	100,5
other	metronidazol	87,5	92,4	94,0	92,5	87,5	92,4	94,0	92,5				
other	tiamuline	2.373,7	1.547,5	1.047,6	1.032,3	1.692,4	1.028,2	615,7	548,3	681,3	519,3	431,8	484,0
other	valnemuline	69,3	38,7	59,3	11,2	0,0	0,0	0,0	0,0	69,3	38,7	59,3	11,2
other	zink bacitracine	27,3	33,0	39,2	48,6	27,3	33,0	39,2	48,6				
penicillines	cloxacilline	415,9	379,9	393,4	337,7	415,9	379,9	393,4	337,7				
penicillines	fenoxymethylpenicilline	385,5	294,2	378,3	537,0	385,5	294,2	378,3	537,0				
penicillines	nafcilline	0,0	12,0	7,1	7,2	0,0	12,0	7,1	7,2				
penicillines	benethamine penicilline		10,5	8,1	10,2		10,5	8,1	10,2				
penicillines	penethamaat	314,4	293,9	6,8	146,1	314,4	293,9	6,8	146,1				
penicillines	procaïne benzylpenicilline	12.205,4	7.507,7	10.113,0	10.508,4	12.205,4	7.507,7	10.113,0	10.508,4				
sulphonamides	sulfachloorpyridazine natrium	555,3	724,8	847,0	1.098,2	555,3	724,8	847,0	1.098,2				
sulphonamides	sulfadiazine	70.439,3	60.689,0	62.414,9	59.403,3	46.519,0	40.196,5	40.610,9	37.954,0	23.920,3	20.492,5	21.804,0	21.449,3
sulphonamides	sulfadimidine natrium	178,3	1,8	0,0	0,0	178,3	1,8	0,0	0,0				
sulphonamides	sulfadoxine	519,9	458,9	511,7	587,9	519,9	458,9	511,7	587,9				
sulphonamides	sulfamethoxazol	107,3	101,3	660,9	557,6	107,3	101,3	660,9	557,6				
sulphonamides	sulfanilamide	11,0	11,0	0,0	0,0	11,0	11,0	0,0	0,0				
sulphonamides	trimethoprim	14.462,4	12.570,1	12.911,8	12.351,8	9.678,4	8.471,6	8.551,0	8.061,9	4.784,1	4.098,5	4.360,8	4.289,9

amino(glyco)sides	apramycine	198,4	158,5	141,6	97,9	95,6	60,1	54,6	37,0	102,8	98,4	87,0	60,9
amino(glyco)sides	dihydrostreptomycine	0,3	12,6	9,0	7,2	0,3	12,6	9,0	7,2				
amino(glyco)sides	gentamicine	127,1	127,3	126,5	129,2	127,1	127,3	126,5	129,2				
amino(glyco)sides	kanamycine	23,2	18,0	17,6	23,7	23,2	18,0	17,6	23,7				
amino(glyco)sides	neomycine	1.266,9	1.036,7	765,9	336,0	1.266,9	1.036,7	765,9	336,0				
amino(glyco)sides	paromomycine	2.619,3	2.533,6	2.690,6	2.368,1	2.619,3	2.533,6	2.690,6	2.368,1				
amino(glyco)sides	spectinomycine	4.076,2	4.197,7	5.224,8	6.471,5	3.765,5	3.883,4	4.959,9	6.217,7	310,7	314,2	264,9	253,7
amino(glyco)sides	framycetinesulfaat	2,4	5,3	6,5	6,3	2,4	5,3	6,5	6,3				
Macrolides	clindamycine	137,4	144,3	148,1	144,1	137,4	144,3	148,1	144,1				
Macrolides	erythromycine	0,0	0,0	0,6	0,9	0,0	0,0	0,6	0,9				
Macrolides	gamithromycine	18,4	20,4	20,2	20,3	18,4	20,4	20,2	20,3				
Macrolides	lincomycine	5.218,0	4.425,1	4.803,0	5.631,8	4.516,1	3.962,1	4.538,0	5.378,0	702,0	463,0	265,0	253,7
Macrolides	pirlimycine	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4				
Macrolides	spiramycine	22,0	23,8	75,5	248,0	22,0	23,8	75,5	248,0				
Macrolides	tilmicosine	2.917,1	4.118,1	4.380,1	4.159,7	1.446,0	2.361,3	2.467,2	2.540,3	1.471,1	1.756,9	1.912,9	1.619,4
Macrolides	tulathromycine	70,4	109,5	100,7	111,1	70,4	109,5	100,7	111,1				
Macrolides	tylosine	9.763,1	8.456,0	13.475,3	12.041,0	8.573,5	7.173,4	12.201,5	11.151,5	1.189,6	1.282,6	1.273,9	889,5
Macrolides	tildipirosine	20,3	34,0	39,6	44,5	20,3	34,0	39,6	44,5				
Macrolides	tylvalosin	24,7	172,4	275,7	377,9	24,7	172,4	275,7	377,9				
other	rifaximin	20,3	115,3	23,1	24,8	20,3	115,3	23,1	24,8				
penicillines	amoxicilline	68.667,1	71.897,2	71.420,3	68.575,2	58.782,2	60.332,5	58.319,6	55.025,6	9.884,9	11.564,7	13.100,7	13.549,7
penicillines	amoxicilline-clav	188,8	181,3	215,1	222,2	188,8	181,3	215,1	222,2				
penicillines	ampicilline	290,8	240,3	234,7	233,3	290,8	240,3	234,7	233,3				
polymyxins	polymyxine B sulfaat	1,0	0,1	1,0	0,9	1,0	0,1	1,0	0,9				
polymyxins	colistinesulfaat	9.634,8	7.875,4	5.658,1	4.755,6	7.064,1	5.896,1	4.693,9	4.060,3	2.570,7	1.979,3	964,3	695,3
tetracyclines	chloortetracycline	1.364,2	749,5	633,1	588,2	578,5	370,8	510,8	526,1	785,7	378,7	122,3	62,1
tetracyclines	doxycycline	45.903,8	49.961,7	50.664,6	49.134,3	38.136,6	42.168,4	43.263,6	42.364,9	7.767,2	7.793,3	7.401,0	6.769,4

tetracyclines	oxytetracycline	15.738,2	11.699,9	10.603,4	10.369,3	14.609,0	11.231,0	10.259,4	10.199,8	1.129,1	468,9	344,0	169,5
(fluoro)quinolones	danofloxacine	68,7	67,3	69,1	60,0	68,7	67,3	69,1	60,0				
(fluoro)quinolones	difloxacine	9,2	7,6	0,7	0,0	9,2	7,6	0,7	0,0				
(fluoro)quinolones	enrofloxacine	1.088,3	1.361,0	1.411,2	1.280,7	1.088,3	1.361,0	1.411,2	1.280,7				
(fluoro)quinolones	flumequine	2.734,0	1.534,5	1.564,5	2.197,5	2.734,0	1.534,5	1.564,5	2.197,5				
(fluoro)quinolones	ibafloxacine	0,7	1,0	-0,0	0,0	0,7	1,0	-0,0	0,0				
(fluoro)quinolones	marbofloxacine	307,5	335,1	438,2	504,0	307,5	335,1	438,2	504,0				
(fluoro)quinolones	orbifloxacine	2,3	2,8	3,4	3,1	2,3	2,8	3,4	3,1				
(fluoro)quinolones	pradofloxacine	6,1	5,7	4,7	3,4	6,1	5,7	4,7	3,4				
cephalosporins 3G	cefoperazon	3,9	6,1	5,5	6,5	3,9	6,1	5,5	6,5				
cephalosporins 3G	cefovecin	9,7	8,6	9,3	9,1	9,7	8,6	9,3	9,1				
cephalosporins 3G	ceftiofur	594,5	624,5	598,4	537,1	594,5	624,5	598,4	537,1				
cephalosporins 4G	cefquinome	201,6	197,2	180,7	179,9	201,6	197,2	180,7	179,9				

Discussion

In the context of the increasing (awareness about) antibacterial resistance development, comparable data and evolutions on antibacterial consumption are of utmost importance. This annual BelVetSAC report is now published for the seventh time and describes the antibacterial use in animals in Belgium in 2015 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 much 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 becoming available and have an added value to the BelVetSac data. It is anticipated that in the near future data collected through the SANITEL-MED system, which is very recently launched, will further provide species specific consumption data for pigs, poultry and veal calves. This information will likely not replace the BelVetSac 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. Also 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.

As the 2015 BelVetSac results are concerned, it is promising to see that the positive evolution seen in 2012 and 2013 (with a respective reduction of -6,9% and -6,3% in mg substance/kg biomass) which was stopped in 2014 (increase of +1,1% mg/kg biomass), has now been taken

up again with **a reduction of -4,7% mg substance/kg biomass in comparison to 2014**. However this evolution is not sufficient to obtain the objective of 50% reduction in 2010 and actions to reduce the use of antimicrobials should be increased. In absolute number this relates to a decrease in the use of antimicrobial compounds of 2,8% (-2,6% pharmaceuticals and -3,4% antibacterial premixes) in combination with an increase of the biomass of 2,0%.

When looking more in detail to the different types of antibacterials used, it is observed that for the third year in a row the penicillines (30,9%) form the largest group of consumed antimicrobials, followed by the sulphonamides (28,4%), and tetracyclines (23,1%). In 2015 a decrease in use in most antimicrobial classes was observed with the largest reduction for the polymixines (-28,7 %). This continued reduction in use of polymixines is likely due to 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 as medicated premix) the polymixine use has dropped with 51%. This is of great importance since the risk of spread of polymixine resistance has increased substantially due to the detection of plasmid mediated colistine resistance in *E.coli* of animals and humans (Callens et al., 2016). For aminosides (+4,4%), Quinolones (+16,0%) and fenicols (+31,9%) and increased use is observed. The increased use of quinolones is almost solely due to an increase in the use of flumequine. When evaluating the specific products causing this increase, this is likely related to the use in poultry production. The increased use in fenicols is due to an increase in use of florfenicol. This might be an effect of adherence to the AMCRA formularia where florfenicol is types as a "yellow" product (lowest usage restriction level) which is often used as an alternative to the "red" or "orange" products.

Unfortunately, in 2015 **the use of molecules of critical importance for human medicine** (grouped in the category of the "red" antibacterials such as the cephalosporines of the 3° and 4° generation and the fluoroquinolones) **has further increased with 11,6%.** This increase is entirely due to the increased use of flumequine wheres the use of 3° and 4° generation has decreased.

As a result of the recent covenant between the government and all parties involved in the field of antimicrobial use in animals 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. Therefore 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 2015 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 15,9% is achieved** since 2011 (2011 is used as reference year for the AMCRA 2020 goals). This reduction is relatively evenly split into a reduction of 16,2% in antibacterial pharmaceuticals and 14,7% in antibacterial premixes. This means that we are **still 34,1% away**

from achieving this goal. This also means that in the following 5 years (2016-2020) an annual reduction of 7% is required.

When focusing on **medicated premixes the reduction achieved in 2015 in comparison to 2011 is 14,7%.** This is still 35,3% away from the goal. **This also means that in the following 2 years (2016-2017) an annual reduction of 18% is required.** Therefore the concerned parties will need to substantially increase efforts and take strict measures otherwise it is unlikely that this goal will be achieved.

Finally the increased use of critically important antimicrobials for human medicine is also a very alarming evolution which urgently needs to be turned backwards. **In comparison to 2011 the reduction of red molecules is only 6,4%** whereas a reduction 75% is aimed at by 2020.
It is believed that the new legislation, presumably coming into force in the third quarter of 2016, will substantially help in this. It will implement criteria for use of critical important antimicrobials and oblige vets to register antimicrobials prescribed, delivered or administered in pigs, poultry and veal calves in a national database. This may help inforce prudent use principles (benchmarking vets and farmers) to still achieve the goal in 2020.

Conclusion

This report shows both promising and worrisome results. The further reduction of the total consumption is positive and makes us believe that the general goal of 50% reduction by 2020 is still feasible. Yet the slow decrease of the use of medicated premixes and the increase in use of red molecules are two very worrisome evolutions that warrant further measures to assure that also these goals will be met by the foreseen timing.

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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