BelVet-SAC

**BELGIAN VETERINARY SURVEILLANCE OF ANTIBACTERIAL CONSUMPTION**

# NATIONAL REPORT ON SALES AND USE OF ANTIBACTERIAL VETERINARY MEDICINAL PRODUCTS

# 2024

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# SUMMARY

This 16th BelVet-SAC report describes the results of the sales and usage of antibacterial veterinary medicinal products (VMPs) in animals in Belgium in 2024, along with an analysis of their evolution since 2011.

As in previous years, sales data were collected at the level of the manufacturers of medicated feed (antibacterial premixes) and the holders of a marketing authorisation (MAH) for antibacterial VMPs in Belgium (antibacterial pharmaceuticals); usage data were sourced from registrations in Sanitel-Med. In addition to the traditional results for pigs, broilers, laying hens and veal calves, this report introduces findings on antibacterial use in dairy and beef cattle. It also covers other food-producing chicken categories (rearing and (grand)parent stock) and turkeys.

The 'Vision 2024' action plan, with reduction targets defined by AMCRA, spanned from 2021 until the end of 2024. This BelVet-SAC report presents the results in relation to the reduction targets set within this 'Vision 2024' action plan. With a result of 58,7 mg/kg biomass of antibacterial substances sold in 2024 compared to 55,2 mg/kg biomass in 2023, an increase of 6,3 % was recorded for the first time since 2014. This increase was exclusively attributed to the sales of antibacterial pharmaceuticals, increasing with 8,2 %, while the sales of antibacterial premixes continued their downward trend, decreasing by 19,2 %. As a result, the reduction in total sales of antibacterials for veterinary use between 2011 and 2024 reached 59,9 %. This means that the national reduction target of 65 %, set for 2024, was not met.

On the other hand, the other national reduction targets were successfully met. The total reduction compared to 2011 in sales of antibacterial premixes reached 89,1 % in 2024, remaining on track for complete phase-out of antibacterials in feed by 2027. The sales of critically important antibacterials continued to decline, dropping to 81,0 % less than in 2011 – well above the defined target of 75 %. Colistin sales also remained comfortably below the 1 mg/kg biomass threshold in 2024, at 0,69 mg/kg biomass, though an increase was noted for the second consecutive year. However, as further explained below, the target of a maximum of 1 % alarm users, based on species-specific $BD_{100}$-threshold values, was not met in every animal category.

Including the use data for dairy and beef cattle and the complete poultry sector, the discrepancy between the used and sold quantity of antibacterial active substance in 2024 amounted to approx. 19 tonnes. This seems remarkably high, given that limited use of antibacterials is expected for the animal types not yet included (sheep, goats, other poultry, horses, pets, etc.). As explained in previous reports, several factors can contribute to the discrepancy between sales and use figures, including stock formation, purchase abroad and underreporting. Additionally, the incomplete coverage of use data remains a source of uncertainty. In the coming years, structured measures should be implemented to enhance the transparency of the purchase and use of antibacterial agents by veterinarians.

The gap between sales and use becomes even more apparent when examining the antibacterial use in 2024, reinforcing the growing importance of use data in monitoring the situation in Belgium. Indeed, while total sales increased, the $BD_{100}$-species values decreased across all monitored animal species between 2024 and 2023: pigs saw a 6,3% reduction ($BD_{100}$-species of 3,55), poultry dropped by 21,6% ($BD_{100}$-species of 2,48), and veal calves declined by 0,9% ($BD_{100}$-species of 7,46). Since 2018, each sector has maintained a positive trend, with cumulative reductions of 48,3 % for pigs, 56,3 % for poultry

and 45,2 % for veal calves. Notably, cattle, with a $BD_{100}$-species value of only 0,4 in 2024, exhibited a markedly lower antibacterial use than the other monitored species.

In pigs, the decline in antibacterial use among weaned piglets stands out. Possibly influenced by the announced tightening of the $BD_{100}$-action value at the end of 2024, farms in high-use zones showed a significant decrease. While the median $BD_{100}$ in 2024 dropped by just 1 % compared to 2023 (a 29 % decrease since 2018), the 90$^{th}$ percentile value saw a more significant drop of 16 % in 2024 compared to 2023 (a 46 % reduction since 2018). Despite this progress, the median $BD_{100}$ in this category (10,2) remains the highest among all monitored pig categories and across all animal species. Furthermore nearly 10 % of farms administer antibacterials to their piglets for at least a third of their time on-site. Fattening pigs continue to require attention, as this was the only category across all species exhibiting an overall rise in antibacterial use in 2024. Their median $BD_{100}$ increased for the second consecutive year reaching a value of 2 (up 2 % from 2023). Reducing antibacterial use in farms located in the yellow and red benchmarking zones remains a challenge. In 2024, roughly 30 % and 10 % of all monitored tonnes of antibacterials used were situated in these zones, respectively. Alarm users within the pig sector declined across all animal categories, dropping to 0,9 % for farrowing pigs, 1,9 % for weaned piglets, 1,7 % for fattening pigs and 0,4 % for breeding animals. Consequently, the target of a maximum of 1 % alarm users was only narrowly missed in weaned and fattening pigs. The pig sector deserves recognition for its efforts, particularly in reducing premix usage and colistin consumption. Moving forward, continued sustainable progress will be essential, achieved through targeted measures.

The poultry sector has made a remarkable run over the past four years. In 2021, the first year following the introduction of the reduction path for broilers, antibacterial use decreased sharply but it remained relatively stable in the subsequent two years. However, 2024 marked another major step forward for broilers, with the median $BD_{100}$ decreasing by almost a quarter, to 2,6. This led to a sharp decline in the number of yellow-zone broiler farms, now representing only 11 %, along with a reduction in the total number of tonnes of antibacterials used in these farms. Notably, 88 % of broiler farms achieved a green benchmark colour score in 2024, and as anticipated, this sector successfully met the target of a maximum of 1 % alarm users. Additionally, the use of quinones in broilers further declined in 2024, although absolute figures remain significantly higher than in 2021 and 2018/19 (approx. 340 kg). Laying hens also continued to show positive results in 2024, with the median $BD_{100}$ dropping by 43 % to 0,88, approaching levels previously seen in 2018. The use of colistin in laying hens also decreased in 2024.

There is a relatively small number of farms with turkeys or chickens for rearing, selection and breeding, and their contribution to the overall antibacterial use in poultry is low. However, turkeys stand out: their median $BD_{100}$ in 2024 reached 3,72, surpassing broilers and ranking as the third highest among all monitored animal species and categories. This will require close monitoring in the coming years.

The veal sector continues to make gradual progress, which is encouraging. However, this has led to a discrepancy with the reduction path set in 2020. Following consultation with the sector, the adjustment of the $BD_{100}$-threshold values at the end of 2024, was postponed by a few years, resulting in better-than-expected outcomes for alarm users (3,7 %) and red farms (1,4 %). Despite these improvements, significant challenges remain. On the positive side, the use of quinolones and colistin in veal calves declined further in 2024. On the other hand, overall reductions are among the lowest of all monitored sectors, with a median $BD_{100}$ dropping by just 37 % since 2018. Additionally, antibacterial use in veal production remains the second highest of all monitored animal species and categories, with a median $BD_{100}$ of 7,08 in 2024. The small gap between low and high users, suggests an underlying structural problem for the antibacterial use in this sector. Strengthening cross-sectoral cooperation with the dairy sector will provide part of the solution, especially now that dairy farms are also reporting antibacterial use.

The results for cattle confirm the sector's overall low antibacterial use. While adult animals account for the highest total use in tonnes, the youngest calves (aged 0-3 months) experience the highest number of treatment days. A notable gap exists between the median and 90$^{th}$ percentile usage rates in both dairy cattle (median: 1,6; P90: 12,4) and beef cattle (median: 1,45; P90: 13,3). This highlights potential reduction among the high-use farms, an expected trend given the relatively early phase of national monitoring in this sector. Moreover, compared to the other sectors, a relatively high percentage of farms fall within the red zone (33 %), a common characteristic during dynamic benchmarking across multiple animal categories at this stage. The only available long-term data on antibacterial use in cattle, i.e. the sales of intramammary tubes, unfortunately show a further increase in 2024, reaching the highest level recorded in the past six years. Furthermore, a comparison between the usage and sales data for intramammary tubes suggests incomplete coverage of antibacterial use in cattle. The sector hence has several areas for improvement in the coming years.

In terms of antibacterial classes and routes of administration, aminopenicillins, tetracyclines, the combination of trimethoprim-sulfamide and the macrolides remain the most sold and used in 2024, particularly via oral administration. While aminopenicillins and tetracyclines continued their decline in sales, trimethoprim-sulfamide combinations and macrolides saw an increase. Sales of macrolides reached their highest level in recent years, as did the sales of amino(glyco)sides. Of concern is the ongoing rise in colistin and 3$^{rd}$ and 4$^{th}$ generation cephalosporins sales, while sales of quinolones declined further. The inclusion of cattle use data provides new insights, revealing that more than 1 500 cattle farms used products with a red AMCRA colour code in 2024, though this does not translate into large quantities used. Additionally, approximately 3 500 cattle farms administered intramammary tubes containing 3$^{rd}$ and 4$^{th}$ generation cephalosporins, classified under the orange AMCRA colour code, representing the primary veterinary applications of these substances.

In conclusion, monitoring the sales and use of antibacterial VMPs remains a cornerstone of the national antimicrobial resistance strategy. Sustained collaboration and commitment from all stakeholders will be essential to drive necessary reductions further. Only through united efforts a healthy and sustainable level of antibacterial use can be achieved that safeguards animal health and protects against the growing threat of antibacterial resistance.

# SAMENVATTING

Het 16e BelVet-SAC-rapport beschrijft de resultaten van de verkoop en het gebruik van antibacteriële diergeneesmiddelen bij dieren in België in 2024 en schetst de evolutie ervan sinds 2011.

Net als in de rapporten van de voorgaande jaren werden de verkoopdata verzameld op het niveau van de mengvoederfabrikanten (antibacteriële premixen) en op het niveau van de houders van een vergunning om antibacteriële diergeneesmiddelen in België op de markt te brengen (antibacteriële farmaceutica); de gebruiksdata zijn afkomstig van de registraties in Sanitel-Med. Naast de traditionele resultaten voor varkens, braadkippen, leghennen en vleeskalveren, worden in dit rapport ook vaststellingen gedaan over het antibioticagebruik bij melk- en vleesvee. Het geeft ook resultaten voor andere voedselproducerende categorieën van kippen (opfok en (groot)ouderdieren) en voor kalkoenen.

Het actieplan 'Visie 2024', waarin AMCRA een aantal reductiedoelstellingen had vastgelegd, liep van 2021 tot eind 2024. De resultaten in dit BelVet-SAC-rapport worden aan die reductiedoelstellingen getoetst. Met een resultaat van 58,7 mg/kg biomassa in 2024 tegenover 55,2 mg/kg biomassa in 2023, werd voor het eerst sinds 2014 een stijging van 6,3 % in de verkoop van antibacteriële stoffen opgetekend. Die stijging was uitsluitend het gevolg van de groeiende verkoop van antibacteriële farmaceutica (+8,2 %), terwijl de verkoop van antibacteriële premixen bleef dalen (-19,2 %). Hierdoor daalde de totale verkoop van antibacteriële middelen voor diergeneeskundig gebruik tussen 2011 en 2024 met 59,9 %. Dat betekent dat de nationale reductiedoelstelling van 65 % die voor 2024 was vastgesteld, niet werd gehaald.

De andere nationale reductiedoelstellingen werden daarentegen wel gehaald. In vergelijking met 2011 daalde de verkoop van antibacteriële premixen in 2024 in totaal met 89,1 %. We blijven dus op koers voor de volledige afbouw van antibacteriële stoffen in diervoeders tegen 2027. De verkoop van kritieke antibiotica bleef dalen en zakte tot 81,0 % onder het niveau van 2011, duidelijk boven de vastgestelde doelstelling van 75 %. De verkoop van colistine bleef in 2024 met 0,69 mg/kg biomassa ook ruim onder de drempel van 1 mg/kg biomassa, hoewel er voor het tweede opeenvolgende jaar een stijging was. Zoals hieronder verder wordt toegelicht, werd de doelstelling van maximaal 1 % alarmgebruikers, vertrekkende van diersoortspecifieke $BD_{100}$-grenswaarden, echter niet voor elke diercategorie gehaald.

Rekening houdend met de inclusie van de rundvee- en volledige pluimveegebruiksdata, bedroeg het verschil tussen gebruiks- en verkoopdata in 2024 ongeveer 19 ton. Dat lijkt opmerkelijk veel, aangezien een beperkt gebruik van antibiotica wordt verwacht voor de diersoorten die nog niet opgevolgd worden (schapen, geiten, ander pluimvee, paarden, huisdieren enz.). Zoals uitgelegd in eerdere rapporten, kan het verschil tussen de gebruiksdata en de verkoopdata door verschillende factoren worden verklaard, waaronder het aanleggen van een voorraad, aankopen in het buitenland en onderrapportage. Daarnaast blijft het feit dat niet alle gebruiksdata gecoverd zijn een bron van onzekerheid. Het is daarom belangrijk om de komende jaren gestructureerde maatregelen te nemen om aankoop en gebruik van antibacteriële middelen door dierenartsen transparanter te maken.

De kloof tussen verkoop en gebruik wordt nog duidelijker wanneer er gekeken wordt naar het gebruik van antibacteriële middelen in 2024, wat erop wijst dat gebruiksdata meer dan ooit belangrijk zijn om de situatie in België op te volgen. Immers, hoewel de totale verkoop steeg, toont de $BD_{100}$-species voor alle opgevolgde diersoorten mooie dalingen tussen 2024 en 2023: -6,3 % voor varkens ($BD_{100}$-species van 3,55), -21,6 % voor pluimvee ($BD_{100}$-species van 2,48) en -0,9 % voor vleeskalveren ($BD_{100}$-species van 7,46). Sinds 2018 hield elke sector een positieve trend aan, met cumulatieve dalingen van 48,3 % voor varkens, 56,3 % voor pluimvee en 45,2 % voor vleeskalveren. Bij rundvee, met een $BD_{100}$-species van 0,4 in 2024, lag het antibioticagebruik beduidend lager dan bij de andere diersoorten.

Bij varkens springt vooral de evolutie bij de gespeende biggen in het oog. Mogelijk onder impuls van de aangekondigde verstrenging van de $BD_{100}$-actiewaarde eind 2024 vertoonde het AB-gebruik over de bedrijven heen een aanzienlijke daling in de hogere gebruikszones. Terwijl de mediane $BD_{100}$ in 2024 met amper 1 % zakte ten opzichte van 2023 (een daling van 29 % sinds 2018), noteren we voor de 90e percentielwaarde een veel grotere daling van 16 % in 2024 ten opzichte van 2023 (een daling van 46 % sinds 2018). Ondanks die vooruitgang blijft de mediane $BD_{100}$ in deze categorie (10,2) de hoogste van alle opgevolgde varkenscategorieën en van alle diersoorten. Bovendien krijgen biggen in bijna 10 % van de bedrijven gedurende minstens één derde van hun tijd op de boerderij antibiotica toegediend. Ook de vleesvarkens vereisen blijvende aandacht, want dit was de enige categorie van alle diersoorten waar het antibioticagebruik in 2024 globaal toenam. De mediane $BD_{100}$ steeg voor het tweede opeenvolgende jaar en klom naar 2 (een stijging van 2 % ten opzichte van 2023). Het blijft daarnaast een uitdaging voor de sector om het gebruik van antibacteriële middelen van bedrijven in de gele en rode zone naar omlaag te krijgen, aangezien in 2024 respectievelijk ongeveer 30 % en 10 % van alle gemonitorde gebruikte tonnen antibacteriële middelen zich daar situeerden. Het aantal alarmgebruikers in de varkenssector daalde in alle diercategorieën, tot 0,9 % voor kraamvarkens, 1,9 % voor gespeende biggen, 1,7 % voor mestvarkens en 0,4 % voor fokdieren. De doelstelling van maximaal 1 % alarmgebruikers werd dan ook maar net niet gehaald voor gespeende varkens en mestvarkens. De varkenssector verdient erkenning voor zijn inspanningen, vooral het verminderde gebruik van premixen en colistine. Het is belangrijk om de komende jaren duurzame vooruitgang te blijven maken, dankzij gerichte maatregelen.

De pluimveesector heeft de afgelopen vier jaar een opmerkelijke evolutie doorgemaakt. In 2021, het eerste jaar na de invoering van het reductiepad voor braadkippen, ging het antibioticagebruik steil naar beneden, maar in de twee daaropvolgende jaren bleef het relatief stabiel. In 2024 maakte de braadkippensector opnieuw een grote sprong vooruit: de mediane $BD_{100}$ daalde met bijna een kwart tot 2,6. Dit resulteerde in een flinke daling van het aantal braadkipbedrijven in de gele zone, die nu nog maar 11 % uitmaken. Die daling ging gepaard met een vermindering van het totale aantal ton antibacteriële middelen dat in deze bedrijven wordt gebruikt. Opvallend is dat 88 % van de braadkipbedrijven in 2024 een groene benchmarkkleurscore behaalde en zoals verwacht werd de doelstelling van maximaal 1 % alarmgebruikers in deze sector met gemak gehaald. Daarnaast is het gebruik van quinolones in braadkippen in 2024 verder gedaald, hoewel de absolute cijfers een pak hoger blijven dan die in 2021 en 2018/19 (ongeveer 340 kg). Ook de leghennen lieten in 2024 positieve resultaten zien, met een daling van de mediane $BD_{100}$ met 43 % tot 0,88, waarmee het niveau van 2018 wordt benaderd. Ook het gebruik van colistine bij leghennen daalde in 2024.

De inclusie van de kippenopfok, -selectie en -vermeerdering, alsook de kalkoenen, in de gebruikscijfers van pluimvee, leert dat het over een klein aantal bedrijven gaat die in absolute cijfers een beperkte rol spelen in het AB-gebruik. De kalkoenen springen evenwel in het oog: hun mediane $BD_{100}$ in 2024 was 3,72 – hoger dan die van braadkippen en op de derde plaats van alle opgevolgde diersoorten en -categorieën Dit zal de komende jaren nauwlettend opgevolgd moeten worden.

De vleeskalversector blijft geleidelijk vooruitgang boeken, wat bemoedigend is. Dat betekent wel dat er werd afgeweken van het in 2020 vastgelegde reductiepad. Na overleg met de sector werd de aanpassing van de $BD_{100}$-grenswaarden eind 2024 met enkele jaren uitgesteld, wat resulteerde in beter dan verwachte resultaten voor alarmgebruikers (3,7 %) en rode bedrijven (1,4 %). Ondanks die verbeteringen moet de sector zijn inspanningen blijven opschroeven. Positief is dat het gebruik van quinolones en colistine bij vleeskalveren verder afnam in 2024. Anderzijds zijn de totale afnames in deze sector bij de laagste van alle opgevolgde sectoren en is de mediane $BD_{100}$ sinds 2018 met een eerder bescheiden 37 % gedaald. Bovendien blijft het antibioticagebruik in de vleeskalveren het op één na hoogste van alle opgevolgde diersoorten en -categorieën, met een mediane $BD_{100}$ van 7,08 in 2024. Het geringe verschil tussen kleinverbruikers en grootverbruikers duidt op een onderliggend structureel probleem met het antibioticagebruik in deze sector. Een deel van de oplossing ligt in een betere sector overschrijdende samenwerking met de zuivelsector, vooral nu melkveebedrijven ook antibioticagebruik rapporteren.

De resultaten voor rundvee bevestigen het algehele lage antibioticagebruik in de sector. Terwijl het totale gebruik in ton het hoogst is voor volwassen dieren, noteren we voor de jongste kalveren (0-3 maanden oud) het hoogste aantal behandeldagen. Zowel bij melkvee (mediaan: 1,6; P90: 12,4) als bij vleesvee (mediaan: 1,45; P90: 13,3) is er een aanzienlijk verschil tussen de mediaan en het 90e percentiel. Dit wijst op ruimte voor reductie bij de hogere gebruikers, wat niet geheel onverwacht is gezien de relatief vroege fase van nationale opvolging in deze sector. Bovendien zit, in vergelijking met de andere sectoren, een relatief hoog percentage bedrijven in de rode zone (33 %), wat in deze fase van dynamische benchmarking over meerdere diercategorieën te verwachten is. De enige beschikbare langetermijngegevens over antibioticagebruik bij rundvee, namelijk de verkoop van intramammaire tubes, laten helaas een verdere stijging zien in 2024, tot het hoogste niveau van de afgelopen zes jaar. Bovendien suggereert een vergelijking tussen de gebruiksdata en de verkoopdata voor intramammaire tubes dat het antibioticagebruik bij rundvee niet volledig gecoverd wordt. De rundveesector heeft dus een aantal aandachtspunten voor de komende jaren.

Wanneer we naar de antibioticaklassen en toedieningswijzen kijken, zien we dat aminopenicillines, tetracyclines, de combinatie trimethoprim-sulfamide en macroliden in 2024 nog steeds het meest verkocht en gebruikt werden, vooral via orale toediening. Terwijl de verkoop van aminopenicillines en tetracyclines bleef dalen, vertoonden combinaties van trimethoprim-sulfamide en macroliden een stijging. De verkoop van macroliden piekte de afgelopen jaren, net als de verkoop van amino(glyco)siden. Een zorgpunt is de aanhoudende stijging van de verkoop van 3e en 4e generatie colistine en cefalosporines, terwijl de verkoop van quinolones verder zakte. De opname van data over het gebruik bij rundvee biedt nieuwe inzichten en laat zien dat meer dan 1 500 rundveebedrijven in 2024 producten met een rode AMCRA-kleurcode gebruikten, hoewel dit zich niet vertaalt in grote gebruikte hoeveelheden. Bovendien dienden ongeveer 3 500 rundveebedrijven intramammaire tubes toe met 3e en 4e generatie cefalosporines, die een oranje AMCRA-kleurcode hebben, als primaire veterinaire toepassing van deze stoffen.

Concluderend blijft het monitoren van de verkoop en het gebruik van antibacteriële diergeneesmiddelen een hoeksteen van de nationale strategie tegen antimicrobiële resistentie. Duurzame samenwerking en inzet van alle belanghebbenden zijn essentieel om de noodzakelijke reducties verder te stimuleren. Alleen door gezamenlijke inspanningen kan een gezond en duurzaam niveau van antibacterieel gebruik worden bereikt dat de diergezondheid beschermt en bescherming biedt tegen de groeiende dreiging van antibioticaresistentie.

# RESUME

Le 16e rapport BelVet-SAC présente les résultats des ventes et de l'utilisation des médicaments vétérinaires antibactériens (MVA) chez les animaux en Belgique en 2024, ainsi qu'une analyse de leur évolution depuis 2011.

Comme les années précédentes, les données sur les ventes ont été collectées au niveau des fabricants d'aliments médicamenteux (prémélanges antibactériens) et des détenteurs d'une autorisation de mise sur le marché (AMM) pour les MVA en Belgique (produits pharmaceutiques antibactériens) ; les données relatives à l'utilisation proviennent des enregistrements dans Sanitel-Med. Outre les résultats traditionnels concernant les porcs, les poulets de chair, les poules pondeuses et les veaux de boucherie, ce rapport présente des conclusions sur l'utilisation des antibiotiques chez le bétail laitière et le bétail viandeux. Il couvre également d'autres catégories de poulets destinés à la production alimentaire (élevage et volailles de reproduction) et de dindes.

Le plan d'action « Vision 2024 », dont les objectifs de réduction ont été définis par l'AMCRA, s'étendait de 2021 à fin 2024. Ce rapport BelVet-SAC présente les résultats par rapport aux objectifs de réduction fixés dans le plan d'action « Vision 2024 ». Avec un résultat de 58,7 mg/kg de biomasse de substances antibactériennes vendues en 2024 contre 55,2 mg/kg de biomasse en 2023, une augmentation de 6,3 % a été enregistrée pour la première fois depuis 2014. Cette augmentation était exclusivement due aux ventes de produits pharmaceutiques antibactériens, qui ont augmenté de 8,2 %, tandis que les ventes de prémélanges antibactériens ont poursuivi leur tendance à la baisse, avec une diminution de 19,2 %. De ce fait, la réduction des ventes totales d'antibactériens à usage vétérinaire entre 2011 et 2024 a atteint 59,9 %. Cela signifie que l'objectif national de réduction de 65 %, fixé pour 2024, n'a pas été réalisé.

D'autre part, les autres objectifs nationaux de réduction ont été pleinement remplis. La réduction totale des ventes de prémélanges antibactériens par rapport à 2011 a atteint 89,1 % en 2024, ce qui laisse présager une élimination complète des antibactériens dans les aliments pour animaux d'ici 2027. Les ventes d'antibiotiques d'importance critique ont continué à diminuer, chutant à 81 % de moins qu'en 2011 – bien en dessus de l'objectif fixé de 75 %. Les ventes de colistine sont également restées largement en dessous du seuil de 1 mg/kg de biomasse en 2024, à 0,69 mg/kg de biomasse, bien qu'une augmentation ait été observée pour la deuxième année consécutive. Toutefois, comme expliqué plus en détail ci-dessous, l'objectif d'un maximum de 1 % d'utilisateurs en zone d'alarme, sur la base de la valeur d'action $BD_{100}$ spécifique à l'espèce, n'a pas été atteint dans chaque catégorie d'animaux.

Compte tenu de l'inclusion des données complètes relatives à l'utilisation chez les bovins et les volailles, l'écart entre les données relatives à l'utilisation et aux ventes en 2024 s'élève à environ 19 tonnes. Ce chiffre semble remarquablement élevé, étant donné qu'une utilisation limitée d'antibiotiques est attendue pour les types d'animaux qui ne sont pas encore inclus (ovins, caprins, autres volailles, chevaux, animaux de compagnie, etc.). Comme expliqué dans les rapports précédents, plusieurs facteurs peuvent contribuer à l'écart entre les chiffres de vente et d'utilisation, notamment la constitution du stock, les achats à l'étranger et la sous-déclaration. De plus, la couverture incomplète des données d'utilisation demeure une source d'incertitude. Dans les années à venir, des mesures structurées devraient être mises en œuvre pour améliorer la transparence de l'achat et de l'utilisation des agents antibactériens par les vétérinaires.

L'écart entre les ventes et l'utilisation devient encore plus évident lorsqu'on examine l'utilisation d'antibiotiques en 2024, ce qui renforce l'importance croissante des données d'utilisation dans le suivi de la situation en Belgique. En effet, alors que les ventes totales ont augmenté, les valeurs $BD_{100}$-species ont diminué pour toutes les espèces animales surveillées entre 2024 et 2023 : pour les porcs, il s'agissait d'une baisse de 6,3 % (valeur $BD_{100}$-species de 3,55), pour les volailles, d'une baisse de 21,6 % (valeur $BD_{100}$-species de 2,48) et pour les veaux de boucherie, d'une baisse de 0,9 % (valeur $BD_{100}$-species de 7,46). Depuis 2018, chaque secteur a maintenu une tendance positive, avec des réductions cumulées de 48,3 % pour les porcs, 56,3 % pour les volailles et 45,2 % pour les veaux de boucherie. Il est à noter que les bovins, avec une valeur $BD_{100}$-species de seulement 0,4 en 2024, démontrent une utilisation d'antibiotiques nettement inférieure à celle des autres espèces animales.

Chez les porcs, la baisse d'antibiotiques administrés aux porcelets sevrés est spectaculaire. Probablement influencées par le resserrement annoncé de la valeur d'action $BD_{100}$ pour fin 2024, les exploitations situées dans des zones à forte utilisation ont enregistré une baisse significative. Alors que la médiane du $BD_{100}$ en 2024 n'a baissé que de 1 % par rapport à 2023 (soit une diminution de 29 % depuis 2018), la valeur du 90$^{e}$ percentile a connu une baisse plus importante de 16 % en 2024 par rapport à 2023 (soit une réduction de 46 % depuis 2018). Malgré ces progrès, la médiane du $BD_{100}$ dans cette catégorie (10,2) reste la plus élevée parmi toutes les catégories de porcs surveillées et toutes espèces animales confondues. En outre, près de 10 % des exploitations administrent des antibiotiques à leurs porcelets pendant au moins un tiers de leur temps sur place. Les porcs d'engraissement continuent de requérir une attention particulière, car il s'agit de la seule catégorie, toutes espèces confondues, à afficher une augmentation globale de l'utilisation d'antibiotiques en 2024. Leur $BD_{100}$ médian a augmenté pour la deuxième année consécutive, atteignant une valeur de 2 (soit une hausse de 2 % par rapport à 2023). Réduire l'utilisation des antibactériens dans les exploitations situées dans les zones de référence jaune et rouge demeure un défi. En 2024, environ 30 % et 10 % de toutes les tonnes d'antibactériens utilisées et contrôlées se trouvaient respectivement dans ces zones. Les utilisateurs en zone d'alarme dans le secteur porcin ont diminué dans toutes les catégories d'animaux, tombant à 0,9 % pour les truies en gestation, 1,9 % pour les porcelets sevrés, 1,7 % pour les porcs d'engraissement et 0,4 % pour les animaux reproducteurs. Par conséquent, l'objectif d'un maximum de 1 % d'utilisateurs en zone d'alarme n'a été manqué que de peu pour les porcelets sevrés et les porcs d'engraissement. Le secteur porcin mérite d'être reconnu pour ses efforts, notamment en ce qui concerne la réduction de l'utilisation des prémélanges et de la consommation de colistine. À l'avenir, il sera essentiel de poursuivre les progrès durables grâce à des mesures ciblées.

Le secteur avicole a connu une évolution remarquable au cours des quatre dernières années. En 2021, la première année suivant l'introduction de la trajectoire de réduction pour les poulets de chair, l'utilisation d'antibiotiques a fortement diminué, mais elle est restée relativement stable au cours des deux années suivantes. Cependant, l'année 2024 a marqué une autre étape importante pour les poulets de chair, avec une diminution de près d'un quart du $BD_{100}$ médian qui passe à 2,6. Cela a entraîné une forte baisse du nombre de fermes d'élevage de poulets de chair situés en zone jaune et qui ne représentent plus que 11 %, ainsi qu'une réduction du nombre total de tonnes d'antibactériens utilisés dans ces fermes d'élevage. Il convient de noter que 88 % des fermes d'élevage de poulets de chair ont atteint un score de couleur de référence verte en 2024 et, comme prévu, ce secteur a atteint avec succès l'objectif d'un maximum de 1 % d'utilisateurs en zone d'alarme. En outre, l'utilisation des quinones chez les poulets de chair a encore diminué en 2024, bien que les chiffres absolus restent nettement supérieurs à ceux d'il y a quelques années. Les poules pondeuses ont également continué à afficher des résultats positifs en 2024, avec une baisse de 43 % du $BD_{100}$ médian, qui passe à 0,88 et se rapproche ainsi des niveaux précédemment observés en 2018. L'utilisation de la colistine chez les poules pondeuses a également diminué en 2024.

L'inclusion des données relatives aux poulets d'élevage, de sélection et de reproduction, ainsi qu'aux dindes, dans les chiffres d'utilisation de la volaille montre qu'il s'agit d'un petit nombre d'élevages qui jouent un rôle limité dans l'utilisation de l'AB en chiffres absolus. Les dindes se démarquent toutefois : leur $BD_{100}$ médian atteignant 3,72 en 2024. Elles dépassent les poulets de chair et se classent au troisième rang parmi toutes les espèces et catégories animales surveillées. Cette situation nécessitera un suivi attentif dans les années à venir.

Le secteur du veau continue à progresser graduellement, ce qui est encourageant. Toutefois, cela a entraîné un décalage par rapport à la trajectoire de réduction fixée en 2020. Après consultation du secteur, l'adaptation des valeurs seuils du $BD_{100}$ à la fin de 2024 a été reportée de quelques années, ce qui a permis d'obtenir des résultats meilleurs que prévu pour les utilisateurs en zone d'alarme (3,7 %) et les fermes en zone rouge (1,4 %). En dépit de ces améliorations, il reste d'importants défis à relever. Du côté positif, l'utilisation des quinolones et de la colistine chez les veaux a encore diminué en 2024. D'autre part, les réductions globales sont parmi les plus faibles de tous les secteurs surveillés, le $BD_{100}$ médian n'ayant baissé que de 37 % depuis 2018. De plus, l'utilisation d'antibiotiques dans la production de viande de veau reste la deuxième plus importante de toutes les espèces et catégories animales surveillées, avec un $BD_{100}$ médian de 7,08 en 2024. Le faible écart entre les utilisateurs qui en utilisent peu et ceux qui en utilisent beaucoup suggère l'existence d'un problème structurel sous-jacent à l'utilisation d'antibiotiques dans ce secteur. Le renforcement de la coopération intersectorielle avec le secteur laitier apportera une partie de la solution, d'autant plus que les exploitations laitières déclarent désormais aussi leur utilisation d'antibiotiques.

Les résultats concernant les bovins confirment la faible utilisation globale d'antibiotiques dans ce secteur. Alors que les animaux adultes représentent l'utilisation totale la plus élevée en tonnes, ce sont les plus jeunes veaux (âgés de 0 à 3 mois) qui subissent le plus grand nombre de jours de traitement. Il existe un écart notable entre les taux d'utilisation médians et ceux du 90e percentile, tant pour les bovins laitiers (médiane : 1,6 ; P90 : 12,4) que pour les bovins de boucherie (médiane : 1,45 ; P90 : 13,3). Cela met en évidence une réduction potentielle dans les exploitations à forte utilisation et une tendance attendue compte tenu du stade relativement précoce de la surveillance nationale dans ce secteur. En outre, par rapport aux autres secteurs, un pourcentage relativement élevé d'exploitations se situe en zone rouge (33 %), une caractéristique courante lors de le benchmarking dynamique de plusieurs catégories d'animaux à ce stade. Les seules données à long terme disponibles sur l'utilisation d'antibiotiques chez les bovins, c'est-à-dire les ventes de tubes intramammaires, indiquent malheureusement une nouvelle augmentation en 2024, atteignant ainsi le niveau le plus élevé enregistré au cours des six dernières années. En outre, une comparaison entre les données d'utilisation et de ventes des tubes intramammaires suggère une couverture incomplète de l'utilisation des antibiotiques chez les bovins, ce qui laisse entrevoir des possibilités d'amélioration pour les années à venir.

En termes de classes d'antibiotiques et de voies d'administration, les aminopénicillines, les tétracyclines, l'association triméthoprime-sulfamide et les macrolides restent les plus vendus et les plus utilisés en 2024, notamment par voie orale. Alors que les ventes d'aminopénicillines et de tétracyclines ont continué à baisser, celles des associations triméthoprime-sulfamide et des macrolides ont augmenté. Les ventes de macrolides ont atteint leur niveau le plus élevé de ces dernières années, tout comme celles des amino(glyco)sides. La hausse continue des ventes de colistine et de céphalosporines de $3^{e}$ et $4^{e}$ génération est préoccupante, tandis que celles des quinolones ont encore diminué. L'inclusion des données relatives à l'utilisation chez les bovins fournit de nouvelles informations, révélant que plus de 1 500 exploitations bovines ont utilisé des produits ayant le code couleur AMCRA rouge en 2024, bien que cela ne se traduise pas par de grandes quantités utilisées. De plus, environ 3 500 exploitations bovines ont administré des tubes intramammaires contenant des céphalosporines de $3^{e}$ et $4^{e}$ génération, classées sous le code couleur AMCRA orange, ce qui représente les principales applications vétérinaires de ces substances.

En conclusion, le suivi des ventes et de l'utilisation des médicaments vétérinaires antibactériens demeure un élément essentiel de la stratégie nationale de lutte contre la résistance aux antimicrobiens. Une collaboration et un engagement soutenus de toutes les parties prenantes seront essentiels pour poursuivre les réductions nécessaires. Seuls des efforts concertés permettront d'atteindre un niveau d'utilisation sain et durable des antibactériens, préservant ainsi la santé animale et protégeant contre la menace croissante de la résistance aux antibiotiques.

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# DEFINITIONS AND ABBREVIATIONS

| | |
|---|---|
| AMCRA | Centre of expertise on Antimicrobial Consumption and Resistance in Animals |
| AMR | Antimicrobial Resistance |
| ASU | Antimicrobial Sales and Use |
| ATCvet | Anatomical Therapeutic Chemical classification system for veterinary medicinal products |
| $BD_{100}$ | Indicator which represents the % of time an animal is treated with antibacterials |
| BLI | Beta Lactamase Inhibitor |
| CIA | Critically Important Antibacterials (fluoro)quinolones and cephalosporins of the 3rd and 4th generation) |
| DC | Dry Cow |
| $DDDA_{bel}$ | Defined Daily Dose Animal for Belgium |
| DLP | Data-Lock-Point |
| EMA | European Medicines Agency |
| ESVAC | European Surveillance of Veterinary Antimicrobial Consumption project |
| ESUAvet | European Sales and Use of Antimicrobials for veterinary medicinal products |
| FAMHP | Belgian Federal Agency for Medicines and Health Products |
| FASFC | Belgian Federal Agency for the Safety of the Food Chain |
| $LA_{bel}$ | Long-Acting factor defined for Belgium |
| LC | Lactating Cow |
| MAH | Market Authorisation Holder |
| MMF | Manufacturers of Medicated Feed |
| SDP | Self-Defined Product |
| SPC | Summary of Product Characteristics |
| VMP | Veterinary Medicinal Product |

# I. INTRODUCTION AND SCOPE

Antimicrobial resistance (AMR) remains a critical global “One Health” concern that threatens the future effectiveness of both human and veterinary medical treatments. This 16th BelVet-SAC report presents a comprehensive overview of the sales and use of antibacterial veterinary medicinal products (VMPs) in animals in Belgium in 2024, highlighting trends and developments over time.

Over the past 15 years Belgium has made substantial progress in reducing the use of antibacterials in animals. However, sustained commitment is essential, as the use of antibacterials in human and veterinary medicine continues to be a main driver in the emergence and spread of AMR.

We wish you an interesting and pleasant reading!

# II. INFORMATION ON THE DATA COLLECTION AND ANALYSIS

## II.1 ANTIBACTERIAL SALES DATA

### Data collection

#### a) *Sales of antibacterial VMPs*

##### i. Antibacterial pharmaceuticals and premixes

The sales data of all veterinary medicinal products (VMPs), in every pharmaceutical formulation containing active antibacterial substances and authorised on the Belgian market, were aggregated.

These data can be collected at different levels. Until 2022, these data originated from the distributors and the manufacturers of medicated feed (MMF). Since last year, the data from the marketing authorisation holders (MAHs) for the antibacterial pharmaceuticals and the data from the MMF for the antibacterial premixes are used as the source data for the calculation of the quantity of antibacterial VMPs sold. The reason for this switch was the new veterinary legislation (Regulation 2019/6), effective since January 2022, that authorises MAHs with the appropriate authorisation to sell VMPs directly to veterinarians, pharmacists and MMF.

Data collection from the MAHs has been conducted biannually since 2016 and was accordingly carried out in 2024. In July 2024, all MAHs with at least one authorised and commercialised antibacterial VMP in Belgium received a customised template, listing their respective products. This template included details such as the name of the VMP, its strength, pack size, pharmaceutical form and the national reference code (cti-ext). Upon submission, the MAHs reported the number of packages sold during the first semester of 2024. In January 2025, all MAHs with at least one authorised and commercialised antibacterial VMP in Belgium were requested to declare their volume of sales for the second semester of 2024 using their customised template in the newly developed Vet-AM Sales application. The Vet-AM Sales application was developed under the EU grant SMP-FOOD-2022-AMRtool-AG-IBA – aimed at supporting the ‘Implementation of the collection and reporting of data on sales and use of antimicrobials in animals for the period 2022-2027’.

As for the previous BelVet-SAC reports, the data concerning the antibacterial premixes was collected annually from the MMF, considering that they supply to farmers directly and only upon veterinary prescription. In January 2025, the number of packages of sold premixes was reported via the new Vet-AM Sales application. The template in the Vet-AM Sales application only included those premixes that were commercially available in Belgium at that time.

*Figure 1* provides a schematic overview of the 'flow' of (antibacterial) VMPs in Belgium. Antibacterial VMPs require a veterinary prescription and can be administered or dispensed by the prescribing veterinarian or dispensed by a pharmacist.

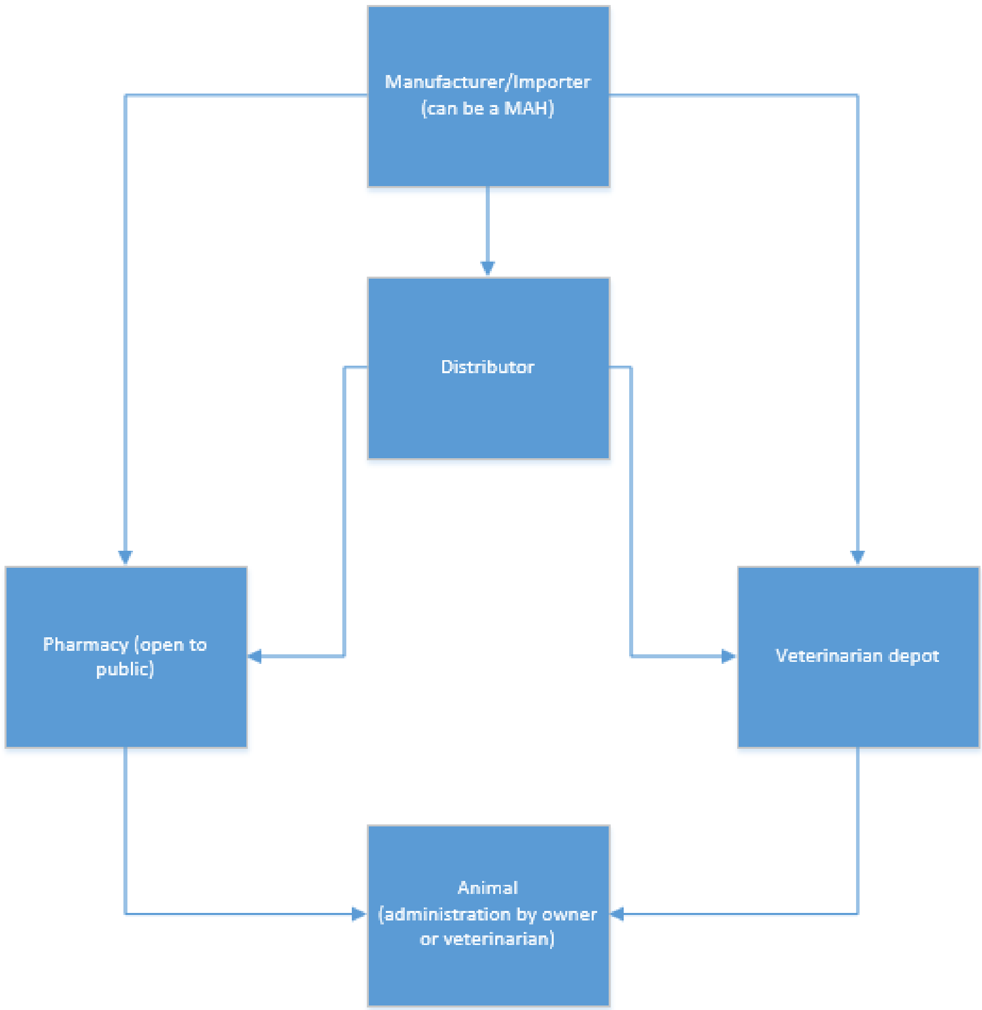



**Figure 1. Distribution of VMPs in Belgium.**

*Figure 2* is a schematic overview specifically for (antibacterial) premixes and the production of medicated feed. Antibacterial premixes intended for medicated feed are dispensed to manufacturers of medicated feed either directly by the MAHs or via distributors. The medicated feed is dispensed to the animal owner exclusively on veterinary prescription.

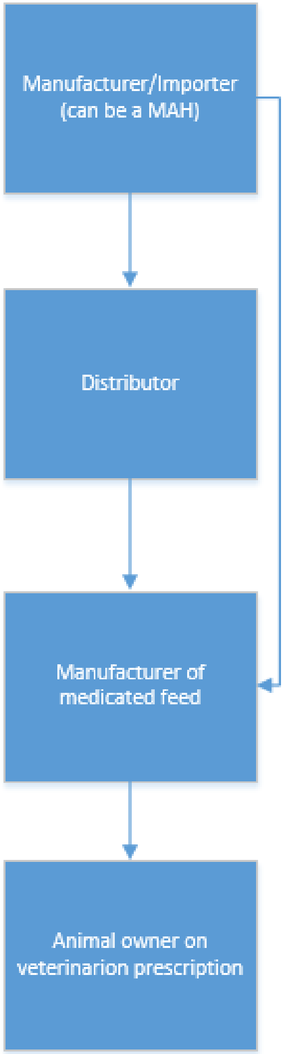



**Figure 2. Distribution of feed medicated with antibacterial premixes in Belgium.**

### ii. Antibacterial classes included

*Table 1* provides an overview of the groups of antibacterial substances covered in the BelVet-SAC data collection system, together with the corresponding ATCvet codes[1].

The BelVet-SAC data collection covers all antibacterial VMPs (in every pharmaceutical formulation containing antibacterial active substances) that are authorised on the Belgian market. No antibacterial VMPs are excluded from this report, which is broader than the EU-level mandatory Antimicrobial Sales and Use (ASU) collection system, where antibacterial VMPs for dermatological use and for use in sensory organs are generally excluded. The sales data presented in this report may therefore slightly differ from what is reported for Belgium in the ASU report.

[1] https://www.whocc.no/atcvet/atcvet_index/

**Table 1. Groups of antibacterial substances included in the data collection and corresponding ATCvet codes.**

| Groups of antibacterial substances | ATCvet codes |
| --- | --- |
| **~ for gastro-intestinal use** | QA01AB04 + QA01AB08 + QA01AB10 + QA01AB13 + QA01AB17 + QA01AB21 + QA01AB22 + QA01AB23 + QA01AB25 + QA02BD + QA07AA + QA07AB + QA07AX03 + QA07AX04 |
| **~ used in blood and blood forming organs** | QB05CA03 + QB05CA04 + QB05CA09 |
| **~ for dermatological use** | QD01AA + QD06A + QD06BA + QD06BX01 + QD06C + QD07C + QD08F01+ QD09AA01 + QD09AA02 + QD09AA03 + QD10AF |
| **~ for gynaecological use including intrauterine use** | QG01AA + QG01AE + QG01AF01 + QG01AX06 + QG01AX90 + QG01BA + QG01BE + QG51AA + QG51AG |
| **~ for systemic use** | QJ01 + QJ02AA + QJ04AB + QJ04AC + QJ04AD01 + QJ04AD03 + QJ04AK01 + QJ04AK02 + QJ04AM + QJ04BA |
| **~ for intramammary use** | QJ51+ QJ54 |
| **~for use in sensory organs** | QS01AA + QS01AB + QS01AE + QS01AX04 + QS01C + QS02AA01 + QS02AA02 + QS02AA07 + QS02AA08 + QS02AA11 + QS02AA12 + QS02AA14 + QS02AA15 + QS02AA16 + QS02AA17 + QS02AA18 + QS02AA30 + QS02AA57 + QS02CA + QS03AA01 + QS03AA02 + QS03AA03 + QS03AA06 + QS03AA07 + QS03AA08 + QS03AA30 + QS03CA |
| **~ for use as antiparasitic** | QP51AA01 + QP51AC02 + QP51AG +QP51BA01 |
| **~ for use in respiratory system** | QR01AX06 + QR01AX08 + QR02AB |

### b) *Animal population*

Animal population data to calculate the produced biomass were derived from the Belgian Statistics Bureau (Statbel website[2,3]). From these animal population data, the biomass (in kg) was calculated according to Grave[4] et al., (2010), as shown in the formula below:

$$biomass\ (kg) = (kg\ beef + pork + poultry + small\ ruminants) + (n\ live\ dairy\ cattle \times 500\ kg)$$

The kilograms of beef, pork, poultry and small ruminants refer to the slaughtered weight as reported at the slaughterhouse.

The calculated biomass is estimated to be 93 % of the total animal biomass in Belgium. This includes animals that were slaughtered in Belgium, but raised in other countries, yet it excludes animals that were raised in Belgium, but slaughtered abroad. It also does not include other food-producing species such as aquaculture and rabbits, companion animals and horses (estimated to be 7 % of the total animal biomass in Belgium).

[2] https://statbel.fgov.be/en/themes/agriculture-fishery/animal-slaughtering#figures
[3] https://statbel.fgov.be/en/themes/agriculture-fishery/farm-and-horticultural-holdings#figures
[4] Grave K, Torren-Edo J and Mackay D (2010). Comparison of the sales of veterinary antibacterial agents between 10 European countries. *Journal of Antibacterial Chemotherapy*, 65, 2037-2010

## Data analysis

The database developed for the purpose of registering the total number of packages sold per VMP for all MMF and MAHs, contains additional product information, consisting of:

- the different active antibacterial substances in the VMP per ml for liquids or per mg for solids
- the weight per active antibacterial substance
- the number of units in one package
- for active antibacterial substances expressed as a salt, the conversion to the base
- for active antibacterial substances expressed in International Units: the ASU[5] conversion factor to mg
- calculated from the above: the total amount of active antibacterial substance (per active antibacterial substance) in one package (per ml or per mg). If the VMP contains more than one antibacterial active antibacterial substance, the calculation was done for each substance.
- the ATC vet code for each (combination of) active antibacterial substance(s) required for the ASU reporting
- the class of the antibacterial VMP, the AMEG code and the AMCRA colour code.

## Data validation

### *a) External data validation*

The sales data are compared to the reported use data in Sanitel-Med.

Previously, the data on antibacterial premixes collected by the FAMHP were compared to the data collected by the Belgian Feed Association[6] to compare trends and evolutions. As the production of medicated feed containing antibacterial VMPs has dropped significantly over the past years and the goal to phase out their use completely by the end of 2026, this comparison was no longer performed for the 2024 data.

### *b) Internal data validation*

With the introduction of the Vet-AM Sales platform, sales data from MAHs and MMFs are now securely collected via the PharmaStatus website managed by the FAMHP. This application is secured with two-factor authentication, and all the login information is stored in a database hosted internally at the FAHMP.

[5] EMA Antimicrobial Sales and Use (ASU) technical implementation protocol
[6] www.bfa.be

Each MAH and MMF has access to a predefined selection of VMPs for which they can enter sales data. This selection is automatically determined based on their profile: MAHs can report on their currently commercialised owned products while MMFs can enter data for all currently commercialised premixes. The selection is refreshed prior to each declaration period.

A validation system ensures the accuracy of the declarations, verifying that VMP information (such as identification number, name, ...) remains unchanged. It also checks that a sales quantity is provided for each product – zero indicating no sales – and that the quantity is a natural number (integer). Any errors are immediately displayed on the user screen, along with recommendations on how to correct them. To prevent multiple submissions from the same company, only one entry per period is permitted. After submission, MAHs and MMFs cannot edit their data themselves; required corrections are handled manually by FAMHP administrators.

The data submitted by MAHs was reviewed for consistency by comparison with the values from previous years. MMF data were examined to confirm that the reported figures reflected the number of sold packages and not the sold mass (kg). All MMFs were contacted again to make sure the reporting was done correctly. In addition, as for the MAH data, the data were compared with previous years. Within the MMFs and MAHs, respectively, outliers were identified.

# II.2 ANTIBACTERIAL USE DATA

## Data collection in Sanitel-Med

### a) Notifications of antibacterial use at farm level

Since 27 February 2017, veterinarians are legally obliged[7] to register all prescriptions, administrations and deliveries of antibacterial VMPs (pharmaceuticals as well as premixes, incl. premixes containing ZnO as an antidiarrheal substance) for pigs, broilers, laying hens and veal calves in the secured online data collection system 'Sanitel-Med'.

As of 10 August 2023, the mandatory data collection in Sanitel-Med is extended to all cattle and all categories of poultry of the species chicken and turkey.

Sanitel-Med, the data collection system of the FAMHP, is accessible as a web application or through automated data transfer using xml (webservices).

To manually register[8] the use of an antibacterial VMP in the web application, the veterinarian first creates a 'Medicinal Delivery Document' containing the identification of the veterinarian and the farm as well as the type, number and date of the reference document (prescription or 'treatment and delivery document/register out' of the veterinarian). Secondly, one or more 'notifications' of the use of antibacterial VMPs are added to this Medicinal Delivery Document, each representing a specific prescription, delivery or administration of an antibacterial VMP.

The notification needs to mention the animal species and category for which the antibacterial VMP is intended as well as the unique identification product key and the quantity of the VMP (see below).

[7] https://www.ejustice.just.fgov.be/cgi_loi/change_lg.pl?language=nl&la=N&cn=2016072106&table_name=wet

[8] https://prd.sanitel.be/web/PRD_SanitelMed_Web/Account/Login?ReturnUrl=%2Fweb%2FPRD_SanitelMed_Web%2F

### i. The animal species and category

The categories that can be selected for the animal species, for which data collection currently is legally obliged, are listed in ***Table 2***.

**Table 2. Animal species and categories that can be selected in the Sanitel-Med data collection system.**

| Animal species / category | Date included in data collection | Year included in BelVet-SAC |
|---|---|---|
| **Pigs** | | |
| Suckling piglets | 27/02/2017 | 2018 |
| Weaned piglets | 27/02/2017 | 2018 |
| Fattening pigs | 27/02/2017 | 2018 |
| Sows | 27/02/2017 | 2018 |
| **Poultry** | | |
| Broilers | 27/02/2017 | 2018 |
| Meat propagation – selection | 10/08/2023 | 2024 |
| Meat rearing – propagation – selection | 10/08/2023 | 2024 |
| Laying hens | 27/02/2017 | 2018 |
| Lay rearing | 10/08/2023 | 2024 |
| Lay propagation – selection | 10/08/2023 | 2024 |
| Lay rearing – propagation – selection | 10/08/2023 | 2024 |
| Turkey breed | 10/08/2023 | 2024 |
| Turkey meat | 10/08/2023 | 2024 |
| Hatching eggs | 10/08/2023 | - |
| Day-old chicks | 10/08/2023 | - |
| **Veal calves** | 27/02/2017 | 2018 |
| **Beef cattle** | | |
| Calves (0 to 3 months) | 10/08/2023 | 2024 |
| Calves (4 to 8 months) | 10/08/2023 | 2024 |
| Young stock (9-24 months) | 10/08/2023 | 2024 |
| Bovine adult BEEF | 10/08/2023 | 2024 |
| **Milk cattle** | | |
| Calves (0 to 3 months) | 10/08/2023 | 2024 |
| Calves (4 to 8 months) | 10/08/2023 | 2024 |
| Young stock (9-24 months) | 10/08/2023 | 2024 |
| Bovine adult DAIRY | 10/08/2023 | 2024 |

### ii. The name and quantity of the antibacterial VMP

The veterinarian can select the VMP from a regularly updated medicinal product list, which includes all antibacterial VMP packages commercialised in Belgium, identified by their national reference code (cti-ext). Similar to the antibacterial sales data, all groups of antibacterial substances that are listed in Table 1 are included. For pharmaceuticals, the veterinarian needs to register the quantity used as either the number of 'packages' or the number of 'units', allowing for decimals, including values below one. For premixes, either the number of packages or the weight in kilograms can be registered, allowing for decimals, including values below one.

VMPs that are not in the medicinal product list (e.g. VMPs that are authorised in Belgium or in another Member State but not commercialised in Belgium, products for human use or products prepared extemporaneously according to a veterinary prescription) need to be registered as a 'Self-Defined Product' (SDP), requiring additional data fields, to allow calculation of the used quantity of antibacterial active substance and the $BD_{100}$-indicator (see below).

Veterinarians can register the data at any moment, on the condition that all data from a given quarter are registered on the 14th day of the following quarter at the latest. The farmer or person responsible for the animals should verify the accuracy of the data and ask the veterinarian for corrections if needed, no later than the last day of the first month of the following quarter. So, there are four 'deadlines', known as 'Data-Lock-Points' (DLP), a year for both veterinarians and farmers (***Figure 3***).

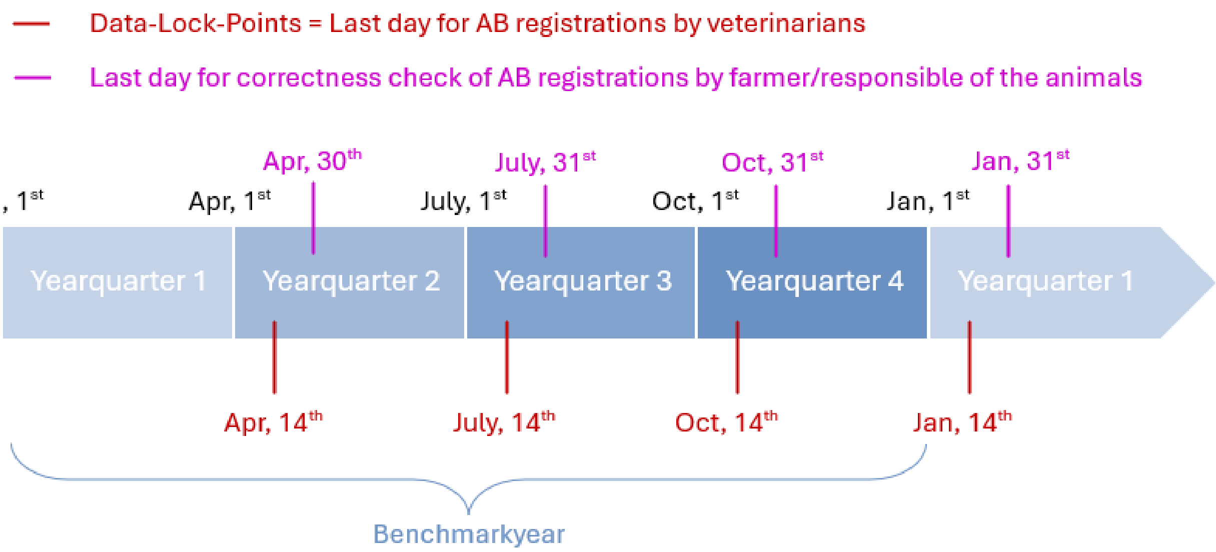



**Figure 3. The timeline of the Sanitel-Med data collection throughout a year.**

So-called 'third parties' (i.c. other Belgian data collection systems) can transfer the legally required data, registered by the veterinarian in their collection system, to Sanitel-Med, on behalf of the veterinarian. Nonetheless, both the veterinarian and the farmer share the responsibility for the completeness, accuracy and timeliness of the registrations in Sanitel-Med.

Reprising ***Figure 1***, explaining the origin of the antibacterial sales data, the data from Sanitel-Med originate at the bottom of the chain and cover data on the use of antibacterial VMPs at farm-level (***Figure***

4). However, from the information provided above, it can be noted that not all Sanitel-Med data are 'use data' in a strict sense; indeed, prescribing or dispensing a VMP does not necessarily mean that this VMP has subsequently been used. Nonetheless, it is deemed likely that most antibacterial VMPs prescribed or dispensed are used. Therefore, the Sanitel-Med data are referred to as 'use data'.

A list with all notifications is accessible to AMCRA as a report, based on a query developed and maintained by the FAMHP, that can be extracted by AMCRA through a secured online business object tool provided by the Federal Agency for the Safety of the Food Chain (FASFC).

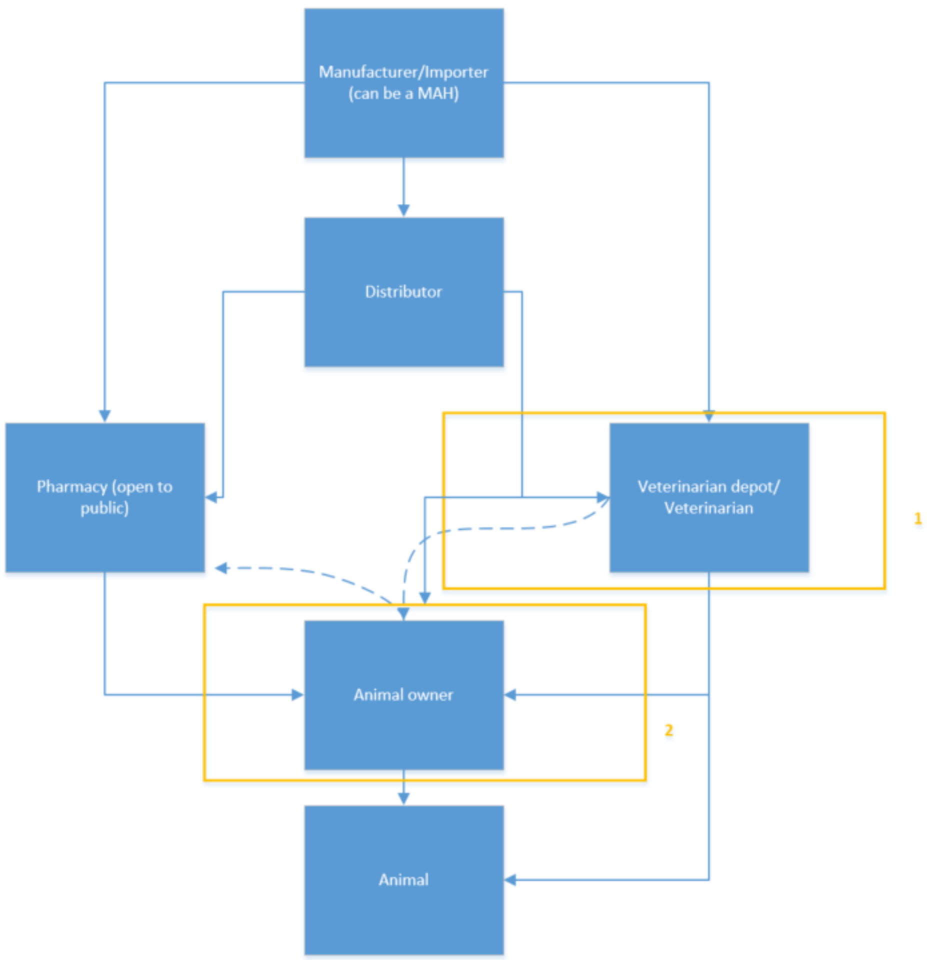



**Figure 4. Origin of Sanitel-Med data concerning farm-level use of antibacterial pharmaceuticals. Veterinarians can directly administer antibacterials to the animals, dispense the antibacterials to the farmer (after which the farmer administers them to the animals following the guidelines of the veterinarian for continuation of the treatment), or prescribe the antibacterials which can then be bought in a pharmacy (dashed line) or from an MMF (in case of medicated feed, not shown in the figure). The responsibility for registration in Sanitel-Med encompasses two levels (dark yellow boxes): 1. the veterinarian who administers/dispenses/prescribes the antibacterial VMP and registers this in the data collection system, and 2. the animal owner who checks and validates the registrations.**

### b) Number of animals present at farm level

The number of animals present at each farm is necessary to calculate the animal mass 'at risk for treatment' at the farm (cf. further, 'Calculation of the indicator $BD_{100}$'). This number is deduced from the identification and registration data present in the SANITEL[9]-database (owned and managed by the FASFC and linked to Sanitel-Med) or, specifically for poultry farms for the year 2018, from SANITEL-data combined with data from the yearly 'Biosecurity-survey' organized by the FASFC.

#### i. Veal calf farms

The average number of calves present at each farm per semester is determined by calculating the average of the monthly animal counts, considering only the months within the semester when animals are present. From January 2018 till July 2019, the monthly number of animals was calculated as the average occupation number, taking into account the number of arrivals, births, departures and deaths per month on the farm as notified in SANITEL. From August 2019 onwards, the monthly number of animals is calculated as the average of the number of calves notified as present in SANITEL each 1st, 10th and 20th day of each month and the 1st day of the subsequent month.

#### ii. Poultry farms

As of 2019, for each Sanitel-Med poultry category present on a poultry facility, the average number of animals present is determined per quarter for each of the corresponding poultry sanitary units of that facility. This is calculated by averaging the SANITEL-capacity data from the beginning and end of the quarter. If one of these capacity values is zero, only the capacity greater than zero is considered for that quarter.

For the 2018 dataset, the capacity numbers from the annual FASFC 'Biosecurity-survey' were chosen over the data in SANITEL. These were either a separate capacity for broilers and laying hens on a facility, a total capacity for broilers and laying hens on a facility, or a total capacity for either broilers or laying hens on a facility. If for a given facility notifications were present in Sanitel-Med for a poultry category missing from the Biosecurity-survey but for which capacity data was available in SANITEL, the SANITEL-capacity was used.

#### iii. Pig farms

For pigs, data in SANITEL include both capacity data, which are updated whenever practical changes occur (such as building a new stable or changing an existing one), and actual animal count data, which must be recorded by the herd veterinarian at least three times a year. The capacity is the preferred animal number in the calculations; if not available, count data are used. Capacity/count data is calculated per animal category per quarter as the average of the SANITEL-capacity/count data at the

[9] https://favv-afsca.be/nl/sanitel

beginning and end of the quarter. If one of these values is zero, only the capacity greater than zero is used for that quarter.

The number of suckling piglets is calculated from the number of sows using the formula

$$\# \, sucklers = {}^{\# \, sows \times 30}/_{12}$$

The number of gilts is added to the number of sows if these are present at the farm; if not, gilts are counted as fattening pigs. No separate antibacterial use analysis is done for gilts.

#### iv. Dairy and beef cattle farms

For each Sanitel-Med dairy and beef cattle category (cf. Table 2), the average number of cattle present on the farm is determined per quarter by averaging the monthly numbers of animals, considering only the months within the quarter when animals are present for that animal category. The monthly number of animals is calculated as the average of the number of cattle notified as present in SANITEL each 1$^{st}$, 10$^{th}$ and 20$^{th}$ day of each month and the 1$^{st}$ day of the subsequent month. For each of these days, per age category and race type first the sum of male and female animals present in SANITEL is calculated. Animals with race type ‘mixed’ are by default added to the corresponding age category of the race type ‘milk’, unless only ‘meat’ and ‘mixed’ animals are present on the farm; in the latter case the ‘mixed’ animals are added to the corresponding ‘meat’ category.

### c) Number of active farms

The number of active farms (i.e., farms having raised animals and, where, therefore, antibacterial VMPs could have been used) is needed to determine the reference population for benchmarking (cf. further, ‘Quality control for defining the yearly reference populations for benchmarking’). Whether a farm is ‘active’ or not is encoded at sanitary unit level as a separate feature in SANITEL. A list of active sanitary units is accessible to AMCRA as a report, based on a query developed and maintained by the FAMHP, that can be extracted by AMCRA through a secured online business object tool provided by the FASFC.

### d) Veterinary contract

AMCRA has access to a report listing all agreement roles between a herd veterinarian and a farm that were stopped, initiated or remained active since 01/04/2017, including the start and end dates of each agreement. This report is based on a query, developed and maintained by the FAMHP and can be extracted by AMCRA through a secured online business object tool provided by the FASFC.

## Data analysis

### a) Determination of the numerator

#### i. Mg active antibacterial substance used

The quantity in mg of the active antibacterial substance used is calculated per Sanitel-Med notification, using the formula

$$active\ substance\ used\ (mg) = quantity\ antibacterial\ product\ \times strength$$

For pharmaceuticals, the quantity of antibacterial VMP can be the number of packages times the number of units of antibacterial VMP per package, when the use data are registered per package. It can also be the number of used units when the use data are registered this way. The strength is the number of units of active antibacterial substance per unit of VMP and is taken from the VMPs' summary of product characteristics (SPC). Where applicable, the same conversion factors for international units to mg or from salt to base were used as for the sales data analysis. If the VMP contains more than one active antibacterial substance, the calculation is done for each substance and the sum is made.

For premixes, if the number of packages of the premix is registered, this number is first recalculated to kg premix used. From the quantity in kg premix used, the quantity active antibacterial substance used is calculated by multiplying the kg premix used with the mg active antibacterial substance per kg premix, obtained from the SPC.

After calculating the total mg of active antibacterial substance used per notification, these amounts can be aggregated by farm, by type of active antibacterial substance, by animal category and by animal species, and recalculated to kg or tonnes used.

#### ii. Number of $DDDA_{bel}$ used

The $DDDA_{bel}$ (the Defined Daily Dose Animal for Belgium) is the daily dose (in mg) per kg live bodyweight for VMPs that are administered orally or through injection, and the daily dose (in mg) per animal for VMPs that are administered locally or topically. The number of $DDDA_{bel}$ used (# $DDDA_{bel}$) is calculated per notification using the formula

$$\#\ DDDA_{bel} =\ mg\ active\ antibacterial\ substance / DDDA_{bel}$$

The $DDDA_{bel}$-values for all antibacterial VMPs in the Sanitel-Med medicinal product list and for all SDPs are defined and maintained by AMCRA in 'Antibacterial-dosing' lists formulated per animal species[10]. Furthermore, per VMP also a minimum dose is defined, as the lowest dose mentioned in the SPC (mg) to be administered to a kg animal in a period that can be shorter than one day. These lists also contain the $LA_{bel}$ (Long-Acting factor defined for Belgium) of each VMP. This $LA_{bel}$ factor corrects for the longer duration of action of certain VMPs in the calculation of the $BD_{100}$ (cf. further, Calculation of the indicator $BD_{100}$). For not-long-acting VMPs, the $LA_{bel}$ equals 1. The procedures for determining the $DDD_{bel}$ and $LA_{bel}$ values are also available on the AMCRA website[10].

[10] https://www.amcra.be/nl/analyse-antibioticagebruik/

### b) Determination of the denominator

#### i. Animals and kg at risk per species at national level

The national number of animals and the kg animal at risk (for antibacterial treatment) per species is calculated from the yearly average number of animals in Belgium per animal category, as registered in the Statbel database[5] (accession date: 26/05/2025) in the final Agricultural figures of 2024. *Table 3* shows the categories retrieved from the Statbel database to calculate the total number of animals at risk and the standard weights to calculate the corresponding kg at risk. These are retrieved from EMA 2013[11] with the exception of the weight of veal calves, dairy and beef cattle and poultry other than broilers and turkey, for which standard weights as agreed with the respective sectors are used.

If the final Statbel numbers for 2024 were not yet available at the above listed accession date, for pigs the number as listed in the Provisional agricultural results (May 2024) are used; for poultry, the numbers from the final Agricultural figures of 2023 are used; for veal calves, aggregated overall averages calculated from the semestrial averages are used.

It must be noted that for poultry, the denominator is different in 2024 from that calculated in the previous years, as the (grand)parents and the turkeys were included – as was the case for the numerator data of 2024 as well.

**Table 3. Categories and standard estimated weights at treatment for the calculation of the $BD_{100}$-species.**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Piglets of <20 kg | 12 kg | Laying hens | 2 kg | Bovines < 1 year to be slaughtered as calves | 160 kg | Bovines < 1 year | 160 kg |
| Pigs 20-50 kg + fatteners | 50 kg | Broilers | 1 kg | | | Bovines 1-2 year | 400 kg |
| Breeding pigs >50 kg | 220 kg | Turkey | 6 kg | | | Adult cattle | 750 kg |
| | | Breeder hens | 1,9 kg | | | | |
| | | Pullets | 1 kg | | | | |
| | | Breeder cocks | 3,5 kg | | | | |

[11] https://www.ema.europa.eu/en/documents/scientific-guideline/revised-european-surveillance-veterinary-antimicrobial-consumption-esvac-reflection-paper-collecting_en.pdf

### ii. Animals and kg at risk per animal category at farm level

Per animal category on each farm, the kg animal at risk of treatment is calculated using the formula

$$kg\ animals\ at\ risk = number\ of\ animals\ \times estimated\ standard\ weight\ (kg)\ at\ treatment$$

The estimated standard weights at treatment shown in *Table 4* are used. There are retrieved from EMA 2013[12] with the exception of the weight of veal calves, for which standard weights as agreed with the respective sectors are used.

**Table 4. Categories and standard estimated weights at treatment for the calculation of the $BD_{100}$ at farm level.**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Suckling piglets | 4 kg | Broilers | 1 kg | Veal calves | 160 kg | Calf 0-3m milk | 80 kg |
| Weaned piglets | 12 kg | Laying hens | 2 kg | Veal calves on farms with exclusively double muscled calves during the benchmarking period | 210 kg | Calf 4-8m milk | 160 kg |
| Fattening pigs | 50 kg | Lay rearing-propagation-selection | 1 kg | | | Young stock 9-24m milk | 400 kg |
| Sows | 220 kg | Meat rearing-propagation-selection | 1 kg | | | Adult cows +24m milk | 700 kg |
| | | Lay propagation-selection | 1,9 kg | | | Calf 0-3m beef | 100 kg |
| | | Meat propagation-selection | 3,5 kg | | | Calf 4-8m beef | 210 kg |
| | | Lay rearing | 1 kg | | | Young stock 9-24m beef | 500 kg |
| | | Turkey | 6 kg | | | Adult cows +24m beef | 800 kg |

[12] https://www.ema.europa.eu/en/documents/scientific-guideline/revised-european-surveillance-veterinary-antimicrobial-consumption-esvac-reflection-paper-collecting_en.pdf

### c) Indicators

#### i. Mg used

The total amount of active antibacterial substance used is calculated from the sum of the mg used in all Sanitel-Med notifications for that species.

#### ii. $BD_{100}$

To compare and follow up on the use of antibacterial VMPs in the different animal categories, the $BD_{100}$ is used, which represents the % of time an animal is treated with antibacterials. This indicator is calculated with the general formula:

$$BD_{100} = \left[\left({}^{\#DDDA_{bel}}\!/_{kg\ animals\ at\ risk \times days\ at\ risk}\right) \times LA_{bel}\right] \times 100$$

To obtain a result per combination of farm and animal category, the $BD_{100}$ is first calculated per Sanitel-Med notification and per month (i.e., with 30,42 days at risk and with the number of animals at risk determined for that month). Then, the sum of these $BD_{100}$-values over all notifications in one month is made, from which an average over the 12 months in the year is calculated, resulting in a final average $BD_{100}$ per animal category on a farm. The comparison between animal categories is then done based on the frequency distribution over all farm-animal category combinations that belong to the reference population for benchmarking (cf. further, Quality control for defining the yearly reference populations for benchmarking).

#### iii. $BD_{100}$-species

The $BD_{100}$-species is calculated with the $BD_{100}$ formula but with numerator and denominator data at species level. It is per species the sum of:

- $BD_{100}$-species$_{mg/kg}$: in the numerator the total #$DDDA_{bel}$*$LA_{bel}$ used for VMPs administered orally or through injection and in the denominator the animal weight (in kg) at risk.
- $BD_{100}$-species$_{mg/animal}$: in the numerator the total #$DDDA_{bel}$*$LA_{bel}$ used for VMPs administered locally or topically and in the denominator the number of animals at risk.

### d) Antibacterial use by the contract veterinarian

The part of the antibacterial use (excl. ZnO) at farm level by the contract veterinarian is calculated by linking the veterinarian responsible for a use notification in Sanitel-Med to the veterinarian having a contract with the farm at the document date. In addition, the part of the antibacterial use (excl. ZnO) at farm level by a veterinarian who is not the contract veterinarian but who is linked to the veterinary practice to which the contract with the farm is allocated, as a legal person, is also determined.

## Quality control for possibly erroneous notifications

Numerator data are subjected to quality controls for possibly erroneous notifications. Notifications that are considered possibly erroneous and have not been confirmed as being correct are excluded for further calculations or analyses.

The notified quantity of antibacterials is considered possibly erroneous in the following cases:

- Intramammary or intrauterine VMPs used in non-adult categories of pigs and cows (piglets, fatteners, calves).
- The number of packages is greater than one – in case of a multi-package VMP for injection or cutaneous use.
- The number of packages is greater than 50.
- The administered number of packages is lower than the quantity needed to treat an animal of 1 kg (pigs), 0,042 kg (broilers and chicken rearing categories), 2 kg (other chicken categories and turkeys) and 35 kg (veal calves and cattle), with the minimum dose.
- The $BD_{100}$ calculated for a notification is higher than 100.
- The premix ppm is unlikely low or high (based on the VMP specific SPC's and only relevant for registrations dated before 2022).

## Quality control for defining the reference populations for benchmarking

The reference population for benchmarking is used to study the distribution of the $BD_{100}$ in an animal category and its evolution. The reference population is defined per animal category as the group of farms that, for the period under consideration:

- were 'active' (see below, point a)
- had no 'errors' in their Sanitel-Med notifications (see below, point b)
- fulfilled the conditions with respect to 'minimum herd size and empty stables' (see below, points c and d).

In the reference populations, a further distinction is made between zero-registration farms and registration-farms (see below, point e). Specifically for dairy and beef cattle, being a zero-registration farm is an additional criterium to be excluded from the reference populations for benchmarking.

### *a) Active during the whole period*

A farm is eligible for inclusion in the benchmarking reference population for a certain period when it was encoded as 'active' in Sanitel during the whole period.

For poultry farms, more specifically, all sanitary units need to have been active during the whole period for the facility to be included.

Pig farms encoded as 'active' but not having any registration in Sanitel-Med and either having no recent animal count date (i.e., count date before the period considered) or having a recent count date (count date in the considered period) but with all counts in that period equalling zero, are excluded (considered de facto inactive).

Veal calf farms and dairy and beef cattle farms encoded as 'active', yet not having any registration in Sanitel-Med and having no animals in the considered period, are excluded (considered de facto inactive).

### *b) Notification errors*

Two types of errors are distinguished:

i. Notifications for which a $BD_{100}$ cannot be (reliably) calculated due to missing denominator data or due to denominator data considered unreliable (in pigs: no recent count date, or a recent count date but counted animals equalling zero).

ii. Notifications where the delivered quantity is considered erroneous (see higher, Quality control for possibly erroneous notifications).

Farms that have notification errors that are not confirmed as correct are excluded from the benchmarking reference population.

### *c) Empty stables*

Pig farms with recent count data equalling zero for two consecutive trimesters, poultry farms with facility capacities equalling zero at the start of two consecutive trimesters, veal calf farms with at least one semester without animals and dairy and beef cattle farms without animals for at least half of the count dates in a trimester are excluded from the benchmarking reference populations.

### *d) Minimum herd size requirements*

For the data until 2020 included, a minimum herd size was defined for all included animal categories, as shown in *Table 5*. Poultry and pig farms with animal numbers below the minimum for at least one quarter were excluded from the benchmarking reference population. Veal calf farms with animal numbers below the minimum for at least one semester were excluded from the reference population.

**Table 5. Minimum herd size to be included in the benchmark reference groups (until 2020 included).**

| | | | | | |
|---|---|---|---|---|---|
| Weaned piglets | 50 animals | Broilers | 5000 animals | Veal calves | 25 animals |
| Fattening pigs | 100 animals | Laying hens | 5000 animals | | |
| Sows | 10 animals | | | | |

From 2021 onwards, these criteria were no longer taken into account to define the benchmarking populations for pigs. For poultry and veal calf farms these minimum herd size requirements still need to be fulfilled to be included in the benchmarking reference groups.

From September 2023 onwards, the minimum herd size requirement of 5000 animals per facility in each trimester of the benchmarking period was extended to the additional poultry categories of the species chicken and turkey. For dairy and beef cattle farms, a minimum average of 11 adult cows (animals of +24 months old) throughout the one-year benchmarking period is required for an animal category to be included in the benchmarking reference population, determined for BEEF and MILK animals separately.

**Table 6. Current minimum herd size requirements to be included in the benchmark reference population.**

| Species | Minimum average herd size | Period |
|---|---|---|
| All poultry categories | 5000 animals on facility level | per trimester |
| Veal calves | 25 animals | per semester |
| Dairy and beef cattle | 11 adult animals (+24 months) | per year |

### *e) Zero-registration farms*

A zero-registration farm is defined as a farm that has no notifications in Sanitel-Med in a given period. For pig farms, this is at species level (no notifications during the benchmarking period for all categories present at the farm). For poultry farms and veal calf farms, a zero-registration farm is defined at animal category level (no notifications for an animal category during the benchmarking period). Zero-registration farms of pigs, poultry and veal calves can be ex- or included in the benchmark reference populations. For dairy and beef cattle farms, a zero-registration farm is defined at the milk or beef production level and zero-registration farms are excluded from the benchmark reference populations (no notifications during the benchmarking period for all milk categories present at the farm excludes all milk categories from their respective benchmark reference group and similar for the beef production ).

# III. RESULTS

## III.1 TOTAL SALES AND USE OF ANTIBACTERIAL VMPS IN BELGIUM

### Number of antibacterial VMPs available on the Belgian market

*Table 7* provides an overview of the number of antibacterial pharmaceuticals and antibacterial premixes available on the Belgian market since 2018 according to the commented compendium of the Belgian Centre for Pharmacotherapeutic Information[13].

The only new antibacterial substances registered on the market in the last 15 years are products containing tildipirosin (2011), pradofloxacine (2011), fusidic acid (2014), thiamfenicol (2015) and cefadroxil (2019). The observed increase in available VMPs since 2021 is mainly due to the marketing of new formulations or new generic VMPs based on existing active antibacterial substances.

**Table 7. Armatorium of antibacterial VMPs on the Belgian market from 2018 to 2024.**

| | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 |
|---|---|---|---|---|---|---|---|
| Number of veterinary antibacterial pharmaceuticals on the market | 325 | 326 | 308 | 327 | 346 | 353 | 368 |
| Number of veterinary antibacterial premixes on the market | 18 | 13 | 15 | 14 | 13 | 14 | 12 |
| Total number of antibacterial VMPs on the market | 343 | 339 | 323 | 341 | 359 | 367 | 380 |

*Table 8* gives an idea of the available VMPs with a critically important active antibacterial substance per target species. These VMPs can be indicated for several species and thus appear under more than one species. Compared to 2023, the situation is unchanged for the cephalosporins of the 3rd and 4th generation. For enrofloxacin, the distribution changed slightly but overall, there is a slight decrease in number of VMPs. For marbofloxacin, there was an increase in number of VMPs.

[13] www.bcfi-vet.be

**Table 8. Armatorium of antibacterial VMPs belonging to the critical antibacterial classes on the Belgian market in 2024 per target species.**

| AB class | Active Substance | Target species | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Cat | Cattle | Dog | Goat | Ornamental bird | Pig | Poultry | Rabbit | Sheep | Other or not known |
| **Cephalosporins of 3rd and 4th generation** | | | | | | | | | | | |
| | Cefoperazone | | 1 | | | | | | | | |
| | Cefovecin | 1 | | 1 | | | | | | | |
| | Cefquinome | | 4 | | | | 1 | | | | |
| | Ceftiofur | | 7 | | | | 6 | | | | |
| **Quinolones** | | | | | | | | | | | |
| | Danofloxacin | | 1 | | | | | | | | |
| | Enrofloxacin | 7 | 5 | 8 | 2 | 3 | 6 | 5 | 5 | 2 | 4 |
| | Flumequine | | 1 | | | | | 1 | | | |
| | Marbofloxacin | 2 | 7 | 8 | | | 5 | | | | |
| | Orbifloxacin | | | 1 | | | | | | | |
| | Pradofloxacin | 2 | | 3 | | | | | | | |

## Non-standardised total sales of antibacterial VMPs in Belgium

### *a) Response rate and data validation*

Of the 34 contacted MMF, all 34 responded to the call for data, with three declaring to have ceased activities and six to have zero sales of antibacterial medicated feed. Out of the 56 MAH with authorised antibacterial VMPs in Belgium, all responded to the inquiry.

The sales data coming from the MMF matched the amount used in 2024 (Sanitel-Med, see further). Overall, it was concluded that the data from the MMF covered 100 % of the sales of antibacterial premixes in Belgium in 2024. Upon recontacting, all MMF verified that the data were reported in number of packages.

### b) Non-standardised total sales of antibacterial VMPs in Belgium since 2018

The total sales of antibacterial VMPs for veterinary use in Belgium since 2018, in tonnes of active substance per year since 2018, is presented in *Figure 5*. The results are divided into antibacterial pharmaceuticals and antibacterial premixes. As previously mentioned, sales of antibacterial pharmaceuticals were reported using data from the VMP distributors until 2021. However, starting in 2022, sales of pharmaceuticals have been based on data from the MAHs.

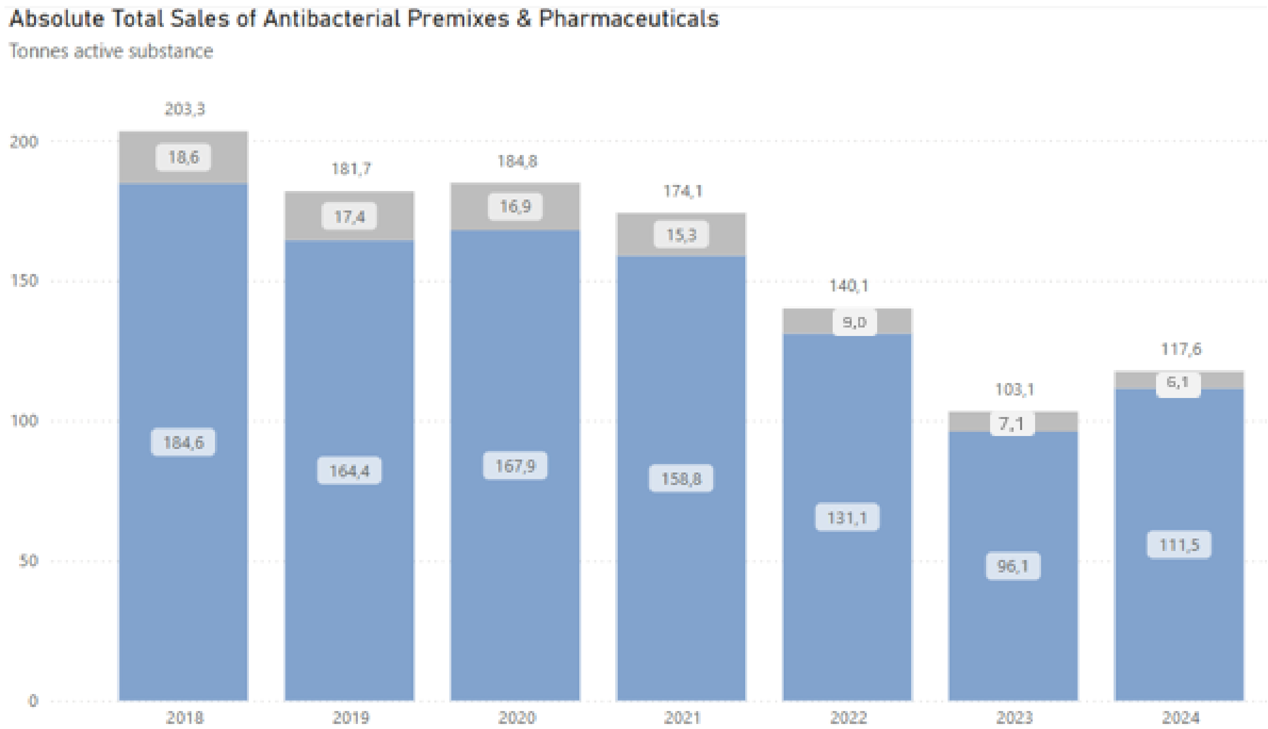



**Figure 5. Total, non-standardised national sales in tonnes active substance of antibacterial VMPs via the distributors (antibacterial pharmaceuticals, until 2021), the MAHs (antibacterial pharmaceuticals, as of 2022) and the MMF (antibacterial premixes) in Belgium for the period 2018-2024.**

After a large drop in total sales between 2021 and 2022 (-19,5 %), and an even larger decrease in the total quantity of antibacterial VMPs between 2022 and 2023 (-26,5 %), we see an increase of 14,0 % in 2024. This increase concerns only the pharmaceuticals (16,0 % between 2023 and 2024) since the premixes continue to decrease (-39,6 % between 2021 and 2022; -23,6 % between 2022 and 2023 and -13,4 % between 2023 and 2024).

It is important to note that, as in 2022 and 2023, the available data do not allow for a definitive conclusion that the sales figures from the MAHs fully represent the total sales of antibacterial products for animals in Belgium in 2024. Indeed, the new European legislation 2019/6, in force since 2022, allows veterinarians and pharmacies to purchase VMPs from distributors or manufacturers, including MAHs with the appropriate authorisation in other member states. Currently, data on these purchases from abroad are not yet captured.

## Non-standardised total Sanitel-Med use data

### a) Antibacterial use registrations in Sanitel-Med

*Table 9* shows the number of notifications in Sanitel-Med in 2024 (accession date: 08/05/2025), the number of farms for which notifications were made and the number of veterinarians that registered the notifications, in total and per species. As a reference, the data for 2018 (the first full year of Sanitel-Med data collection) and for 2023 were added.

Notably, 2024 marked the first full year with data collection for cattle, all food producing chicken categories (all 'lay' categories and 'meat' categories), and turkeys, following the implementation of the adapted Royal Decree of 21 July 2016[14] in August 2023.

**Table 9. Number of AB-registrations (ZnO for 2018 not included) and number of farms and veterinarians with notifications per animal species in Sanitel-Med in 2024, 2023 and 2018.**

| | YEAR | TOTAL | PIGS | | POULTRY[1] | | VEAL CALVES | | CATTLE MILK/BEEF | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | n | AB n | % | AB n | % | AB n | % | AB n | % |
| **AB-registrations** | **2024** | **754 452** | **86 469** | ***11*** | **16 285** | ***2*** | **18 298** | ***2*** | **633 338** | ***84*** |
| | 2023 | 353 223 | 89 785 | *25* | 16 705 | *5* | 16 877 | *5* | 229 854 | *65* |
| | 2018 | 164 479 | 127 298 | *77* | 18 130 | *11* | 19 051 | *12* | - | - |
| **Farms** | **2024** | **15 011** | **3 371** | ***22*** | **899** | ***6*** | **241** | ***2*** | **11 652** | ***78*** |
| | 2023 | 13 327 | 3 470 | *26* | 851 | *6* | 239 | *2* | 9 845 | *74* |
| | 2018 | 5 204 | 4 325 | *83* | 745 | *14* | 258 | *5* | - | - |
| **Veterinarians** | **2024** | **974** | **192** | ***20*** | **53** | ***5*** | **17** | ***2*** | **848** | ***87*** |
| | 2023 | 921 | 210 | *23* | 50 | *5* | 18 | *2* | 774 | *84* |
| | 2018 | 323 | 270 | *84* | 63 | *20* | 20 | *6* | - | - |

[1] In 2023 and 2024 data also include the following categories: lay rearing – propagation – selection; meat rearing – propagation – selection; lay propagation – selection; meat propagation – selection; lay rearing; turkey breed; turkey meat; hatching eggs; day-old chicks.

The huge impact of dairy and beef cattle continued in 2024, solidifying them as the leading sector in terms of AB-registrations, as well as the number of farms and veterinarians with registrations. As noted in the previous BelVet-SAC report, the high number of registrations is not directly linked to the quantity of antibacterials used in dairy and beef cattle as a notification can represent the treatment of a single animal, with a few ml of a VMP, just as well as the use of a whole bottle or bag for a group of animals.

The numbers for poultry continued to increase with the inclusion of the new categories though the overall impact was less pronounced. The downward trends in pigs and veal calf data persisted.

[14] 21 JULI 2016. - Koninklijk besluit betreffende de voorwaarden voor het gebruik van geneesmiddelen door de dierenartsen en door de verantwoordelijken van de dieren. NUMAC - 2016024152

### b) Comparison of the non-standardised total Sanitel-Med use data with total sales data

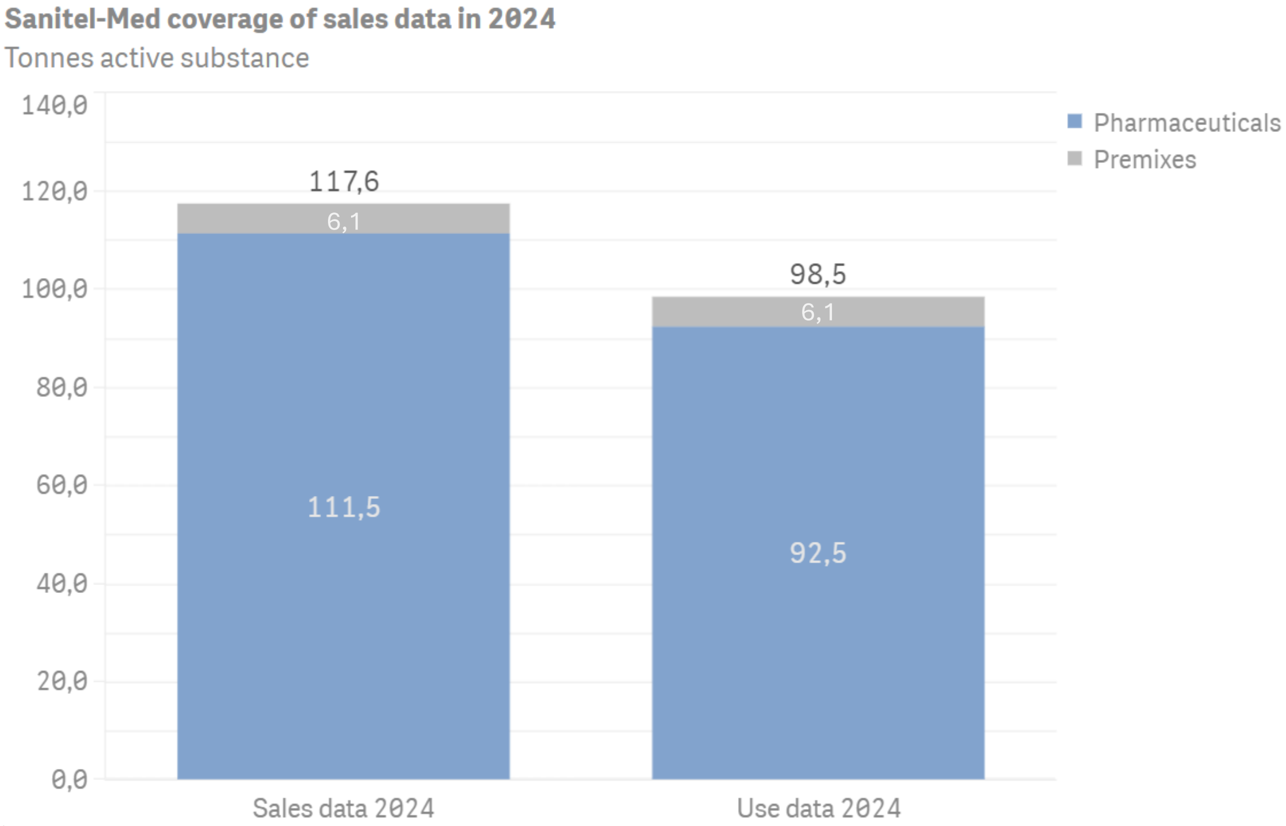



**Figure 6. Comparison of tonnes of active antibacterial substance used (Sanitel-Med) with the tonnes sold by the MAHs and MMF for 2024, distinguishing between antibacterial premixes and antibacterial pharmaceuticals.**

The mass antibacterials calculated from the Sanitel-Med notifications reached a total of 98,5 tonnes in 2024 (***Figure 6***), covering 83,8 % of the overall sales data of 2024, distributed as 83,0 % coverage for the antibacterial pharmaceuticals and 99,2 % coverage for antibacterial premixes.

These results, and how they relate to the results of the previous year, need to be interpreted with caution, as 2024 is the first year for which use data from dairy and beef cattle and the extra poultry categories are included. Regarding only the ‘classic’ animal categories (pigs, broilers, laying hens and veal calves), the total usage amounted to 82,9 tonnes in 2024 (cf. also section III.2). This represents a decrease of 3,7 tonnes compared to 2023 for these categories (data not shown) and corresponds to a coverage of 70,5 % of the total sales. Again, only considering the above-mentioned animal categories, this equates to a gap between sales and use of 34,6 tonnes for 2024, consistent with the discrepancies observed between 2018 and 2022. However, including the dairy and beef cattle categories and the extra poultry categories, the gap between sales and use for 2024 decreases to 19,0 tonnes (***Figure 7***). Remarkably, even though the inclusion of additional categories is not expected to affect the results for premixes-as their use is almost exclusively limited to pigs, 2024 marks the first year in which premix usage nearly fully aligns with the amount sold by the MMF.

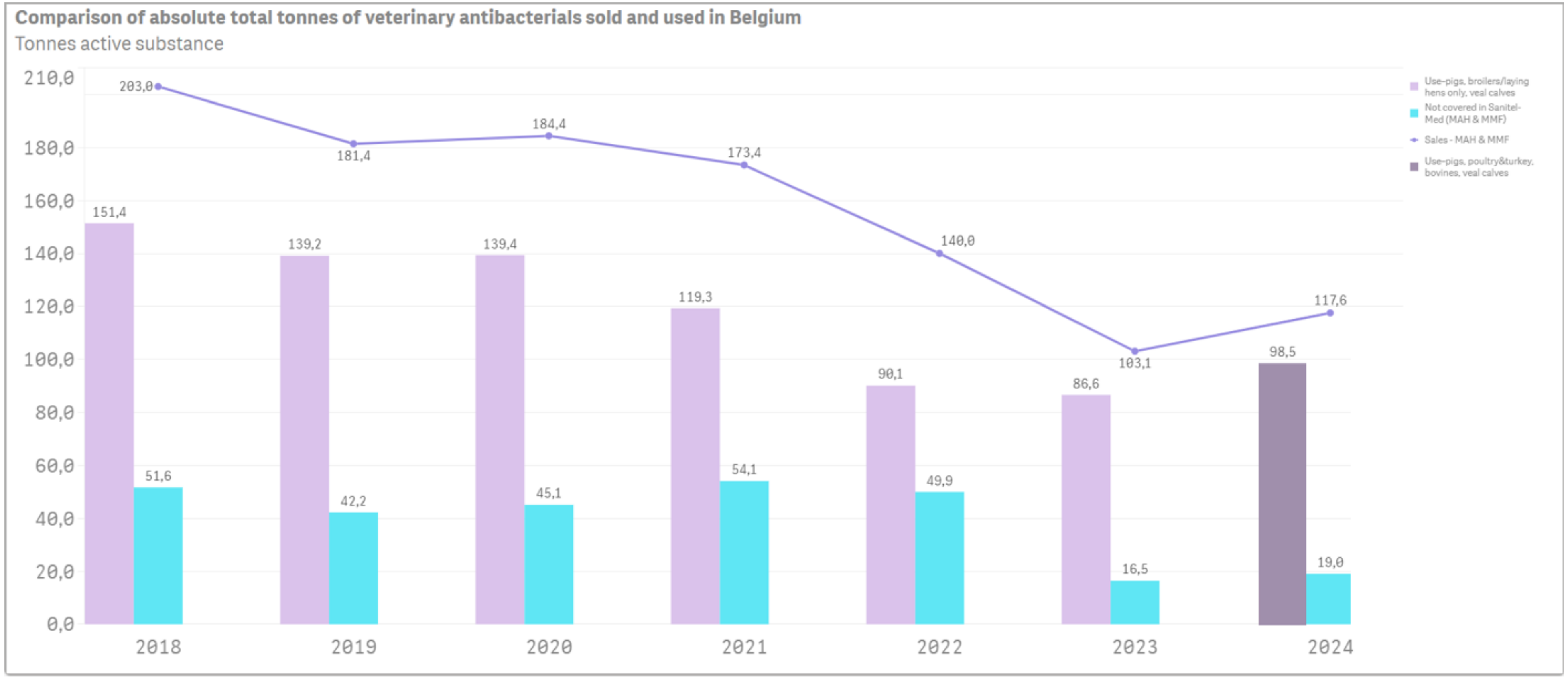



**Figure 7. Comparison of tonnes of active antibacterial substance used (Sanitel-Med) with the corresponding Belgian sales from the distributors (until 2021), MAHs (as of 2022) and MMF (2018-2024). The discrepancy between 'sales' and 'use' is also shown (= "Not covered in Sanitel-Med"). A different colour is applied in the used quantity of 2024, to emphasize the inclusion of the beef and dairy cattle and additional poultry categories in the result, whereas the use data for 2018-2023 only include pigs, broilers, laying hens and veal calves. The sales data cover all animal species, food- and non-food producing.**

## Animal biomass produced in Belgium in 2024

*Table 10* illustrates that the produced biomass of animals in Belgium **increased with 7,2 %** between 2023 and 2024, which is a considerable increase after two years of decrease. The produced biomass in 2024 was still 5,3 % lower compared to the peak year 2021. Compared to 2011, the reference year for the national reduction targets, a decrease of 6,1 % is apparent in the total biomass production in Belgium.

**Table 10. Animal biomass produced in Belgium from 2018 to 2024.**

| Animal biomass | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 |
|---|---|---|---|---|---|---|---|
| **Meat (tonnes)** | | | | | | | |
| Pork | 1 073 121 | 1 038 916 | 1 098 714 | 1 140 002 | 1 032 197 | 929 740 | 945 176 |
| Beef | 277 312 | 263 750 | 254 509 | 247 122 | 238 137 | 240 180 | 249 435 |
| Poultry | 469 587 | 447 786 | 448 974 | 455 115 | 449 039 | 428 196 | 538 523 |
| Sheep/goat | 3 090 | 3 036 | 2 845 | 3 058 | 2 514 | 2 189 | 1 905 |
| **Total biomass from meat production** | **1 823 110** | **1 753 488** | **1 805 042** | **1 845 297** | **1 721 886** | **1 600 305** | **1 735 039** |
| **Dairy cattle** | | | | | | | |
| Dairy cattle (number) | 529 247 | 537 960 | 537 941 | 537 246 | 543 680 | 535 548 | 534 891 |
| Dairy cattle metabolic weight (tonnes) | 264 624 | 268 980 | 268 971 | 268 623 | 271 840 | 267 774 | 267 446 |
| **Total biomass (tonnes)** | **2 087 734** | **2 022 468** | **2 074 013** | **2 113 920** | **1 993 726** | **1 868 079** | **2 002 485** |
| **Evolution since previous year** | **+ 1,7%** | **-3,1%** | **+2,6%** | **+1,9%** | **-5,7%** | **-6,3%** | **+7,2%** |

In contrast to previous years, not pigs but poultry were the driving force in the change of the slaughtered biomass; the produced kg poultry increased with almost 26 %. A closer look at the poultry specific data (not shown) suggests that this was not due to an increase in the slaughtered number of animals, as that increased with a mere 3 %. Instead, it appears that in 2024 the animals were slaughtered at a markedly higher weight because of favourable economic factors.

## Total sales of antibacterial VMPs in Belgium standardised per kg biomass

In 2024 the mg of active antibacterial substance, sold via the MAHs for pharmaceuticals and via the MMF for premixes, in relation to the kg biomass produced was **58,7 mg/kg**, coming from **55,2 mg/kg** in 2023 (*Figure 8*). This represents **an increase of 3,6 mg/kg or 6,3 % between 2023 and 2024** (*Figure 9*)**.**

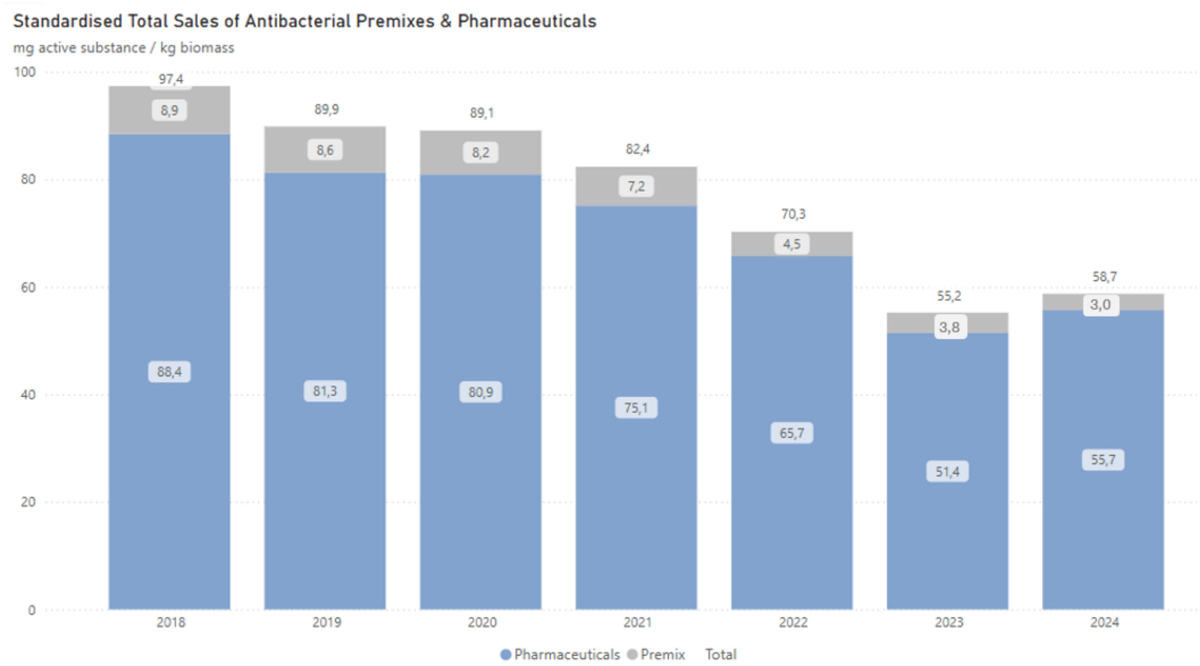



**Figure 8. Sales of antibacterial pharmaceuticals and antibacterial premixes in mg/kg biomass for animals in Belgium in 2018-2024, consisting of data from the MMF for premixes for 2018-2024, from the distributors for pharmaceuticals for 2018-2021 and from the MAHs for pharmaceuticals for 2022-2024.**

The increase from 2023 to 2024 results from a 19,2 % reduction in premixes, coupled with an 8,2 % rise in pharmaceuticals sales.

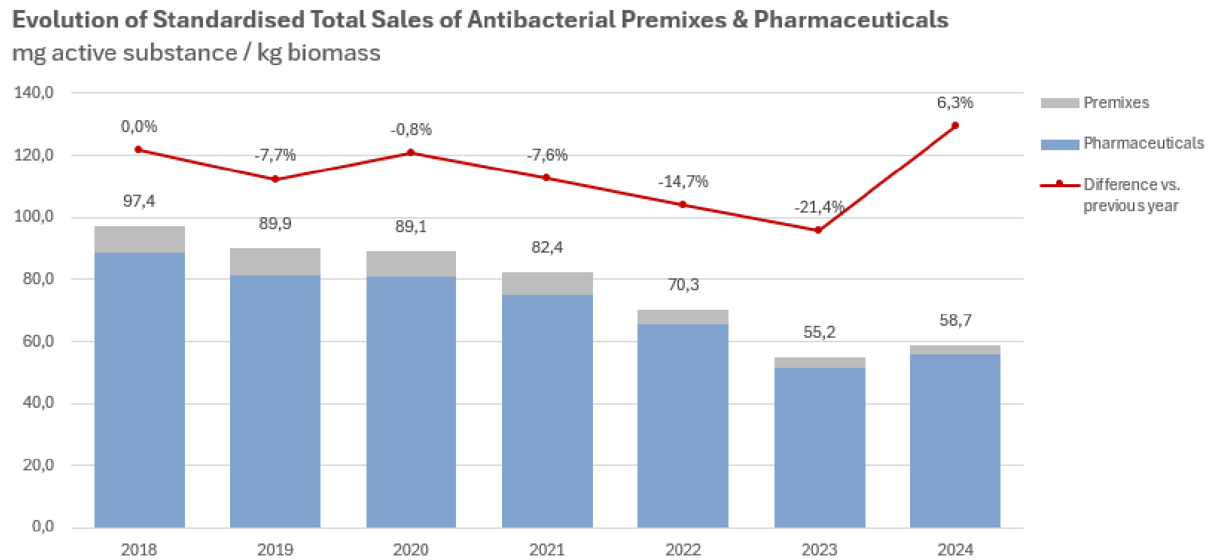



**Figure 9. Year-to-year evolution of the total sales of antibacterial VMPs in Belgium based on the sales data since 2018 as presented in Figure 8.**

## III.2 USE OF ANTIBACTERIAL VMPS PER ANIMAL SPECIES AND CATEGORY

### Non-standardised Sanitel-Med use data per species/animal category

In absolute numbers, pigs are by far the largest consumers of antibacterial substances , accounting for nearly 54 % of the total tonnes used (*Figure 10*). The dairy and beef cattle sector, despite its enormous predominance regarding the number of notifications, vets and farms, has a quantity of used tonnes that is in the range of the much smaller veal calf sector. However, it must be noted that to calculate these results, for dairy and beef cattle, 8 133 registrations were excluded (1,3 % of all notifications for cattle), mostly due to unrealistic quantities that were notified. If those registered quantities would be correct, that would equal an additional 12,1 tonnes antibacterial substances used in dairy and beef cattle.

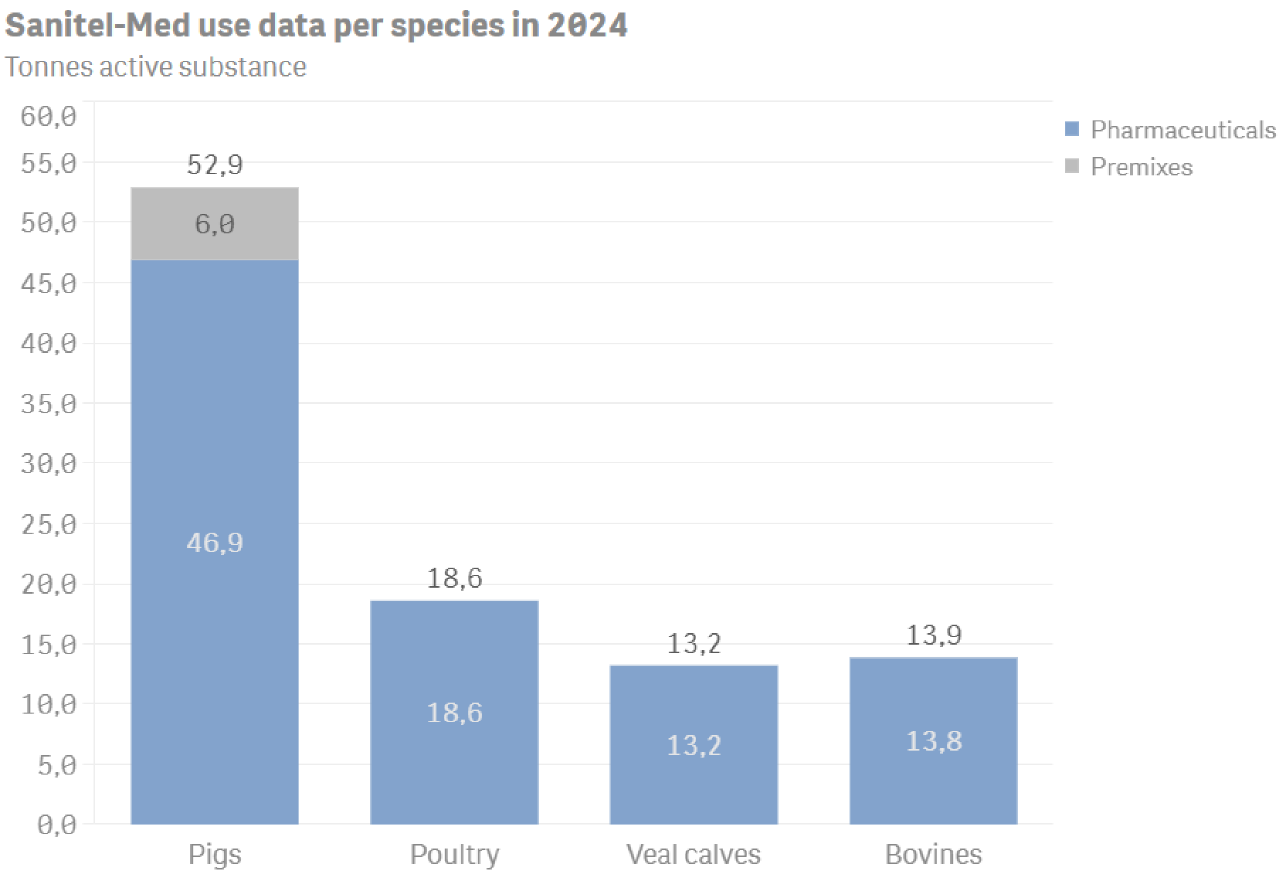



**Figure 10. Tonnes active antibacterial substance of antibacterial pharmaceuticals and antibacterial premixes used in 2024 in pigs, poultry, veal calves, and dairy and beef cattle ('bovines').**

In pigs, fatteners and weaned piglets are the major categories in terms of used tonnes, with premixes being used more in weaned piglets and pharmaceuticals being used more in fatteners (*Figure 11*).

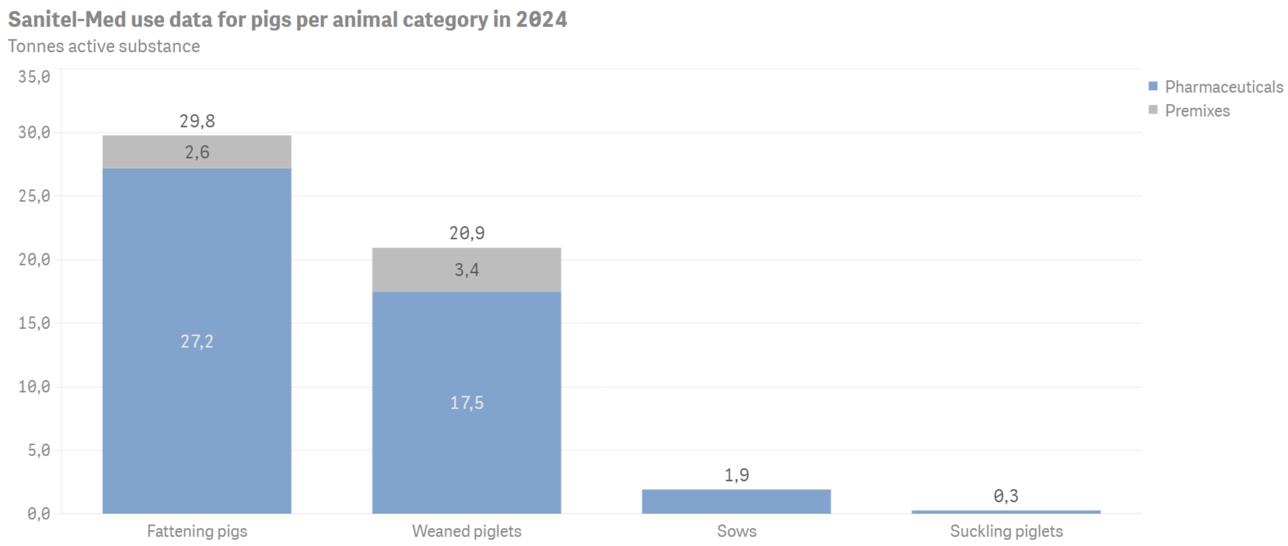



**Figure 11. Tonnes active antibacterial substance of antibacterial pharmaceuticals and antibacterial premixes used in 2024 in pigs per category.**

Broilers are the predominant category within poultry (***Figure 12***), accounting for 88,2 % of poultry antibiotic use, and ranking third among all animal categories, accounting for 16,6 % of the total used tonnes. This reflects the predominance of broiler farms within the sector. Turkeys hold the second position in poultry, and despite the relatively low number of turkey farms, their larger size and intensive production contributes to higher antibiotic use.

In beef and dairy cattle, the majority of antibiotic use is concentrated in adult animals, which is expected given their larger population within these sectors and their significantly greater body mass compared to calves, even though, as the youngest category, the latter are more disease-prone. Beef cattle account for the highest use, reflecting the higher number of farms with beef cattle in Belgium (***Figure 13***). Noteworthy, a small amount of premix was used in cattle.

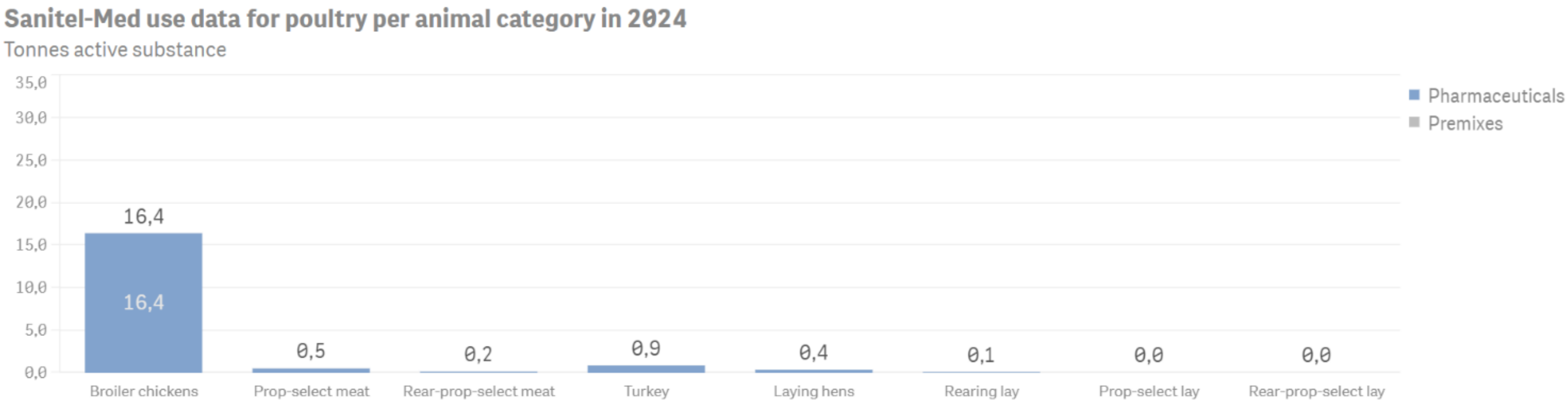



**Figure 12. Tonnes active antibacterial substance of antibacterial pharmaceuticals and antibacterial premixes used in 2024 in poultry per category.**

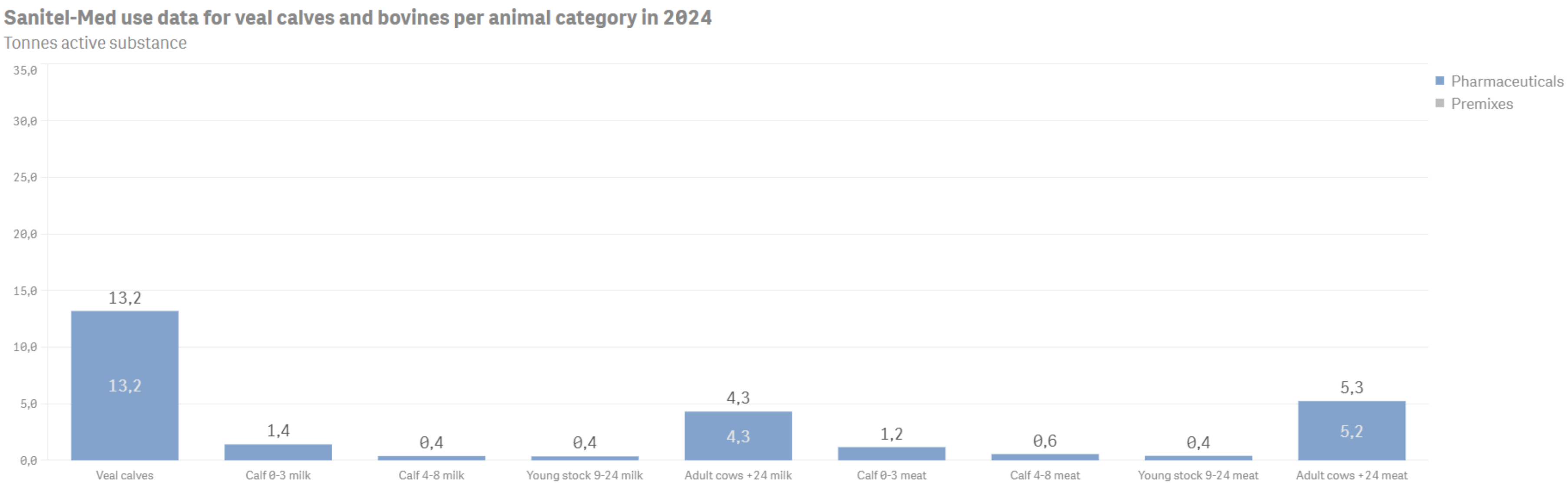



**Figure 13. Tonnes active antibacterial substance of antibacterial pharmaceuticals and antibacterial premixes used in 2024 in veal calves and dairy and beef cattle.**

## The $BD_{100}$-species

*Table 11* and *Table 12* respectively show the number and the corresponding kg of animals at risk for treatment, per species at national level between 2018 and 2024. These are used for the denominators for the $BD_{100}$-species.

**Table 11. Number of animals at risk from 2018 until 2024 in pigs, poultry, veal calves, and dairy and beef cattle.**

| | Animals at risk (x $10^3$) | | | | | | |
|---|---|---|---|---|---|---|---|
| | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 |
| PIGS | 6 209 | 6 085 | 6 218 | 6 042 | 5 751 | 5 380 | 5 381 |
| POULTRY[1] | 43 624 | 44 902 | 49 016 | 48 919 | 48 754 | 50 005 | 55 133[1] |
| VEAL CALVES | 170 | 171 | 171 | 173 | 168 | 173 | 170[2] |
| DAIRY/BEEF CATTLE | | | | | | | 2 075 |

[1] The data correspond to the final Agricultural figures of 2023. Until 2023 in the table, only the numbers of broilers and laying hens are included under poultry, while for 2024 in the table all chicken and turkey categories are included as well.

[2] Data for 2024 are the aggregated overall averages, calculated from the semestrial averages used for the farm-level $BD_{100}$-calculations.

**Table 12. Kg animals at risk from 2018 until 2024 in pigs, poultry, veal calves, and dairy and beef cattle.**

| | Kg at risk (x $10^3$) | | | | | | |
|---|---|---|---|---|---|---|---|
| | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 |
| PIGS | 318 869 | 311 901 | 316 048 | 306 642 | 289 561 | 272 681 | 271 644 |
| POULTRY[1] | 54 921 | 55 860 | 60 838 | 60 892 | 60 474 | 61 620 | 69 055[1] |
| VEAL CALVES | 27 258 | 27 434 | 27 437 | 27 712 | 26 904 | 27 753 | 27 128 |
| DAIRY/BEEF CATTLE | | | | | | | 936 124 |

[1] Until 2023 in the table, only the numbers of broilers and laying hens are included under poultry, while for 2024 in the table all chicken and turkey categories are included.

*Table 13* and *Table 14* respectively show the evolution of daily doses used per species at national level, for VMPs for which the doses are expressed as mg/animal (VMPs for local or topical use) and for VMPs for which the doses are expressed as mg/kg (VMPs for systemic use). The sum of these is the numerator for the $BD_{100}$-species. The number of doses used for all types of antibacterial VMPs declined for pigs, poultry and veal calves. Notably, in poultry, this decrease occurred despite the inclusion of additional categories, meaning the decrease in use among broilers and laying hens was more pronounced than the total figure shows.

**Table 13. Doses used of VMPs administered locally or topically in pigs, poultry, veal calves, and dairy and beef cattle.**

| | n DDDA$_{bel}$ × LA$_{bel}$ (locally/topically) | | | | | | |
|---|---|---|---|---|---|---|---|
| | **2018** | **2019** | **2020** | **2021** | **2022** | **2023** | **2024** |
| **PIGS** | 601 202 | 518 923 | 569 043 | 557 727 | 484 494 | 435 334 | 400 126 |
| **POULTRY**[1] | 0 | 0 | 0 | 0 | 0 | 0 | 94[1] |
| **VEAL CALVES** | 2 055 | 3 397 | 3 402 | 4 468 | 3 887 | 2 402 | 3 073 |
| **DAIRY/BEEF CATTLE** | | | | | | | 2 496 348 |

[1] Until 2023 in the table, only the use of broilers and laying hens is included under poultry, while for 2024 in the table the use in all chicken and turkey categories is included.

**Table 14. Doses used of VMPs administered orally or parenterally in pigs, poultry, veal calves, and dairy and beef cattle.**

| | n DDDA$_{bel}$ × LA$_{bel}$ (x10$^3$) (orally, injection) | | | | | | |
|---|---|---|---|---|---|---|---|
| | **2018** | **2019** | **2020** | **2021** | **2022** | **2023** | **2024** |
| **PIGS** | 7 995 199 | 7 403 220 | 7 114 627 | 6 125 816 | 4 168 270 | 3 769 520 | 3 519 932 |
| **POULTRY**[1] | 1 136 466 | 1 085 958 | 1 135 231 | 673 848 | 745 491 | 709 793 | 626 107[1] |
| **VEAL CALVES** | 1 354 466 | 1 077 382 | 1 059 701 | 863 038 | 763 663 | 762 623 | 738 605 |
| **DAIRY/BEEF CATTLE** | | | | | | | 1 369 758 |

[1] Until 2023 in the table, only the use of broilers and laying hens is included, while for 2024 in the table the use in all chicken and turkey categories is included.

The resulting BD$_{100}$-species (***Figure 14***) expresses the sector-level treatment days out of 100 days based on the total, national number of daily doses of antibacterials used per species and the total, national mass of animals at risk per species. Between 2023 and 2024 the BD$_{100}$-species decreased for all species, with 6,3 % for pigs and 0,9 % for veal calves, leading to an overall decrease since 2018 of 48,3 % for pigs and 45,2 % for veal calves. The poultry result was 21,6 % lower than in 2023. However, as previously noted, the results for poultry cannot be compared directly due to the inclusion of the additional poultry categories from 2024 onwards. Still, these new categories influenced both the numerator and the denominator, and compared to 2018 a 56,3 % reduction was achieved. The BD$_{100}$-species for dairy and beef cattle was markedly lower compared to other species, confirming the overall lower antibiotic use in these sectors despite its predominance in the number of registrations and number of active farms/veterinarians. The result of poultry and veal calves is subject to change depending on the final kg of animals at risk, expected in July/August 2025.

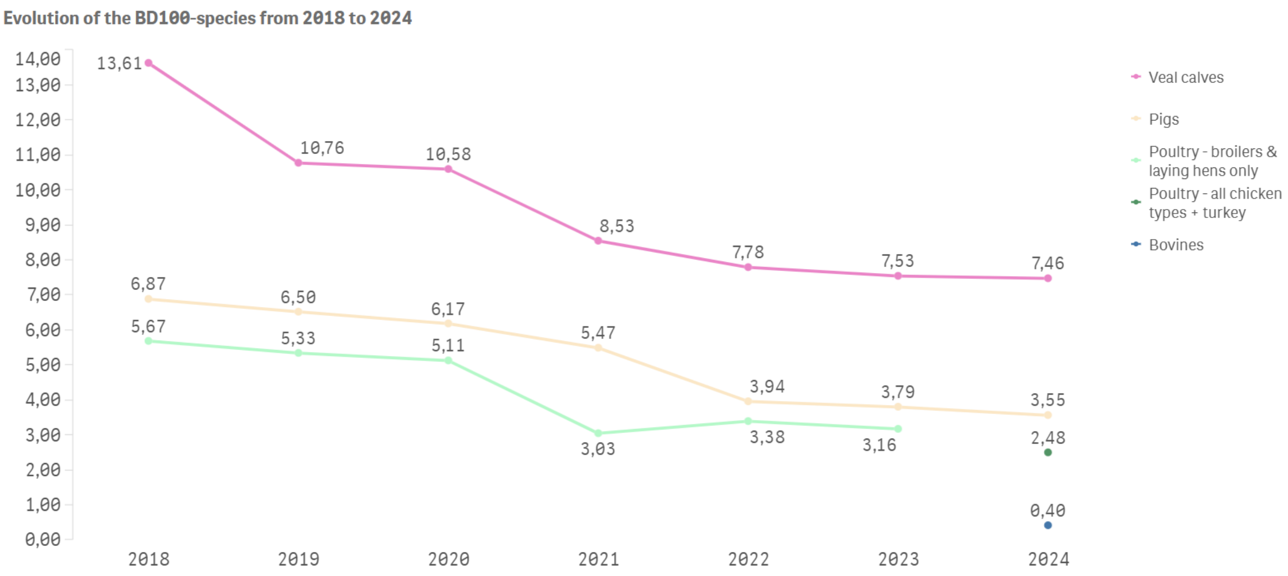



**Figure 14. Antibacterial use ($BD_{100}$-species) from 2018 to 2024 in pigs, poultry and veal calves, and in dairy and beef cattle in 2024.**

## Farm-level antibacterial use

At farm level, antibacterial use, expressed as the % of time an animal is treated (the average $BD_{100}$), is calculated per animal category present on the farm. Per animal category, reference populations for benchmarking are defined. The results presented below pertain to these benchmark reference populations.

### *a) Reference populations for benchmarking in 2024*

**Table 15. Number of farms and zero-registration farms per Sanitel-Med animal category that were included in the 2024 reference populations for benchmarking.**

| | PIGS | | | | BOVINES | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sucklers | Weaners | Fatteners | Breeders | **VEAL CALVES**[2] | Milk calf 0-3 m | Milk calf 4-8 m | Milk young adults 9-24 m | Milk adults +24 m | Beef calf 0-3 m | Beef calf 4-8 m | Beef young adults 9-24 m | Beef adults +24 m |
| n farms | 1 339 | 1 385 | 3 549 | 1 346 | 216 | 3 206 | 4 168 | 4 664 | 4 537 | 1 985 | 4 267 | 4 619 | 5 072 |
| n (%) zero-registration farms[1] | 205 (15) | 121 (9) | 638 (18) | 206 (15) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| | POULTRY | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Broilers | Propagation-selection meat | Rearing-propagation-selection meat | Laying hens | Rearing lay[2] | Propagation-selection lay | Rearing-propagation-selection lay[3] | Turkey |
| n farms | 747 | 103 | 53 | 207 | 55 | 10 | 1 | 18 |
| n (%) zero-registration farms[1] | 117 (16) | 52 (50) | 12 (23) | 137 (66) | 32 (58) | 7 (70) | 1 (100) | 0 |

*[1] For pigs, zero-registration is applied at the farm level, whereas for poultry and veal calves, zero registration is determined at the animal category level. In dairy and beef cattle, zero-registration is a criterion for exclusion from the reference population for benchmarking and is assigned at the production level (milk and beef).*

*[2] For veal calves, benchmarking reference populations at the farm level are established for periods of two years, meaning the '2024' period encompasses data from both 2023 and 2024 .*

*[3] Due to the limited number of rearing-propagation-selection lay farms, a combined benchmark reference group was created together with the rearing lay category for the analyses.*

***Table 15*** outlines the number of farms per animal category that met eligibility criteria for inclusion in the 2024 reference populations for benchmarking, following farm-level quality controls. For veal calves, the benchmarking reference populations are defined for 2-year periods, i.e. 2023 and 2024. In cattle, two main production types, 'meat' and milk, are distinguished. It is important to note that many farms house both production types and that cattle can be kept for dual purposes. The 'milk' and 'meat' benchmark reference groups are determined based on the farms housing animals categorised as 'milk' and 'meat', respectively (see section II.2.b.iv for more information on the distribution of 'mixed' cattle animals).

### b) Distribution of farm-level antibacterial use per animal category in 2024

*Figures 15*, *16* and *17* depict the distribution of the farm-level $BD_{100}$ in the 2024 reference populations (excluding the zero-registration farms) of the Sanitel-Med animal categories as box-plots with the median use indicated. Overall, use was highest in weaners (median $BD_{100}$ of 10,12) and veal calves (median $BD_{100}$ of 7,08).

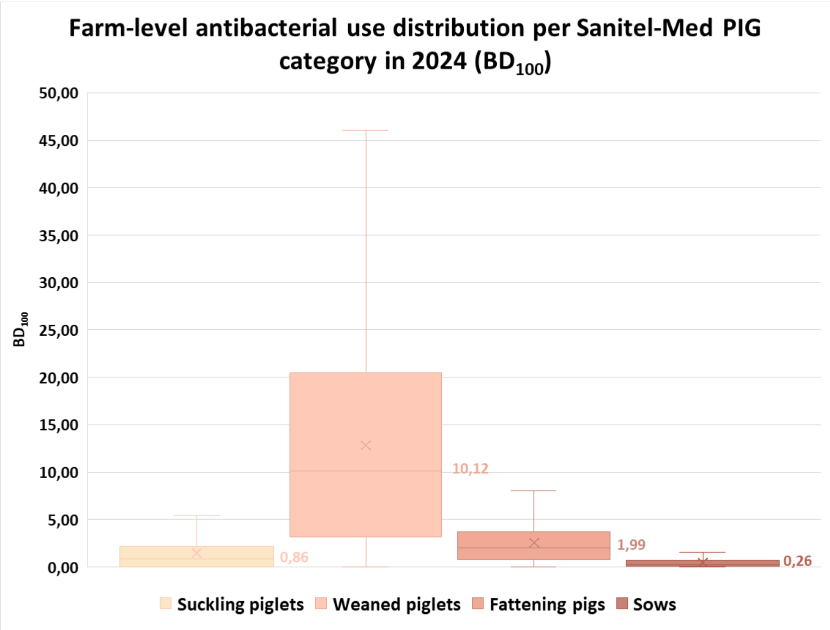



**Figure 15. Box-plots representing the $BD_{100}$-distribution in the 2024 reference populations* of the Sanitel-Med pig categories. Outliers are not shown. The median values are provided next to the lines in the boxes.** ** Excluding zero-registration farms (see Table 15).*

Turkeys and broilers had the highest use in poultry.

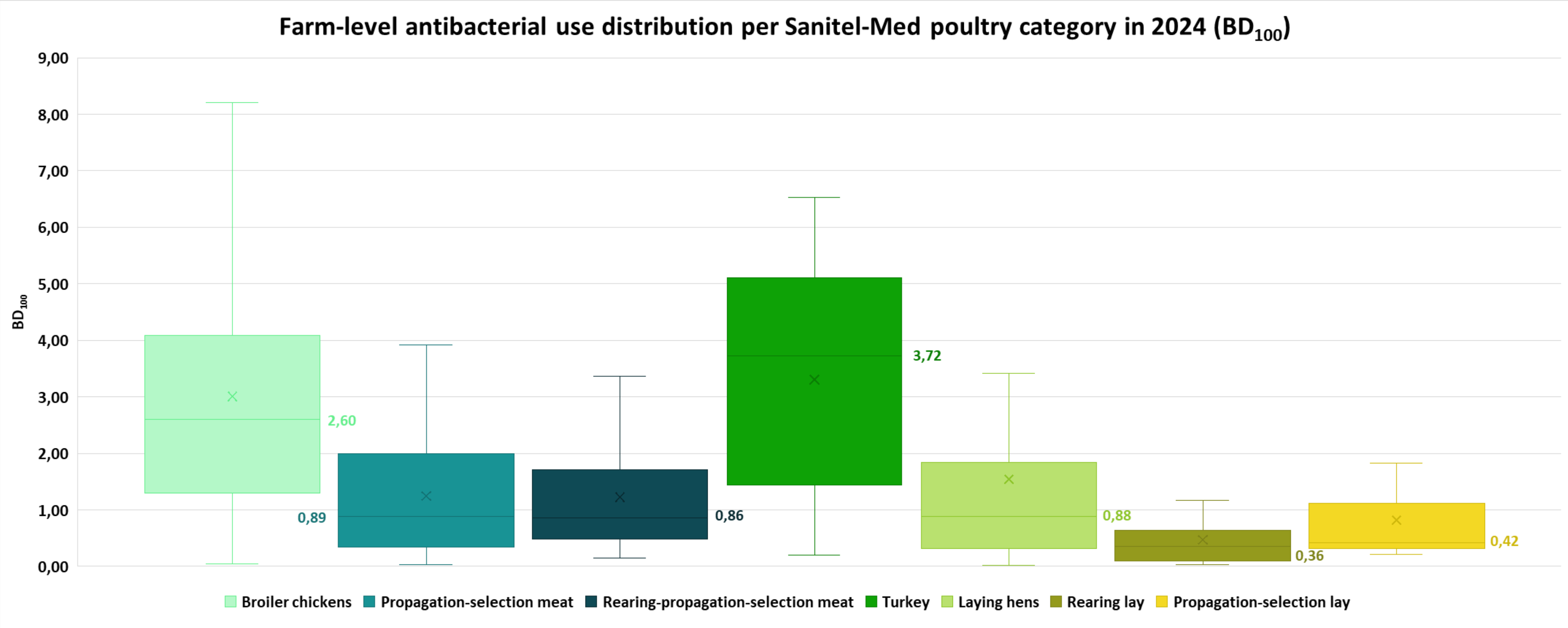



**Figure 16. Box-plots representing the $BD_{100}$-distribution in the 2024 reference populations* of the Sanitel-Med poultry categories. Outliers are not shown. The median values are provided next to the lines in the boxes.**
** Excluding zero- registration farms (see Table 15).*

The youngest milk and beef calf categories (0-3 months) had the highest use in dairy and beef cattle.

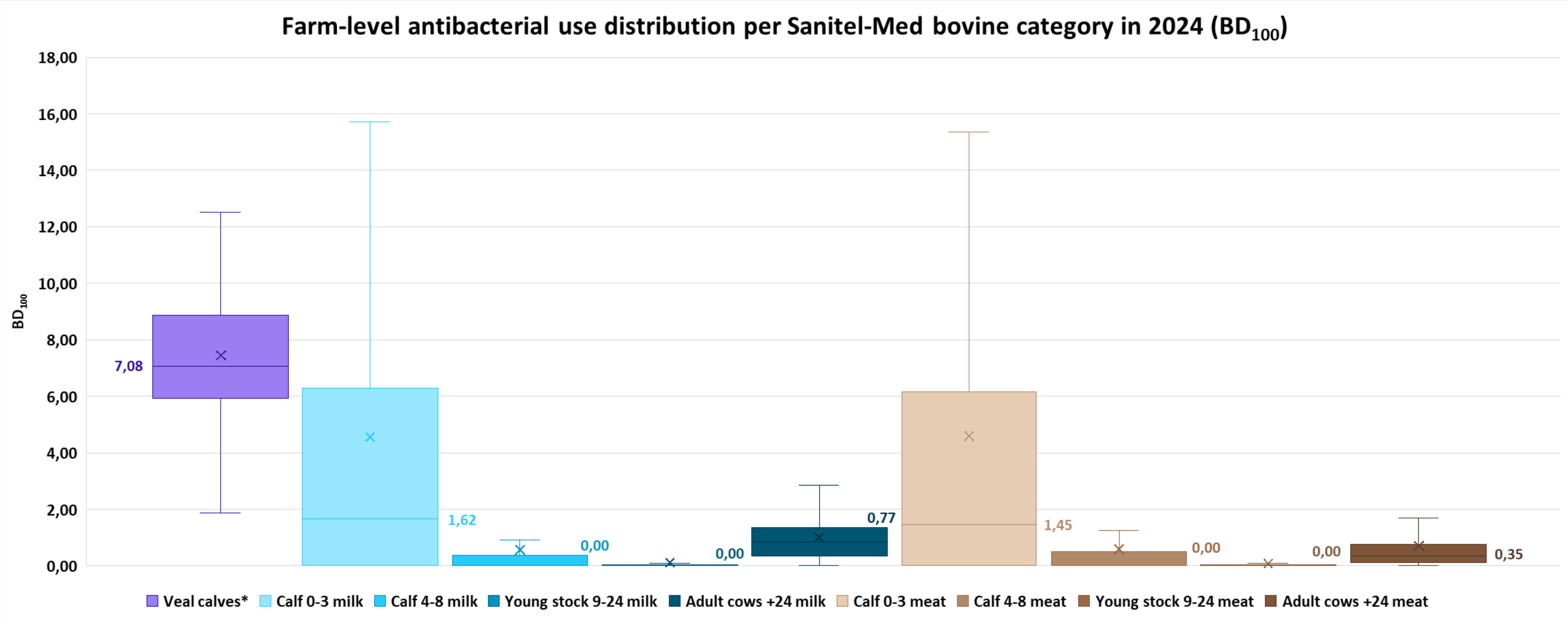



**Figure 17. Box-plots representing the $BD_{100}$-distribution in the 2024 reference populations of the Sanitel-Med bovine categories. Outliers are not shown. The median values are provided next to the lines in the boxes. In dairy and beef cattle, zero- registration farms are as a rule excluded from the benchmarking reference groups.**
** The veal calf results are based on a two year benchmarking period (2023/24).*

The right-skewed distribution with 'tails' of high users is visible in almost all categories. This illustrates that even though in each category there is a 'concentration' of farms in the lower use zones, considerable variation remains, with a smaller number of farms 'scattered' around the higher use zones.

### c) Evolution of median farm-level antibacterial use per animal category from 2018 to 2024

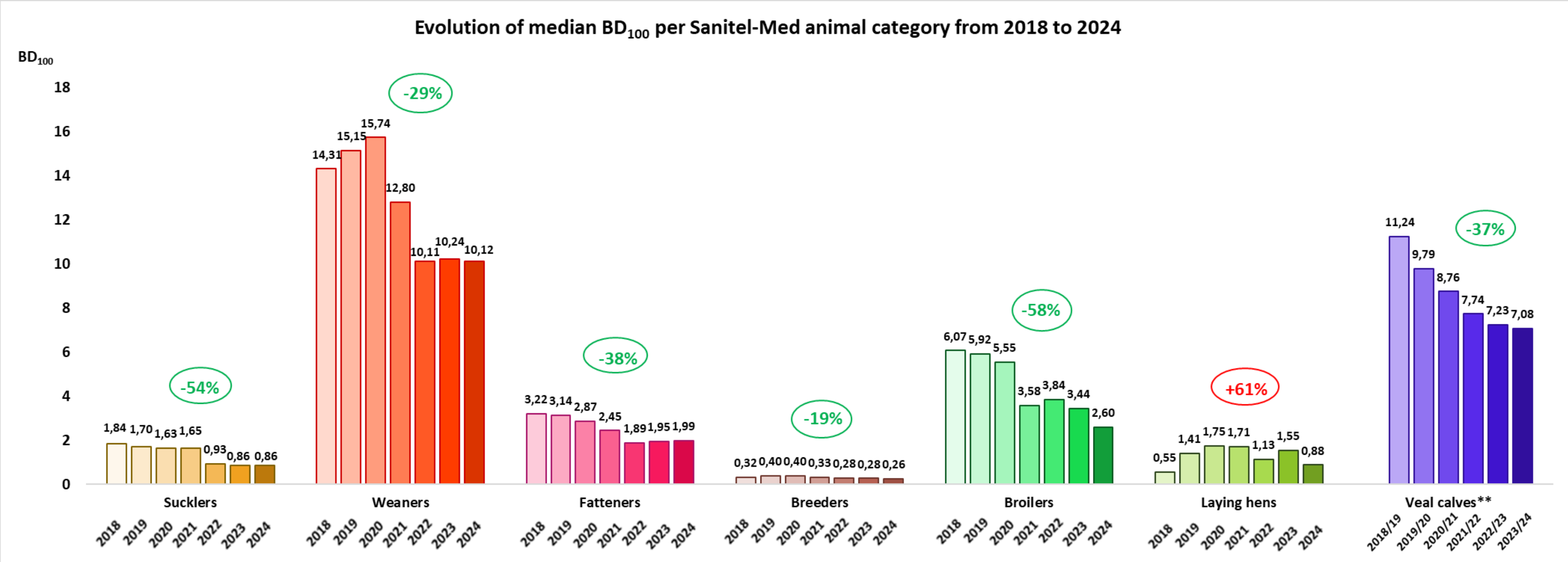



**Figure 18. Evolution of the median of the $BD_{100}$-distribution in the reference populations for benchmarking* from 2018 till 2024 per Sanitel-Med animal category for which data is being collected since 2018. The total decrease/increase in 2024 compared to 2018 (in %) is given per animal category.**

** Excluding zero-registration farms (see Table 15).*

*** The veal calf results are based on a two year benchmarking period (2023/24)*

Since 2022, the median $BD_{100}$ values in the four pig categories remained stable, also in 2024 (*Figure 18*). As the detailed analyses per category show, this does not imply that no further reductions were realised in any pig category. Rather, it indicates that the use of antibacterial VMPs has stabilised for most farms where use falls below or around the attention $BD_{100}$-value. In poultry, both the broilers and laying hens achieved considerable reductions in the median $BD_{100}$-values in 2024 compared to 2023. The median $BD_{100}$ veal calves continued to steadily decrease.

### d) Percentage of farms and use in the three colour zones in the different species

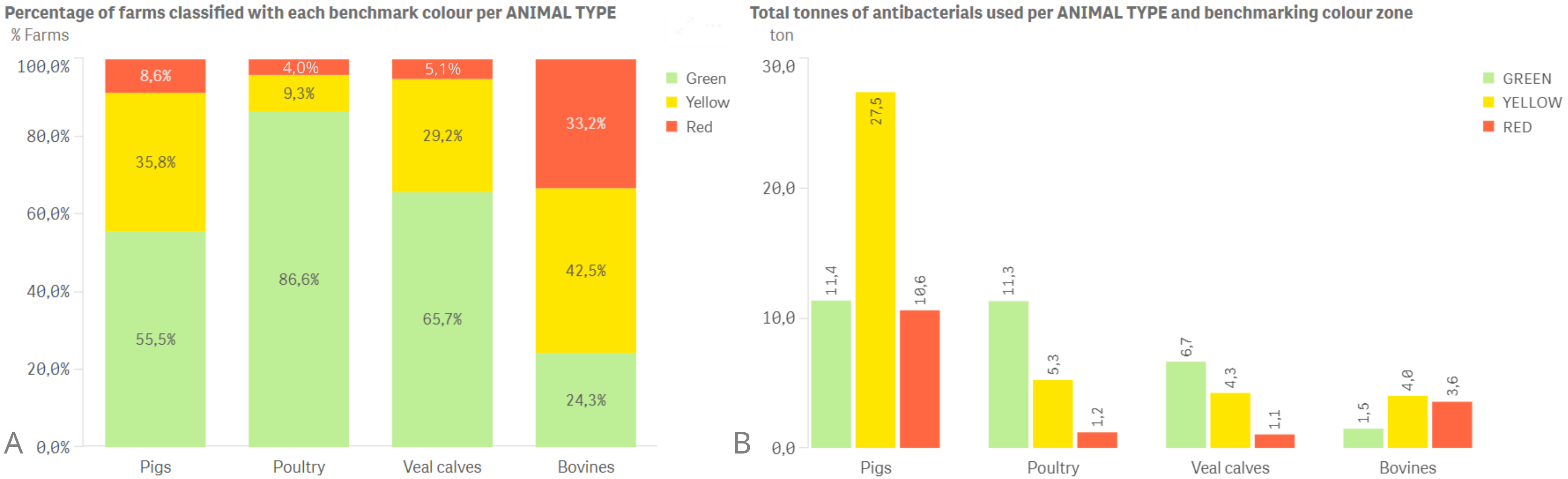



**Figure 19. A. Percentage* of pig, poultry, veal calf, and dairy and beef cattle ('bovine') farms classified in the three benchmarking colour zones in 2024. B. Total ton of antibacterials used in the animal categories with the respective benchmarking colour score.**

** Including zero-registration farms for pigs, poultry and veal calves (see Table 15).*

The percentage of farms with a red benchmarking colour score was the lowest in poultry and the highest in cattle (***Figure 19A***). However, it has to be noted that for pigs, broilers, laying hens and veal calves a benchmarking with fixed thresholds is applied, whereas for dairy and beef cattle, as well as for the other chicken categories and turkeys (included in the poultry results), a benchmarking with dynamic thresholds is applied.

When looking at the quantity of antibacterials used (in tonnes) in the different colour zones, in pigs and poultry (broilers more specifically) the majority of the used antibacterials is situated in the yellow farms, whereas in veal calf farms this was in the green farms (*Figure 19B*). Similarly, the dynamic benchmarking approach and the early stage of data collection in dairy and beef cattle explain the high proportion of tonnes in the red colour zone.

### e) Antibacterial use by the contract-veterinarian

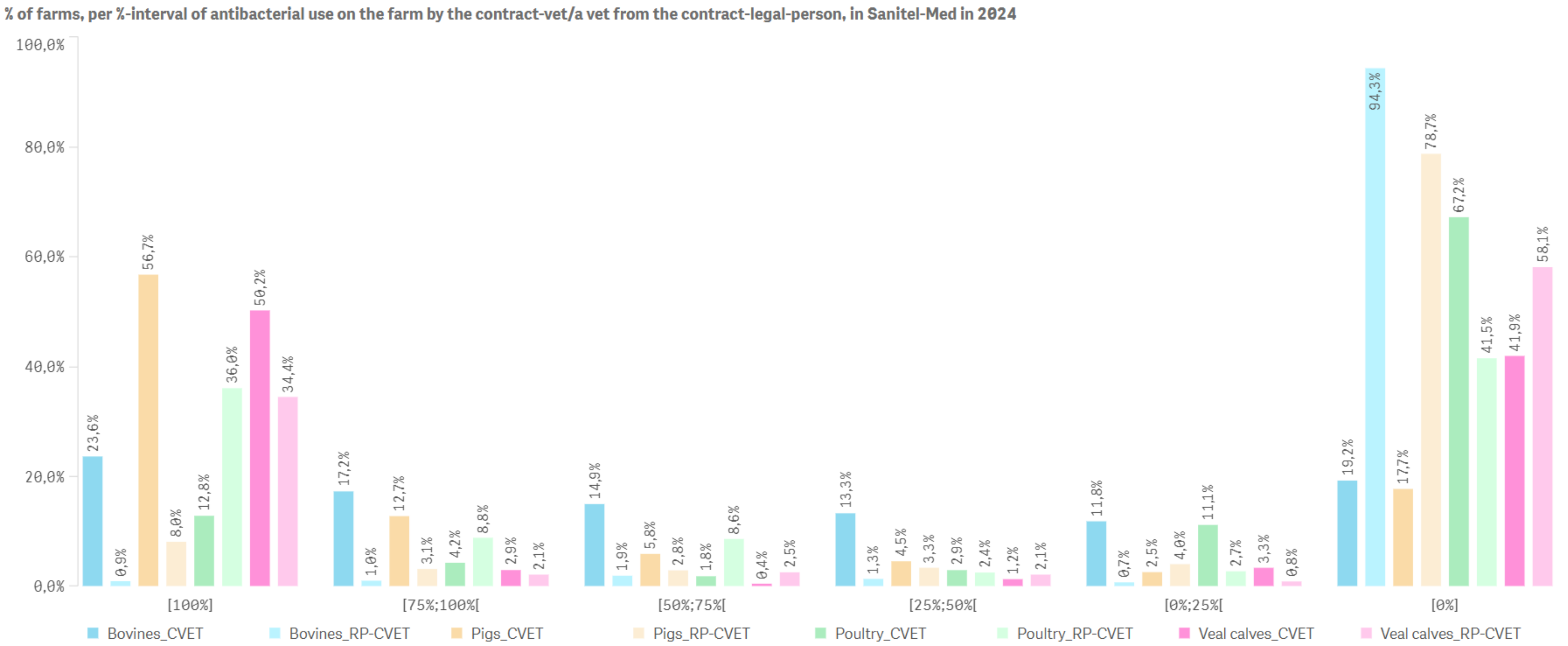



**Figure 20. The percentage of farms (Y-axis) where the antibacterial use, per %-use-intervals of 25 (X-axis), was done by the contract veterinarian (CVET) or by a vet belonging to the contract-legal-person (RP-CVET) on pig, poultry, veal calf, and dairy and beef cattle farms in 2024.**

In Belgium, the contract-veterinarian is the veterinarian responsible for the epidemiological surveillance on the farm. The contract can be concluded with an individual veterinarian ('natural person') but also with a 'legal person' veterinarian, typically representing a veterinary practice.

Overall, the veal calf sector has the highest percentage of farms where 100 % of the antibacterial use is administered by the natural or legal person contract-veterinarian, whereas for beef and dairy farms the result is the lowest (***Figure 20***). In cattle farming, the concept of the legal--person veterinarian is clearly less common, with the majority of farms relying largely or entirely on non-contract veterinarians for antibacterial use. Remarkably, poultry stands out as the only sector where farms are more frequently overseen by legal-person contract veterinarians than by natural-person contract veterinarians, highlighting the predominance of legal-person veterinary practices in this sector.

## Distribution of the antibacterial use in pig farms

### a) *Suckling piglets*

The antibacterial use in suckling piglets further decreased in 2024 (*Table 16a*). The median $BD_{100}$ dropped by more than 50%, and in the higher use zones reductions of almost 70 % were achieved. Since 2018, the number of farms with suckling piglets that have a $BD_{100}$ above the current action value for suckling piglets (*Table 16b*), has declined from more than 25 % in 2018 to around 4 % in 2024. For that small number of farms with (sometimes very) high antibacterial use in suckling piglets, ongoing efforts should focus on aligning with broader industry practices. Overall, the results in this age group are very rewarding. Including the zero-registration farms, nearly 77 % farms with suckling piglets are now situated in the green colour zone (results not shown).

**Table 16a (left). Parameters describing the distribution of the farm-level antibacterial use in the reference populations for benchmarking of suckling piglets from 2018 to 2024 and the % difference (diff) over the years. 16b (right). The thresholds of the $BD_{100}$ reduction path 2021-2024 for suckling piglets, with the current thresholds indicated within the dotted line.**

| Parameters $BD_{100}$ | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | diff 24-23 | diff 24-18 |
|---|---|---|---|---|---|---|---|---|---|
| **P25** | 0,12 | 0,12 | 0,21 | 0,13 | 0,01 | 0,04 | 0,00 | **-100,00%** | **-100,00%** |
| **P50** | 1,84 | 1,70 | 1,63 | 1,65 | 0,93 | 0,86 | 0,86 | **0,00%** | **-53,53%** |
| **P75** | 5,76 | 5,19 | 4,79 | 4,70 | 2,96 | 2,53 | 2,16 | **-14,87%** | **-62,57%** |
| **P90** | 11,58 | 9,94 | 9,95 | 8,57 | 5,30 | 4,44 | 3,71 | **-16,40%** | **-67,98%** |
| **Mean** | 4,42 | 3,83 | 3,90 | 3,49 | 2,02 | 1,82 | 1,46 | **-19,74%** | **-67,00%** |
| **Sum** | 5.401 | 4.609 | 4.792 | 4.831 | 2.569 | 2.190 | 1.654 | **-24,47%** | **-69,37%** |
| **Total n farms** | 1.358 | 1.327 | 1.374 | 1.648 | 1.543 | 1.426 | 1.339 | ND | ND |
| **% farms with zero registrations[1]** | 10% | 9% | 10% | 16% | 18% | 15% | 15% | ND | ND |

| Date of application | Attention value | Action value |
|---|---|---|
| **01/01/2021** | **2** | **10** |
| **01/01/2023** | **2** | **6** |
| **01/01/2024** | **2** | **5** |

[1] *Zero-registration farms were not included in the data determining the parameter values.*

### b) Weaned piglets

In 2024, another major reduction was achieved in the higher user zones of the weaned piglets. Since 2018, the 90th percentile has dropped with almost 46 % (*Table 17a*), leaving around 7,5 % of farms with weaned piglets in the red zone (results not shown). These figures now fall below the current action threshold value that came into force at the end of 2024 (*Table 17b*). The median $BD_{100}$ has been stabilizing at around 10 treatment days, a level it has been approaching for the past three years. This threshold appears to be a relevant value for an 'acceptable use target' moving forward. However, as shown in the box-plot (Figure 14), variation remains considerable, particularly at the upper end of usage. Weaned piglets continue to account for the highest overall antibacterial use.

**Table 17a (left). Parameters describing the distribution of the farm-level antibacterial use in the reference populations for benchmarking of weaned piglets from 2018 to 2024 and the % difference (diff) over the years. 17b (right). The thresholds of the $BD_{100}$ reduction path 2021-2024 for weaned piglets, with the current thresholds indicated within the dotted line.**

| Parameters $BD_{100}$ | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | diff 24-23 | diff 24-18 |
|---|---|---|---|---|---|---|---|---|---|
| P25 | 3,58 | 4,40 | 3,73 | 3,32 | 2,70 | 3,09 | 3,18 | 2,81% | -11,34% |
| P50 | 14,31 | 15,15 | 15,74 | 12,80 | 10,11 | 10,24 | 10,12 | -1,10% | -29,27% |
| P75 | 31,56 | 30,55 | 31,54 | 28,82 | 22,04 | 22,47 | 20,48 | -8,84% | -35,11% |
| P90 | 53,23 | 50,56 | 54,28 | 49,72 | 37,81 | 34,33 | 28,80 | -16,10% | -45,89% |
| Mean | 22,28 | 21,91 | 22,50 | 20,60 | 15,66 | 14,62 | 12,84 | -12,16% | -42,35% |
| Sum | 28.960 | 28.439 | 29.964 | 30.494 | 22.082 | 19.607 | 16.235 | -17,20% | -43,94% |
| Total n farms | 1.370 | 1.368 | 1.402 | 1.614 | 1.577 | 1.459 | 1.385 | ND | ND |
| % farms with zero registrations[1] | 5% | 5% | 5% | 8% | 11% | 8% | 9% | ND | ND |

| Date of application | Attention value | Action value |
|---|---|---|
| 01/01/2021 | 14 | 50 |
| 01/01/2023 | 14 | 40 |
| 31/12/2024 | 14 | 30 |

[1] *Zero-registration farms were not included in the data determining the parameter values.*

### c) Fattening pigs

Of all pig categories, the fattening pigs are the odd one out as they record a slight increase in antibacterial use in 2024 compared to 2023, throughout the whole benchmarking reference group (*Table 18a*). It is possible that the continued effort in piglets leads to a shift, in the later age stages of production, regardless of whether this is due to an increased disease burden or not. Additionally, the fact that a large majority of farms, almost 95 % (results not shown), find themselves below the current action value (*Table 18b*) could mean an eased sense of urgency is experienced with regard to this category. It remains to be seen if this is a temporary effect. In conclusion, the results are largely positive since the start of the data collection, and especially since the implementation of the reduction paths as in 2018, over 25 % of farms were situated above the current action value.

**Table 18a (left). Parameters describing the distribution of the farm-level antibacterial use in the reference populations for benchmarking of fattening pigs from 2018 to 2024 and the % difference (diff) over the years. 18b (right). The thresholds of the $BD_{100}$ reduction path 2021-2024 for fattening pigs, with the current thresholds indicated within the dotted line.**

| Parameters $BD_{100}$ | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | diff 24-23 | diff 24-18 |
|---|---|---|---|---|---|---|---|---|---|
| **P25** | 1,17 | 1,27 | 1,13 | 0,93 | 0,64 | 0,74 | 0,79 | **7,44%** | **-32,06%** |
| **P50** | 3,22 | 3,14 | 2,87 | 2,45 | 1,89 | 1,95 | 1,99 | **2,03%** | **-38,24%** |
| **P75** | 6,47 | 6,30 | 5,76 | 4,96 | 3,79 | 3,66 | 3,70 | **0,96%** | **-42,88%** |
| **P90** | 10,56 | 10,38 | 9,81 | 8,35 | 5,99 | 5,46 | 5,46 | **0,01%** | **-48,35%** |
| **Mean** | 4,69 | 4,67 | 4,23 | 3,61 | 2,63 | 2,53 | 2,56 | **1,26%** | **-45,37%** |
| **Sum** | 15.449 | 15.124 | 13.999 | 12.563 | 8.502 | 7.731 | 7.457 | **-3,54%** | **-51,73%** |
| **Total n farms** | 3.600 | 3.518 | 3.619 | 4.288 | 4.117 | 3.760 | 3.549 | ND | ND |
| **% farms with zero registrations[1]** | 8% | 8% | 9% | 19% | 22% | 19% | 18% | ND | ND |

| Date of application | Attention value | Action value |
|---|---|---|
| **01/01/2021** | **2,7** | **9** |
| **01/01/2023** | **2,7** | **6** |
| **01/01/2024** | **2,7** | **6** |

[1] *Zero-registration farms were not included in the data determining the parameter values.*

### d) Breeders

The antibacterial use keeps decreasing in breeding pigs (*Table 19a*), even though no real reduction path has been agreed with the sector (*Table 19b*). Compared to the other categories , the percentage of farms in the yellow zone is still higher, with the current median value being close to the attention value. On the plus side, the percentage of red farms of approximately 3 % is the lowest of all pig categories (results not shown).

**Table 19a (left). Parameters describing the distribution of the farm-level antibacterial use in the reference populations for benchmarking of breeding pigs from 2018 to 2024 and the % difference (diff) over the years. 19b (right). The thresholds of the $BD_{100}$ reduction path 2021-2024 for fattening pigs, with the current thresholds indicated within the dotted line.**

| Parameters $BD_{100}$ | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | diff 24-23 | diff 24-18 |
|---|---|---|---|---|---|---|---|---|---|
| P25 | 0,05 | 0,09 | 0,09 | 0,07 | 0,06 | 0,08 | 0,07 | -4,00% | 38,46% |
| P50 | 0,32 | 0,40 | 0,40 | 0,33 | 0,28 | 0,28 | 0,26 | -5,61% | -19,20% |
| P75 | 0,97 | 1,02 | 1,05 | 0,90 | 0,74 | 0,72 | 0,67 | -7,23% | -31,10% |
| P90 | 1,95 | 2,04 | 2,12 | 1,81 | 1,28 | 1,30 | 1,25 | -3,87% | -36,15% |
| Mean | 0,87 | 0,85 | 0,84 | 0,74 | 0,51 | 0,50 | 0,47 | -6,92% | -45,94% |
| Sum | 1057 | 1.023 | 1.034 | 1.058 | 659 | 608 | 534 | -12,23% | -49,48% |
| Total n farms | 1.350 | 1.322 | 1.369 | 1.688 | 1.552 | 1.431 | 1.346 | ND | ND |
| % farms with zero registrations[1] | 10% | 9% | 10% | 16% | 18% | 15% | 15% | ND | ND |

| Date of application | Attention value | Action value |
|---|---|---|
| 01/01/2021 | 0,28 | 1,65 |
| 01/01/2023 | 0,28 | 1,65 |
| 01/01/2024 | 0,28 | 1,65 |

[1] *Zero-registration farms were not included in the data determining the parameter values.*

Overall, both the number and percentage of zero-registration pig farms decreased in 2024 compared to 2023 (results not shown), a noteworthy trend given the encouraging figures for antibacterial use. Also the percentage of farms with zero-registrations over the past two consecutive years decreased. It shows that the good results are not simply due to farms ceasing antibacterial use.

In conclusion for the pig sector, 2024 was a year of continued reduction of antibacterial use for all categories except for the fattening pigs, where a slight increase was notable. Since the start of the data collection and especially since the start of the reduction paths, commendable reductions have been achieved. In each category, well over 50 % of farms (sometimes up to 75 %) achieved an antibacterial use in the green zone, with only 3-8 % of farms situated in the red zone. Yet, outliers persist and it is important to recognize that the action values for weaned piglets and fattening pigs still represent considerably modest thresholds. Furthermore, considerable quantities of antibacterials are still used in the red and yellow zones. The collective efforts of all parties involved deserve merit, and the nice results achieved so far should encourage the sector to, in the course of the coming years, sustain the present results, yet find ways to stimulate and coach the remaining higher users towards a reduction of their antibacterial use.

## Distribution of the antibacterial use in poultry

### a) Broilers

The broiler sector achieved a drastic decrease in antibacterial use in 2021 compared to 2020 yet remained in steady-state in the two years after that (*Table 20a*). However, in 2024, a clear further reduction was achieved, with most parameters showing a reduction of more than 60 %. Whereas in 2018 around 30 % of broiler farms had an antibacterial use above the current action value (*Table 20b*), this number has crumbled to a mere 1,5 % (results not shown). Almost 88 % of farms are even below the current attention value. This illustrates the ability of the sector to reduce the use in the de facto absence of use thresholds as an incentive, while also highlighting the potential to adopt more ambitious threshold values moving forward.

**Table 20a (left). Parameters describing the distribution of the farm-level antibacterial use in the reference populations for benchmarking of broilers from 2018 to 2024 and the % difference (diff) over the years. 20b (right). The thresholds of the $BD_{100}$ reduction path 2021-2024 for broiler chickens, with the current thresholds indicated within the dotted line.**

| Parameters $BD_{100}$ | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | diff 24-23 | diff 24-18 |
|---|---|---|---|---|---|---|---|---|---|
| **P25** | 3,28 | 2,83 | 2,41 | 1,81 | 2,18 | 1,59 | 1,30 | **-18,42%** | **-60,38%** |
| **P50** | 6,20 | 5,99 | 5,49 | 3,58 | 3,84 | 3,44 | 2,60 | **-24,33%** | **-58,06%** |
| **P75** | 11,54 | 10,53 | 10,45 | 5,56 | 6,07 | 5,70 | 4,09 | **-28,24%** | **-64,56%** |
| **P90** | 16,98 | 16,12 | 15,44 | 7,64 | 7,87 | 7,68 | 5,64 | **-26,60%** | **-66,81%** |
| **Mean** | 7,88 | 7,66 | 7,35 | 3,97 | 4,24 | 3,94 | 3,01 | **-23,58%** | **-61,79%** |
| **Sum** | 5.003 | 4.751 | 4.725 | 2.447 | 2.635 | 2.486 | 1.897 | **-23,70%** | **-62,09%** |
| **Total n farms** | 732 | 724 | 742 | 720 | 738 | 758 | 747 | ND | ND |
| **% farms with zero registrations[1]** | 13% | 14% | 13% | 14% | 16% | 17% | 16% | ND | ND |

| Date of application | Attention value | Action value |
|---|---|---|
| **01/01/2021** | **6** | **14** |
| **01/01/2023** | **5** | **12** |
| **31/12/2024** | **5** | **10** |

[1] *Zero-registration farms were not included in the data determining the parameter values.*

## b) Laying hens

After an increased antibacterial use in the period 2019-2021, the farm-level use for laying hens has reduced again, with 2024 being the year with the lowest use since 2018 (*Table 21a*). As in previous years, the results for this sector require careful interpretation. Only a minority of the farms use antibacterials, the hens have a long production cycle-which hampers quick wins in terms of 'stronger' animals to work with-and the overall low use levels lead to dramatic year-to-year fluctuations.

**Table 21a (left). Parameters describing the distribution of the farm-level antibacterial use in the reference populations for benchmarking of laying hens from 2018 to 2024 and the % difference (diff) over the years. 21b (right). The $BD_{100}$-threshold for laying hens. This sole action value was agreed upon in consultation with the sector. An evolution in time of the value (reduction path) is currently not foreseen**

| Parameters $BD_{100}$ | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | diff 24-23 | diff 24-18 |
|---|---|---|---|---|---|---|---|---|---|
| P25 | 0,21 | 0,36 | 0,57 | 0,73 | 0,44 | 0,46 | 0,32 | -30,54% | 51,98% |
| P50 | 0,55 | 1,41 | 1,75 | 1,71 | 1,13 | 1,55 | 0,88 | -43,22% | 61,43% |
| P75 | 1,33 | 3,26 | 2,47 | 3,26 | 1,95 | 2,98 | 1,84 | -38,37% | 37,67% |
| P90 | 2,91 | 5,27 | 6,55 | 5,26 | 3,78 | 3,99 | 3,52 | -11,80% | 20,69% |
| Mean | 1,24 | 2,07 | 2,63 | 2,33 | 1,97 | 2,04 | 1,54 | -24,41% | 24,12% |
| Sum | 81 | 136 | 205 | 156 | 142 | 147 | 108 | -26,51% | 33,67% |
| Total n farms | 193 | 193 | 202 | 200 | 208 | 205 | 207 | ND | ND |
| % farms with zero registrations[1] | 66% | 66% | 61% | 67% | 65% | 65% | 66% | ND | ND |

| Date of application | Action value |
|---|---|
| 01/01/2021 | 3 |

[1] *Zero-registration farms were not included in the data for determining the parameter values.*

## c) Other chicken 'meat', turkey and other chicken 'lay'.

For the first time, this BelVet-SAC report includes use data for the entire poultry sector, covering both the 'meat' and 'lay' branches-with the 'meat' category also including turkeys (*Table 22* and *Table 23*).

**Table 22. Parameters describing the distribution of the farm-level antibacterial use in the reference populations for benchmarking of other chicken 'meat' categories and turkeys in 2024.**

| Parameters $BD_{100}$ | Chicken propagation-selection meat | Chicken rearing-propagation-selection meat | Turkey |
|---|---|---|---|
| **P25** | 0,34 | 0,49 | 1,43 |
| **P50** | 0,89 | 0,86 | 3,72 |
| **P75** | 1,99 | 1,72 | 5,11 |
| **P90** | 2,61 | 2,66 | 5,63 |
| **Mean** | 1,25 | 1,23 | 3,31 |
| **Sum** | 64 | 50 | 60 |
| **Total n farms** | 103 | 53 | 18 |
| **% farms with zero registrations[1]** | 50% | 23% | 0% |

[1] *Zero-registration farms were not included in the data determining the parameter values.*

**Table 23. Parameters describing the distribution of the farm-level antibacterial use in the reference populations for benchmarking of other chicken 'lay' categories in 2024.**

| Parameters $BD_{100}$ | Chicken 'rearing' lay[2] | Chicken propagation-selection lay |
|---|---|---|
| **P25** | 0,10 | 0,32 |
| **P50** | 0,36 | 0,42 |
| **P75** | 0,64 | 1,12 |
| **P90** | 1,08 | 1,54 |
| **Mean** | 0,47 | 0,82 |
| **Sum** | 11 | 2 |
| **Total n farms** | 56 | 10 |
| **% farms with zero registrations[1]** | 59% | 70% |

[1] *Zero-registration farms were not included in the data determining the parameter values.*

[2] *This is a combined benchmark reference group of rearing lay and rearing-selection-propagation lay.*

A first important observation is the relatively small number of farms active in these additional categories. However, it is important to consider that many farms are excluded from the benchmark reference groups due to not meeting the ‘benchmark IN’-criterion of the minimum required number of animals per farm. Meat chicken (grand)parents represent the largest subgroup, however, the turkeys stand out as they have the highest antibacterial use overall, even exceeding that of broilers. It remains to be seen how these figures will evolve in the future, but the intention is to closely monitor their evolution, in close cooperation with the sector, and define adequate reduction targets in a few years.

In conclusion, the outcomes for the poultry sector are rewarding. Broilers, by far the largest contributors to antibacterial use, have again achieved a meaningful reduction, after some years of steady-state. This underscores the sector’s resilience and capacity for progress, independent from the reduction path, as the target $BD_{100}$-values have long been achieved by a majority of farms. It also suggests that the sector is well positioned to take on more ambitious thresholds. Laying hens, too, appear to reconnect with the lower use results prior to 2019. It will be interesting to see how the data of the additional chicken categories and turkeys will offer a more comprehensive view on the sector as a whole. Remarkably, within a single year, the poultry sector has significantly reduced usage within the yellow zone, an achievement that should inspire further efforts to support the few remaining farms with higher antibacterial use.

## Distribution of the antibacterial use in veal calves

In line with the $BD_{100}$-species result, the veal calf farm-level results show a modest progress, with use levels in the lowest use zones remaining steady (*Table 24a*). It seems clear that future progress in this sector will be made in small steps. In that sense, a noteworthy effort was made in 2024 to further reduce the number of farms in the red zone – now just above 5 % – while increasing the number of green farms to approximately 65 % (results not shown). That said, 2024 was particularly challenging due to the bluetongue crisis, which the sector acknowledges will negatively impact use data in upcoming benchmarking periods. Ongoing commitment and an adjusted pace of the reduction path should support further improvement in the years ahead.

**Table 24a (left). Parameters describing the distribution of the farm-level antibacterial use in the reference population for benchmarking of veal calves from 2018 to 2024 and the % difference (diff) over the years. 24b (right). The thresholds of the $BD_{100}$ reduction path 2021-2024 for veal calves**

| Parameters $BD_{100}$ | 2018/19 | 2019/20 | 2020/21 | 2021/22 | 2022/23 | 2023/24 | diff 23/24 – 22/23 | diff 23/24-18/19 |
|---|---|---|---|---|---|---|---|---|
| **P25** | 9,18 | 7,49 | 6,84 | 5,83 | 5,77 | 5,92 | **2,62%** | **-35,46%** |
| **P50** | 11,24 | 9,79 | 8,76 | 7,74 | 7,23 | 7,08 | **-2,18%** | **-37,06%** |
| **P75** | 14,23 | 12,31 | 11,27 | 9,63 | 9,11 | 8,87 | **-2,71%** | **-37,70%** |
| **P90** | 16,93 | 15,11 | 13,79 | 11,44 | 10,71 | 10,19 | **-4,86%** | **-39,81%** |
| **Mean** | 11,90 | 10,30 | 9,30 | 7,97 | 7,55 | 7,45 | **-1,42%** | **-37,45%** |
| **Sum** | 2.821 | 2.441 | 2.242 | 1.881 | 1.715 | 1.608 | **-6,20%** | **-43,00%** |
| **Total n farms** | 238 | 237 | 241 | 236 | 228 | 216 | ND | ND |
| **% farms with zero registrations[1]** | 0,4% | 0,0% | 0,0% | 0,0% | 0,4% | 0,0% | ND | ND |

| Date of application | Attention value | Action value |
|---|---|---|
| **01/01/2021** | **10** | **15** |
| **01/01/2023** | **8** | **11** |

[1] *Zero-registration farms were not included in the data determining the parameter values.*

In conclusion, the 2024 results for veal calves once again highlight the big challenges the sector faces in addressing its persistently high levels of antibacterial use. The efforts made so far deserve recognition, and the challenging health conditions in 2024 must be taken into account. Still, it's essential that the sector remains confident in its direction and continues working collaboratively with all stakeholders involved to identify and implement the necessary next steps.

## Antibacterial use in dairy and beef cattle

### a) Distribution of the antibacterial use in dairy and beef cattle

For the first time, this BelVet-SAC report includes use data for the whole dairy and beef cattle sectors. In both the dairy (*Table 25*) and beef (*Table 26*) branch, the youngest calves (0-3 months old) appear as the highest users of antibacterials, followed by the adult animals. A remarkable feat is the high spread between the lower and higher users in these calves, as previously illustrated in the box-plots (*Figure 18*), with the P90 being almost 10 times higher than the P50. This stands in contrast to pigs, broilers and veal calves, and underscores the difference between sectors with a decade of experience in monitoring antibacterial use and those that have only recently started. It also highlights clear opportunities for improvement, as the P90 in calves ranks among the highest across all monitored animal categories – even exceeding that of veal calves.

**Table 25. Parameters describing the distribution of the farm-level antibacterial use in the reference populations for benchmarking of dairy cattle in 2024.**

| Parameters $BD_{100}$ | Calf 0-3 months milk | Calf 4-8 months milk | Young stock 9-24 months milk | Adult cattle +24 months milk |
|---|---|---|---|---|
| **P25** | 0,00 | 0,00 | 0,00 | 0,32 |
| **P50** | 1,62 | 0,00 | 0,00 | 0,77 |
| **P75** | 6,16 | 0,33 | 0,04 | 1,30 |
| **P90** | 12,44 | 1,65 | 0,24 | 1,95 |
| **Mean** | 4,49 | 0,53 | 0,11 | 0,95 |
| **Sum** | 14.399 | 2.204 | 503 | 4 303 |
| **Total n farms** | 3 206 | 4 168 | 4 664 | 4 537 |
| **% farms with zero registrations[1]** | 0% | 0% | 0% | 0% |

[1] *Zero-registration farms are, currently, as a rule excluded from the benchmark reference groups in cattle.*

**Table 26. Parameters describing the distribution of the farm-level antibacterial use in the reference populations for benchmarking of beef cattle in 2024.**

| Parameters $BD_{100}$ | Calf 0-3 months beef | Calf 4-8 months beef | Young stock 9-24 months beef | Adult cattle +24 months beef |
|---|---|---|---|---|
| **P25** | 0,00 | 0,00 | 0,00 | 0,13 |
| **P50** | 1,45 | 0,00 | 0,00 | 0,35 |
| **P75** | 6,16 | 0,45 | 0,03 | 0,75 |
| **P90** | 13,30 | 1,77 | 0,18 | 1,40 |
| **Mean** | 4,59 | 0,56 | 0,08 | 0,74 |
| **Sum** | 9.119 | 2.397 | 5.306 | 3 732 |
| **Total n farms** | 1 985 | 4 267 | 4 619 | 5 072 |
| **% farms with zero registrations[1]** | 0% | 0% | 0% | 0% |

[1] *Zero-registration farms are, currently, as a rule excluded from the benchmark reference groups in cattle.*

### b) Sales and use of intramammary injectors

The adult cows, while not leading in terms of treatment days, remain significant due to their substantial body mass, which results in high not-standardised quantities of antibacterial use. They are also of interest due to the use of intramammary tubes as a common practice. The BelVet-SAC report has consistently monitored the sales of intramammary VMPs for both dry cow therapy (dry cow, DC) and mastitis treatment during the lactating period (lactating cow, LC). For 2024, these sales figures – expressed as the number of injectors sold per cow per year – are now complemented by actual use data (*Figure 21*). In the past year, sales of both DC and LC injectors have increased, reversing the downward trends observed in the past two years. Remarkably, the reported use quantities are considerably lower, pointing to a likely underreporting within the sector. It remains to be seen in the coming years whether this is a consistent pattern, or a temporary anomaly, potentially due to factors such as stock fluctuations or due to the start-up of the national data collection.

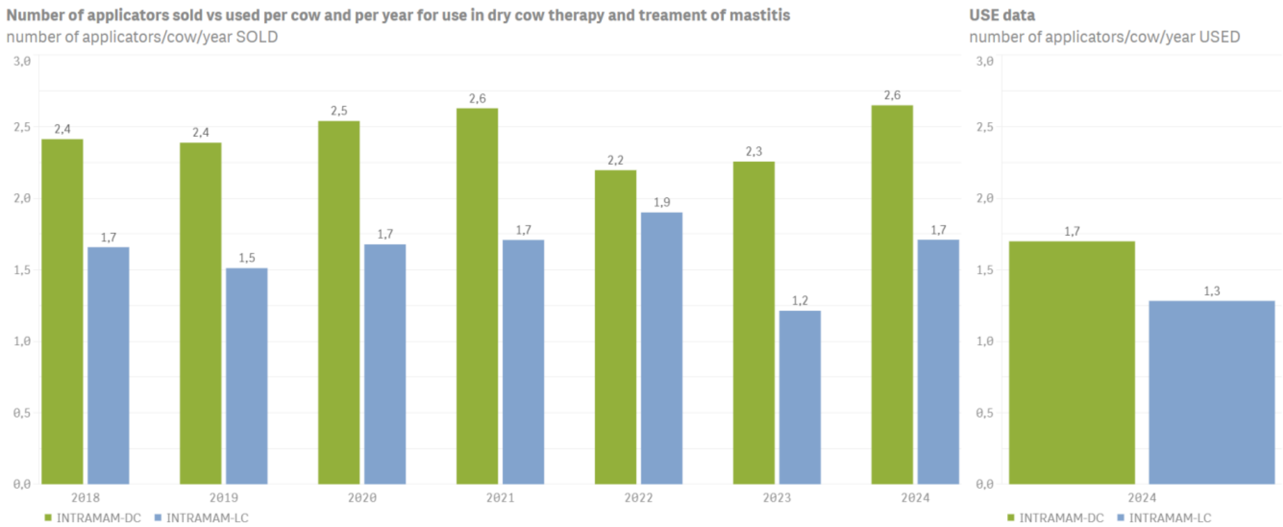



**Figure 21. Number of intramammary preparations sold per cow per year between 2018 and 2024 vs the number of intramammary preparations used in 2024.**

In conclusion, the 2024 results for cattle – the first full year of national data – highlight that calves aged 0-3 months should be the main target for reduction efforts, as their median antibacterial use surpasses all monitored animal categories and the wide variability across farms, including an important group of heavy users. Additionally, the disparity between the sales and reported use of intramammary tubes likely points to underreporting, underscoring the need for all stakeholders to accelerate improvements in data quality the coming years.

# III.3 Sales and use of antibacterial VMPs per antibacterial class and administration route

## Sales of antibacterial VMPs per antibacterial class

Antibacterial pharmaceuticals and antibacterial premixes can be classified into different antibacterial classes based on their active antibacterial substance. The classification used in this report can be found in Annex I – Table I.1.

*Figure 22* depicts the proportion of the total sales per antibacterial class for 2024.

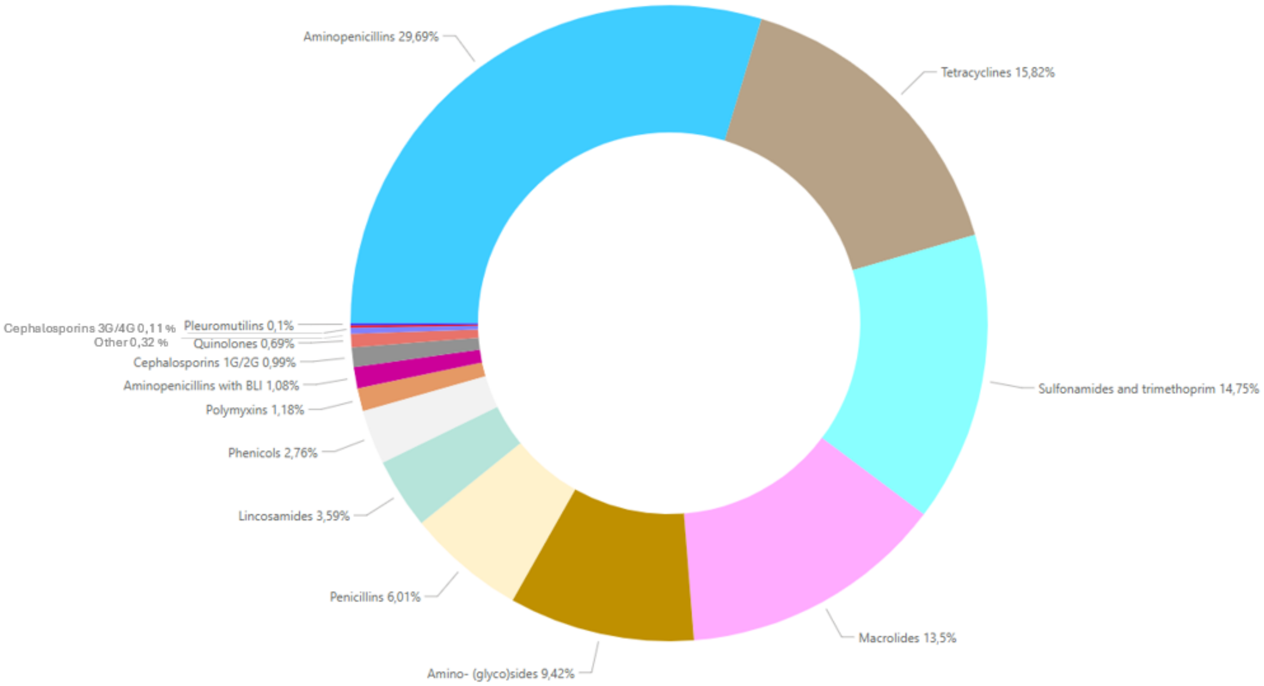



**Figure 22. Proportion of sales of antibacterial pharmaceuticals and antibacterial premixes per antibacterial class in 2024.**

Aminopenicillins remained the most widely sold group of antibacterial substances in veterinary medicine in 2024, with an absolute volume of 34,9 tonnes, accounting for 29,69 % of total sales. When aminopenicillins combined with clavulanic acid are included, this figure rises to 36,2 tonnes or 32,90 %. Tetracyclines ranked second (18,6 tonnes; 15,82 %), followed by sulfonamides combined with trimethoprim (17,3 tonnes; 14,75 %), macrolides (15,9 tonnes; 13,5 %), and amino(glyco)sides (11,1 tonnes; 9,42 %). Penicillins accounted for 6,01 % and lincosamides for 3,59 % of sales. Each of the remaining antibacterial classes accounted for less than 3% of total sales.

*Table 27* and *Figure 23* present the six-year trends in the sales of antibacterial pharmaceuticals and premixes by class, expressed in mg per kg of biomass.

**Table 27. Evolution of the sales in mg/kg biomass per antibacterial class since 2018. In the evolution graph in the last column, the red dot marks the highest value recorded during the period, while the green dot represents the lowest.**

| Class AB Mg/Kg Biomass | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 18»19 | 19»20 | 20»21 | 21»22 | 22»23 | 23»24 | 2024% | Evolution |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aminopenicillins | 30,41 | 30,07 | 30,81 | 26,89 | 22,44 | 17,53 | 17,43 | -1,13 % | 2,47 % | -12,72 % | -16,55 % | -21,87 % | -0,56 % | 29,69 % | |
| Tetracyclines | 26,12 | 19,83 | 19,18 | 17,32 | 13,29 | 9,58 | 9,29 | -24,08 % | -3,28 % | -9,70 % | -23,30 % | -27,89 % | -3,03 % | 15,82 % | |
| Sulfonamides and trimethoprim | 18,24 | 17,69 | 16,72 | 16,35 | 12,16 | 7,31 | 8,66 | -3,04 % | -5,50 % | -2,20 % | -25,60 % | -39,86 % | 18,40 % | 14,75 % | |
| Macrolides | 5,95 | 5,52 | 6,42 | 6,62 | 6,28 | 7,18 | 7,93 | -7,25 % | 16,39 % | 3,04 % | -5,14 % | 14,46 % | 10,39 % | 13,50 % | |
| Amino- (glyco)sides | 3,74 | 4,55 | 4,27 | 4,53 | 4,37 | 3,96 | 5,53 | 21,59 % | -6,21 % | 6,12 % | -3,63 % | -9,30 % | 39,64 % | 9,42 % | |
| Penicillins | 5,11 | 4,22 | 4,19 | 3,84 | 5,23 | 3,85 | 3,53 | -17,29 % | -0,91 % | -8,34 % | 36,38 % | -26,33 % | -8,47 % | 6,01 % | |
| Lincosamides | 2,20 | 2,57 | 2,32 | 1,90 | 2,09 | 1,43 | 2,11 | 16,73 % | -9,88 % | -18,08 % | 10,25 % | -31,49 % | 47,13 % | 3,59 % | |
| Phenicols | 1,59 | 1,56 | 1,57 | 1,81 | 1,82 | 1,52 | 1,62 | -1,79 % | 0,41 % | 15,33 % | 0,87 % | -16,43 % | 6,31 % | 2,76 % | |
| Polymyxins | 1,73 | 1,50 | 1,33 | 1,16 | 0,57 | 0,62 | 0,69 | -13,25 % | -11,24 % | -12,62 % | -50,79 % | 8,01 % | 11,81 % | 1,18 % | |
| Aminopenicillins with BLI | 0,49 | 0,56 | 0,55 | 0,57 | 0,55 | 0,63 | 0,63 | 14,55 % | -3,05 % | 4,52 % | -2,98 % | 14,42 % | 0,26 % | 1,08 % | |
| Cephalosporins 1G/2G | 0,38 | 0,52 | 0,62 | 0,60 | 0,49 | 0,64 | 0,58 | 37,93 % | 19,31 % | -3,73 % | -17,49 % | 29,40 % | -9,40 % | 0,99 % | |
| Quinolones | 0,44 | 0,48 | 0,65 | 0,35 | 0,59 | 0,53 | 0,40 | 9,84 % | 36,69 % | -46,02 % | 66,43 % | -10,25 % | -23,70 % | 0,69 % | |
| Other | 0,14 | 0,15 | 0,14 | 0,18 | 0,16 | 0,23 | 0,19 | 12,63 % | -10,70 % | 32,61 % | -10,71 % | 38,59 % | -15,94 % | 0,32 % | |
| Cephalosporins 3G/4G | 0,07 | 0,07 | 0,07 | 0,06 | 0,05 | 0,06 | 0,06 | -5,48 % | 3,61 % | -13,49 % | -16,97 % | 22,20 % | 1,59 % | 0,11 % | |
| Pleuromutilins | 0,74 | 0,55 | 0,27 | 0,18 | 0,16 | 0,13 | 0,06 | -25,92 % | -50,59 % | -31,99 % | -13,56 % | -21,01 % | -53,47 % | 0,10 % | |

In 2024, the sales of three out of the eight main antibacterial classes decreased, with the two top-selling classes reaching their lowest level on record. In contrast, sales volumes increased for the combination of sulphonamides and trimethoprim, macrolides, amino(glyco)sides, lincosamides and phenicols.

Sales of 3rd and 4th generation cephalosporins and quinolones-classified as Critically Important Antibacterials (CIAs)-declined by 21,7 % in 2024 compared to 2023 primarily driven by the reduction in quinolone sales.

The evolution graphs in *Figure 23* illustrate the consistent downward trend between 2018 and 2024 for aminopenicillins, pleuromutulins and tetracyclines. A downward trend is also observed for penicillins, polymyxins, lincosamides, 3th and 4th generation cephalosporines and the sulfonamides/trimethoprim combination even though sales increased in the last year for the combination of sulfonamides and trimethoprim, lincosamides, polymyxins and 3rd and 4th generation cephalosporines.

While quinolone sales have shown fluctuations over time, the overall trend remains relatively stable.

Macrolides, amino(glyco)sides, phenicols, aminopenicillins associated with clavulanic acid, 1st and 2nd generation cephalosporines and the group of 'other' show increasing trends.

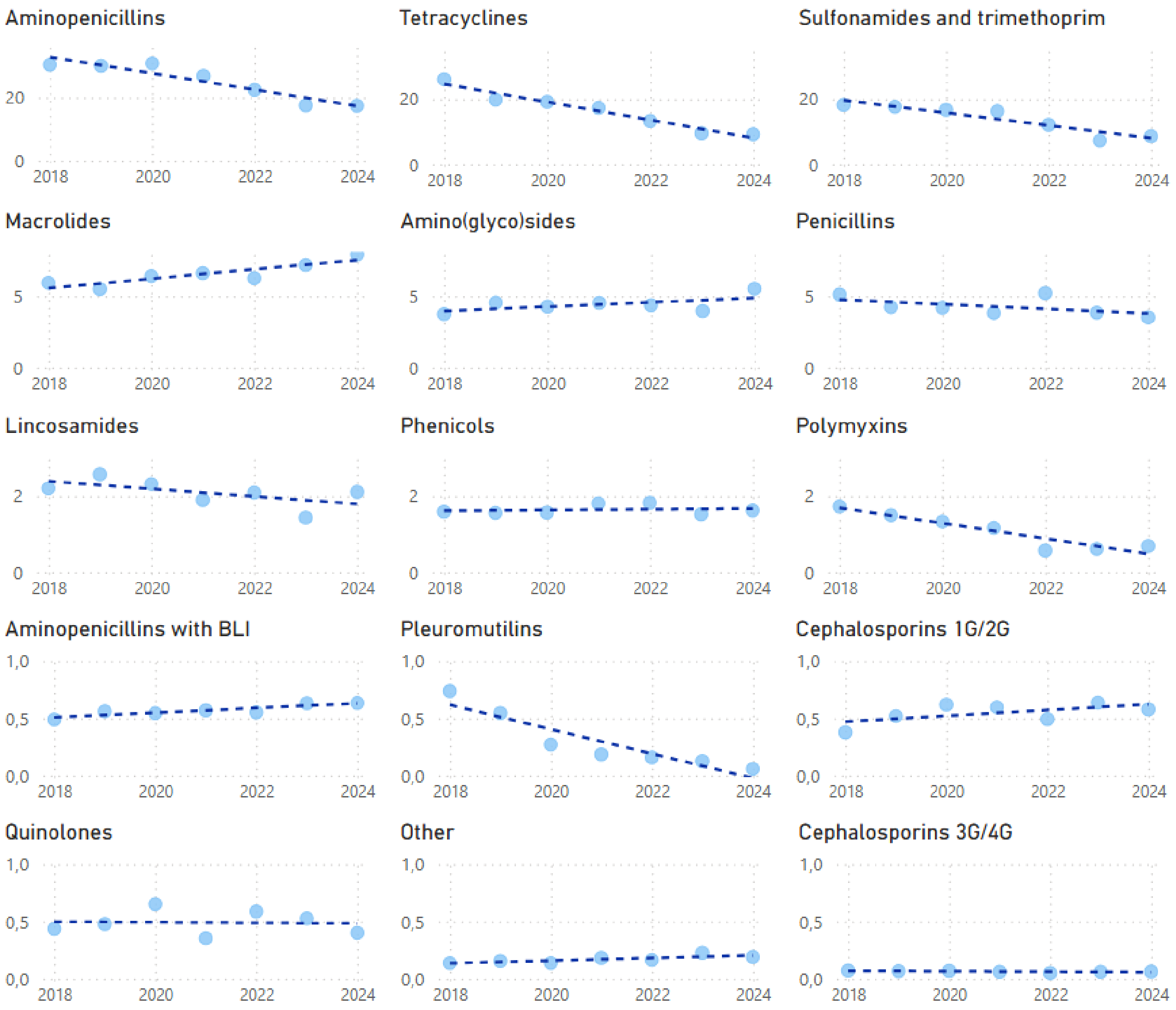



**Figure 23. Evolution in the sales (mg/kg biomass) per antibacterial class between 2018 and 2024.**

## Sales of antibacterial VMPs per administration route

In 2024, VMPs for oral administration accounted for a bit more than three quarters of the total sales of antibacterials, followed by injectable VMPs (15,26 %), premixes (5,19 %) and VMPs for intramammary use (0,53 %) (*Figure 24*). The share of VMPs with 'Other' administration routes corresponds roughly half/half to intra-uterine and cutaneous VMPs. Compared to 2023, VMP's for oral use are still increasing at the expense of injectable VMPs.

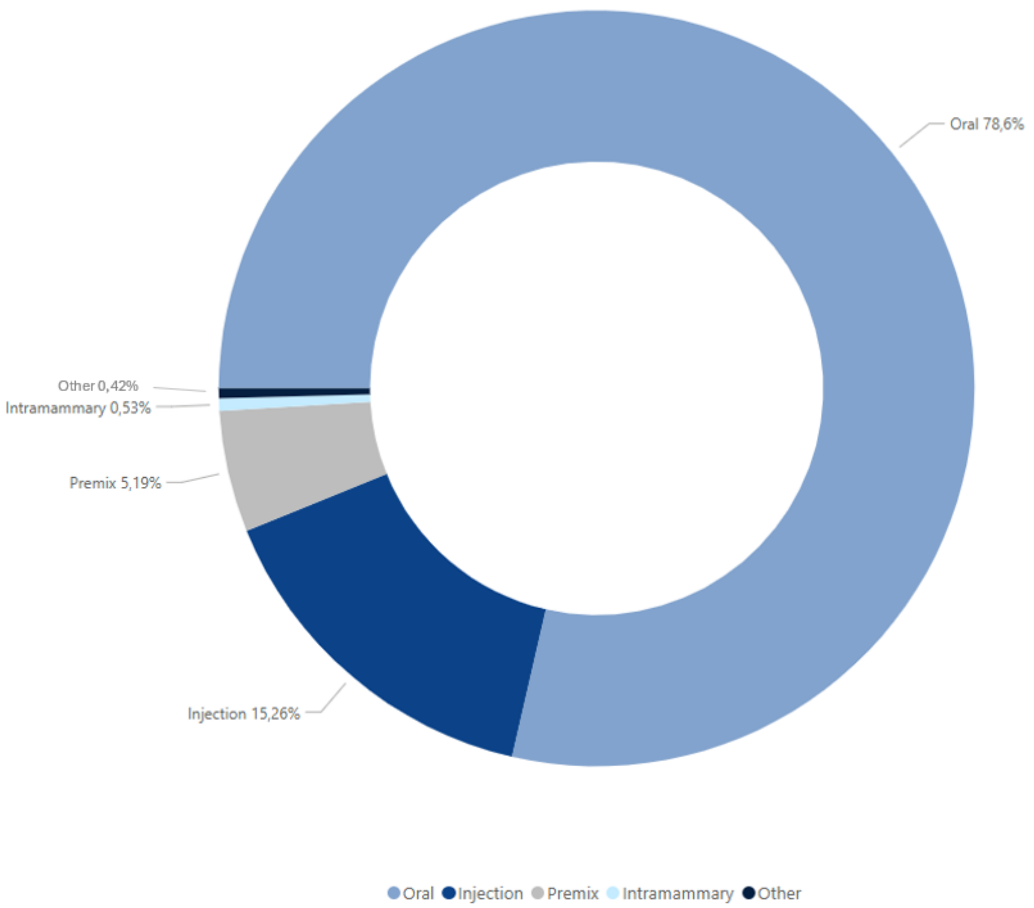



**Figure 24. Proportion of sales of antibacterial pharmaceuticals and antibacterial premixes per administration route in 2024.**

## Sales of antibacterial VMPs per antibacterial class and administration route

Evidently, the vast majority of antibacterial classes sold in 2024 were formulated as VMPs for oral administration (*Figure 25*). For the penicillins and phenicols, injectable VMPs had the largest share. While in 2023, injectable VMPs made up a significant portion(>20 %) of total sales for all generations of cephalosporins, lincosamides and amino(glyco)sides, this trend continued in 2024 only for 3rd and 4th generation cephalosporins. Remarkably, for 3rd and 4th generation cephalosporins, more than two thirds of sales were for intramammary use. Most premixes contained aminopenicillins, pleuromutilins (tiamulin) and tetracyclines.

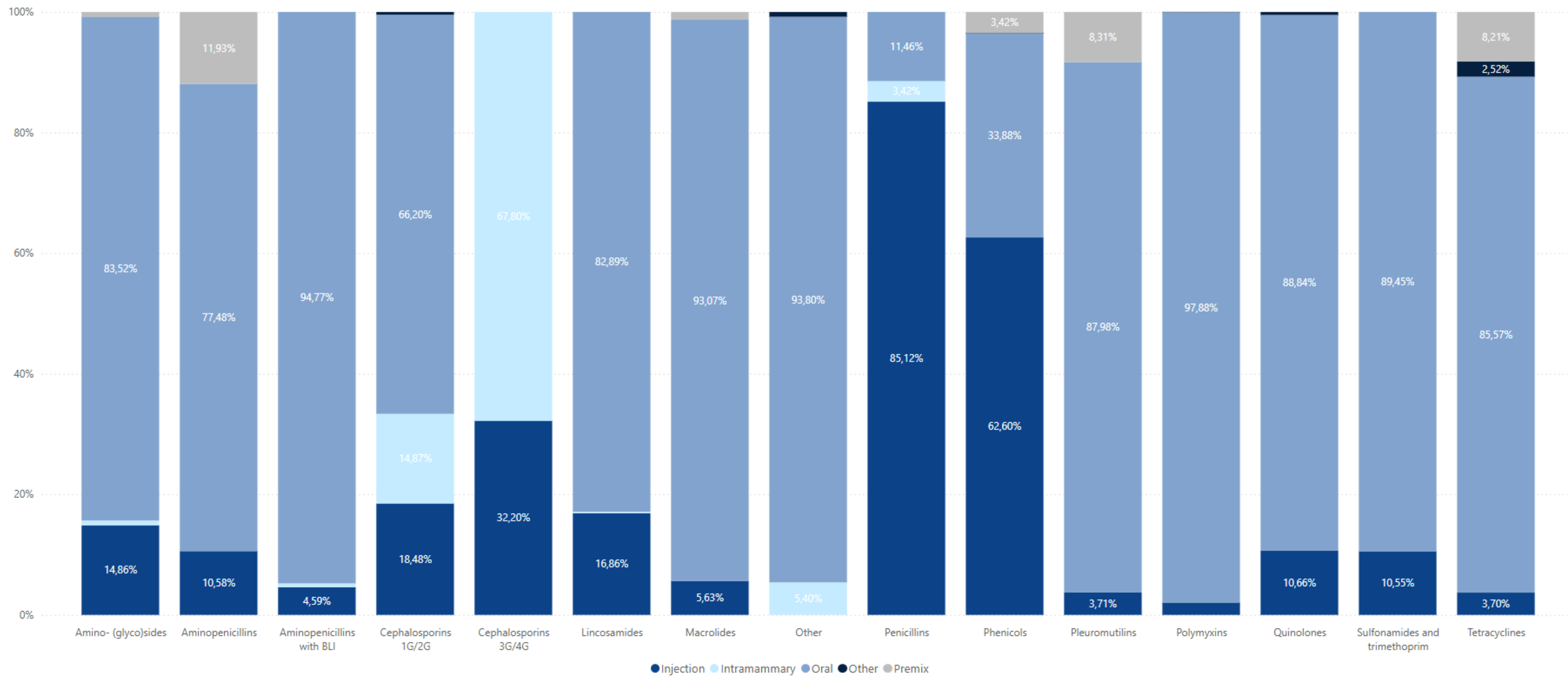
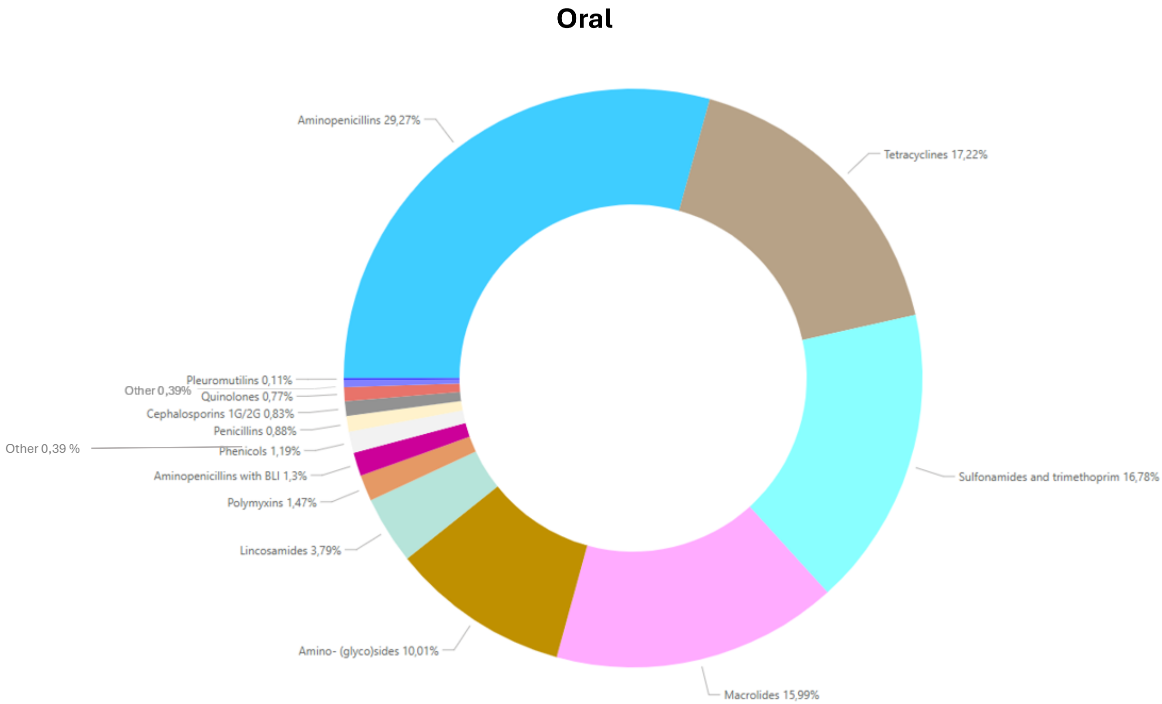
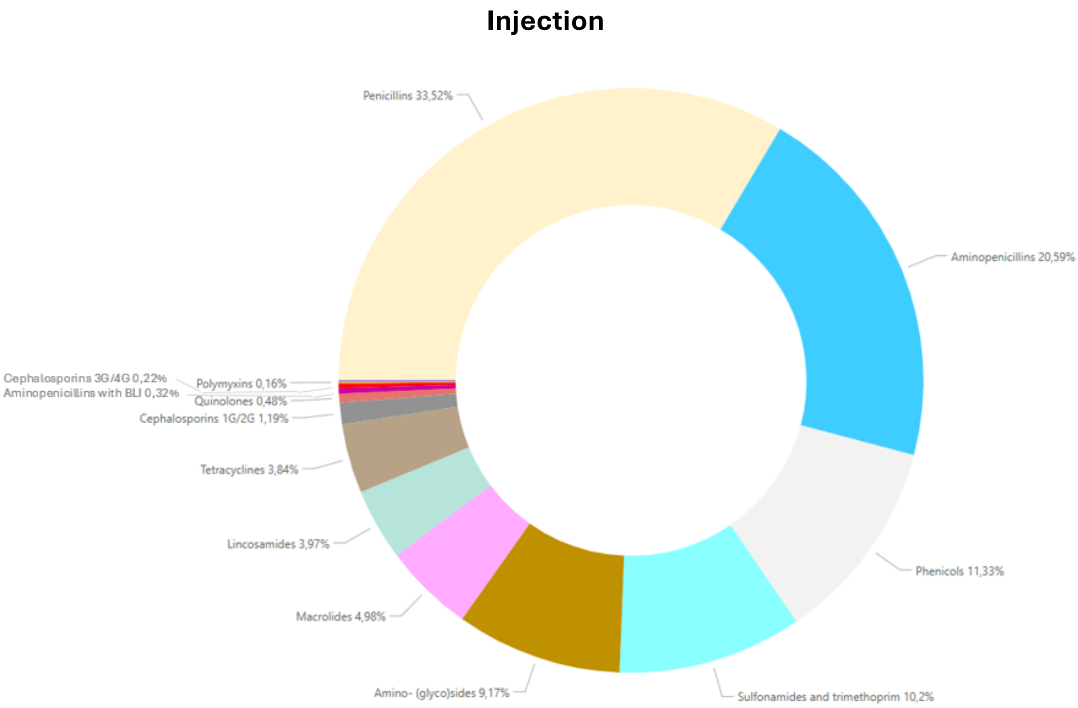
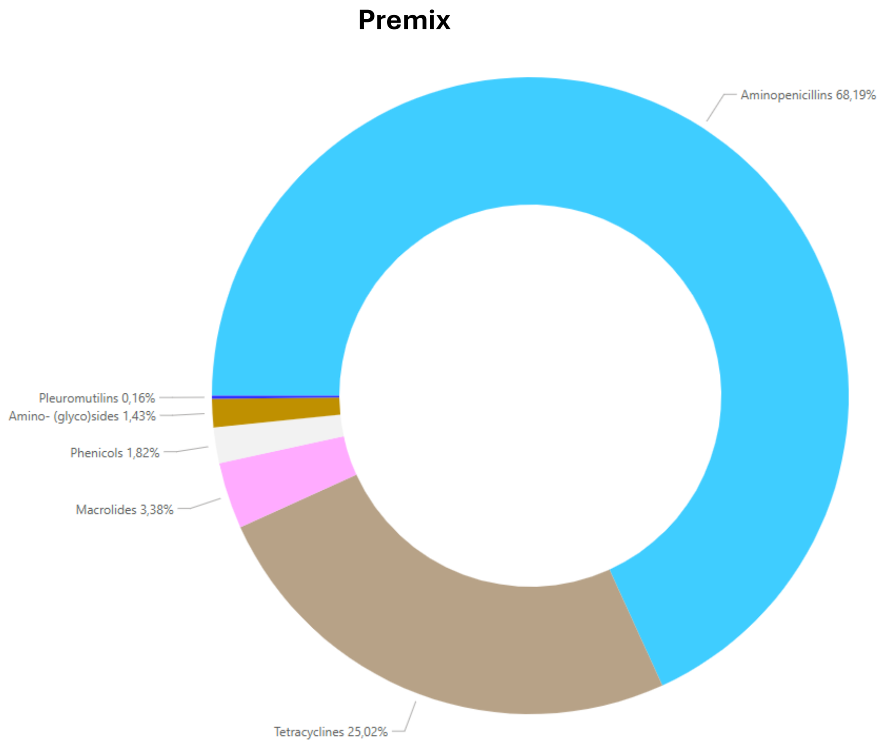


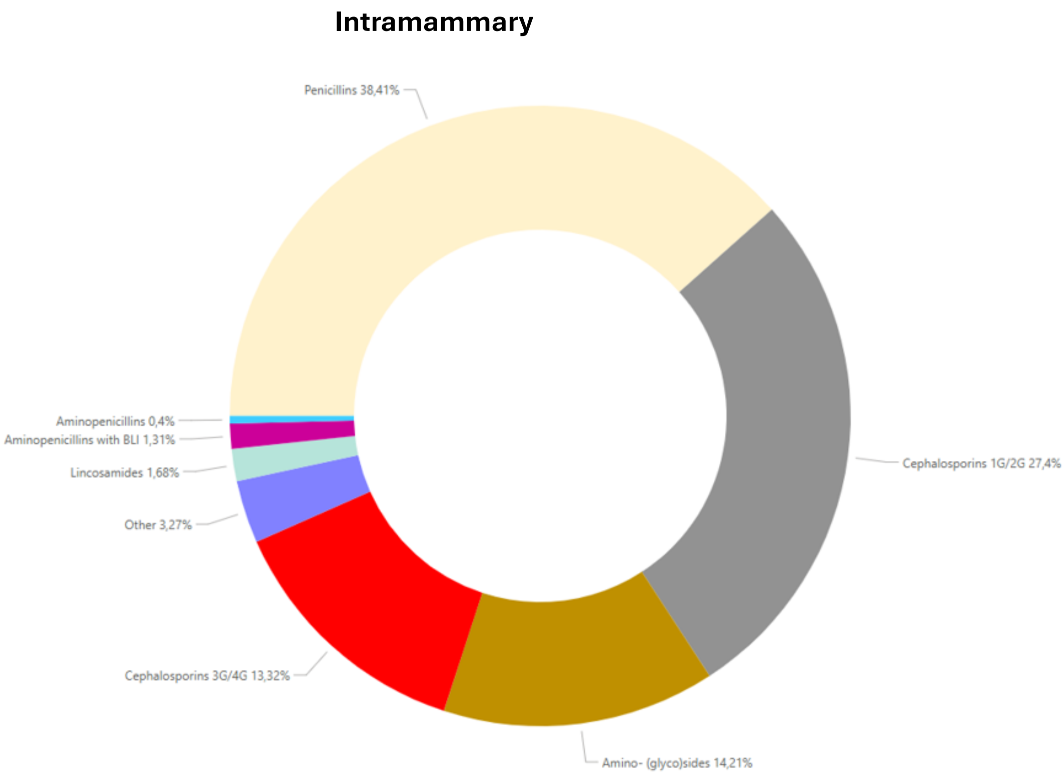

**Figure 25. Proportion of sales (mg/kg biomass) per administration route for each antibacterial class in 2024.**

***Figure 26*** depicts the proportion of each antibacterial class per administration route for 2024 (legend at the end of the graph, p. 78).




Premix
Aminopenicillins 68,19%
Pleuromutilins 0,16%
Amino- (glyco)sides 1,43%
Phenicols 1,82%
Macrolides 3,38%
Tetracyclines 25,02%


Intramammary
Penicillins 38,41%
Aminopenicillins 0,4%
Aminopenicillins with BLI 1,31%
Lincosamides 1,68%
Other 3,27%
Cephalosporins 3G/4G 13,32%
Amino- (glyco)sides 14,21%
Cephalosporins 1G/2G 27,4%

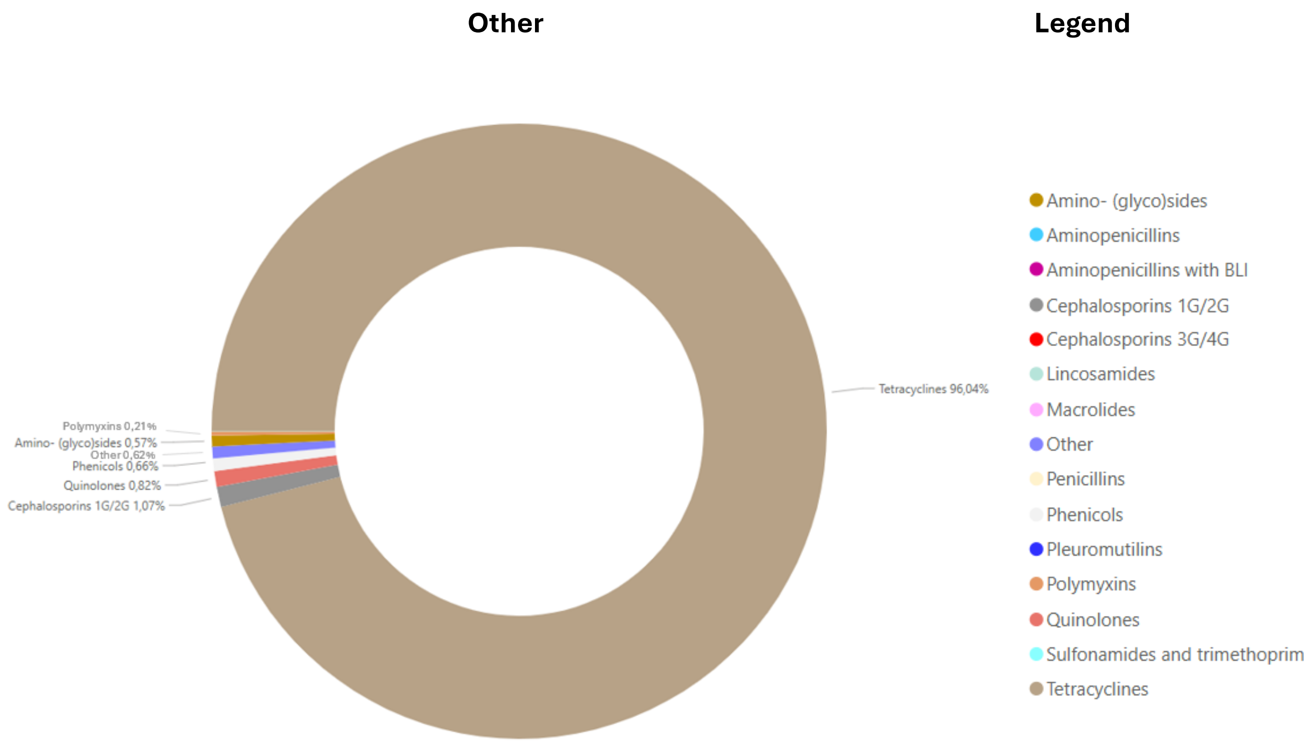



**Figure 26. Proportion of sales (mg/kg biomass) per antibacterial class for each administration route in 2024.**

As oral VMPs account for the majority of sales across nearly all antibacterial classes, their distribution looks very similar to the overall sales distribution presented in *Figure 22.* The largest shares are held by aminopenicillins (32,97 %), the combination of sulfonamides and trimethoprim (20,77 %), tetracyclines (19,23 %), and macrolides (10,7 %). For injectable VMPs, the top three classes are somewhat different, with penicillins leading (37,8 %), followed by tetracyclines (16,73 %) and phenicols (10,31 %). The Penicillins are also the most common antibacterial class for intramammary VMPs (42,27 %), followed by the 1$^{st}$ and 2$^{nd}$ generation cephalosporins (24,01 %), amino(glyco)sides (16,03 %) and 3$^{rd}$ and 4$^{th}$ generation cephalosporins (13,32 %). Compared to 2023, the distribution of the oral VMPs shifted, with sulfonamides and trimethoprim combinations rising to second place. For the injectable VMPs, phenicols entered the top three at the expense of aminopenicillins.

With premix use continuing to decline and a complete phase-out scheduled for 2027, it is worth considering whether the rise in pharmaceuticals sales in 2024 reflects a potential replacement effect. A closer look into the data of the two substances of antibacterials that are most applied in premixes, amoxicillin (first place) and doxycycline, shows that, for doxycycline, the sold quantity of both premixes and pharmaceuticals actually increased in 2024. For amoxycillin, there was a clear decrease in premix sales, and an increase in pharmaceuticals sales, even so, the rise in sales did not match the scale of the reduction. These are assumptions, however, remain indirect , with many factors possibly at play influencing the year-to-year fluctuations.

## Comparison of Sanitel-Med use data with sales data per antibacterial class

As in previous years, the rankings of the most sold and used antibiotic classes largely correspond (*Table 28*). Pigs account for the majority of aminopenicillins, tetracyclines, polymyxins and pleuromutilins, whereas poultry remains the primary contributor for macrolides and quinolones. The inclusion of dairy and beef cattle has had the greatest effect on the sales of penicillins and cephalosporins and also contributes significantly to the sales of phenicols and amino(glyco)sides.

**Table 28. Total tonnes per antibacterial class sold in 2024 vs. tonnes used in pigs, poultry, veal calves, and dairy and beef cattle ('bovines') as reported in Sanitel-Med in 2024. Next to the absolute number of tonnes used, the % this covers of the sales data is shown.**

| Antibacterial class | Sales 2024 | Total use 2024 | % sales | Use in pigs 2024 | % sales (pig) | Use in poultry 2024 | % sales (poultry) | Use in veal 2024 | % sales (veal) | Use in bovines 2024 | % sales (bovines) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Totals** | **117,59** | **98,55** | **84%** | **52,90** | **45%** | **18,60** | **16%** | **13,20** | **11%** | **13,85** | **12%** |
| Aminopenicillins | 34,91 | 33,08 | 95% | 26,16 | 75% | 2,28 | 7% | 3,27 | 9% | 1,37 | 4% |
| Tetracyclines | 18,60 | 17,45 | 94% | 10,52 | 57% | 1,76 | 9% | 3,39 | 18% | 1,77 | 10% |
| Sulfonamides and trimethoprim | 17,34 | 10,71 | 62% | 6,70 | 39% | 1,36 | 8% | 0,99 | 6% | 1,67 | 10% |
| Macrolides | 15,88 | 13,80 | 87% | 2,62 | 16% | 7,61 | 48% | 2,76 | 17% | 0,82 | 5% |
| Amino(glyco)sides | 11,07 | 9,36 | 84% | 2,20 | 20% | 2,93 | 26% | 2,18 | 20% | 2,04 | 18% |
| Penicillins | 7,06 | 5,60 | 79% | 0,54 | 8% | 0,51 | 7% | 0,06 | 1% | 4,50 | 64% |
| Lincosamides | 4,23 | 3,32 | 79% | 1,50 | 36% | 1,48 | 35% | 0,03 | 1% | 0,31 | 7% |
| Phenicols | 3,25 | 2,72 | 84% | 1,37 | 42% | 0,05 | 2% | 0,49 | 15% | 0,81 | 25% |
| Polymyxins | 1,38 | 1,39 | 101% | 1,19 | 86% | 0,15 | 11% | 0,00 | 0% | 0,05 | 4% |
| Aminopenicillins with BLI | 1,27 | 0,06 | 4% | 0,00 | 0% | 0,00 | 0% | 0,00 | 0% | 0,06 | 4% |
| Cephalosporins 1G/2G | 1,16 | 0,37 | 32% | 0,01 | 0% | 0,00 | 0% | 0,00 | 0% | 0,37 | 32% |
| Quinolones | 0,81 | 0,51 | 64% | 0,00 | 0% | 0,47 | 59% | 0,03 | 3% | 0,01 | 2% |
| Other | 0,38 | 0,01 | 3% | 0,00 | 0% | 0,00 | 0% | 0,00 | 0% | 0,01 | 3% |
| Cephalosporins 3G/4G | 0,12 | 0,06 | 52% | 0,00 | 0% | 0,00 | 0% | 0,00 | 0% | 0,06 | 52% |
| Pleuromutilins | 0,12 | 0,10 | 81% | 0,10 | 81% | 0,00 | 0% | 0,00 | 0% | 0,00 | 0% |

## Farm-level use of the various antibacterial classes in pigs, poultry and veal calves

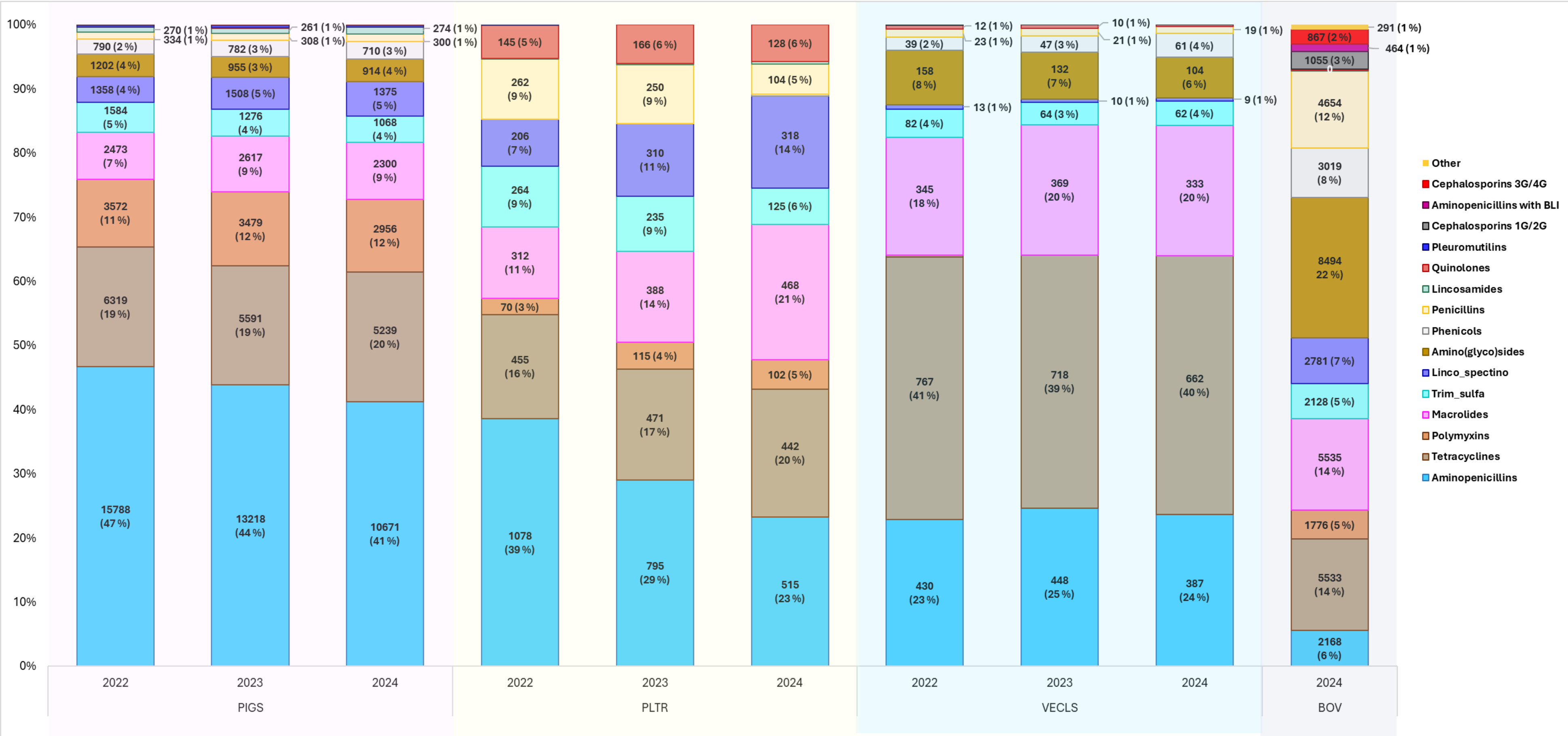



**Figure 27. Number of treatment days with the different antibacterial classes and percentage of the total number of treatment days per species in 2022 and 2023 (for pigs, broilers and laying hens, and veal calves) and 2024 (pigs, all poultry, veal calves, and dairy and beef cattle ('bovines'). Numbers/percentages not shown are classes where the use was below 1% of treatment days.**

In pigs, the reduction in the usage of aminopenicillins catches the eye, even though it remains by far the most used antibacterial class (*Figure 27*). All other classes showed reductions in absolute number of treatment days, but similar relative importance as in the previous years. Also in poultry, treatment days with amino-penicillins decreased dramatically, whereas the relative importance of tetracyclines, polymyxins, and especially macrolides and lincomycin-spectinomycin antibacterials increased. The importance of penicillins and trimethoprim-sulfonamide antibacterials decreased. It must be noted though that the comparison of the year-to-year results is hampered by the inclusion of the additional poultry categories in 2024 (and 2023) . In veal calves, the use of most –antibacterial classes remained stable, yet polymyxins and quinolones decreased to almost zero. The use pattern in cattle is quite different from the other species: aminopenicillins are of minor importance, whereas aminoglycosides are particularly prominent. T; tetracyclines, macrolides and penicillins show comparable levels of use. As noted earlier, cephalosporin use stands out as a key distinction between cattle and other livestock categories.

## Sales of intramammary antibacterial VMPs per antibacterial class

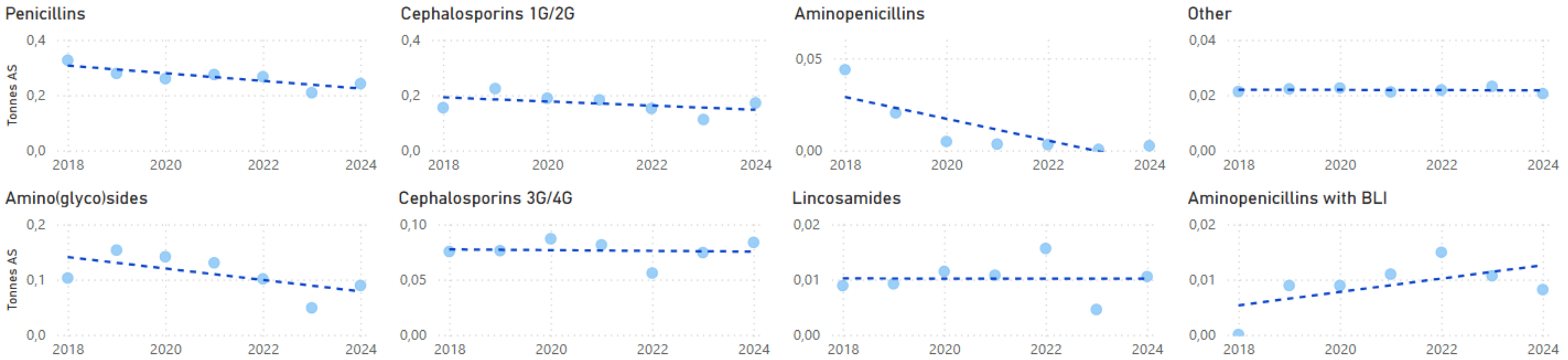
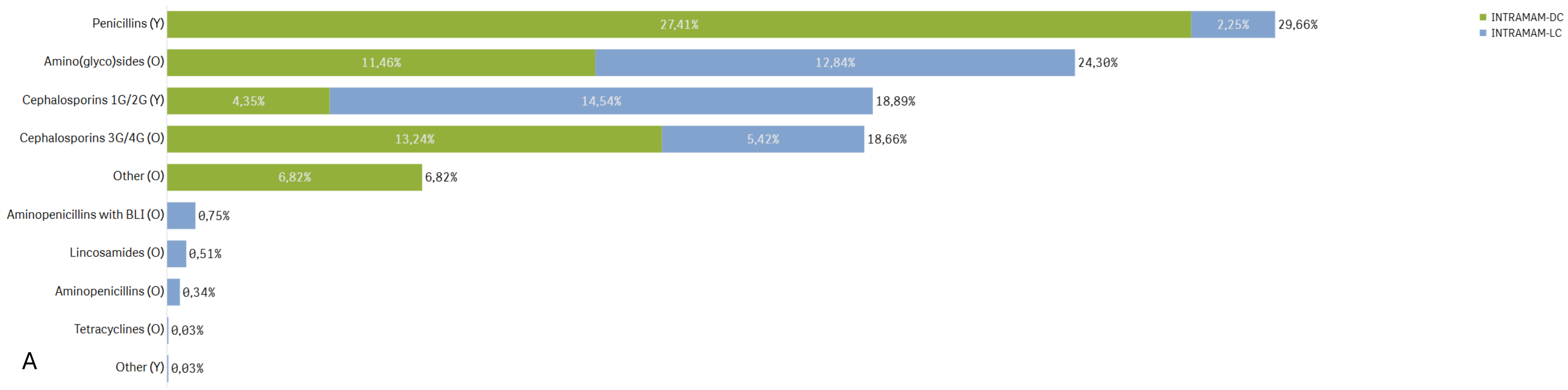



**Figure 28. Evolution in sales of antibacterials for intramammary use per antibacterial class between 2018 and 2024.**

*Figure 28* presents the evolution in sales of intramammary VMPs per antibacterial class in the last six years . Of the eight antibacterial classes, four have a decreasing trend, while three remain stable and one displays an increasing trend. In the most recent year, sales increased for amino(glyco)sides, all cephalosporins, lincosamides and penicillins. Specifically, 3rd and 4th generation cephalosporins saw a substantial increase over the last two years. In contrast, sales of aminopenicillins have sharply decreased since peaking in 2019 and are now nearly negligible. Encouragingly, although aminopenicillins in association with clavulanic acid had shown an upward trend until 2022, their use continues to decrease in 2024. The 'other' antibacterial VMPs category also experienced another drop.

## Use of intramammary antibacterial VMPs per antibacterial class



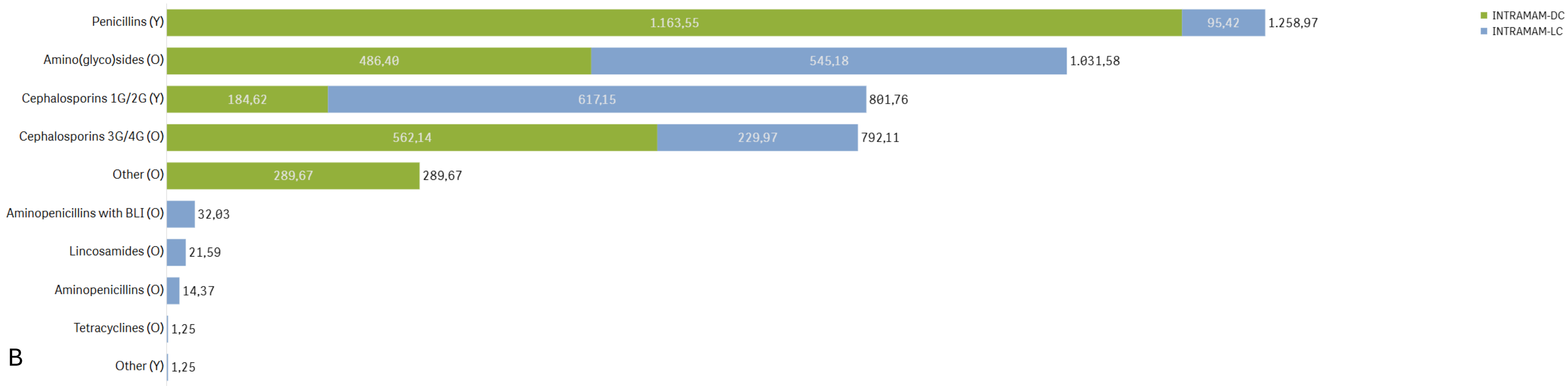



**Figure 29. The importance (A: %; B: absolute number of treatment days) of the different antibacterial classes for intramammary use in 2024, with distinction among tubes used for mastitis (LC) or dry cows (DC).**

In line with the sales data, the data of intramammary antibacterial use show that penicillins and aminoglycosides are of most importance, followed by the cephalosporins (*Figure 29*). Noteworthy, amino(glycol)sides and 1st and 2nd generation cephalosporins are more commonly used for mastitis treatment, whereas penicillins and, more worryingly, 3rd and 4th generation cephalosporins are mostly used during the drying off period.

# III.4 Sales and use of antibacterial VMPs per AMCRA colour code

## Sales of antibacterial VMPs per AMCRA colour code

The AMCRA[15] colour codes for veterinary antibacterial VMPs are linked to the AMCRA formulary which offers guidelines to veterinarians for responsible and prudent use of antibacterial VMPs. The first version of these guidelines, for the food producing animals pigs, poultry and cattle, was printed in 2013. Since then, guidelines for cats, dogs and horses have also been published and the printed versions have been supplemented by an online version[16] and a free app for iOS and Android.

These guidelines assign a colour code to the different antibacterial classes available in veterinary medicine, to differentiate and rank them in terms of their importance for public and animal health. This classification is based on the WHO list of antibacterial substances with importance for human medicine [17] and the lists produced by the World Organisation for Animal Health (WOAH), reflecting their relevance for veterinary medicine [18]. In determining the ranking of the antibacterial substances, priority was given to their importance for public health.

The VMPs with a yellow colour code contain antibacterial classes with the lowest importance for human medicine in terms of the risk for selection and transfer of antimicrobial resistance (AMR) and therefore no additional restrictions beyond any legal requirements, are suggested for the use of these substances. They include certain penicillins, sulfonamides (and diaminopyrimidines), $1^{st}$ and $2^{nd}$ generation cephalosporins, as well as phenicols.

The VMPs with an orange colour code are of a higher importance for human medicine. These should therefore be used with caution in veterinary medicine, only after accurate diagnostics allowing targeted therapy. This group contains the highest number of different molecules including macrolides, lincosamides, polymyxins, amino(glyco)sides, tetracyclines and aminopenicillins.

The VMPs with a red colour code are of the highest importance for human medicine. Therefore, their use in veterinary medicine should be avoided as much as possible. AMCRA advises to only use these critically important antibiotics (CIAs) under very strict conditions. Their use in food producing animals is, in agreement with the AMCRA advise, regulated by royal decree since 2016. An extension of the legal requirements to all animals was implemented on September $1^{st}$, 2024. This group contains the $3^{rd}$ and $4^{th}$ generation cephalosporins and quinolones.

*Figure 30* shows the proportion of the antibacterial sales in mg per kg biomass per AMCRA colour code for 2024. This figure shows illustrates that the orange-class continues to be the most widely used, accounting for 74,38 % of total usage, whereas the red-class molecules represent only a minimal share (0,72 %). It must be noted though that the red-class molecules are generally more modern molecules with a high potency and therefore a low molecular weight in relation to their treatment potential, leading to an inherently lower mass needed to treat an animal.

[15] www.amcra.be
[16] https://formularium.amcra.be/
[17] https://www.who.int/publications/i/item/9789241515528
[18] https://www.woah.org/app/uploads/2021/06/a-oie-list-antimicrobials-june2021.pdf

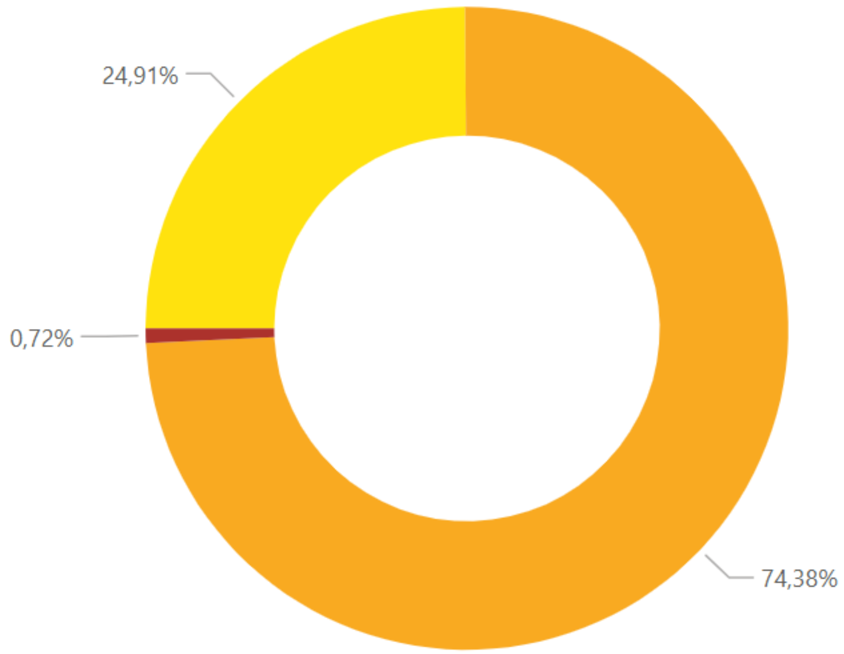



**Figure 30. Proportion of sales, in mg active antibacterial substance per kg biomass, of antibacterial VMPs per AMCRA colour code in 2024.**

The 2024 distribution of antibacterial sales in mg active substance per kg biomass per AMCRA colour code is similar to last year (***Figure 31***): a higher proportion of orange-class products sold resulted in a lower share of the yellow-class VMPs compared to the years before 2023. The share of red-class VMPs (0,7 %) fortunately dropped again and is now back at the level of 2020.

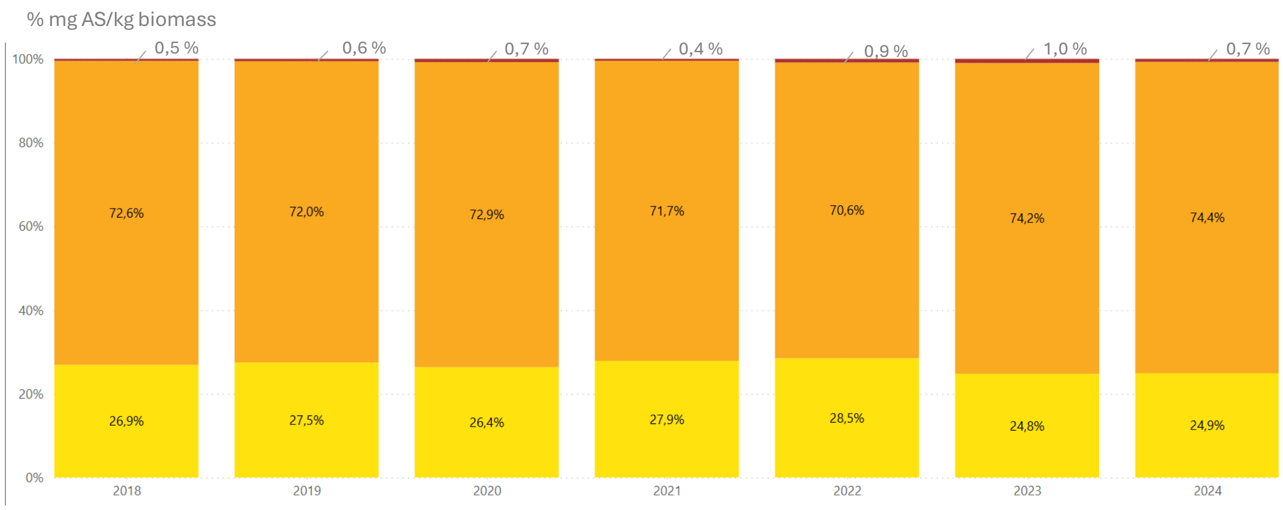



**Figure 31. Evolution of the proportional distribution of the antibacterial sales (mg active substance/kg biomass) per AMCRA colour code between 2018 and 2024.**

*Figure 32* shows the evolutions for each AMCRA colour code separately, expressed in mg active substance per kg biomass. This illustrates that together with the stable proportions over time, the quantity of both orange- and yellow-class VMPs has steadily decreased. However, in the last year, another increase was observed. The quantity of red-class VMPs remains consistently very low, and due to their small absolute volume, their usage tends to relatively fluctuate more noticeably.

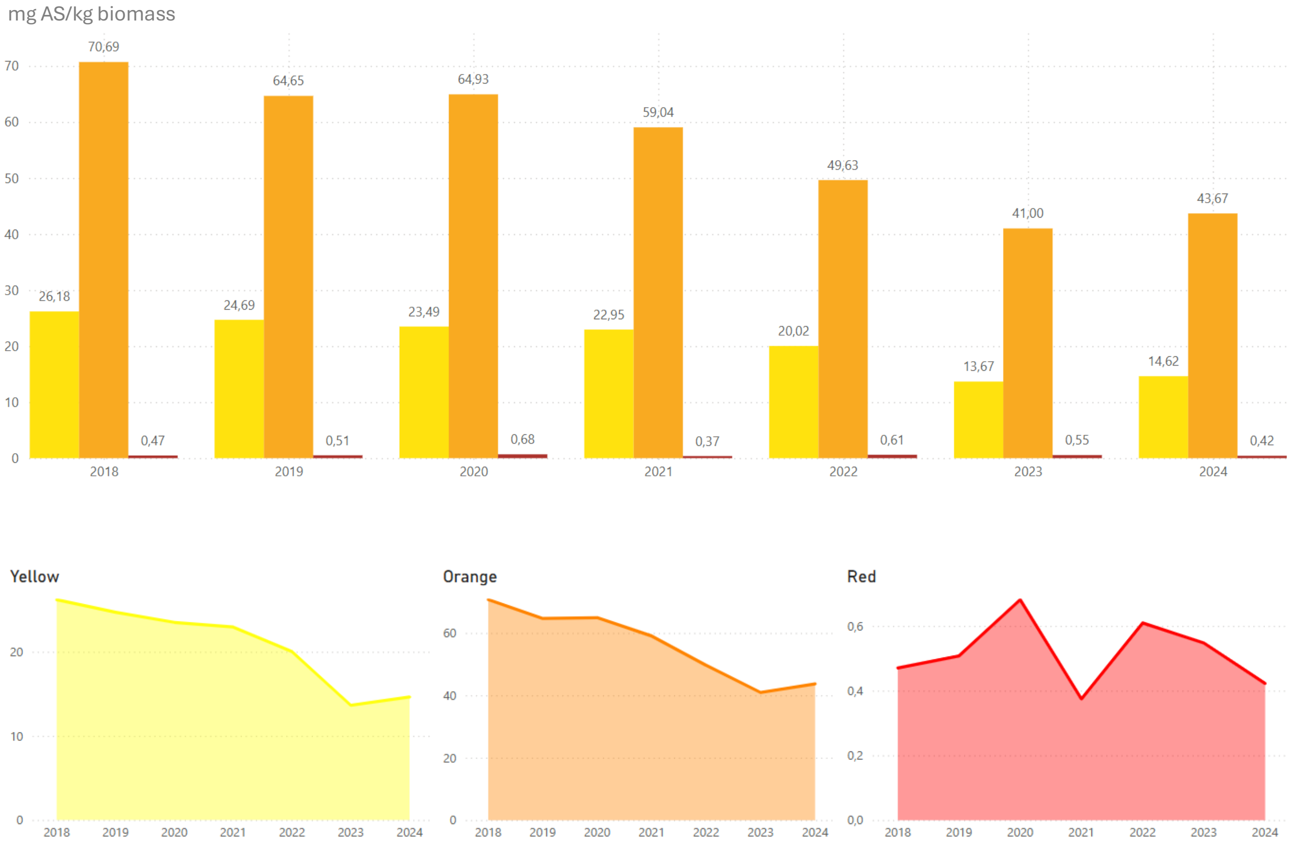



**Figure 32. Evolution of the antibacterial sales (mg/kg biomass) per AMCRA colour code between 2018 and 2024. The top graph uses the same Y-axis, allowing comparing of the quantities used, while the lower graphs have different Y-axes, allowing for a better view on the respective evolutions.**

Between 2023 and 2024, the sales of orange- and yellow-class molecules increased with 6,7 % and 7,1 %, respectively. After a huge increase of 62,7 % of the sales in sales of red-class molecules in 2022, a downward trend resumed in 2023 with a reduction of 10,1 %, which further deepened in 2024 with an additional reduction of 23,6 %. As a result, usage levels are once again approaching the low recorded in 2021.

It is important to note that in the graphs above, the 3rd and 4th generation cephalosporins for intramammary use are included in the orange-class molecules, as established in the AMCRA guidelines. The proportion of this application route in relation to the red-class molecules, and overall more details about the red-class molecules, are provided below.

## Sales and use of VMPs with a red AMCRA colour code

### a) Overall sales of VMPs with a red AMCRA colour code

Among the antibacterials classified under the red AMCRA code, quinolones contribute more significantly than 3rd and 4th generation cephalosporins (*Figure 33*). While sales of the latter remained stable over the past years, quinolone volumes fluctuated, with notable peaks in 2020 and 2022. As illustrated in *Figure 34,* Tese fluctuations are mainly driven by changes in flumequine sales.

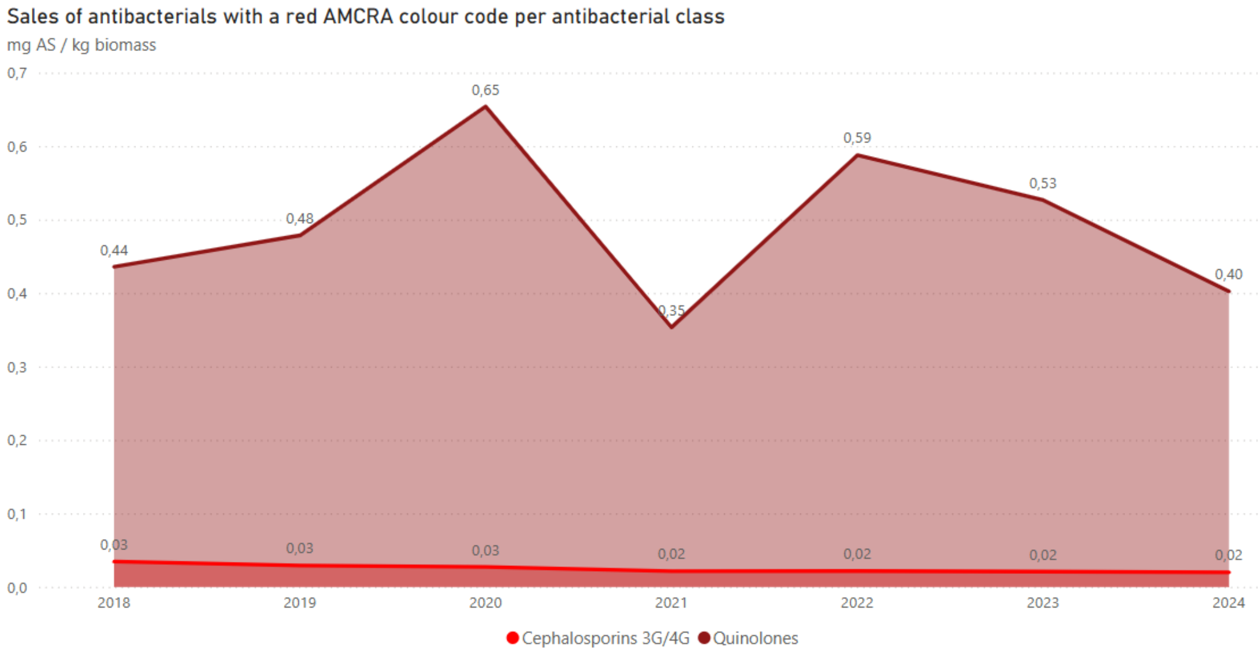



**Figure 33. Evolution since 2018 of the sales (mg active substance/kg biomass) of the two antibacterial classes with a red AMCRA colour code, excluding the 3rd and 4th generation cephalosporins for intramammary use.**

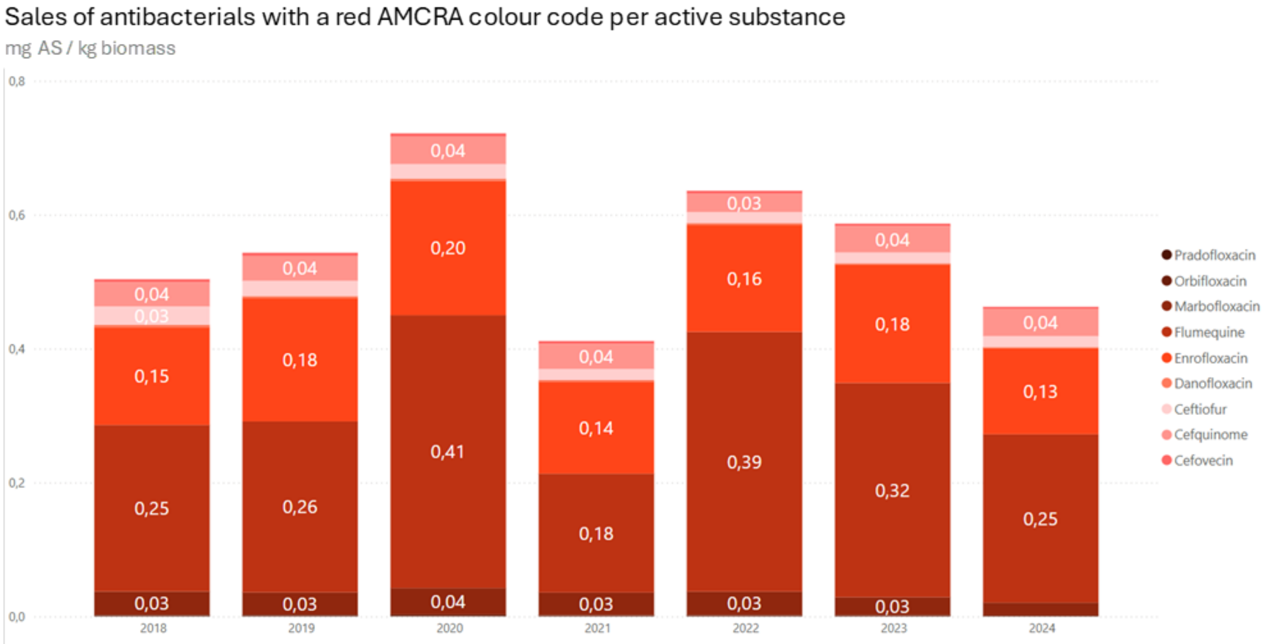
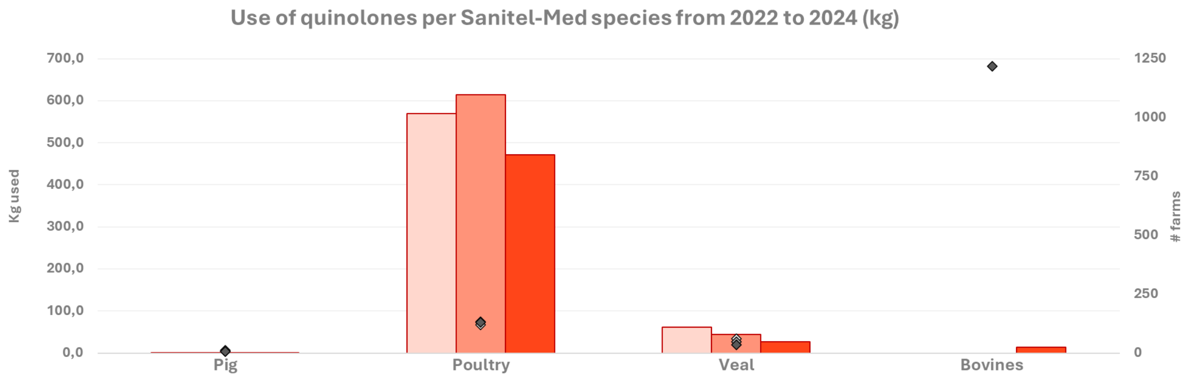



**Figure 34. Evolution since 2018 of the sales (mg/kg biomass) of the active antibacterial substances with a red AMCRA colour code, excluding the 3rd and 4th generation cephalosporins for intramammary application.**

## *b) Use of VMPs with a red colour code in pigs, poultry, veal calves, and dairy and beef cattle*



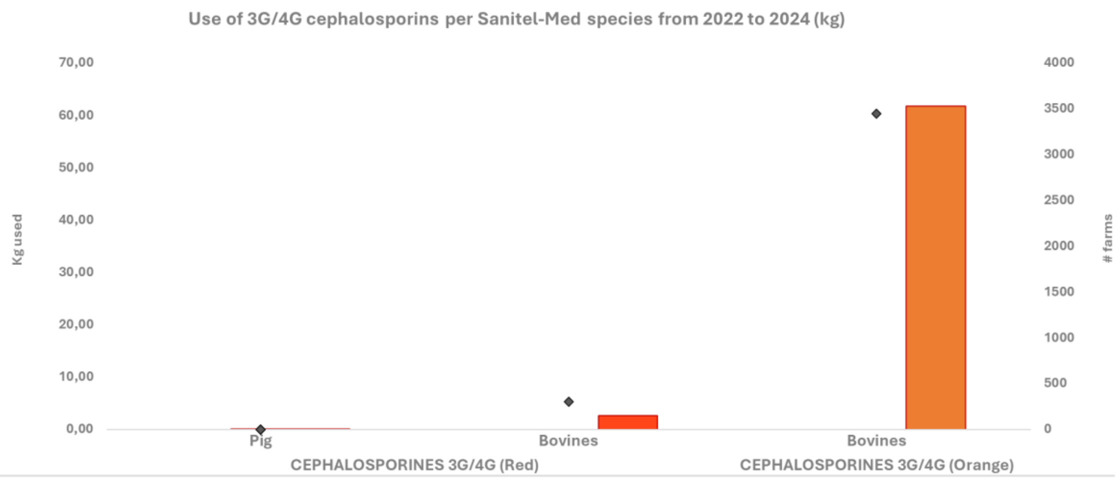

| | Pig | Poultry | Veal | Bovines |
|---|---|---|---|---|
| 2022 - Kg used | 0,2 | 569,8[1] | 62,3 | |
| 2023 - Kg used | 0,4 | 613,6[1] | 43,9 | |
| 2024 - Kg used | 0,4 | 472,1[2] | 27,0 | 13,7 |
| 2022 - #farms (%) | 7 (0,1) | 121[1] (9,9) | 60 (24,2) | |
| 2023 - #farms (%) | 11 (0,2) | 133[1] (10,7) | 49 (20,0) | |
| 2024 - #farms (%) | 7 (0,2) | 131[2] (8,6) | 35 (14,3) | 1219 (5,8) |

**Figure 35. Kg used of the quinolones in pigs, poultry and veal calves from 2022 to 2024, and in dairy and beef cattle in 2024, together with the number of farms with quinolone use notifications.**

*[1] Data of broilers and laying hens only. [2] Data of all poultry categories.*

Poultry remain the main users of quinolones (*Figure 35*). The used amount, however, markedly decreased in 2024. As noted in the graph, the data of 2024 include all poultry categories, meaning that the quantity used in broilers alone decreased even more, to 436 kg spread over 110 broiler farms (data not shown). This positive result, hopefully continues in 2025. Poultry accounts for the majority of the flumequine use, and likewise, flumequine represents the predominant antibacterial used in this species. The remainder is primarily used in veal calves. Among the more potent fluoroquinolones, enrofloxacin is also predominantly administered in poultry.

In pigs, the use of quinolones remained negligible, and also in veal calves, the used quantity of quinolones continued to decrease. Expressed in used kg, cattle appears to add only a minor portion to the used quinolones, however, it is quite remarkable to see that these substances were used in over 1 200 cattle farms. Use in cattle is only parenteral, with the more potent enrofloxacin, marbofloxacin and danofloxacin, the latter being exclusively used in cattle.




| | Pig – CEPHALOSPORINES 3G/4G (Red) | Bovines – CEPHALOSPORINES 3G/4G (Red) | Bovines – CEPHALOSPORINES 3G/4G (Orange) |
|---|---|---|---|
| 2022 - Kg used | 0,00 | | |
| 2023 - Kg used | 0,02 | | |
| 2024 - Kg used | 0,11 | 2,63 | 61,78 |
| 2022 - # farms (%) | 0 | | |
| 2023 - # farms (%) | 2 (0,04) | | |
| 2024 - # farms (%) | 2 (0,05) | 307 (1,47) | 3451 (16,48) |

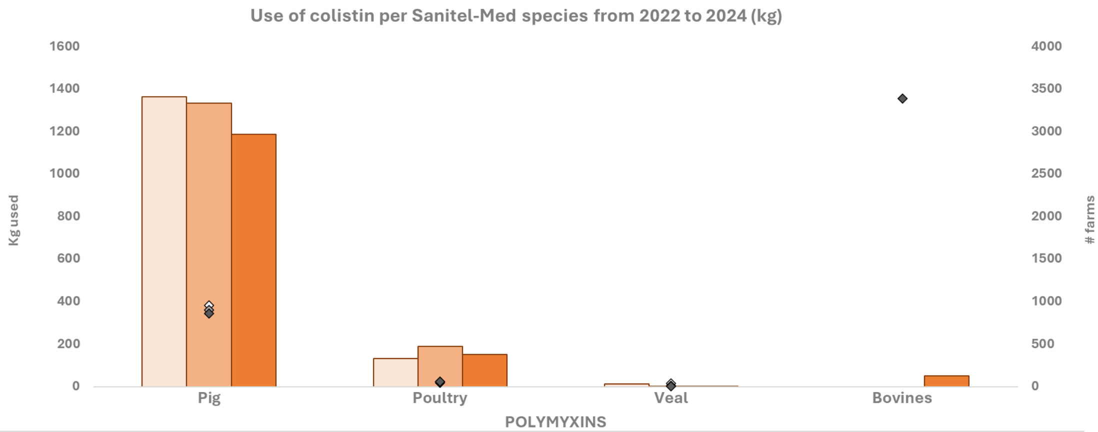
**Figure 36. Kg used of the 3rd and 4th generation cephalosporins in pigs from 2022 to 2024, and in beef and dairy cattle ('bovines') in 2024, and the number of farms with 3rd and 4th generation cephalosporin use notifications.**

As shown in ***Figure 36***, and earlier in ***Figure 27***, the inclusion of the dairy and beef cattle categories in the data drastically alters the picture of the use of the 3rd and 4th generation cephalosporins. Whereas the use data in the past years included marginal use in pigs, it appears that over 300 cattle farms use these products parenterally, which carries a red AMCRA colour code. In contrast, almost 3 500 farms used the same active substances intramammarily, which is classified under the orange AMCRA colour code. As explained earlier, this use is predominantly linked to the use during the drying-off period.

All use of molecules with a red AMCRA colour code is subjected to stringent legal requirements, meaning that on all these >1 500 cattle farms, adequate supportive (laboratory) data should be available for the use of quinolones and 3rd and 4th generation cephalosporins.

## Use of colistin

Colistin was labelled a CIA with the highest priority for public health by the WHO but it retained its orange colour code in the AMCRA guidelines in agreement with the stakeholders involved in its veterinary use. In contrast to the evolution of the sales data, the use data show a continued decrease in 2024, in all species that are monitored over the years, pigs in the first place. The data of poultry are slightly confounded by the addition of the extra poultry categories, even though only a minor quantity (approx. 3 kg) was used in those categories. Remarkably, the quantity used in broilers seems to increase over the years, reaching approximately 10 kg in 2024. In veal calves, the use of colistin continued to diminish in 2024. The used quantity in cattle was quite low but similar to the quinolones and cephalosporines, it is the high number of farms where these products are used that catches the eye.




| | Pig | Poultry | Veal | Bovines |
|---|---|---|---|---|
| 2022 - Kg used | 1364,2 | 131,4 | 11,8 | |
| 2023 - Kg used | 1334,7 | 188,6 | 2,4 | |
| 2024 - Kg used | 1187,7 | 151,5 | 0,9 | 51,9 |
| 2022 - # farms (%) | 959 (19,0) | 48[1] (3,9) | 37 (14,9) | |
| 2023 - # farms (%) | 900 (19,7) | 58[1] (4,7) | 11 (4,5) | |
| 2024 - # farms (%) | 860 (19,8) | 62[2] (4,1) | 6 (2,4) | 3391 (16,2) |

**Figure 37. Kg used of polymyxins (colistin) in pigs, poultry and veal calves from 2022 to 2024, and in beef and dairy cattle ('bovines') in 2024, and the number of farms with colistin use notifications.**

*[1] Data of broilers and laying hens only. [2] Data of all poultry categories*

## III.5 THE 2024 RESULTS IN LIGHT OF THE REDUCTION TARGETS

This BelVet-SAC report plays a key role in shaping the Belgian policy on antimicrobial sales and use in animals. This policy is constructed around reduction targets. The current targets, stemming from the AMCRA Vision 2024[19] and incorporated in both the covenant[20] between government and sectoral stakeholders, and in the Belgian "One Health" National Action Plan on the fight against AMR 2020-2024[21], are set until the end of 2024.

In general, it must be noted that even though the national targets refer to the 'use' of antibacterials, the indicator by which this is monitored in Belgium relies on the sales data, because the available use data in Belgium currently only cover the pigs, poultry (chicken and turkey),veal calves, and dairy and beef cattle, whereas the sales data capture the overall sales with no distinction between species.

There are four targets at national level:

1. A maximal antibacterial use of 60 mg/PCU (population correction unit), corresponding to approximately 50 mg/kg biomass or a reduction of 65% compared to the reference year 2011, by the end of 2024.
   This objective is driven by the aim to reach the European median level of antibacterial use by the end of 2024.
2. Reduce the use of colistin to a maximum of 1 mg/PCU by the end of 2024.
3. Achieve a reduction of at least 75% compared to 2011 in the use of feed medicated with antibacterials.
4. Yearly preserving the achieved reduction of 75% compared to 2011 in the use of CIAs (quinolones and 3rd and 4th generation cephalosporins).

A fifth target is situated at species level: for food-producing animals there ought to be species-specific targets in the form of animal category-specific target $BD_{100}$-threshold values and the goal of limiting the proportion of alarm users to a maximum of 1%.

Below, the 2024 results are assessed in relation to these five targets.

### Target 1: a maximum sale of antibacterials of 50 mg active substance per kg biomass by the end of 2024

#### *a) Evolution in antibacterial sales (mg/kg biomass) since the reference year 2011*

Between 2022 and 2023, the total amount of antibacterials sold per kg biomass dropped by 21,4 %, extending the downward trend observed over the past 12 years. Unfortunately, this progress was interrupted in 2024, when the sales increased once again. The total cumulative reduction in 2024,

[19] https://www.amcra.be/nl/visie-2024/
[20] https://www.amcra.be/swfiles/files/Convenant-AB-2021-2024_ondertekend.pdf
[21] https://www.health.belgium.be/sites/default/files/uploads/fields/fpshealth_theme_file/en-amr_one_health_national_plan_final_0.pdf

compared to the reference year 2011, stands at **59,9 %** (*Figure 38*), falling short of the 65 % reduction target.

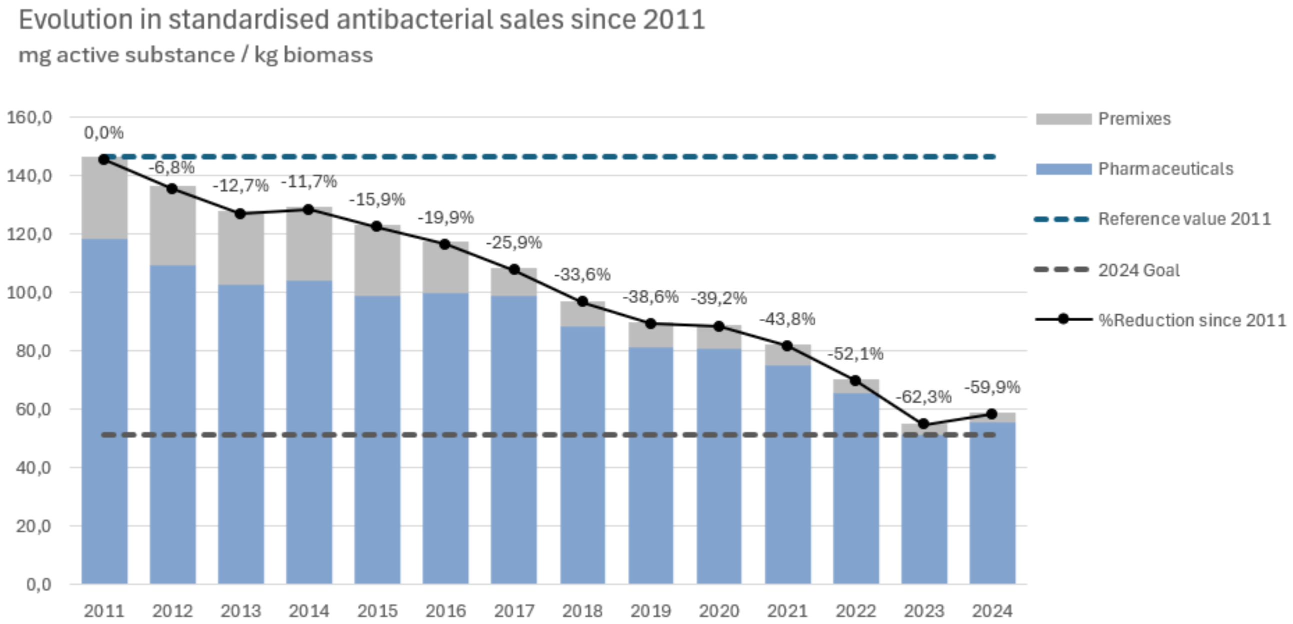



**Figure 38. Year-to-year results of total antibacterial VMP sales (mg active substance/kg biomass) with 2011 as a reference year.**

### *b) Positioning of Belgium in comparison to the other EU member states*

The baseline for the first national target on antibacterial use is defined by the aim to achieve the median European antibacterial use. These data are available in the ESVAC reports: between 2009 and 2022 the European Medicines Agency (EMA) ran the European Surveillance of Veterinary Antibacterial Consumption (ESVAC) project that collected the antibacterial **sales data** in EU Member States on a voluntary basis, in a comparable manner, allowing to evaluate trends and to compare sales within and between countries. Voluntary participation in the ESVAC project increased from 9 to 31 reporting countries over the years. The data that were collected in Belgium and presented in the previous BelVet-SAC reports were also collected in the framework of this EU-wide ESVAC data collection effort.

As of January 2024, all European Union (EU) / European Economic Area (EEA) Member States have to report the **volume of sales and use of antimicrobial medicinal products in animals** via EMA's Antimicrobial Sales and Use Platform (ASU)[22], in line with the Veterinary Medicinal Products Regulation[23]. This new report is called the European Sales and Use of Antimicrobials for Veterinary Medicine (ESUAvet[24]) annual surveillance report.

In 2025, the 1st ESUAvet report was published, presenting the annual surveillance report for 2023 with data on the volume of sales and use of antimicrobial VMPs under this legal framework coming from 29

[22] https://www.ema.europa.eu/en/veterinary-regulatory-overview/antimicrobial-resistance-veterinary-medicine/antimicrobial-sales-use-platform
[23] https://www.ema.europa.eu/en/veterinary-regulatory-overview/veterinary-medicinal-products-regulation
[24] https://www.ema.europa.eu/en/veterinary-regulatory-overview/antimicrobial-resistance-veterinary-medicine

EU countries, including Iceland and Norway [25]. It was the first time that use data were reported. The use data distinguished between cattle, pigs, chickens and turkeys, marking a significant step towards obtaining more granular information on antimicrobial consumption by species. In this report the antibacterial consumption in animals up to 2022 is presented in relation to the animal production in the country (PCU). The latter is comparable to the biomass used in the national mg/kg biomass indicators, but it also includes horses and food producing rabbits and corrects more thoroughly for import and export.

***Figure 39*** presents the 2023 data for 29 EU countries, illustrating that Belgium made large progress in previous years. However, other countries have also implemented measures leading to considerable decreases in veterinary antibacterial consumption, leading to a reduction in the EU median. This context is essential when interpreting the Belgian results: in the broader European context, it is not a unique performance, and as we are striving to reach the middle of the 'pack' we cannot afford to 'sit back and relax'.

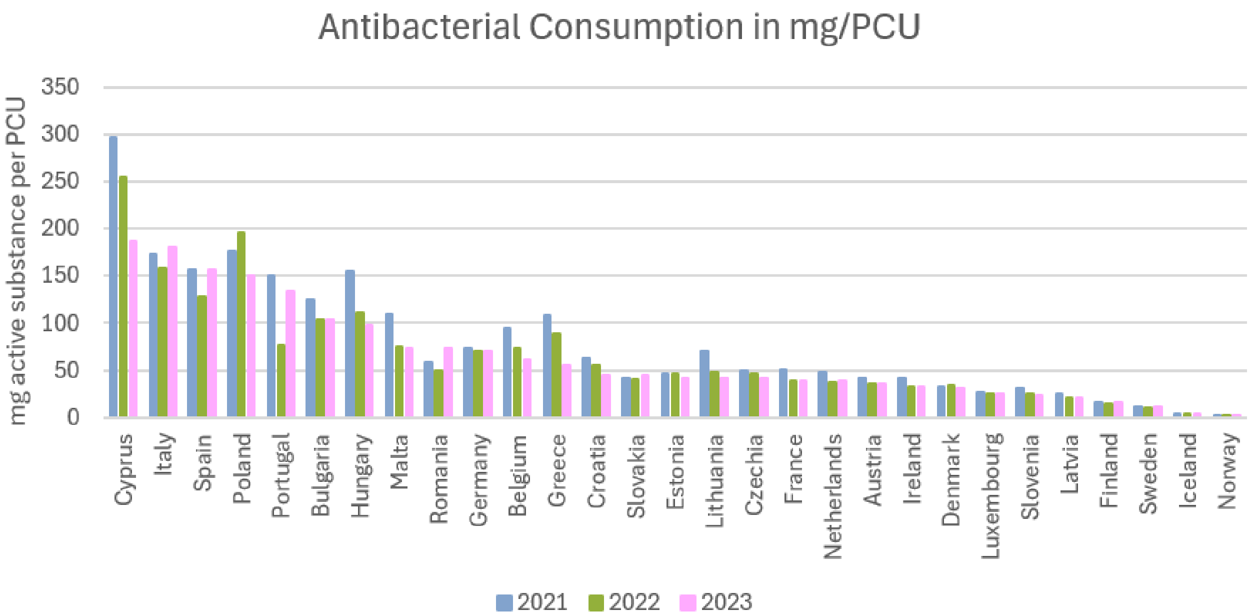



**Figure 39. EU countries progress in reducing antimicrobial sales (mg/PCU) for farmed animals and aquaculture from 2018 to 2023 (source: 1st annual surveillance report for 2023 from ESUAvet on European sales and use of antimicrobials for veterinary medicine.)**

Compared to countries with a comparable PCU composition as Belgium and a relatively comparable structure of livestock farming (Austria, Germany, the Netherlands, Spain), the use in Belgium is positioned in the middle: higher than in the Netherlands and Austria, but lower than in Spain and Germany (***Figure 40***).

[25] https://www.ema.europa.eu/en/documents/report/european-sales-use-antimicrobials-veterinary-medicine-annual-surveillance-report-2023_en.pdf

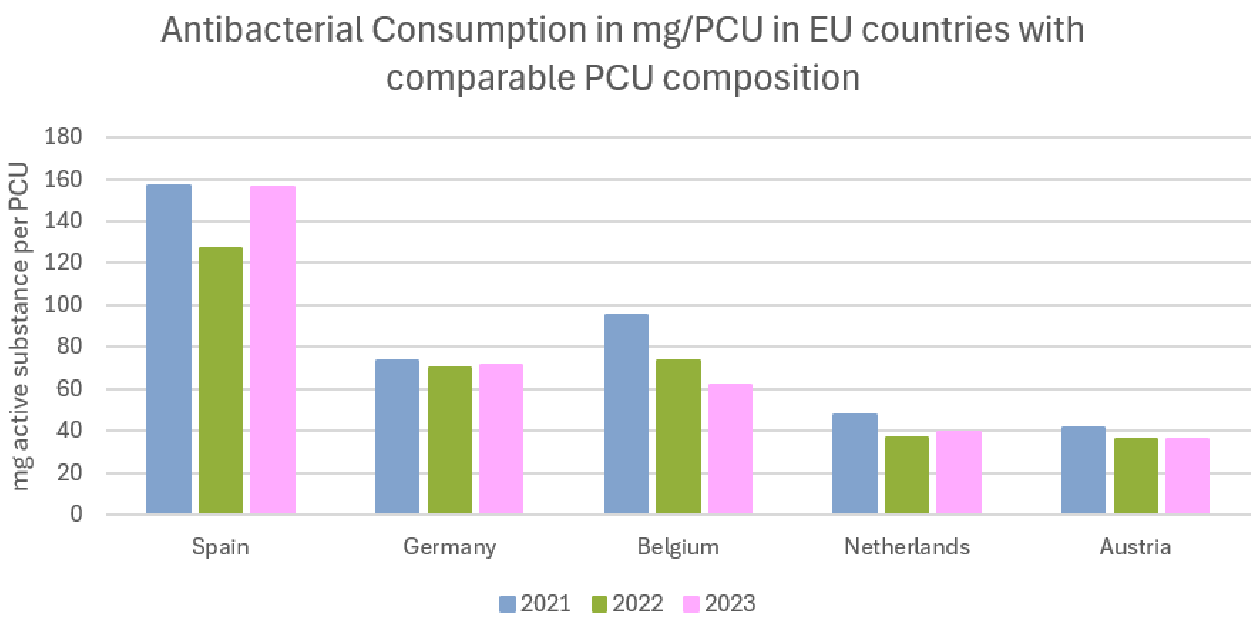



**Figure 40. Overall sales of antibacterials in mg/PCU in 2021-2023 (source: 1st annual surveillance report for 2023 from ESUAvet on European sales and use of antimicrobials for veterinary medicine) for Belgium and countries with a comparable PCU composition.**

## Target 2: a maximum sale of colistin of 1 mg/kg biomass by the end of 2024

In Chapter III.3 it was already mentioned that the polymyxin sales have increased from 0,62 mg/kg biomass in 2023 to 0,69 mg/kg biomass in 2024. The 2024 target has been reached, but it is the second year in a row that the sales of polymyxins are increasing, so caution is warranted. *Figure 41* presents the evolution in colistin sales (mg/kg biomass) since 2012.

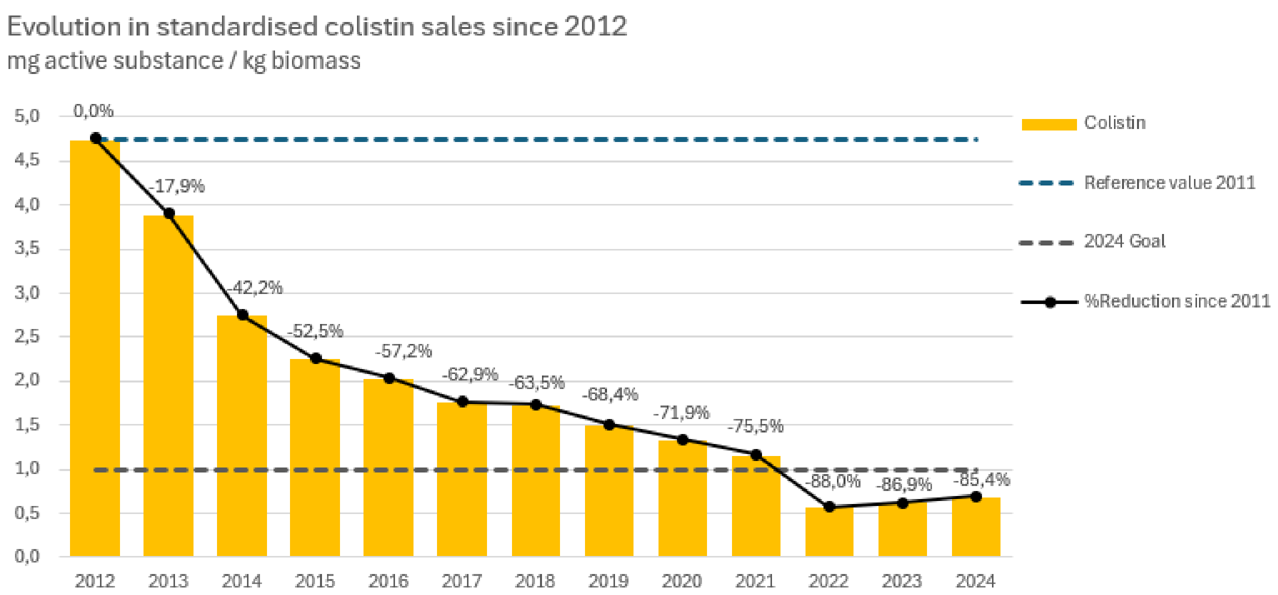



**Figure 41. Evolution of colistin sales (mg active substance/kg biomass) and current progress regarding the 2024 reduction target of 1 mg colistin/kg biomass.**

The lower dotted line represents the 2024 goal of 1 mg/kg biomass (note that the target of 1 mg/PCU is loosely translated into a target of 1 mg/kg biomass, as achieving the latter will surely lead to achieving the former because the PCU denominator is typically bigger than the kg biomass denominator).

## Target 3: a 75 % reduction in sales of of medicated feed containing antibacterials between 2011 and 2024

As mentioned in Chapter III.1, the 2024 sales of antibacterial premixes further dropped with 19,2 %, resulting in a cumulative reduction of 89,1 % compared to the reference year 2011 (***Figure 42***). This means that its position relative to the target, which was already achieved in 2022, has been further strengthened. This is a very nice achievement, thanks to the coordinated efforts of the sector of the MMF and the veterinarians. It is praiseworthy that the sector of the MMF has set the target to completely phase out the production of antibacterial medicated feed by the end of 2027. However, close monitoring will be essential to prevent this from leading to a further increase in the use of pharmaceuticals use.

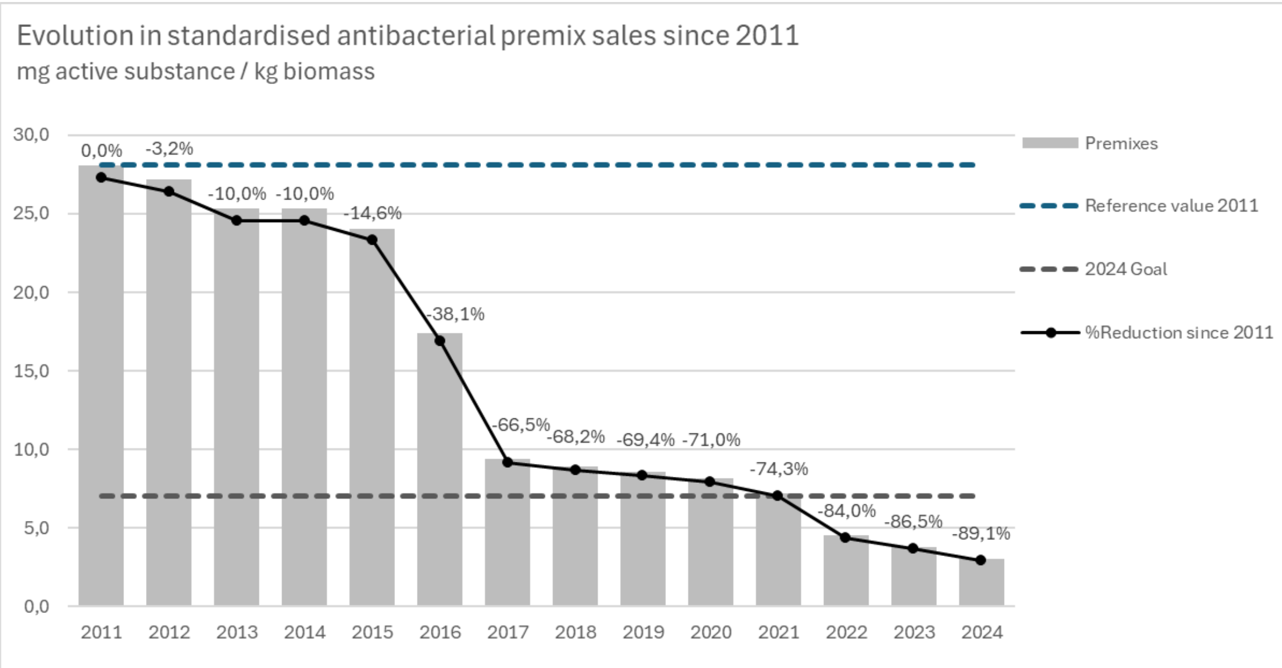



**Figure 42. Evolution of antibacterial premix sales (mg active substance/kg biomass) and current progress regarding the 2024 reduction target of 75 % reduction since the reference year 2011.**

## Target 4: maintain a minimum of 75 % reduction compared to 2011 of the sales of critically important antibiotics

In Chapters III.3 and III.4 it was already noted that, in general, sales of CIAs (quinolones and 3rd and 4th generation cephalosporins – incl. those for intramammary use) have decreased in 2024. Nonetheless, caution is needed regarding the slight increase for 3rd and 4th generation cephalosporines. ***Figure 43*** illustrates that while the 2023 results were still hovering just below the75 % reduction target, the goal has now been successfully achieved reached.

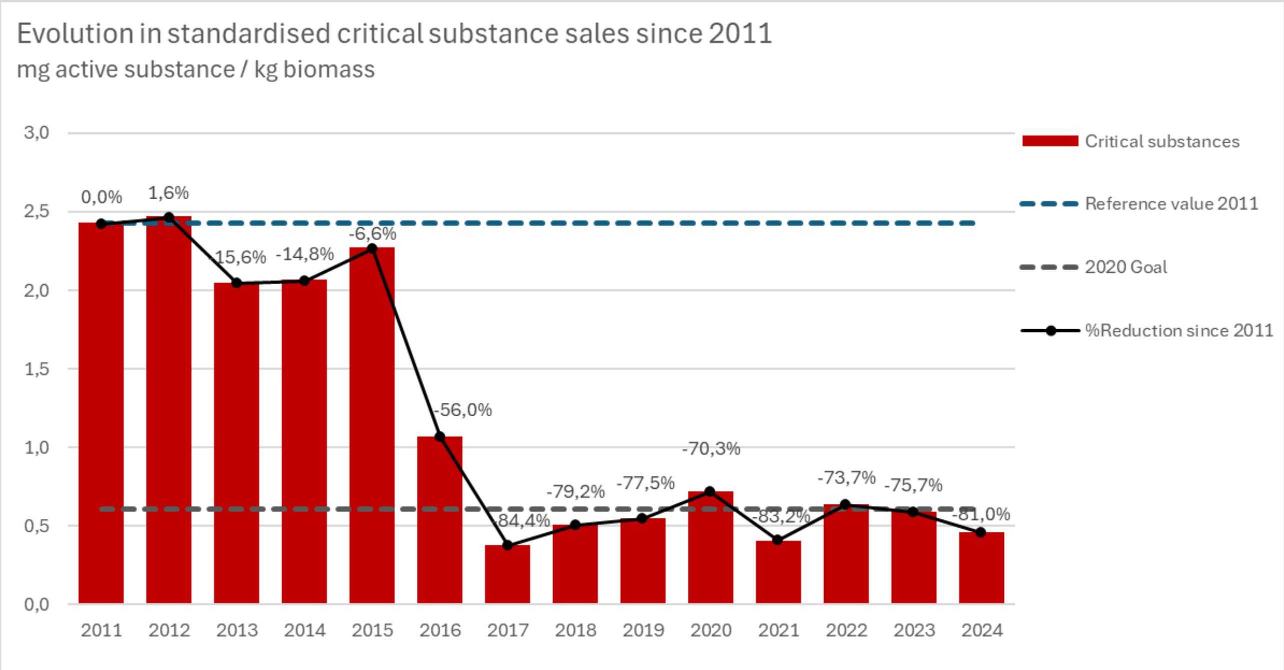



**Figure 43. Evolution of the sales of CIAs (quinolones and 3rd and 4th generation cephalosporines) in mg active substance/kg biomass since the reference year 2011.**

## Target 5: species-specific threshold values at farm-level and limit of 1% 'alarm users' by 2024

In 2020, benchmark threshold values ($BD_{100}$) were defined for each pig category, for broilers and for veal calves, in close cooperation with the sector stakeholders. These were the three species for which reliable and long-term usage data were available at that time (and still are today). These values were integrated in defined 'reduction paths', with progressively lower thresholds over time (see *Tables 16b-24b*). From the beginning, it was clear what the threshold values would be for low users (green zone), intermediate users (yellow zone), and high users (red zone)-throughout the whole period from 2021 to the end of 2024.

Additionally, the concept of 'alarm use' was introduced to identify farms with persistent high antibacterial use. This category includes farms that have remained in the red zone for two consecutive years-unless they achieved a reduction of at least 20% compared to the action threshold in the most recent year-or who have repeatedly fallen into the red zone in the past three years. As such, this group forms a subset of the red zone and are assigned a purple colour score to indicate heightened concern.

*Figure 44* summarises the percentage of farms, including zero-registration farms, in each benchmarking colour zone, based on the 2024 farm-level use results for the species involved, as well as for the pig categories separately. Pig farms with multiple pig categories receive a colour score based on their worst-scoring category.

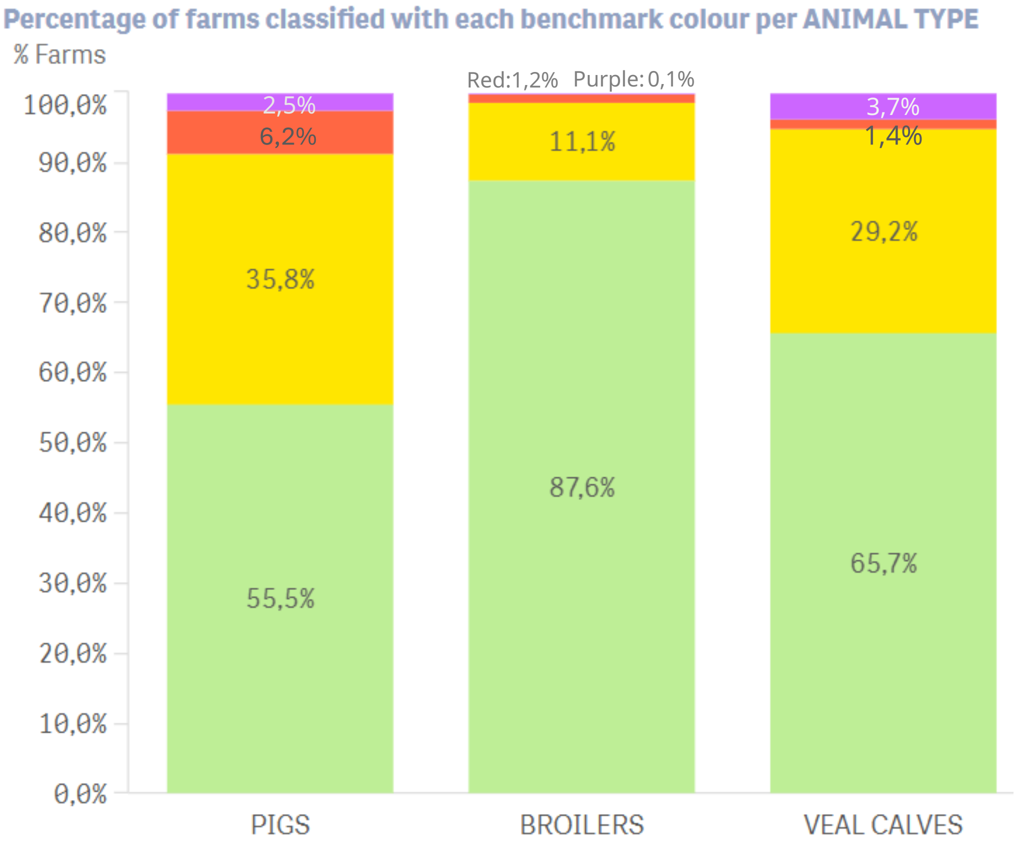




**Figure 44. Distribution of the percentage of farms* in the different benchmarking colour zones for pigs, broilers and veal calves and separately for the pig categories, in 2024.** ** Including zero-registration farms.*

Compared to 2023, the situation in terms of alarm users in pig farms slightly improved (-0,6 %), even though the percentage of red and yellow farms slightly increased. A decrease in the percentage of alarm users was also observed in broilers (-0,2 %) and veal calves (-1,6 %). Only the broiler sector succeeded in reaching the target of a maximum of 1 % alarm users. It should be noted that these outcomes are not solely a reflection of the actual use levels, but are also linked to the evolution of the threshold $BD_{100}$-values scoping the antibacterial use policy at farm level. In this light, it is important to note that the action value for weaned piglets was adjusted end of 2024. In veal calves, the anticipated adjustment of the action threshold end of 2024 was not applied, accounting for the moderately positive outcomes in terms of the alarm users.

# IV. DISCUSSION

This annual BelVet-SAC report, now in its 16th edition, provides a comprehensive overview of the sales and use of antibacterial VMPs in Belgium in 2024 and their evolution over the years. With rising awareness of AMR in a "One Health" context – highlighting its risks to both public and animal health – the need for long-term, detailed monitoring of the sales and use of antibacterials is more critical than ever.

In Belgium, the BelVet-SAC report has become a cornerstone of the policy on the sales and use of antibacterials in animals. It supports informed decision-making by providing authorities, veterinary and agricultural sector representatives and other stakeholders with the data needed to establish reduction targets. In that respect, 2024 was a landmark year, marking the horizon for the targets set by the AMCRA Vision 2024, the Second Veterinary Antibiotic Covenant, and the veterinary objectives of Belgium's first National 'One Health' Action Plan on Antimicrobial Resistance. Furthermore, 2024 was the first full year of use data collection and analysis for the dairy and beef sector, the last of the four 'major' livestock sectors in Belgium. In parallel, use data collection in the poultry sector was completed with the inclusion of the rearing, propagation and selection stages in chicken, and turkeys.

## 1. Outcomes measured against the 2024 reduction targets

Between 2011 and 2024, sales of antibacterials decreased by 59,9 % mg/kg biomass. Despite being a big achievement it is not sufficient to reach the national reduction target (-65 %) set for the total sales of antibacterials for animals in Belgium. In 2024, total sales increased by 6,3 % compared to 2023, with the entire increase attributed to antibacterial pharmaceuticals, as sales of antibacterial premixes continued to decline. Indeed, the national target for antibacterial premixes (-75 % by 2024), which was already achieved in 2022, was further surpassed in 2024, reaching an impressive -89,1 %. This reinforces the belief that the medicated feed sector will meet its goal of ceasing all production of antibacterial-medicated feed by 2027. While the pig sector and medicated feed industry deserve credit for this achievement, the recent 8,3% rise in antibacterial pharmaceuticals raises concerns about a potential compensatory shift. However, closer analysis of the two most commonly used substances in antibacterial premixes, amoxicillin (first place) and doxycycline, does not reveal any obvious signs of a replacement effect in 2024. Continued monitoring in collaboration with the sectors is strongly recommended in the coming year to assess and manage these evolving dynamics.

The fact that the national target was not fully met should not be viewed in an overly bad light. First of all, a sixty percent decrease is undisputedly a substantial accomplishment. After a streak of several years of notable progress, and having achieved a remarkable total reduction, it is not unexpected that the road becomes more 'bumpy' rather than continuously downhill. Secondly, 2024 has been a challenging year due to the outbreak of bluetongue virus in small ruminants and bovines, which increased susceptibility to secondary bacterial infections, and consequently, the demand for antibacterial treatments. Thirdly, as the current data collection system does not capture sales occurring outside Belgium, some uncertainty remains concerning the completeness of the reported sales figures. It is essential to assess the sales figures together with the use results, and these were generally encouraging (see also next sections). While the target of a maximum of 1 % alarm users was not reached in all animal categories, it was achieved in broilers (0,1 %), suckling piglets (0,9 %) and breeding pigs (0,4 %). The other categories showed worthy progress compared to 2023, with results close to the target (weaned piglets 1,9 %; fattening pigs 1,7 %; veal calves 3,7 %).

Furthermore, the 2024 targets relating to critically important antibacterials were successfully met. The goal of maintaining at least a 75 % reduction in the sales of quinolones and 3rd and 4th generation cephalosporins was surpassed, with an 81,1% decrease. Likewise, sales of colistin remained within the defined threshold of 1 mg/kg biomass, reaching 0,69 mg/kg biomass.

Even before the final outcomes for the 2024 targets were known, the sector stakeholders had already decided in the course of that year to sustain and build upon the progress made. New targets have been set, both at national and sector-specific levels, extending the vision towards 2030. This enduring commitment of all partners is important and shows that, despite the difficulties encountered, and the low-hanging fruit having been harvested for a while now, there is a clear understanding that the work is far from complete. Targeted improvements are still needed and to combat the threat of antimicrobial resistance, the involved parties can’t let their guards down.

## 2. Overall assessment of the national sales and use of antibacterial VMPs

In 2024, a total quantity of 117,6 tonnes antibacterial active substances was sold in Belgium, comprised of 111,5 tonnes antibacterial pharmaceuticals and 6,1 tonnes antibacterial premixes. Overall, this is an increase of 14 % compared to 2023, yet this was partly countered by a 7,2 % increase in the animal biomass produced in Belgium in 2024. As a result, the final outcome amounted to **58,7 mg/kg biomass of sold antibacterial VMPs in Belgium in 2024**, representing a 6,5 % rise compared to the 55,2 mg/kg biomass recorded in 2023.

At first glance, the gap between the total volume of antibacterials sold and used in 2024 (19 tonnes) appears to be in line with that of 2023 (16,5 tonnes). However, 2024 marks the first year in which use data for cattle (calves, young stock and adult cows, of both the beef and dairy sector) were included, accounting for 14 tonnes in total. The additional poultry categories (chickens for rearing, selection and breeding, as well as turkeys) added another 1,8 tonnes. It remains difficult to interpret the difference between total sales and use data due to various unknown factors being at play, including the fact that the current use data collection system does not cover all animal species – in contrast to the sales data. It can therefore only be assumed that these factors provoke a relatively consistent degree of variation over the years – hopefully not impairing the year-on-year comparisons relevant to shaping veterinary policy.

Policy-making in this area should also account for the organisational aspects of data collection and analysis. In particular, including **the dairy and beef cattle sector** had a profound impact: in 2024 it **accounted for 84 % of antibacterial use registrations, 78 % of farms with antibacterial use registrations and 87 % of veterinarians submitting antibacterial use data**. This considerable expansion should not be taken lightly in terms of additional work concerning data cleaning, data management, helpdesk operations, and communication strategies needed to reach the newly included stakeholders as well as to make sure the sector stakeholders are meaningfully involved in the decision-making processes.

Despite its overwhelming presence in absolute descriptive use data parameters, the dairy and beef cattle sector, on a relative basis, reports the lowest antibacterial use among the four main livestock sectors (pig, poultry, veal calf and cattle). In 2024, $BD_{100}$-species for the dairy and beef cattle stood at

0,4, which is markedly lower than for poultry (2,48 – including all chicken categories and turkey), pigs (3,55) and veal calves (7,46). Nevertheless, since 2018, praiseworthy reductions have been achieved in the latter three sectors, with antibacterial use reductions of 56,3 % in poultry, 48,3 % in pigs and 45,2 % in veal calves.

## 3. Antibacterial use in pigs

In pigs, the evolution of the antibacterial use in weaned piglets stands out. Perhaps driven by the announced tightening of the $BD_{100}$-action threshold at the end of 2024, the antibiotic use distribution across farms showed a considerable decrease in the higher use zones. While the 2024 median $BD_{100}$ dropped by just 1 % compared to 2023 (totalling to -29 % since 2018), the 90$^{th}$ percentile value dropped by 16 % in 2024 compared to 2023 (totalling to -46 % since 2018). Nevertheless, the median $BD_{100}$ in this category (10,2) remains the highest of all monitored categories, across all animal species. Furthermore, nearly 10 % of farms with weaned piglets administer antibacterial treatments for at least a third of the animal's time on-farm. Fattening pigs also remain a point of concern. Although the threshold $BD_{100}$ values in this category have not changed since early 2023, it was the only animal category, across all species, exhibiting an overall increase in antibiotic use in 2024. The median $BD_{100}$ increased for the second consecutive year, reaching a value of 2, a 2 % increase compared to 2023. A more in-depth analysis – beyond the scope of this report – may be required to determine whether a shift in use from the other pig categories to the fattening pigs is at play, potentially due to an accompanying shift in disease burden. This warrants close follow-up in the coming years. Another area of concern is the continued high contribution of farms in the yellow and red benchmarking zones to the overall antibacterial use. In 2024, approximately 30 % and 10 % of all monitored tonnes of antibacterial use were attributable to farms situated in these zones, respectively. Finally, although the number of red and alarm users has decreased in all pig categories, it's important to note that almost 10 % of farms still received a red benchmarking colour score at the overall farm level – a proportion higher than in any individual category. This indicates that it can remain challenging to decrease antibacterial use in all pig categories present on a farm.

As highlighted in previous reports, veterinarians and farmers in this sector have already made substantial efforts – efforts that have continued in 2024. To sustain this positive evolution, it is essential that all stakeholders, both within the sector and at the governmental level, reinforce their commitment by translating it into concrete actions. This includes ensuring the availability of adequate incentives, tools and resources to support the ongoing reduction of antibacterial use.

## 4. Antibacterial use in poultry

The poultry sector has made a remarkable run over the past four years. Following the introduction of the reduction path for broilers in 2021, antibacterial use decreased sharply in the first year but then remained relatively stable in the subsequent two years. The 2023 BelVet-SAC report emphasised that the sector should not assume it had already reached an acceptable level of antibacterial use – which is confirmed by the 2024 results: broilers took another major step forward, with the median $BD_{100}$ decreasing by almost a quarter, to 2,6. This led to a sharp decline in the proportion of yellow-zone broiler farms, now representing only 11 % of the total, accompanied by a notable reduction in the overall tonnage of antibacterial agents used in these farms. Notably, 88 % of broiler farms achieved a green benchmark score in 2024, and as anticipated, the sector met the target of limiting alarm users to 1 %. Laying hens also continued to show positive results in 2024, with the median $BD_{100}$ dropping by 43 % to 0,88, approaching levels previously seen in 2018. As always, it should be taken into consideration that the majority of laying hen farms (approx. 65 %) do not use antibacterials at all.

The inclusion of use data in chicken for rearing, selection and breeding, as well as in turkeys, reveals that these production types represent only a small portion of poultry farms and contribute only to a limited extent to the sector's overall antibiotic use. However, turkeys stand out as an exception: their median $BD_{100}$ in 2024 reached 3,72, exceeding that of broilers and ranking the third highest among all monitored animal species and categories. This will require close monitoring in the coming years.

## 5. Antibacterial use in veal calves

The veal sector continues to move forward, albeit in small steps. While this progress remains encouraging, it has diverged from the reduction path set in 2020. At that time, it was anticipated that the action value would be lowered from 11 to 9, and the attention value from 8 to 6, at the end of 2024. However, following discussions with the sector, evaluating the progress made, it was decided to continue using the thresholds of 11 and 8, resulting in now better-than-expected outcomes for alarm users (3,7 %) and red farms (1,4 %). That said, the sector should remain vigilant. Overall, its reduction efforts lag behind those of other monitored sectors. This is evident from the $BD_{100}$-species, and is confirmed by the relatively modest reductions of 35-40 % in the farm-level $BD_{100}$ parameters since 2018. Furthermore, the 2024 antibacterial use is the second highest of all monitored animal species and categories, with a median $BD_{100}$ of 7,08. Lastly, the narrow gap between low and high users points to a deeper structural issue with antibacterial use in this sector. Indeed, the P90/P25 ratio in veal calves is under two, compared to nine in weaned piglets, seven in fattening pigs, and four in broilers and turkeys – indicating limited variability and suggesting broad, sector-wide reliance on antibacterial treatments The outlook for the short-term is further complicated by a challenging second half of 2024 and early 2025 due to the bluetongue virus outbreak. It will be critical to do everything possible to mitigate the impact and to reconnect with long-term structural measures aimed at reducing the need for antibacterial use. Strengthening cross-sectoral cooperation with the dairy sector should provide part of the solution, especially now that dairy farms are also reporting their antibiotic use.

## 6. Antibacterial use in dairy and beef cattle

As previously noted, the findings for dairy and beef cattle confirm the sector's overall low use of antibacterials. Yet, important differences emerge when examining age groups. While adult cows account for the highest total tonnage of antibacterial use, the youngest calves (aged 0-3 months) undergo the highest number of treatment days. In this group, a notable gap exists between the median and $90^{th}$ percentile usage rates, in both dairy cattle (median: 1,6; P90: 12,4) and beef cattle (median: 1,45; P90: 13,3), highlighting the potential for reduction among the high-use farms. This observation is expected given that national monitoring in this sector is still in its early stages. Moreover, 33 % of farms fall within the red benchmarking zone – a high proportion compared to other sectors, but understandable in the context of early stages of dynamic benchmarking across multiple animal categories. The only available national long-term data on antibiotic use in cattle, i.e. the sales of intramammary tubes, unfortunately revealed a further increase in 2024, now reaching the highest level recorded in the past six years. A comparison between the usage and sales data of intramammary tubes also points to incomplete coverage of antibiotic use in this species. Altogether, these insights highlight several opportunities for improvement in the years ahead, particularly in strengthening data coverage and supporting farms with elevated usage.

## 7. Antibacterial classes and administration routes

In terms of antibiotic classes and routes of administration, aminopenicillins, tetracyclines, the combination of trimethoprim-sulfamide and macrolides remained the most sold and used in 2024, particularly via oral administration. While aminopenicillins and tetracyclines continued their decline in sales, trimethoprim-sulfamide combinations and macrolides saw an increase. Sales of macrolides even reached their highest level in recent years, as did those of amino(glyco)sides. Within the macrolides, this was due to an increase in the sales of oral tylosin products. Without information on the indication for antibacterial use, it is difficult to identify the factors explaining variations in sold or used quantities.

Of concern is the ongoing rise in colistin sales. Remarkably, the use data of the pig sector show an ongoing decrease of colistin use, and also the use of colistin in laying hens decreased in 2024. This divergence suggests that the recent rise in sales may represent a temporary fluctuation influenced by other, as yet unidentified, factors.

Unfortunately, sales of 3$^{rd}$ and 4$^{th}$ generation cephalosporins also rose for the second year in a row. On the other hand, sales of quinolones declined further. The latter is in line with the further reduction of quinolone use observed in broilers in 2024. Nevertheless, the absolute amount of quinolones used (436 kg in 2024) remains considerably higher than that recorded in 2021 and 2018/19 (approximately 340 kg). While it must be acknowledged that absolute quantities are an unfavourable metric for making comparisons, the expectation remains that the sector should strive to maintain quinolone use at the lowest possible level.

The inclusion of cattle use data in 2024 offers valuable new insights. Notably, more than 1 500 cattle farms used products VMPs with a red AMCRA colour code in 2024 – though this does not correspond to large quantities used. A likely explanation is the secondary bacterial infection burden due to the bluetongue virus outbreak. Additionally, approximately 3 500 cattle farms administered intramammary tubes containing 3$^{rd}$ and 4$^{th}$ generation cephalosporins, classified under the orange AMCRA colour code. These uses reflect the main veterinary applications of these substances and warrants a close follow-up in the coming years.

# V. OUTLOOK AND CONCLUSIONS

The prudent use of antibacterials remains a complex and critical issue, and ensuring robust, efficient monitoring systems – both now and in the future – is essential. This responsibility will continue to shape veterinary and policy efforts for years to come.

For the near future, key challenges include securing greater oversight of the sales data collection, in anticipation of the VAMREG data collection system currently under development by the FAHMP, with support from the European Commission. Simultaneously, each sector, now including the bovine sector, should establish appropriate targets and mobilize the adequate resources to pursue sustainable reductions in antibacterial use.

Looking further ahead, attention must turn to deploying the data collection and analysis for the other food-producing animal species, as well as horses and companion animals. While their overall contribution to national antibacterial volumes is relatively small, the increasing number of actors involved makes effective communication, guidance and support all the more vital.

AMCRA published new reduction targets in the “Vision 2030”. The evolution of sales and use of antibacterial VMPs will be evaluated in the coming years referring to these general targets as well as to species-specific targets.

**In conclusion, monitoring the sales and use of antibacterial VMPs remains a cornerstone of the national antimicrobial resistance strategy.**

**The results for 2024 present a mixed picture: a general increase int total sales impairs the achievement of the national reduction target, yet encouraging progress was observed for other targets, particularly in species-specific usage trends. Each livestock sector, including the bovine sector, faces distinct challenges that will require tailored attention moving forward.**

**Ultimately, sustained collaboration and commitment from all stakeholders will be essential to drive necessary reductions further. Only through united efforts a healthy and sustainable level of antibacterial use can be achieved that safeguards animal health and protects against the growing threat of AMR.**

# ACKNOWLEDGEMENTS

MAHs (antibacterial pharmaceuticals) and the MMF (antibacterial premixes) are much obliged for their cooperation and for providing the data on the consumption of antimicrobials in animals in Belgium. All veterinarians and thirdparty organisations who transfer data to the SANITEL-MED system are acknowledged for their efforts. We would like to thank Gudrun Sommereyns from the Belgian Centre for Pharmacotherapeutic Information for providing the information on the commercialised medicinal products. We are grateful to the agricultural and veterinary sector for their overall efforts regarding data registration and reduction of the antibacterial use.

# ANNEX

## ANNEX I

### Antibacterial consumption (kg) per antibacterial substance

**Table I.1. The evolution of sales in kg per antibacterial substance since 2018 (when relevant), grouped per antibacterial class, AMCRA colour code and administration route.**

| Class (1) | Antibacterial substance (2) | Year | Pharmaceuticals Injection | Intra-mammary | Oral | Other | Total Pharmaceuticals (kg) | Premix | Total Premix (kg) | Total kg antibacterials (Pharmaceuticals + Premixes) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Cephalosporins 1G/2G** | Cefadroxil | 2023 | | | 54 | | 54 | | | 54 |
| | | 2024 | | | 58,1 | | 58,1 | | | 58,1 |
| | Cefalexin | 2018 | | 106,6 | 619,9 | | 726,5 | | | 726,5 |
| | | 2019 | 157,8 | 184,1 | 658,2 | | 1000,1 | | | 1000,1 |
| | | 2020 | 397,9 | 155 | 689 | | 1241,9 | | | 1241,9 |
| | | 2021 | 372,3 | 126,6 | 697,2 | | 1196,1 | | | 1196,1 |
| | | 2022 | 306,8 | 95,7 | 515,2 | | 917,7 | | | 917,7 |
| | | 2023 | 302,9 | 34,4 | 712,8 | | 1050,1 | | | 1050,1 |
| | | 2024 | 214,2 | 88 | 708,9 | | 1011,1 | | | 1011,1 |
| | Cefalonium | 2018 | | 9,3 | | | 9,3 | | | 9,3 |
| | | 2019 | | 8,7 | | | 8,7 | | | 8,7 |
| | | 2020 | | 10,8 | | | 10,8 | | | 10,8 |
| | | 2021 | | 8,9 | | | 8,9 | | | 8,9 |
| | | 2022 | | 8 | | | 8 | | | 8 |

| Class (1) | Antibacterial substance (2) | Year | Pharmaceuticals Injection | Intra-mammary | Oral | Other | Total Pharmaceuticals (kg) | Premix | Total Premix (kg) | Total kg antibacterials (Pharmaceuticals + Premixes) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 2023 | | 9,6 | | | 9,6 | | | 9,6 |
| | | 2024 | | 7,2 | | | 7,2 | | | 7,2 |
| | Cefapirin | 2018 | | 31,5 | | 13,7 | 45,2 | | | 45,2 |
| | | 2019 | | 28,1 | | 13,2 | 41,3 | | | 41,3 |
| | | 2020 | | 15,8 | | 12,6 | 28,4 | | | 28,4 |
| | | 2021 | | 39,3 | | 11,8 | 51,1 | | | 51,1 |
| | | 2022 | | 39,6 | | 10,4 | 50 | | | 50 |
| | | 2023 | | 63,8 | | 11,3 | 75,1 | | | 75,1 |
| | | 2024 | | 70,6 | | 5,2 | 75,8 | | | 75,8 |
| | Cefazolin | 2018 | | 7,3 | | | 7,3 | | | 7,3 |
| | | 2019 | | 3,2 | | | 3,2 | | | 3,2 |
| | | 2020 | | 7,7 | | | 7,7 | | | 7,7 |
| | | 2021 | | 8,5 | | | 8,5 | | | 8,5 |
| | | 2022 | | 8,4 | | | 8,4 | | | 8,4 |
| | | 2023 | | 4,3 | | | 4,3 | | | 4,3 |
| | | 2024 | | 6,5 | | | 6,5 | | | 6,5 |
| **Other** | Bacitracin | 2018 | | | 28,2 | | 28,2 | | | 28,2 |
| | | 2019 | | | 25,4 | | 25,4 | | | 25,4 |
| | | 2020 | | | 32,1 | | 32,1 | | | 32,1 |
| | | 2021 | | | 46,1 | | 46,1 | | | 46,1 |
| | | 2022 | | | -2,5 | | -2,5 | | | -2,5 |
| | | 2023 | | | 15,9 | | 15,9 | | | 15,9 |
| | Metronidazol | 2018 | | | 234,9 | | 234,9 | | | 234,9 |
| | | 2019 | | | 264,4 | | 264,4 | | | 264,4 |
| | | 2020 | | | 231 | | 231 | | | 231 |

| Class (1) | Antibacterial substance (2) | Year | Pharmaceuticals Injection | Intra-mammary | Oral | Other | Total Pharmaceuticals (kg) | Premix | Total Premix (kg) | Total kg antibacterials (Pharmaceuticals + Premixes) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 2021 | | | 318,9 | | 318,9 | | | 318,9 |
| | | 2022 | | | 302,1 | | 302,1 | | | 302,1 |
| | | 2023 | | | 379,7 | | 379,7 | | | 379,7 |
| | | 2024 | | | 357 | | 357 | | | 357 |
| **Penicillins** | Benzylpenicillin | 2018 | 9293,6 | 76,3 | | | 9369,9 | | | 9369,9 |
| | | 2019 | 6868,1 | 100,7 | | | 6968,8 | | | 6968,8 |
| | | 2020 | 6927,1 | 112,4 | | | 7039,5 | | | 7039,5 |
| | | 2021 | 7314,1 | 134,1 | | | 7448,2 | | | 7448,2 |
| | | 2022 | 8335,9 | 101,5 | | | 8437,4 | | | 8437,4 |
| | | 2023 | 6088,1 | 64 | | | 6152,1 | | | 6152,1 |
| | | 2024 | 6013 | 101,1 | | | 6114,1 | | | 6114,1 |
| | Cloxacillin | 2018 | | 244,3 | | | 244,3 | | | 244,3 |
| | | 2019 | | 170,7 | | | 170,7 | | | 170,7 |
| | | 2020 | | 138,8 | | | 138,8 | | | 138,8 |
| | | 2021 | | 132,1 | | | 132,1 | | | 132,1 |
| | | 2022 | | 156,9 | | | 156,9 | | | 156,9 |
| | | 2023 | | 134,3 | | | 134,3 | | | 134,3 |
| | | 2024 | | 131,9 | | | 131,9 | | | 131,9 |
| | Fenoxymethyl penicillin | 2018 | | | 1078,4 | | 1078,4 | | | 1078,4 |
| | | 2019 | | | 1424,4 | | 1424,4 | | | 1424,4 |
| | | 2020 | | | 1512,4 | | 1512,4 | | | 1512,4 |
| | | 2021 | | | 520,7 | | 520,7 | | | 520,7 |
| | | 2022 | | | 1827,6 | | 1827,6 | | | 1827,6 |
| | | 2023 | | | 902,9 | | 902,9 | | | 902,9 |
| | | 2024 | | | 809,6 | | 809,6 | | | 809,6 |

| Class (1) | Antibacterial substance (2) | Year | Pharmaceuticals Injection | Intra-mammary | Oral | Other | Total Pharmaceuticals (kg) | Premix | Total Premix (kg) | Total kg antibacterials (Pharmaceuticals + Premixes) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Nafcillin | 2018 | | 6 | | | 6 | | | 6 |
| | | 2019 | | 7,3 | | | 7,3 | | | 7,3 |
| | | 2020 | | 8,9 | | | 8,9 | | | 8,9 |
| | | 2021 | | 8,6 | | | 8,6 | | | 8,6 |
| | | 2022 | | 8,7 | | | 8,7 | | | 8,7 |
| | | 2023 | | 10,9 | | | 10,9 | | | 10,9 |
| | | 2024 | | 8,6 | | | 8,6 | | | 8,6 |
| **Phenicols** | Florfenicol | 2018 | 2579,9 | | 460,2 | 0,7 | 3040,8 | 279,2 | 279,2 | 3320 |
| | | 2019 | 2272,4 | | 642,6 | 0,7 | 2915,7 | 243 | 243 | 3158,7 |
| | | 2020 | 2210,9 | | 768,9 | 0,8 | 2980,6 | 268,9 | 268,9 | 3249,5 |
| | | 2021 | 2418,1 | | 1102,2 | 1,2 | 3521,5 | 302 | 302 | 3823,5 |
| | | 2022 | 2273,1 | | 1133,6 | 1,7 | 3408,4 | 228 | 228 | 3636,4 |
| | | 2023 | 1791 | | 839,4 | 1,6 | 2632 | 215 | 215 | 2847 |
| | | 2024 | 2031,9 | | 1099,8 | 1,6 | 3133,3 | 111 | 111 | 3244,3 |
| | Thiamfenicol | 2019 | | | | 0 | 0 | | | 0 |
| | | 2020 | | | | 3,1 | 3,1 | | | 3,1 |
| | | 2022 | | | | 1,2 | 1,2 | | | 1,2 |
| | | 2023 | | | | 1,5 | 1,5 | | | 1,5 |
| | | 2024 | | | | 1,7 | 1,7 | | | 1,7 |
| **Pleuromutilins** | Tiamulin | 2018 | 9,5 | | 993 | | 1002,5 | 539,1 | 539,1 | 1541,6 |
| | | 2019 | 11,8 | | 806,2 | | 818 | 288,4 | 288,4 | 1106,4 |
| | | 2020 | 9,9 | | 441,7 | | 451,6 | 109 | 109 | 560,6 |
| | | 2021 | 7,8 | | 304,7 | | 312,5 | 76,1 | 76,1 | 388,6 |
| | | 2022 | 5,6 | | 290,2 | | 295,8 | 21,1 | 21,1 | 316,9 |
| | | 2023 | 5,5 | | 201,5 | | 207 | 27,5 | 27,5 | 234,5 |

| Class (1) | Antibacterial substance (2) | Year | Pharmaceuticals Injection | Intra-mammary | Oral | Other | Total Pharmaceuticals (kg) | Premix | Total Premix (kg) | Total kg antibacterials (Pharmaceuticals + Premixes) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 2024 | 4,3 | | 102,9 | | 107,2 | 9,7 | 9,7 | 116,9 |
| **Sulfonamides and trimethoprim** | Sulfachlorpyridazine | 2018 | | | 921,4 | | 921,4 | | | 921,4 |
| | | 2019 | | | 402,1 | | 402,1 | | | 402,1 |
| | | 2020 | | | 679,7 | | 679,7 | | | 679,7 |
| | | 2021 | | | 188,5 | | 188,5 | | | 188,5 |
| | | 2022 | | | 459,4 | | 459,4 | | | 459,4 |
| | | 2023 | | | 301,2 | | 301,2 | | | 301,2 |
| | | 2024 | | | 261,6 | | 261,6 | | | 261,6 |
| | Sulfadiazine | 2018 | 1665,3 | | 27023,5 | | 28688,8 | 36,9 | 36,9 | 28725,7 |
| | | 2019 | 2051,2 | | 25277,9 | | 27329,1 | 0 | 0 | 27329,1 |
| | | 2020 | 89,3 | | 25950,7 | | 26040 | 75,6 | 75,6 | 26115,6 |
| | | 2021 | 94 | | 24800,9 | | 24894,9 | 220,9 | 220,9 | 25115,8 |
| | | 2022 | 96,3 | | 15946,4 | | 16042,7 | | | 16042,7 |
| | | 2023 | 101,3 | | 9112,9 | | 9214,2 | 15,6 | 15,6 | 9229,8 |
| | | 2024 | 132,9 | | 11147,1 | | 11280 | | | 11280 |
| | Sulfadimethoxine | 2018 | | | 35,2 | | 35,2 | | | 35,2 |
| | | 2019 | | | 29,9 | | 29,9 | | | 29,9 |
| | | 2020 | | | 3,2 | | 3,2 | | | 3,2 |
| | | 2021 | | | 0,1 | | 0,1 | | | 0,1 |
| | | 2023 | | | 11,6 | | 11,6 | | | 11,6 |
| | | 2024 | | | 6,3 | | 6,3 | | | 6,3 |
| | Sulfadoxine | 2018 | 1238,4 | | | | 1238,4 | | | 1238,4 |
| | | 2019 | 816,4 | | | | 816,4 | | | 816,4 |
| | | 2020 | 935,8 | | | | 935,8 | | | 935,8 |
| | | 2021 | 1104,8 | | | | 1104,8 | | | 1104,8 |

| Class (1) | Antibacterial substance (2) | Year | Pharmaceuticals Injection | Intra-mammary | Oral | Other | Total Pharmaceuticals (kg) | Premix | Total Premix (kg) | Total kg antibacterials (Pharmaceuticals + Premixes) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 2022 | 1404,3 | | | | 1404,3 | | | 1404,3 |
| | | 2023 | 1208,5 | | | | 1208,5 | | | 1208,5 |
| | | 2024 | 1347,3 | | | | 1347,3 | | | 1347,3 |
| | Sulfamethoxazol | 2018 | 114,2 | | 678,4 | | 792,6 | | | 792,6 |
| | | 2019 | 84,3 | | 1138,5 | | 1222,8 | | | 1222,8 |
| | | 2020 | 90,7 | | 1050,9 | | 1141,6 | | | 1141,6 |
| | | 2021 | 82,1 | | 2297,6 | | 2379,7 | | | 2379,7 |
| | | 2022 | 60,4 | | 2225,5 | | 2285,9 | | | 2285,9 |
| | | 2023 | 45,6 | | 579 | | 624,6 | | | 624,6 |
| | | 2024 | 44,8 | | 1503 | | 1547,8 | | | 1547,8 |
| | Trimethoprim | 2018 | 603,6 | | 5766,1 | | 6369,7 | 7,4 | 7,4 | 6377,1 |
| | | 2019 | 590,4 | | 5387,3 | | 5977,7 | 0 | 0 | 5977,7 |
| | | 2020 | 223,2 | | 5558 | | 5781,2 | 15,1 | 15,1 | 5796,3 |
| | | 2021 | 256,2 | | 5470,9 | | 5727,1 | 44,2 | 44,2 | 5771,3 |
| | | 2022 | 312,2 | | 3745,3 | | 4057,5 | | | 4057,5 |
| | | 2023 | 271,1 | | 2014,5 | | 2285,6 | 3,1 | 3,1 | 2288,7 |
| | | 2024 | 305 | | 2594 | | 2899 | | | 2899 |
| **Amino- (glyco)sides** | Apramycin | 2018 | | | 0,2 | | 0,2 | 101,1 | 101,1 | 101,3 |
| | | 2019 | | | | | | 153,4 | 153,4 | 153,4 |
| | | 2020 | | | 298 | | 298 | 108,2 | 108,2 | 406,2 |
| | | 2021 | | | 787,3 | | 787,3 | 239,1 | 239,1 | 1026,4 |
| | | 2022 | | | 291,1 | | 291,1 | 141,3 | 141,3 | 432,4 |
| | | 2023 | | | 454,9 | | 454,9 | 123,2 | 123,2 | 578,1 |
| | | 2024 | | | 2070,9 | | 2070,9 | 87,3 | 87,3 | 2158,2 |
| | Framycetin | 2018 | | 15,8 | | 1,4 | 17,2 | | | 17,2 |

| Class (1) | Antibacterial substance (2) | Year | Pharmaceuticals Injection | Intra-mammary | Oral | Other | Total Pharmaceuticals (kg) | Premix | Total Premix (kg) | Total kg antibacterials (Pharmaceuticals + Premixes) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 2019 | | 24,3 | | 0 | 24,3 | | | 24,3 |
| | | 2020 | | 26,4 | | 0 | 26,4 | | | 26,4 |
| | | 2021 | | 33,1 | | 0 | 33,1 | | | 33,1 |
| | | 2022 | | 23 | | 0,9 | 23,9 | | | 23,9 |
| | | 2023 | | 10,1 | | 0,3 | 10,4 | | | 10,4 |
| | | 2024 | | 23 | | | 23 | | | 23 |
| | Gentamicin | 2018 | 170,4 | | | 2,4 | 172,8 | | | 172,8 |
| | | 2019 | 161,7 | | | 2,9 | 164,6 | | | 164,6 |
| | | 2020 | 180,3 | | | 2,9 | 183,2 | | | 183,2 |
| | | 2021 | 186,4 | | | 2,6 | 189 | | | 189 |
| | | 2022 | 198,9 | | | 2,6 | 201,5 | | | 201,5 |
| | | 2023 | 191,4 | | | 13,6 | 205 | | | 205 |
| | | 2024 | 180,5 | | | 2,8 | 183,3 | | | 183,3 |
| | Kanamycin | 2018 | | 53,2 | | | 53,2 | | | 53,2 |
| | | 2019 | | 102 | | | 102 | | | 102 |
| | | 2020 | | 83,8 | | | 83,8 | | | 83,8 |
| | | 2021 | | 67,1 | | | 67,1 | | | 67,1 |
| | | 2022 | | 48,1 | | | 48,1 | | | 48,1 |
| | | 2023 | | 11,3 | | | 11,3 | | | 11,3 |
| | | 2024 | | 40,4 | | | 40,4 | | | 40,4 |
| | Neomycin | 2018 | 3,8 | 28 | | 13,1 | 44,9 | | | 44,9 |
| | | 2019 | | 19,9 | | 10,5 | 30,4 | | | 30,4 |
| | | 2020 | | 22,4 | | 0,5 | 22,9 | | | 22,9 |
| | | 2021 | 10,9 | 21,7 | | | 32,6 | | | 32,6 |
| | | 2022 | 184,6 | 21,5 | | | 206,1 | | | 206,1 |

| Class (1) | Antibacterial substance (2) | Year | Pharmaceuticals Injection | Intra-mammary | Oral | Other | Total Pharmaceuticals (kg) | Premix | Total Premix (kg) | Total kg antibacterials (Pharmaceuticals + Premixes) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 2023 | 173,2 | 16,8 | | | 190 | | | 190 |
| | | 2024 | 214,4 | 17,4 | | | 231,8 | | | 231,8 |
| | Paromomycin | 2018 | 188,2 | | 1871,2 | | 2059,4 | | | 2059,4 |
| | | 2019 | 160,5 | | 1960,2 | | 2120,7 | | | 2120,7 |
| | | 2020 | 10,8 | | 2059,9 | | 2070,7 | | | 2070,7 |
| | | 2021 | | | 2306,2 | | 2306,2 | | | 2306,2 |
| | | 2022 | | | 2257,7 | | 2257,7 | | | 2257,7 |
| | | 2023 | | | 2047,3 | | 2047,3 | | | 2047,3 |
| | | 2024 | | | 2308,3 | | 2308,3 | | | 2308,3 |
| | Spectinomycin | 2018 | 1362,5 | | 3993,7 | | 5356,2 | 4,4 | 4,4 | 5360,6 |
| | | 2019 | 1265,1 | | 5322,8 | | 6587,9 | 0,6 | 0,6 | 6588,5 |
| | | 2020 | 1420,4 | | 4625,8 | | 6046,2 | 1,1 | 1,1 | 6047,3 |
| | | 2021 | 1298,1 | | 4610,7 | | 5908,8 | | | 5908,8 |
| | | 2022 | 1228 | | 4298,6 | | 5526,6 | | | 5526,6 |
| | | 2023 | 1095,1 | | 3250,1 | | 4345,2 | | | 4345,2 |
| | | 2024 | 1250,7 | | 4870 | | 6120,7 | | | 6120,7 |
| | Streptomycin dihydro | 2018 | | 6 | | | 6 | | | 6 |
| | | 2019 | 14,4 | 7,3 | | | 21,7 | | | 21,7 |
| | | 2020 | 4,8 | 8,9 | | | 13,7 | | | 13,7 |
| | | 2021 | 5,3 | 8,6 | | | 13,9 | | | 13,9 |
| | | 2022 | | 8,7 | | | 8,7 | | | 8,7 |
| | | 2023 | | 10,9 | | | 10,9 | | | 10,9 |
| | | 2024 | | 8,6 | | | 8,6 | | | 8,6 |
| **Aminopenicillins** | Amoxicillin | 2018 | 3404,3 | | 49061 | | 52465,3 | 10670,8 | 10670,8 | 63136,1 |
| | | 2019 | 3507,1 | | 45878,6 | | 49385,7 | 11112,1 | 11112,1 | 60497,8 |

| Class (1) | Antibacterial substance (2) | Year | Pharmaceuticals Injection | Intra-mammary | Oral | Other | Total Pharmaceuticals (kg) | Premix | Total Premix (kg) | Total kg antibacterials (Pharmaceuticals + Premixes) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 2020 | 3501,4 | | 48956,3 | | 52457,7 | 11180,2 | 11180,2 | 63637,9 |
| | | 2021 | 3527,7 | | 43099,7 | | 46627,4 | 10007,1 | 10007,1 | 56634,5 |
| | | 2022 | 1934,6 | | 35529,7 | | 37464,3 | 7043,8 | 7043,8 | 44508,1 |
| | | 2023 | 3025,1 | | 24389 | | 27414,1 | 5164,3 | 5164,3 | 32578,4 |
| | | 2024 | 3542,9 | | 27049,2 | | 30592,1 | 4164 | 4164 | 34756,1 |
| | Ampicillin | 2018 | 312,2 | 43,9 | | | 356,1 | | | 356,1 |
| | | 2019 | 291,3 | 20,4 | | | 311,7 | | | 311,7 |
| | | 2020 | 257,5 | 4,9 | | | 262,4 | | | 262,4 |
| | | 2021 | 209,6 | 3,5 | | | 213,1 | | | 213,1 |
| | | 2022 | 228,1 | 3,1 | | | 231,2 | | | 231,2 |
| | | 2023 | 171,4 | 0,6 | | | 172 | | | 172 |
| | | 2024 | 151,6 | 2,5 | | | 154,1 | | | 154,1 |
| **Aminopenicillins with BLI** | Amoxicillin clavulanic acid | 2018 | 101,2 | 0,1 | 923,8 | | 1025,1 | | | 1025,1 |
| | | 2019 | 84,2 | 8,9 | 1044,3 | | 1137,4 | | | 1137,4 |
| | | 2020 | 37,7 | 8,9 | 1084,3 | | 1130,9 | | | 1130,9 |
| | | 2021 | 88,9 | 11 | 1104,8 | | 1204,7 | | | 1204,7 |
| | | 2022 | 9,9 | 15 | 1077,5 | | 1102,4 | | | 1102,4 |
| | | 2023 | 78,4 | 10,7 | 1092,7 | | 1181,8 | | | 1181,8 |
| | | 2024 | 58,2 | 8,2 | 1203,7 | | 1270,1 | | | 1270,1 |
| **Cephalosporins 3G/4G** | Cefoperazon | 2018 | | 5,4 | | | 5,4 | | | 5,4 |
| | | 2019 | | 4,2 | | | 4,2 | | | 4,2 |
| | | 2020 | | 3,6 | | | 3,6 | | | 3,6 |
| | | 2021 | | 3,5 | | | 3,5 | | | 3,5 |
| | | 2022 | | 3,1 | | | 3,1 | | | 3,1 |
| | | 2023 | | 2,7 | | | 2,7 | | | 2,7 |

| Class (1) | Antibacterial substance (2) | Year | Pharmaceuticals Injection | Intra-mammary | Oral | Other | Total Pharmaceuticals (kg) | Premix | Total Premix (kg) | Total kg antibacterials (Pharmaceuticals + Premixes) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 2024 | | 3,3 | | | 3,3 | | | 3,3 |
| | Cefquinome | 2018 | | 70,1 | | | 70,1 | | | 70,1 |
| | | 2019 | | 71,9 | | | 71,9 | | | 71,9 |
| | | 2020 | | 83,5 | | | 83,5 | | | 83,5 |
| | | 2021 | | 77,9 | | | 77,9 | | | 77,9 |
| | | 2022 | | 52,9 | | | 52,9 | | | 52,9 |
| | | 2023 | | 71,9 | | | 71,9 | | | 71,9 |
| | | 2024 | | 80,5 | | | 80,5 | | | 80,5 |
| **Lincosamides** | Clindamycin | 2018 | | | 135,8 | | 135,8 | | | 135,8 |
| | | 2019 | | | 136,3 | | 136,3 | | | 136,3 |
| | | 2020 | | | 149,5 | | 149,5 | | | 149,5 |
| | | 2021 | | | 147 | 0 | 147 | | | 147 |
| | | 2022 | | | 142,6 | 0,1 | 142,7 | | | 142,7 |
| | | 2023 | | | 143,7 | 0 | 143,7 | | | 143,7 |
| | | 2024 | | | 136,5 | 0,1 | 136,6 | | | 136,6 |
| | Lincomycin | 2018 | 790,3 | 8,9 | 3661,9 | | 4461,1 | 4,4 | 4,4 | 4465,5 |
| | | 2019 | 730,5 | 9,3 | 4326,5 | | 5066,3 | 0,6 | 0,6 | 5066,9 |
| | | 2020 | 813,4 | 11,5 | 3833 | | 4657,9 | 1,1 | 1,1 | 4659 |
| | | 2021 | 758,5 | 10,8 | 3098,6 | | 3867,9 | | | 3867,9 |
| | | 2022 | 704,2 | 15,7 | 3312,1 | | 4032 | | | 4032 |
| | | 2023 | 620,8 | 4,6 | 1910,8 | | 2536,2 | | | 2536,2 |
| | | 2024 | 712,7 | 10,6 | 3367 | | 4090,3 | | | 4090,3 |
| **Macrolides** | Gamithromycin | 2018 | 39,3 | | | | 39,3 | | | 39,3 |
| | | 2019 | 36,7 | | | | 36,7 | | | 36,7 |
| | | 2020 | 16,2 | | | | 16,2 | | | 16,2 |

| Class (1) | Antibacterial substance (2) | Year | Pharmaceuticals Injection | Intra-mammary | Oral | Other | Total Pharmaceuticals (kg) | Premix | Total Premix (kg) | Total kg antibacterials (Pharmaceuticals + Premixes) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 2021 | 14,3 | | | | 14,3 | | | 14,3 |
| | | 2022 | 9,6 | | | | 9,6 | | | 9,6 |
| | | 2023 | 3,9 | | | | 3,9 | | | 3,9 |
| | | 2024 | 7,4 | | | | 7,4 | | | 7,4 |
| | Spiramycin | 2018 | | | 158,8 | | 158,8 | | | 158,8 |
| | | 2019 | | | 185,8 | | 185,8 | | | 185,8 |
| | | 2020 | | | 164,5 | | 164,5 | | | 164,5 |
| | | 2021 | | | 169,6 | | 169,6 | | | 169,6 |
| | | 2022 | | | 162,7 | | 162,7 | | | 162,7 |
| | | 2023 | | | 112,3 | | 112,3 | | | 112,3 |
| | | 2024 | | | 110,4 | | 110,4 | | | 110,4 |
| | Tildipirosin | 2018 | 49,2 | | | | 49,2 | | | 49,2 |
| | | 2019 | 47,2 | | | | 47,2 | | | 47,2 |
| | | 2020 | 37,3 | | | | 37,3 | | | 37,3 |
| | | 2021 | 20,6 | | | | 20,6 | | | 20,6 |
| | | 2022 | 27,3 | | | | 27,3 | | | 27,3 |
| | | 2023 | 20,4 | | | | 20,4 | | | 20,4 |
| | | 2024 | 21,5 | | | | 21,5 | | | 21,5 |
| | Tilmicosin | 2018 | 71,3 | | 2051,2 | | 2122,5 | 676 | 676 | 2798,5 |
| | | 2019 | 54,3 | | 2318,5 | | 2372,8 | 546 | 546 | 2918,8 |
| | | 2020 | 68,1 | | 2600,9 | | 2669 | 561,1 | 561,1 | 3230,1 |
| | | 2021 | 86,2 | | 1819,5 | | 1905,7 | 468 | 468 | 2373,7 |
| | | 2022 | 61,6 | | 2367,5 | | 2429,1 | 76 | 76 | 2505,1 |
| | | 2023 | 55,5 | | 2606 | | 2661,5 | 184 | 184 | 2845,5 |
| | | 2024 | 85,9 | | 3238,9 | | 3324,8 | 196,2 | 196,2 | 3521 |

| Class (1) | Antibacterial substance (2) | Year | Pharmaceuticals Injection | Intra-mammary | Oral | Other | Total Pharmaceuticals (kg) | Premix | Total Premix (kg) | Total kg antibacterials (Pharmaceuticals + Premixes) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Tulathromycin | 2018 | 128,1 | | | | 128,1 | | | 128,1 |
| | | 2019 | 119,5 | | | | 119,5 | | | 119,5 |
| | | 2020 | 113,7 | | | | 113,7 | | | 113,7 |
| | | 2021 | 146 | | | | 146 | | | 146 |
| | | 2022 | 102,7 | | | | 102,7 | | | 102,7 |
| | | 2023 | 122,7 | | | | 122,7 | | | 122,7 |
| | | 2024 | 175,4 | | | | 175,4 | | | 175,4 |
| | Tylosin | 2018 | 724,3 | | 8316 | | 9040,3 | 140,9 | 140,9 | 9181,2 |
| | | 2019 | 587,8 | | 7087 | | 7674,8 | 133,8 | 133,8 | 7808,6 |
| | | 2020 | 624,8 | | 9039,5 | | 9664,3 | 85,7 | 85,7 | 9750 |
| | | 2021 | 701 | | 10377 | | 11078 | 175 | 175 | 11253 |
| | | 2022 | 682,8 | | 8987,5 | | 9670,3 | 20 | 20 | 9690,3 |
| | | 2023 | 521,8 | | 9695,8 | | 10217,6 | 55 | 55 | 10272,6 |
| | | 2024 | 604,2 | | 11397 | | 12001,2 | 10 | 10 | 12011,2 |
| | Tylvalosin | 2018 | | | 46,2 | | 46,2 | 14,4 | 14,4 | 60,6 |
| | | 2019 | | | 37,5 | | 37,5 | 1,7 | 1,7 | 39,2 |
| | | 2020 | | | 0 | | 0 | 3,3 | 3,3 | 3,3 |
| | | 2021 | | | | | | 6,8 | 6,8 | 6,8 |
| | | 2022 | | | 14 | | 14 | | | 14 |
| | | 2023 | | | 40,3 | | 40,3 | | | 40,3 |
| | | 2024 | | | 32,1 | | 32,1 | | | 32,1 |
| **Other** | Fusidic acid | 2018 | | | | 1,6 | 1,6 | | | 1,6 |
| | | 2019 | | | | 0 | 0 | | | 0 |
| | | 2020 | | | | 0 | 0 | | | 0 |
| | | 2021 | | | | 0 | 0 | | | 0 |

| Class (1) | Antibacterial substance (2) | Year | Pharmaceuticals Injection | Intra-mammary | Oral | Other | Total Pharmaceuticals (kg) | Premix | Total Premix (kg) | Total kg antibacterials (Pharmaceuticals + Premixes) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 2022 | | | | 3,8 | 3,8 | | | 3,8 |
| | | 2023 | | | | 3,6 | 3,6 | | | 3,6 |
| | | 2024 | | | | 3 | 3 | | | 3 |
| | Rifaximin | 2018 | | 21,3 | | | 21,3 | | | 21,3 |
| | | 2019 | | 22,3 | | | 22,3 | | | 22,3 |
| | | 2020 | | 22,6 | | | 22,6 | | | 22,6 |
| | | 2021 | | 21,2 | | | 21,2 | | | 21,2 |
| | | 2022 | | 21,9 | | | 21,9 | | | 21,9 |
| | | 2023 | | 23,2 | | | 23,2 | | | 23,2 |
| | | 2024 | | 20,6 | | | 20,6 | | | 20,6 |
| **Polymyxins** | Colistin | 2018 | 39,2 | | 3180,9 | | 3220,1 | 390 | 390 | 3610,1 |
| | | 2019 | 33,5 | | 2928,5 | | 2962 | 71,5 | 71,5 | 3033,5 |
| | | 2020 | 33,3 | | 2721,7 | | 2755 | 6,2 | 6,2 | 2761,2 |
| | | 2021 | 28,9 | | 2430,2 | | 2459,1 | | | 2459,1 |
| | | 2022 | 32,4 | | 1108,5 | | 1140,9 | | | 1140,9 |
| | | 2023 | 24,7 | | 1129,9 | | 1154,6 | | | 1154,6 |
| | | 2024 | 28,4 | | 1355,5 | | 1383,9 | | | 1383,9 |
| | Polymyxin B | 2018 | | | | 0,7 | 0,7 | | | 0,7 |
| | | 2019 | | | | 0,9 | 0,9 | | | 0,9 |
| | | 2020 | | | | 1 | 1 | | | 1 |
| | | 2021 | | | | 0,8 | 0,8 | | | 0,8 |
| | | 2022 | | | | 0,8 | 0,8 | | | 0,8 |
| | | 2023 | | | | 0,9 | 0,9 | | | 0,9 |
| | | 2024 | | | | 1 | 1 | | | 1 |
| **Tetracyclines** | Chlortetracycline | 2018 | | | 132,9 | 551,7 | 684,6 | | | 684,6 |

| Class (1) | Antibacterial substance (2) | Year | Pharmaceuticals Injection | Intra-mammary | Oral | Other | Total Pharmaceuticals (kg) | Premix | Total Premix (kg) | Total kg antibacterials (Pharmaceuticals + Premixes) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 2019 | | | 76 | 512,2 | 588,2 | | | 588,2 |
| | | 2020 | | | 133,8 | 502,5 | 636,3 | | | 636,3 |
| | | 2021 | | | 87,9 | 477,5 | 565,4 | | | 565,4 |
| | | 2022 | | | 67 | 556,5 | 623,5 | | | 623,5 |
| | | 2023 | | | 104,1 | 403,1 | 507,2 | | | 507,2 |
| | | 2024 | | | 56,1 | 413,6 | 469,7 | | | 469,7 |
| | Doxycycline | 2018 | | | 34545 | | 34545 | 5772,4 | 5772,4 | 40317,4 |
| | | 2019 | | | 26124,4 | | 26124,4 | 4815 | 4815 | 30939,4 |
| | | 2020 | | | 23487,3 | | 23487,3 | 4508,5 | 4508,5 | 27995,8 |
| | | 2021 | | | 22957,7 | | 22957,7 | 3750 | 3750 | 26707,7 |
| | | 2022 | | | 15234,4 | | 15234,4 | 1465 | 1465 | 16699,4 |
| | | 2023 | | | 10114,5 | | 10114,5 | 1265 | 1265 | 11379,5 |
| | | 2024 | | | 11485,9 | | 11485,9 | 1527,8 | 1527,8 | 13013,7 |
| | Oxytetracycline | 2018 | 5037,3 | | 8419,5 | 67,6 | 13524,4 | 3,7 | 3,7 | 13528,1 |
| | | 2019 | 3652,3 | | 4865,6 | 60,7 | 8578,6 | 0 | 0 | 8578,6 |
| | | 2020 | 4768,9 | | 6315,2 | 64,8 | 11148,9 | 0 | 0 | 11148,9 |
| | | 2021 | 4015,5 | | 5268 | 57,4 | 9340,9 | | | 9340,9 |
| | | 2022 | 3690,1 | | 5419,2 | 55 | 9164,3 | | | 9164,3 |
| | | 2023 | 1981,1 | | 3969,6 | 59,8 | 6010,5 | | | 6010,5 |
| | | 2024 | 688,1 | | 4376 | 55,6 | 5119,7 | | | 5119,7 |
| **Cephalosporins 3G/4G** | Cefovecin | 2018 | 9,1 | | | | 9,1 | | | 9,1 |
| | | 2019 | 9,4 | | | | 9,4 | | | 9,4 |
| | | 2020 | 9,8 | | | | 9,8 | | | 9,8 |
| | | 2021 | 9 | | | | 9 | | | 9 |
| | | 2022 | 8,5 | | | | 8,5 | | | 8,5 |

| Class (1) | Antibacterial substance (2) | Year | Pharmaceuticals Injection | Intra-mammary | Oral | Other | Total Pharmaceuticals (kg) | Premix | Total Premix (kg) | Total kg antibacterials (Pharmaceuticals + Premixes) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 2023 | 7,2 | | | | 7,2 | | | 7,2 |
| | | 2024 | 5,8 | | | | 5,8 | | | 5,8 |
| | Cefquinome | 2018 | 5,5 | | | | 5,5 | | | 5,5 |
| | | 2019 | 3,4 | | | | 3,4 | | | 3,4 |
| | | 2020 | 1,8 | | | | 1,8 | | | 1,8 |
| | | 2021 | 1,3 | | | | 1,3 | | | 1,3 |
| | | 2022 | 2 | | | | 2 | | | 2 |
| | | 2023 | 1,4 | | | | 1,4 | | | 1,4 |
| | | 2024 | 1,3 | | | | 1,3 | | | 1,3 |
| | Ceftiofur | 2018 | 57,4 | | | | 57,4 | | | 57,4 |
| | | 2019 | 46,1 | | | | 46,1 | | | 46,1 |
| | | 2020 | 44,9 | | | | 44,9 | | | 44,9 |
| | | 2021 | 34,9 | | | | 34,9 | | | 34,9 |
| | | 2022 | 32,6 | | | | 32,6 | | | 32,6 |
| | | 2023 | 30,3 | | | | 30,3 | | | 30,3 |
| | | 2024 | 32,7 | | | | 32,7 | | | 32,7 |
| **Quinolones** | Danofloxacin | 2018 | 8,4 | | | | 8,4 | | | 8,4 |
| | | 2019 | 6,5 | | | | 6,5 | | | 6,5 |
| | | 2020 | 7,3 | | | | 7,3 | | | 7,3 |
| | | 2021 | 5,8 | | | | 5,8 | | | 5,8 |
| | | 2022 | 6,5 | | | | 6,5 | | | 6,5 |
| | | 2023 | 3,2 | | | | 3,2 | | | 3,2 |
| | | 2024 | 3,3 | | | | 3,3 | | | 3,3 |
| | Enrofloxacin | 2018 | 58,4 | | 245,6 | | 304 | | | 304 |
| | | 2019 | 46 | | 326,2 | | 372,2 | | | 372,2 |

| Class (1) | Antibacterial substance (2) | Year | Pharmaceuticals Injection | Intra-mammary | Oral | Other | Total Pharmaceuticals (kg) | Premix | Total Premix (kg) | Total kg antibacterials (Pharmaceuticals + Premixes) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 2020 | 55,5 | | 360,7 | | 416,2 | | | 416,2 |
| | | 2021 | 45,1 | | 244,7 | | 289,8 | | | 289,8 |
| | | 2022 | 57,7 | | 260,2 | | 317,9 | | | 317,9 |
| | | 2023 | 44,7 | | 285,8 | | 330,5 | | | 330,5 |
| | | 2024 | 55,1 | | 202,6 | | 257,7 | | | 257,7 |
| | Flumequine | 2018 | | | 519,5 | | 519,5 | | | 519,5 |
| | | 2019 | | | 516,5 | | 516,5 | | | 516,5 |
| | | 2020 | | | 845 | | 845 | | | 845 |
| | | 2021 | | | 375,5 | | 375,5 | | | 375,5 |
| | | 2022 | | | 773,5 | | 773,5 | | | 773,5 |
| | | 2023 | | | 598 | | 598 | | | 598 |
| | | 2024 | | | 503,5 | | 503,5 | | | 503,5 |
| | Marbofloxacin | 2018 | 56,6 | | 14,3 | 1,8 | 72,7 | | | 72,7 |
| | | 2019 | 50,6 | | 14,9 | 2 | 67,5 | | | 67,5 |
| | | 2020 | 62,9 | | 17,3 | 2 | 82,2 | | | 82,2 |
| | | 2021 | 55,3 | | 14 | 1,7 | 71 | | | 71 |
| | | 2022 | 55,1 | | 12,7 | 1,5 | 69,3 | | | 69,3 |
| | | 2023 | 37,8 | | 10,6 | 1,2 | 49,6 | | | 49,6 |
| | | 2024 | 27,5 | | 9,1 | 1,3 | 37,9 | | | 37,9 |
| | Orbifloxacin | 2018 | | | | 2,9 | 2,9 | | | 2,9 |
| | | 2019 | | | | 3,2 | 3,2 | | | 3,2 |
| | | 2020 | | | | 3,9 | 3,9 | | | 3,9 |
| | | 2021 | | | | 3,3 | 3,3 | | | 3,3 |
| | | 2022 | | | | 3,3 | 3,3 | | | 3,3 |
| | | 2023 | | | | 3,2 | 3,2 | | | 3,2 |

| Class (1) | Antibacterial substance (2) | Year | Pharmaceuticals Injection | Intra-mammary | Oral | Other | Total Pharmaceuticals (kg) | Premix | Total Premix (kg) | Total kg antibacterials (Pharmaceuticals + Premixes) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 2024 | | | | 2,7 | 2,7 | | | 2,7 |
| | Pradofloxacin | 2018 | | | 2,1 | | 2,1 | | | 2,1 |
| | | 2019 | | | 1,8 | | 1,8 | | | 1,8 |
| | | 2020 | | | 2,1 | | 2,1 | | | 2,1 |
| | | 2021 | | | 1,3 | | 1,3 | | | 1,3 |
| | | 2022 | | | 1,2 | | 1,2 | | | 1,2 |
| | | 2023 | | | 0,9 | | 0,9 | | | 0,9 |
| | | 2024 | | | 0,7 | | 0,7 | | | 0,7 |

i. **The colours reflect the AMCRA colour code of the active substances and associated classes.**

ii. **3rd and 4th generation cephalosporins are classified as orange when used intramammary, and as red when used systemically.**