Autoriteit Diergeneesmiddelen

Appendix to the report

Usage of Antibiotics in Agricultural Livestock in the Netherlands in 2023

Trends and benchmarking of livestock farms and veterinarians

SDa-expertpanel
June 2024

Autoriteit Diergeneesmiddelen

Contents

$DDDA_{NAT}$ summary

Table A1. $DDDA_{NAT}$ values for the 2019-2023 period, by livestock sector and pharmacotherapeutic group

	Broiler farming sector					Turkey farming sector					Pig farming sector				
Pharmacotherapeutic group	**2019**	**2020**	**2021**	**2022**	**2023**	**2019**	**2020**	**2021**	**2022**	**2023**	**2019**	**2020**	**2021**	**2022**	**2023**
1st-choice antibiotics	**2.57**	**2.55**	**1.75**	**1.56**	**1.86**	**10.66**	**8.32**	**6.73**	**4.86**	**2.76**	**6.26**	**6.46**	**5.47**	**3.93**	**4.03**
As a proportion of overall AB use	**26.0%**	**27.5%**	**27.7%**	**26.7%**	**27.0%**	**47.9%**	**61.1%**	**51.8%**	**52.6%**	**45.4%**	**78.7%**	**73.7%**	**72.3%**	**68.2%**	**68.1%**
Amphenicols	*	*	*	*	*	*	*	*	*	*	0.26	0.32	0.33	0.32	0.33
Macrolides/lincosamides	0.02	0.05	0.06	0.03	0.03	*	*	*	*	*	0.84	0.80	0.44	0.32	0.34
Other	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Penicillins	0.87	0.88	0.58	0.39	0.56	1.61	0.82	0.95	0.66	0.95	0.51	0.53	0.53	0.48	0.45
Pleuromutilins	*	*	*	*	*	*	*	0.09	*	*	0.09	0.04	0.03	0.03	0.03
Tetracyclines	0.90	1.00	0.60	0.63	0.89	8.13	7.10	5.36	4.03	1.49	3.54	3.77	3.18	2.11	2.05
Trimethoprim/sulfonamides	0.78	0.62	0.52	0.50	0.39	0.93	0.40	0.33	0.18	0.31	1.01	1.00	0.97	0.68	0.82
2nd-choice antibiotics	**7.24**	**6.63**	**4.55**	**4.23**	**4.97**	**10.99**	**4.83**	**5.88**	**4.15**	**3.08**	**1.36**	**1.92**	**1.77**	**1.58**	**1.67**
As a proportion of overall AB use	**73.1%**	**71.6%**	**71.9%**	**72.4%**	**72.0%**	**49.4%**	**35.5%**	**45.2%**	**45.0%**	**50.6%**	**17.1%**	**21.9%**	**23.4%**	**27.4%**	**28.2%**
Aminoglycosides	0.01	0.00	0.00	0.00	0.01	*	0.00	*	*	*	0.03	0.02	0.02	0.02	0.01
Aminopenicillins	5.37	4.90	3.20	2.87	3.39	9.16	3.97	3.79	2.87	2.55	0.97	1.41	1.25	1.08	1.17
1st- and 2nd-gen. cephalosporins	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Quinolones	1.62	1.57	1.23	1.16	1.43	0.16	*	0.32	0.06	0.18	0.04	0.03	0.01	0.00	0.01
Fixed-dose combinations	0.01	0.01	0.01	0.04	0.04	0.01	*	*	*	*	0.02	0.02	0.02	0.02	0.02
Long-acting macrolides	*	*	*	*	*	*	*	*	*	*	0.30	0.45	0.46	0.46	0.46
Macrolides/lincosamides	0.24	0.15	0.11	0.16	0.10	1.66	0.86	1.77	1.23	0.35	*	*	*	*	*
3rd-choice antibiotics	**0.09**	**0.08**	**0.02**	**0.05**	**0.07**	**0.61**	**0.46**	**0.38**	**0.23**	**0.24**	**0.34**	**0.39**	**0.33**	**0.25**	**0.22**
As a proportion of overall AB use	**0.9%**	**0.9%**	**0.4%**	**0.9%**	**1.0%**	**2.7%**	**3.4%**	**3.0%**	**2.4%**	**4.0%**	**4.3%**	**4.5%**	**4.4%**	**4.4%**	**3.7%**
3rd- and 4th-gen. cephalosporins	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Fluoroquinolones	0.04	0.03	0.01	0.02	0.03	0.59	0.46	0.38	0.23	0.15	0.00	0.00	0.00	0.00	0.00
Polymyxins	0.05	0.05	0.01	0.03	0.03	0.02	*	*	*	0.09	0.34	0.39	0.33	0.25	0.22
Overall antibiotic use	**9.90**	**9.26**	**6.33**	**5.84**	**6.89**	**22.25**	**13.62**	**12.99**	**9.24**	**6.08**	**7.96**	**8.77**	**7.57**	**5.77**	**5.92**

0.00 refers to a usage level <0.005 $DDDA_{NAT}$; * refers to no use.

Table A1 (continued)

Pharmacotherapeutic group	Dairy cattle farming sector					Veal farming sector					Non-dairy cattle farming sector				
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023
1st-choice antibiotics	**2.39**	**2.66**	**2.67**	**2.54**	**2.58**	**13.63**	**12.88**	**13.39**	**13.17**	**13.87**	**0.71**	**0.65**	**0.62**	**0.34**	**0.18**
As a proportion of overall AB use	**79.9%**	**80.5%**	**80.6%**	**80.2%**	**80.3%**	**85.6%**	**84.6%**	**86.4%**	**86.2%**	**84.4%**	**85.5%**	**83.7%**	**82.5%**	**80.1%**	**72.8%**
Amphenicols	0.05	0.05	0.05	0.05	0.05	1.23	1.10	1.09	1.04	1.06	0.08	0.07	0.06	0.04	0.04
Macrolides/lincosamides	0.06	0.08	0.09	0.09	0.09	2.94	2.73	2.88	2.95	3.13	0.11	0.10	0.10	0.05	0.01
Other	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Penicillins	1.75	1.96	1.98	1.89	1.93	0.37	0.34	0.33	0.30	0.25	0.09	0.09	0.09	0.08	0.08
Pleuromutilins	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Tetracyclines	0.30	0.32	0.30	0.26	0.25	7.93	7.74	8.14	7.90	8.15	0.38	0.35	0.33	0.15	0.04
Trimethoprim/sulfonamides	0.24	0.26	0.26	0.25	0.26	1.16	0.97	0.96	0.98	1.28	0.05	0.04	0.04	0.02	0.01
2nd-choice antibiotics	**0.59**	**0.64**	**0.64**	**0.62**	**0.63**	**2.28**	**2.32**	**2.10**	**2.09**	**2.53**	**0.12**	**0.12**	**0.13**	**0.09**	**0.07**
As a proportion of overall AB use	**19.9%**	**19.3%**	**19.2%**	**19.6%**	**19.5%**	**14.3%**	**15.3%**	**13.5%**	**13.7%**	**15.4%**	**14.2%**	**15.8%**	**16.8%**	**19.6%**	**26.9%**
Aminoglycosides	0.01	0.01	0.01	0.01	0.01	0.16	0.13	0.17	0.19	0.15	0.00	0.00	0.00	0.00	0.00
Aminopenicillins	0.28	0.28	0.30	0.26	0.30	1.48	1.52	1.37	1.20	1.60	0.06	0.06	0.06	0.03	0.02
1st- and 2nd-gen. cephalosporins	0.03	0.02	0.02	0.02	0.02	*	*	*	*	*	0.00	0.00	0.00	0.00	0.00
Quinolones	0.00	0.00	0.00	0.00	*	0.40	0.45	0.33	0.43	0.44	0.01	0.02	0.01	0.00	0.00
Fixed-dose combinations	0.27	0.31	0.29	0.30	0.28	0.00	0.00	0.00	0.00	0.01	0.02	0.02	0.02	0.02	0.02
Long-acting macrolides	0.01	0.01	0.02	0.02	0.02	0.25	0.23	0.22	0.27	0.33	0.02	0.02	0.02	0.02	0.02
Macrolides/lincosamides	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
3rd-choice antibiotics	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.02**	**0.02**	**0.01**	**0.01**	**0.04**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
As a proportion of overall AB use	**0.2%**	**0.2%**	**0.2%**	**0.2%**	**0.2%**	**0.1%**	**0.2%**	**0.0%**	**0.1%**	**0.3%**	**0.3%**	**0.5%**	**0.7%**	**0.2%**	**0.2%**
3rd- and 4th-gen. cephalosporins	0.00	0.00	0.00	0.00	0.00	*	*	*	*	*	0.00	0.00	0.00	*	0.00
Fluoroquinolones	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.03	0.00	0.00	0.00	0.00	0.00
Polymyxins	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00
Overall antibiotic use	**2.99**	**3.31**	**3.32**	**3.16**	**3.21**	**15.93**	**15.23**	**15.50**	**15.27**	**16.44**	**0.83**	**0.78**	**0.75**	**0.43**	**0.25**

0.00 refers to a usage level <0.005 $DDDA_{NAT}$; * refers to no use.

Table A1 (continued)

Pharmacotherapeutic group	Rabbit farming sector 2019	2020	2021	2022	2023
1st-choice antibiotics	**30.44**	**35.27**	**29.54**	**20.87**	**21.58**
As a proportion of overall AB use	**77.0%**	**83.3%**	**84.2%**	**88.0%**	**83.9%**
Amphenicols	*	*	*	*	*
Macrolides/lincosamides	5.15	3.93	6.74	6.22	9.15
Other	13.25	12.54	11.00	9.08	8.39
Penicillins	*	*	*	*	*
Pleuromutilins	4.02	3.86	2.74	3.08	1.89
Tetracyclines	7.13	11.22	3.23	2.11	2.00
Trimethoprim/sulfonamides	0.89	3.73	5.82	0.38	0.16
2nd-choice antibiotics	**8.39**	**7.09**	**5.53**	**2.84**	**4.14**
As a proportion of overall AB use	**21.2%**	**16.7%**	**15.8%**	**12.0%**	**16.1%**
Aminoglycosides	8.33	6.97	5.09	2.48	3.59
Aminopenicillins	*	*	*	*	*
1st- and 2nd-gen. cephalosporins	*	*	*	*	*
Quinolones	*	0.12	0.44	0.35	0.54
Fixed-dose combinations	*	*	*	*	*
Long-acting macrolides	0.05	*	*	*	0.01
Macrolides/lincosamides	*	*	*	*	*
3rd-choice antibiotics	**0.68**	**0.00**	**0.00**	**0.00**	**0.00**
As a proportion of overall AB use	**1.7%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**
3rd- and 4th-gen. cephalosporins	*	*	*	*	*
Fluoroquinolones	0.11	*	*	*	*
Polymyxins	0.57	*	*	*	*
Overall antibiotic use	**39.51**	**42.35**	**35.07**	**23.71**	**25.71**

0.00 refers to a usage level <0.005 $DDDA_{NAT}$; * refers to no use.

Table A2. Reductions in the amount of antibiotics used in agricultural livestock, compared to 2009 levels (only livestock sectors with available $DDDA_{NAT}$ values for 2009 are included)

Livestock sector	$DDDA_{NAT}$ 2009	Reduction from the 2009 level, in % '10	'11	'12	'13	'14	'15	'16	'17	'18	'19	'20	'21	'22	'23
Broiler farming sector	36,76	37	43	52	65	57	60	72	74	72	73	75	83	84	81
Pig farming sector	20,51	26	29	30	51	54	56	57	58	58	61	57	63	72	71
Dairy cattle farming sector	5,78	-10	-1	30	30	43	46	48	47	47	48	43	43	45	44
Veal farming sector*	33,80	9	14	24	36	37	35	38	40	45	53	55	54	55	51

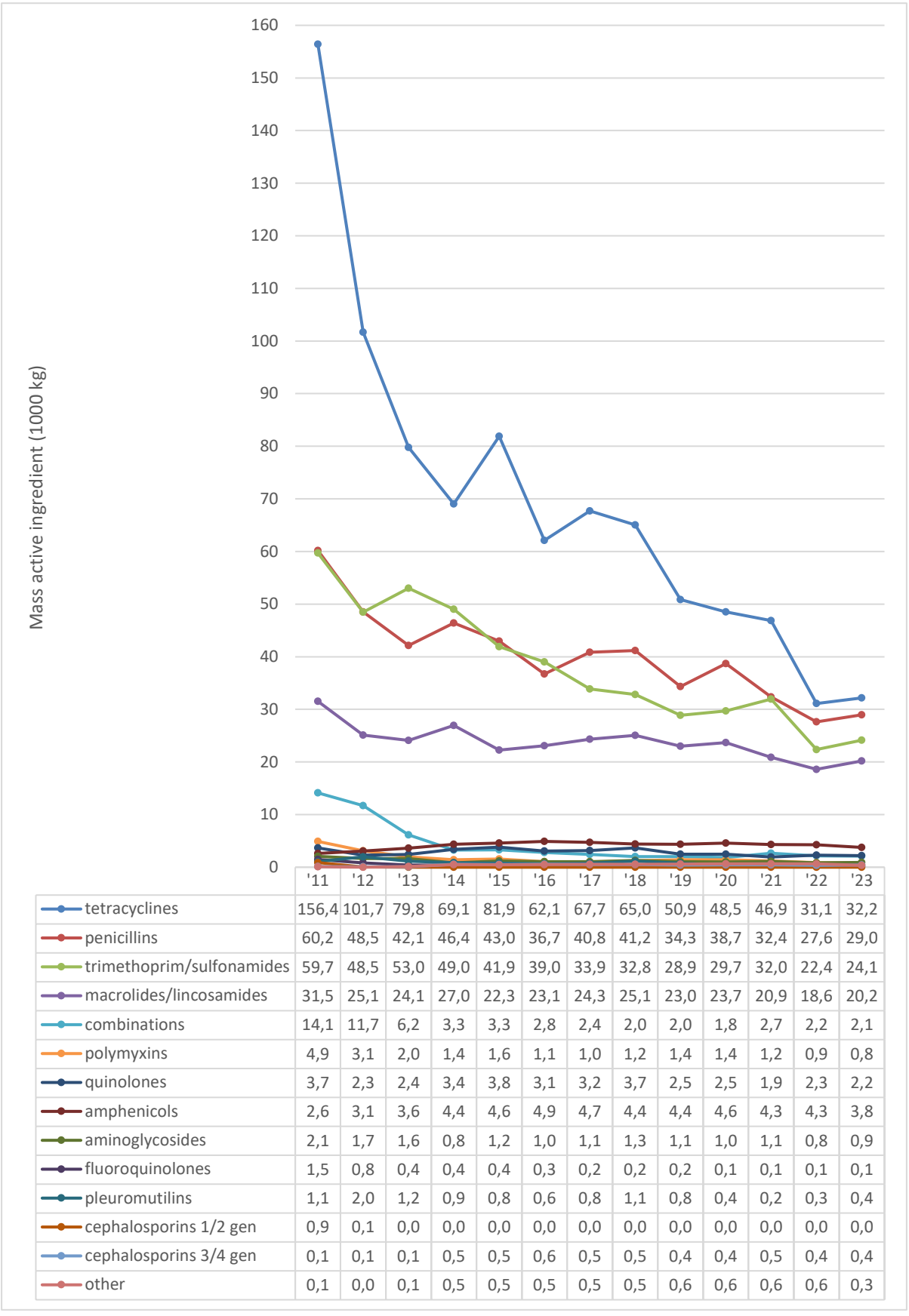
* In 2021, the reduction from its 2007 level amounted to 58%.

Mass balance

Table A3. Kilograms of antibiotics used (by livestock sector and for all livestock sectors combined) and sold in 2023, by pharmacotherapeutic group

Pharmacotherapeutic group	Kilograms used, according to delivery records									Kilograms sold
	Broiler farming sector	Turkey farming sector	Pig farming sector	Dairy cattle farming sector	Veal farming sector	Non-dairy cattle farming sector	Rabbit farming sector	Other poultry farming subsectors	All livestock sectors combined	
1st-choice antibiotics	**2,027**	**328**	**30,666**	**9,461**	**38,618**	**788**	**123**	**2,119**	**84,130**	**89,345**
As a proportion of overall AB use/sales	**38.2%**	**68.6%**	**75.6%**	**79.3%**	**81.2%**	**73.8%**	**63.2%**	**79.2%**	**76.6%**	**76.7%**
Amphenicols	0	0	1,504	420	1,860	152	0	0	3,936	3,774
Fixed-dose combinations	0	0	0	0	0	0	0	0	0	313
Macrolides/lincosamides	237	109	2,806	617	13,551	63	58	876	18,317	20,043
Other	0	0	0	0	0	0	32	0	32	343
Penicillins	380	56	3,542	3,346	319	223	0	465	8,332	8,151
Pleuromutilins	0	0	209	0	0	0	20	82	311	413
Tetracyclines	695	132	12,349	1,335	15,925	206	11	591	31,243	32,170
Trimethoprim/sulfonamides	714	31	10,255	3,742	6,963	144	2	105	21,957	24,138
2nd-choice antibiotics	**3,264**	**143**	**9,323**	**2,454**	**8,928**	**278**	**72**	**428**	**24,889**	**26,270**
As a proportion of overall AB use/sales	**61.5%**	**30.0%**	**23.0%**	**20.6%**	**18.8%**	**26.1%**	**36.7%**	**16.0%**	**22.7%**	**22.5%**
Aminoglycosides	51	0	224	349	583	18	68	331	1,623	928
Aminopenicillins	2,558	137	8,490	1,475	6,912	121	0	47	19,741	20,823
1st- and 2nd-gen. cephalosporins	0	0	0	15	0	0	0	0	15	395
Quinolones	582	7	38	0	1,395	6	4	49	2,081	2,196
Fixed-dose combinations	73	0	481	611	18	129	0	0	1,311	1,774
Long-acting macrolides	0	0	89	5	20	4	0	0	119	154
3rd-choice antibiotics	**19**	**7**	**570**	**20**	**32**	**1**	**0**	**129**	**778**	**927**
As a proportion of overall AB use/sales	**0.4%**	**1.4%**	**1.4%**	**0.2%**	**0.1%**	**0.1%**	**0.0%**	**4.8%**	**0.7%**	**0.8%**
3rd- and 4th-gen. cephalosporins	0	0	0	0	0	0	0	0	0	0
Fluoroquinolones	14	5	0	17	17	1	0	4	59	116
Polymyxins	5	1	570	3	15	0	0	125	719	811
Overall	**5,310**	**478**	**40,558**	**11,935**	**47,578**	**1,067**	**195**	**2,676**	**109,797**	**116,542**

Figure A1. Trends kilograms of active substances sold over the 2011-2023 period, by pharmacotherapeutic group



	'11	'12	'13	'14	'15	'16	'17	'18	'19	'20	'21	'22	'23
tetracyclines	156,4	101,7	79,8	69,1	81,9	62,1	67,7	65,0	50,9	48,5	46,9	31,1	32,2
penicillins	60,2	48,5	42,1	46,4	43,0	36,7	40,8	41,2	34,3	38,7	32,4	27,6	29,0
trimethoprim/sulfonamides	59,7	48,5	53,0	49,0	41,9	39,0	33,9	32,8	28,9	29,7	32,0	22,4	24,1
macrolides/lincosamides	31,5	25,1	24,1	27,0	22,3	23,1	24,3	25,1	23,0	23,7	20,9	18,6	20,2
combinations	14,1	11,7	6,2	3,3	3,3	2,8	2,4	2,0	2,0	1,8	2,7	2,2	2,1
polymyxins	4,9	3,1	2,0	1,4	1,6	1,1	1,0	1,2	1,4	1,4	1,2	0,9	0,8
quinolones	3,7	2,3	2,4	3,4	3,8	3,1	3,2	3,7	2,5	2,5	1,9	2,3	2,2
amphenicols	2,6	3,1	3,6	4,4	4,6	4,9	4,7	4,4	4,4	4,6	4,3	4,3	3,8
aminoglycosides	2,1	1,7	1,6	0,8	1,2	1,0	1,1	1,3	1,1	1,0	1,1	0,8	0,9
fluoroquinolones	1,5	0,8	0,4	0,4	0,4	0,3	0,2	0,2	0,2	0,1	0,1	0,1	0,1
pleuromutilins	1,1	2,0	1,2	0,9	0,8	0,6	0,8	1,1	0,8	0,4	0,2	0,3	0,4
cephalosporins 1/2 gen	0,9	0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
cephalosporins 3/4 gen	0,1	0,1	0,1	0,5	0,5	0,6	0,5	0,5	0,4	0,4	0,5	0,4	0,4
other	0,1	0,0	0,1	0,5	0,5	0,5	0,5	0,5	0,6	0,6	0,6	0,6	0,3

Detailed antibiotic usage data by livestock sector

Big food producing livestock sectors

Veal farming sector

1. $DDDA_{NAT}$

Figure A2. $DDDA_{NAT}$ trends in the veal farming sector over the 2013-2023 period, by antibiotics category

2. $DDDA_F$

2.1 White veal farms

Number of farms: 747
Number of farms with $DDDA_F$ = 0: 9 (1.2%)
Number of farms that used third- and fourth-generation cephalosporins: 0 (0.0%)
Number of farms that used fluoroquinolones: 117 (15.7%)
Number of farms that used polymyxins: 25 (3.3%)

Table A4. Antibiotic use in $DDDA_F$ at white veal farms from 2011 to 2023*

Year	N	Mean	Median	P75	P90
2011	934	41.1	33.2	44.9	57.8
2012	904	33.6	30.7	40.1	50.9
2013	862	31.4	26.2	35.1	45.2
2014	864	24.5	23.4	31.0	37.8
2015	855	25.1	24.3	31.7	38.3
2016	857	23.7	23.0	29.0	35.6
2017	838	23.0	22.2	27.0	33.1
2018	855	20.1	19.3	24.6	30.0
2019	782	20.0	19.2	23.9	29.8
2020	776	19.8	18.7	23.9	29.3
2021	771	20.2	19.8	24.0	29.0
2022	752	19.4	18.5	23.3	27.9
2023	747	19.5	19.5	23.8	28.5

* Only years for which similar $DDDA_F$ calculation methods were used have been included.

Figure A3. 2011 and 2023 $DDDA_F$ distributions for white veal farms

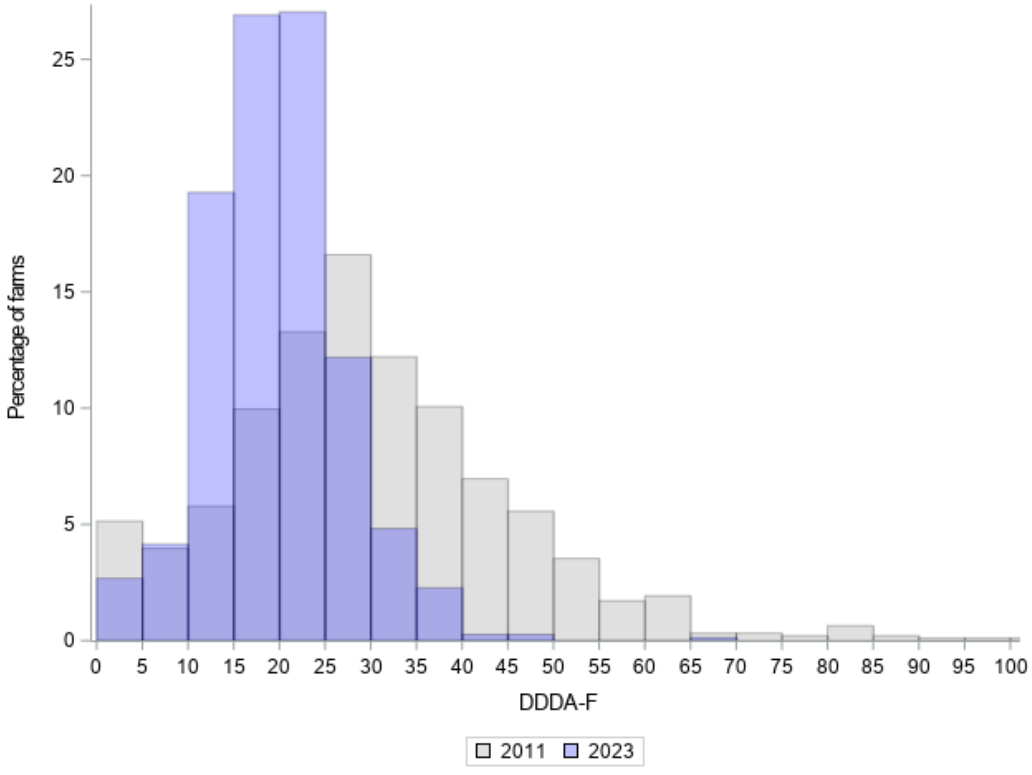


Figure A4. Scatter plot of 2022 and 2023 $DDDA_F$ values for white veal farms. The red solid lines represent the action threshold defined by the SDa. The number of farms with persistently high usage levels (farms whose usage levels exceeded the action threshold in both years) is listed in the upper-left corner of the scatter plot. Here $DDDA_F$ on an annual basis are shown, for the benchmarking of veal calf farmers a $DDDA_F$ over a 1.5 year period is used

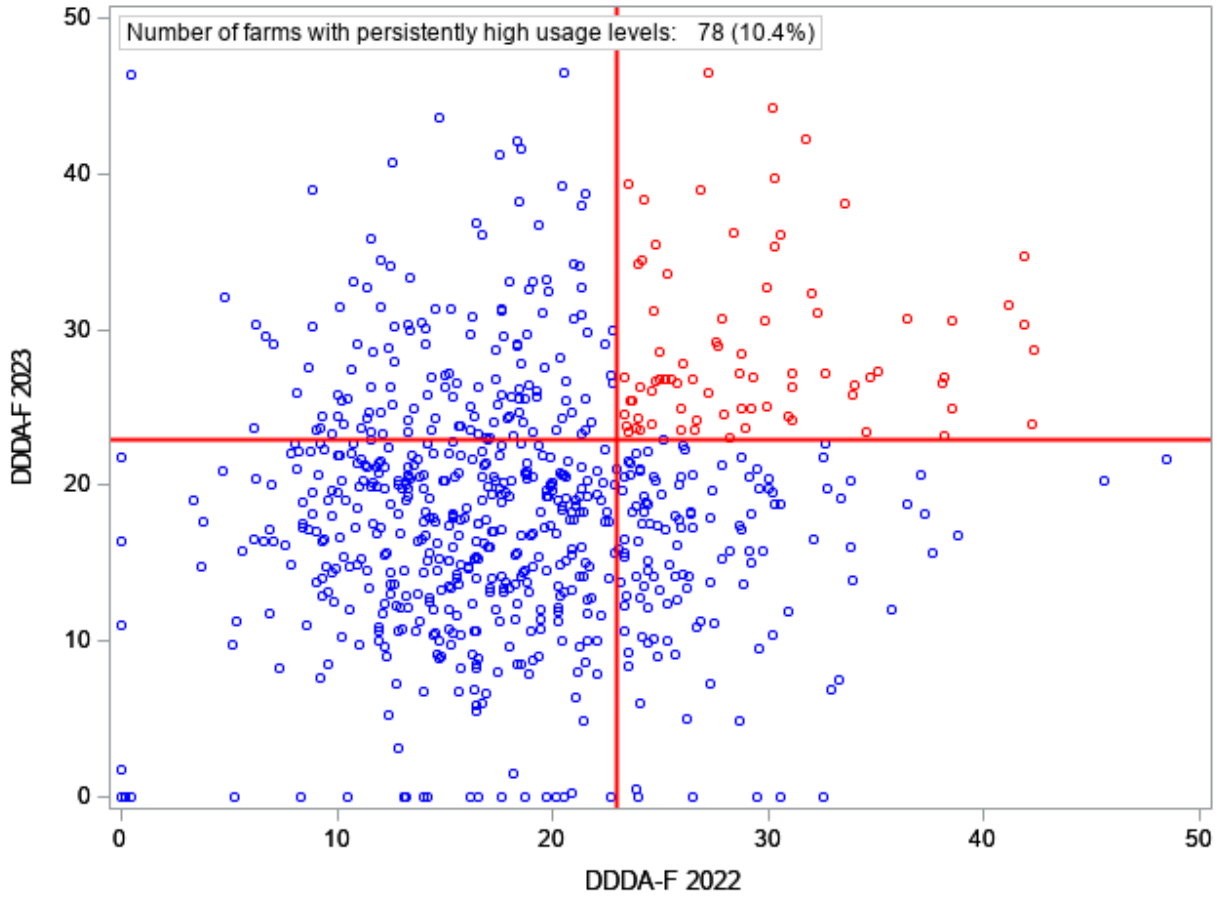


Table A5. Antibiotic use in $DDDA_F$ at white veal farms in 2023, by pharmacotherapeutic group and route of administration

Category of antibiotics	Pharmacotherapeutic group	Route of administration	% of farms with $DDDA_F$=0	$DDDA_F$		
				Median	P75	Mean
1	Amphenicols	Parenteral	1.5%	0.82	1.25	0.98
1	Macrolides/lincosamides	Oral	4.1%	3.65	4.65	3.68
1	Macrolides/lincosamides	Parenteral	47.8%	0.00	0.04	0.08
1	Penicillins	Parenteral	7.8%	0.25	0.42	0.33
1	Tetracyclines	Oral	2.0%	9.57	12.40	10.05
1	Tetracyclines	Parenteral	54.8%	0.00	0.03	0.03
1	Trimethoprim/sulfonamides	Oral	51.8%	0.00	1.68	1.01
1	Trimethoprim/sulfonamides	Parenteral	29.6%	0.02	0.06	0.04
2	Aminoglycosides	Oral	31.1%	0.02	0.07	0.15
2	Aminoglycosides	Parenteral	53.7%	0.00	0.06	0.05
2	Aminopenicillins	Oral	33.6%	0.75	3.21	2.03
2	Aminopenicillins	Parenteral	7.5%	0.11	0.20	0.15
2	Quinolones	Oral	74.4%	0.00	0.11	0.60
2	Fixed-dose combinations	Parenteral	80.5%	0.00	0.00	0.01
2	Long-acting macrolides	Parenteral	22.1%	0.19	0.42	0.31
3	Fluoroquinolones	Oral	98.9%	0.00	0.00	0.01
3	Fluoroquinolones	Parenteral	84.6%	0.00	0.00	0.01
3	Polymyxins	Oral	99.3%	0.00	0.00	0.01
3	Polymyxins	Parenteral	97.1%	0.00	0.00	0.00

2.2 Rosé veal starter farms

Number of farms: 201
Number of farms with $DDDA_F$ = 0: 3 (1.5%)
Number of farms that used third- and fourth-generation cephalosporins: 0 (0.0%)
Number of farms that used fluoroquinolones: 29 (14.4%)
Number of farms that used polymyxins: 6 (3.0%)

Table A6. Antibiotic use in $DDDA_F$ at rosé veal starter farms from 2011 to 2023*

Year	N	Mean	Median	P75	P90
2011	207	120.0	94.4	127.8	171.5
2012	189	97.5	84.2	107.1	143.1
2013	264	115.6	80.9	102.2	131.0
2014	260	79.6	77.7	97.2	113.9
2015	247	82.7	83.0	101.5	115.1
2016	240	83.9	83.2	100.0	111.6
2017	238	83.0	83.1	102.0	113.3
2018	256	79.9	79.3	96.1	115.6
2019	225	71.5	70.4	90.7	106.5
2020	210	68.4	69.4	85.5	98.1
2021	198	71.6	71.2	88.9	104.7
2022	201	70.6	69.7	88.1	103.2
2023	201	73.7	72.7	91.3	109.4

* Only years for which similar $DDDA_F$ calculation methods were used have been included.

Figure A5. 2011 and 2023 $DDDA_F$ distributions for rosé veal starter farms

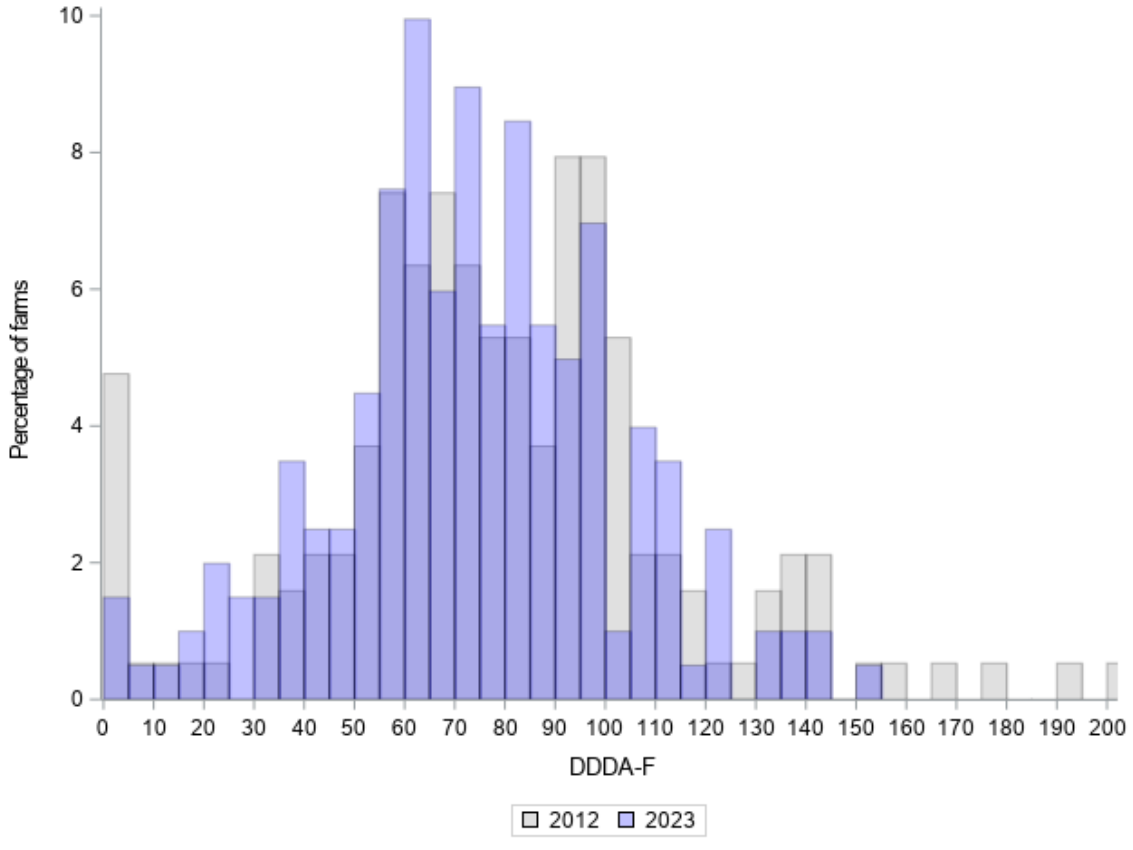


Figure A6. Scatter plot of 2022 and 2023 $DDDA_F$ values for rosé veal starter farms. The red solid lines represent the action threshold defined by the SDa. The number of farms with persistently high usage levels (farms whose usage levels exceeded the action threshold in both years) is listed in the upper-right corner of the scatter plot. Here $DDDA_F$ on an annual basis are shown, for the benchmarking of veal calf farmers a $DDDA_F$ over a 1.5 year period is used

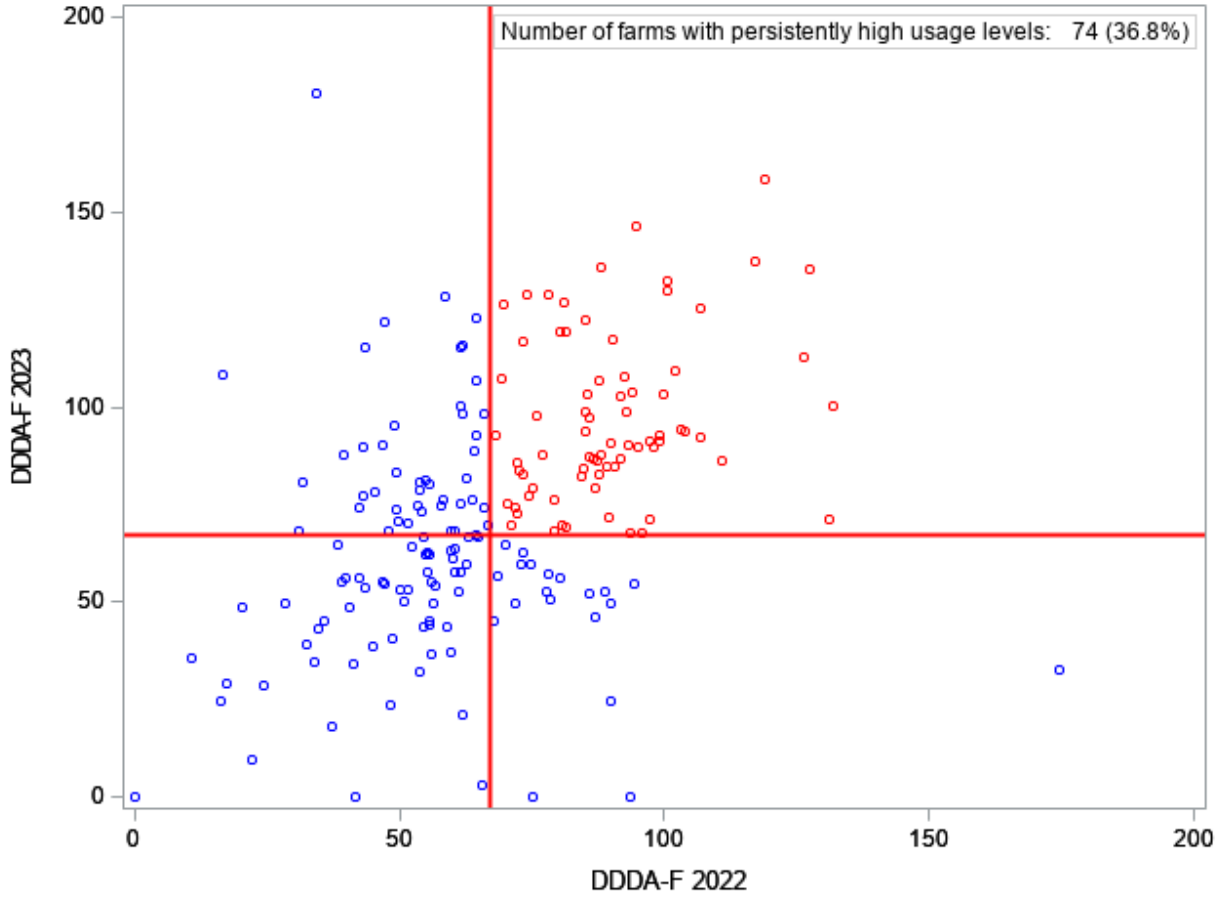


Table A7. Antibiotic use in $DDDA_F$ at rosé veal starter farms in 2023, by pharmacotherapeutic group and route of administration

Category of antibiotics	Pharmacotherapeutic group	Route of administration	% of farms with $DDDA_F$=0	$DDDA_F$		
				Median	P75	Mean
1	Amphenicols	Parenteral	1.5%	4.70	8.24	6.29
1	Macrolides/lincosamides	Oral	6.5%	17.38	21.35	15.99
1	Macrolides/lincosamides	Parenteral	39.3%	0.02	0.23	0.24
1	Penicillins	Intramammary for dry cow therapy	99.5%	0.00	0.00	0.00
1	Penicillins	Parenteral	9.5%	0.82	1.40	1.15
1	Tetracyclines	Oral	2.0%	36.98	47.15	36.48
1	Tetracyclines	Parenteral	51.7%	0.00	0.20	0.22
1	Trimethoprim/sulfonamides	Oral	25.9%	4.71	10.28	7.07
1	Trimethoprim/sulfonamides	Parenteral	36.8%	0.05	0.23	0.27
2	Aminoglycosides	Oral	47.3%	0.03	0.18	0.47
2	Aminoglycosides	Parenteral	45.8%	0.04	0.44	0.32
2	Aminopenicillins	Oral	64.7%	0.00	2.41	2.37
2	Aminopenicillins	Parenteral	12.4%	0.31	0.68	0.50
2	Quinolones	Oral	84.1%	0.00	0.00	0.91
2	Fixed-dose combinations	Intramammary	99.5%	0.00	0.00	0.00
2	Fixed-dose combinations	Parenteral	86.6%	0.00	0.00	0.03
2	Long-acting macrolides	Parenteral	25.4%	0.80	1.90	1.38
3	Fluoroquinolones	Parenteral	85.6%	0.00	0.00	0.05

2.3 Rosé veal fattening farms

Number of farms: 509
Number of farms with $DDDA_F$ = 0: 57 (11.2%)
Number of farms that used third- and fourth-generation cephalosporins: 0 (0.0%)
Number of farms that used fluoroquinolones: 25 (4.9%)
Number of farms that used polymyxins: 6 (1.2%)

Table A8. Antibiotic use in $DDDA_F$ at rosé veal fattening farms from 2011 to 2023*

Year	N	Mean	Median	P75	P90
2011	671	7.8	1.5	6.6	14.5
2012	717	5.8	2.3	7.3	15.5
2013	723	5.2	1.4	5.4	10.8
2014	663	3.4	1.2	4.5	9.5
2015	638	2.7	1.0	4.0	7.3
2016	602	2.8	0.9	3.9	8.1
2017	580	3.0	1.6	4.1	7.8
2018	601	2.7	1.2	3.8	6.4
2019	718	4.0	1.9	6.0	10.7
2020	675	4.0	1.7	6.1	11.0
2021	575	4.0	1.8	6.3	11.5
2022	536	3.9	1.7	6.6	11.5
2023	509	4.0	1.6	6.9	11.6

* Only years for which similar $DDDA_F$ calculation methods were used have been included.

Figure A7. 2011 and 2023 $DDDA_F$ distributions for rosé veal fattening farms

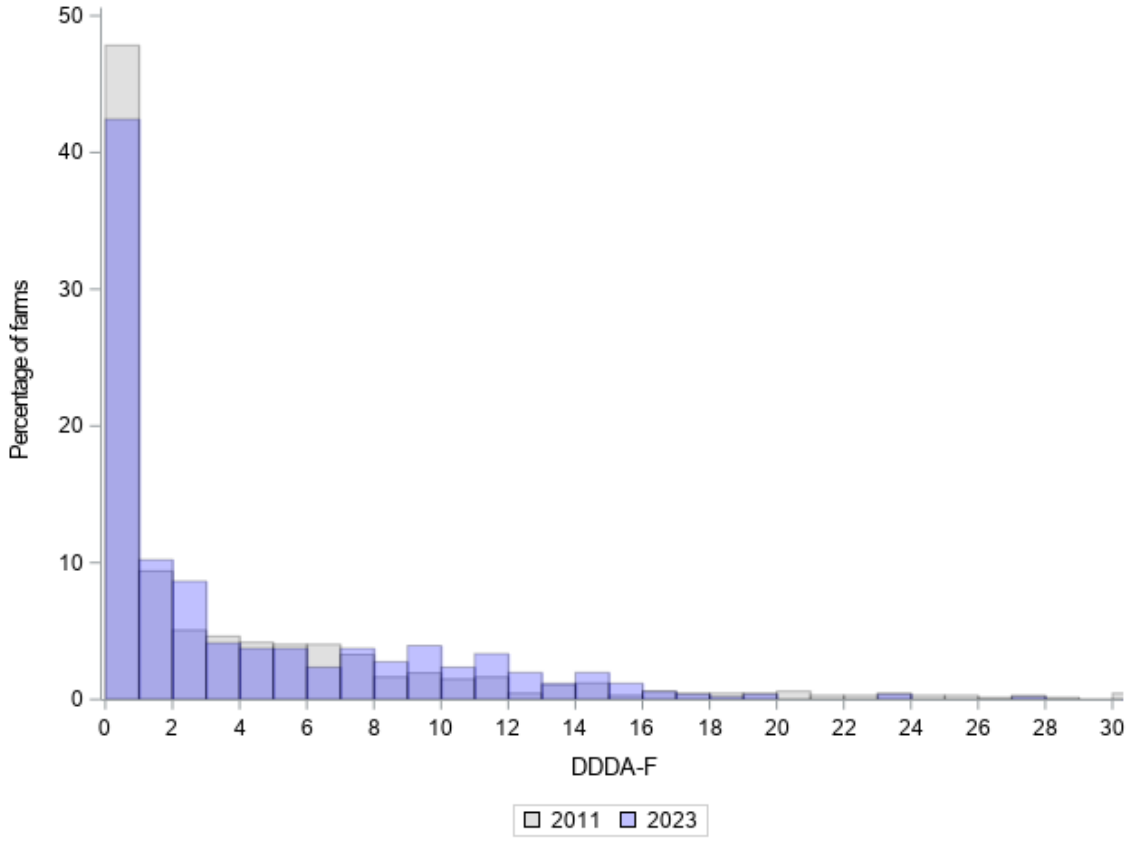


Figure A8. Scatter plot of 2022 and 2023 $DDDA_F$ values for rosé veal fattening farms. The red solid lines represent the action threshold defined by the SDa. The number of farms with persistently high usage levels (farms whose usage levels exceeded the action threshold in both years) is listed in the upper-right corner of the scatter plot. Here $DDDA_F$ on an annual basis are shown, for the benchmarking of veal calf farmers a $DDDA_F$ over a 1.5 year period is used

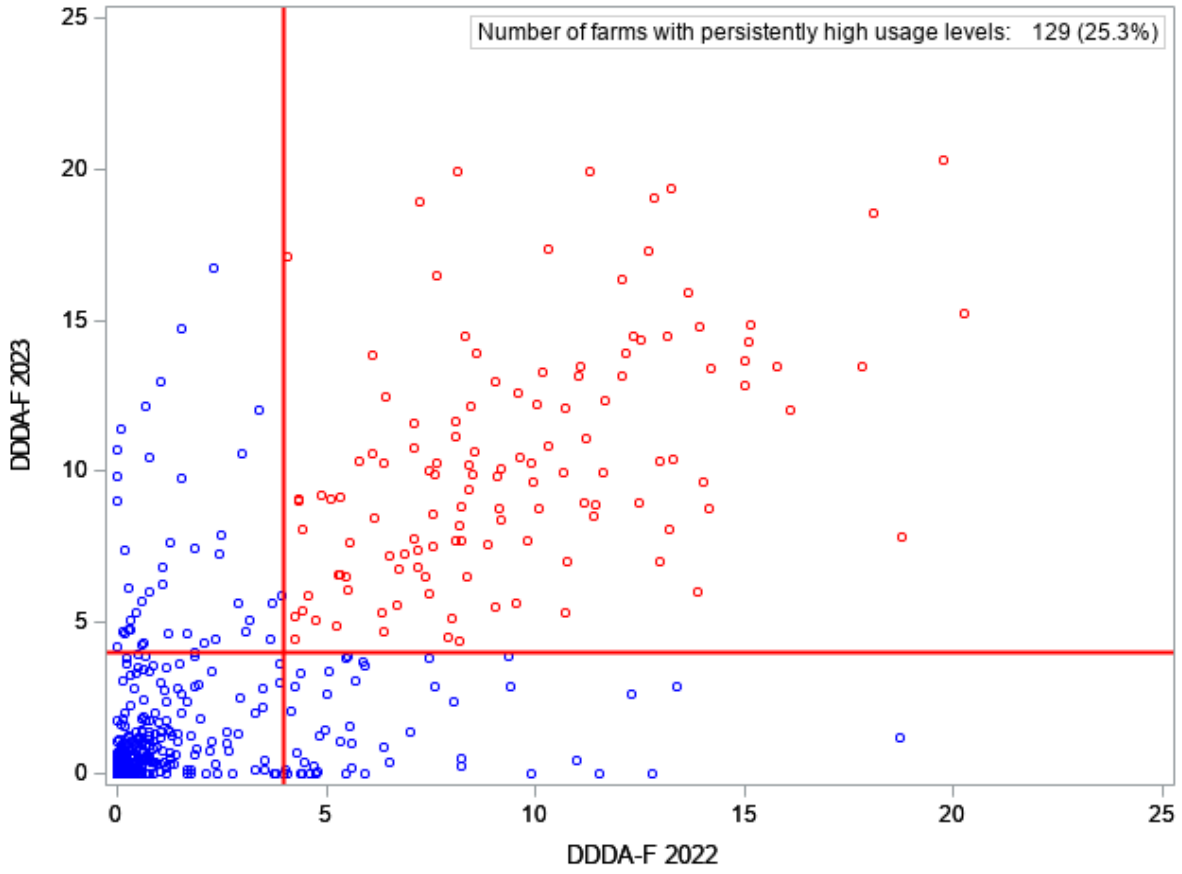


Table A9. Antibiotic use in $DDDA_F$ at rosé veal fattening farms in 2023, by pharmacotherapeutic group and route of administration

Category of antibiotics	Pharmacotherapeutic group	Route of administration	% of farms with $DDDA_F$=0	$DDDA_F$		
				Median	P75	Mean
1	Amphenicols	Parenteral	18.9%	0.27	0.68	0.51
1	Macrolides/lincosamides	Oral	74.1%	0.00	0.20	0.54
1	Macrolides/lincosamides	Parenteral	77.6%	0.00	0.00	0.02
1	Penicillins	Intramammary for dry cow therapy	99.8%	0.00	0.00	0.00
1	Penicillins	Parenteral	38.5%	0.05	0.17	0.13
1	Tetracyclines	Oral	53.0%	0.00	3.41	1.93
1	Tetracyclines	Parenteral	80.4%	0.00	0.00	0.01
1	Trimethoprim/sulfonamides	Oral	63.1%	0.00	0.68	0.50
1	Trimethoprim/sulfonamides	Parenteral	69.9%	0.00	0.01	0.01
2	Aminoglycosides	Oral	88.2%	0.00	0.00	0.01
2	Aminoglycosides	Parenteral	89.6%	0.00	0.00	0.01
2	Aminopenicillins	Oral	89.6%	0.00	0.00	0.09
2	Aminopenicillins	Parenteral	45.8%	0.01	0.07	0.07
2	Quinolones	Oral	96.5%	0.00	0.00	0.02
2	Fixed-dose combinations	Parenteral	91.7%	0.00	0.00	0.00
2	Long-acting macrolides	Parenteral	55.6%	0.00	0.17	0.18
3	Fluoroquinolones	Parenteral	95.1%	0.00	0.00	0.00
3	Polymyxins	Parenteral	98.8%	0.00	0.00	0.00

2.4 Rosé veal combination farms

Number of farms: 68
Number of farms with $DDDA_F$ = 0: 3 (4.4%)
Number of farms that used third- and fourth-generation cephalosporins: 0 (0.0%)
Number of farms that used fluoroquinolones: 29 (22.1%)
Number of farms that used polymyxins: 2 (2.9%)

Table A10. Antibiotic use in $DDDA_F$ at rosé veal combination farms from 2011 to 2023*

Year	N	Mean	Median	P75	P90
2011	313	34.6	17.3	29.7	45.7
2012	365	21.5	13.2	23.7	37.4
2013	276	11.7	10.1	16.2	23.8
2014	215	13.0	12.0	17.1	21.9
2015	238	11.8	11.2	16.2	21.4
2016	229	11.1	11.3	16.6	20.6
2017	212	12.8	12.6	17.3	22.6
2018	186	14.8	14.1	18.1	21.9
2019	70	16.1	14.1	21.9	31.4
2020	68	16.0	15.6	21.7	27.7
2021	64	16.3	14.0	21.1	30.5
2022	65	16.7	14.5	22.1	31.7
2023	68	16.5	13.9	21.5	37.4

* Only years for which similar $DDDA_F$ calculation methods were used have been included.

Figure A9. 2011 and 2023 $DDDA_F$ distributions for rosé veal combination farms

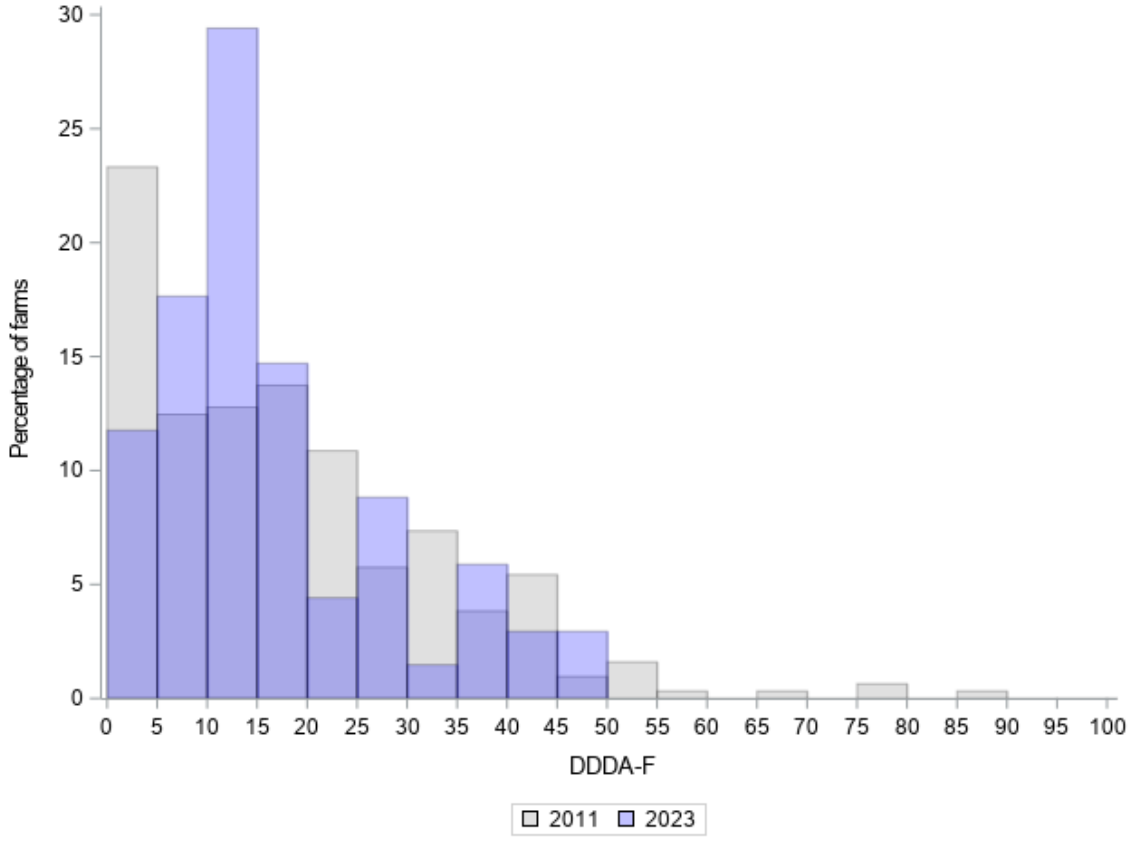


Figure A10. Scatter plot of 2022 and 2023 $DDDA_F$ values for rosé veal combination farms. The red solid lines represent the action threshold defined by the SDa. The number of farms with persistently high usage levels (farms whose usage levels exceeded the action threshold in both years) is listed in the upper-right corner of the scatter plot. Here $DDDA_F$ on an annual basis are shown, for the benchmarking of veal calf farmers a $DDDA_F$ over a 1.5 year period is used

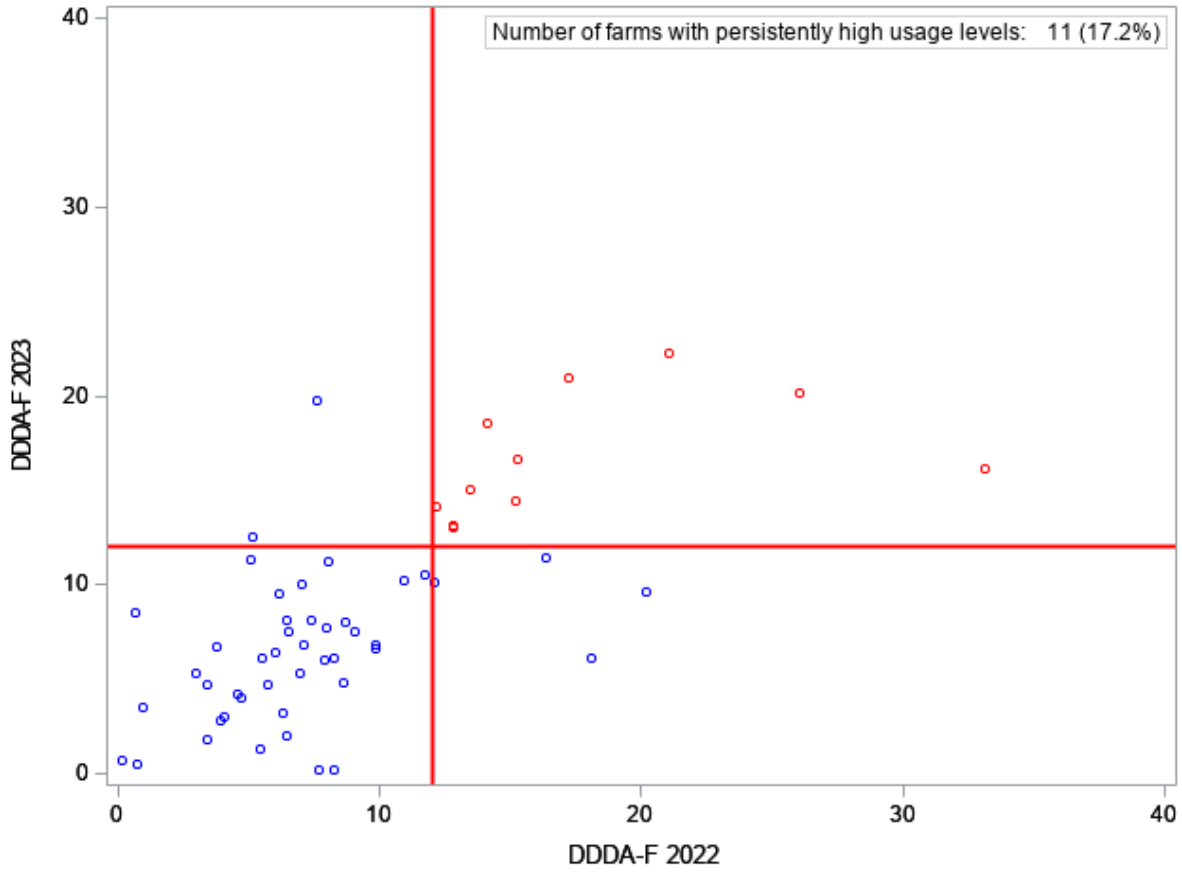


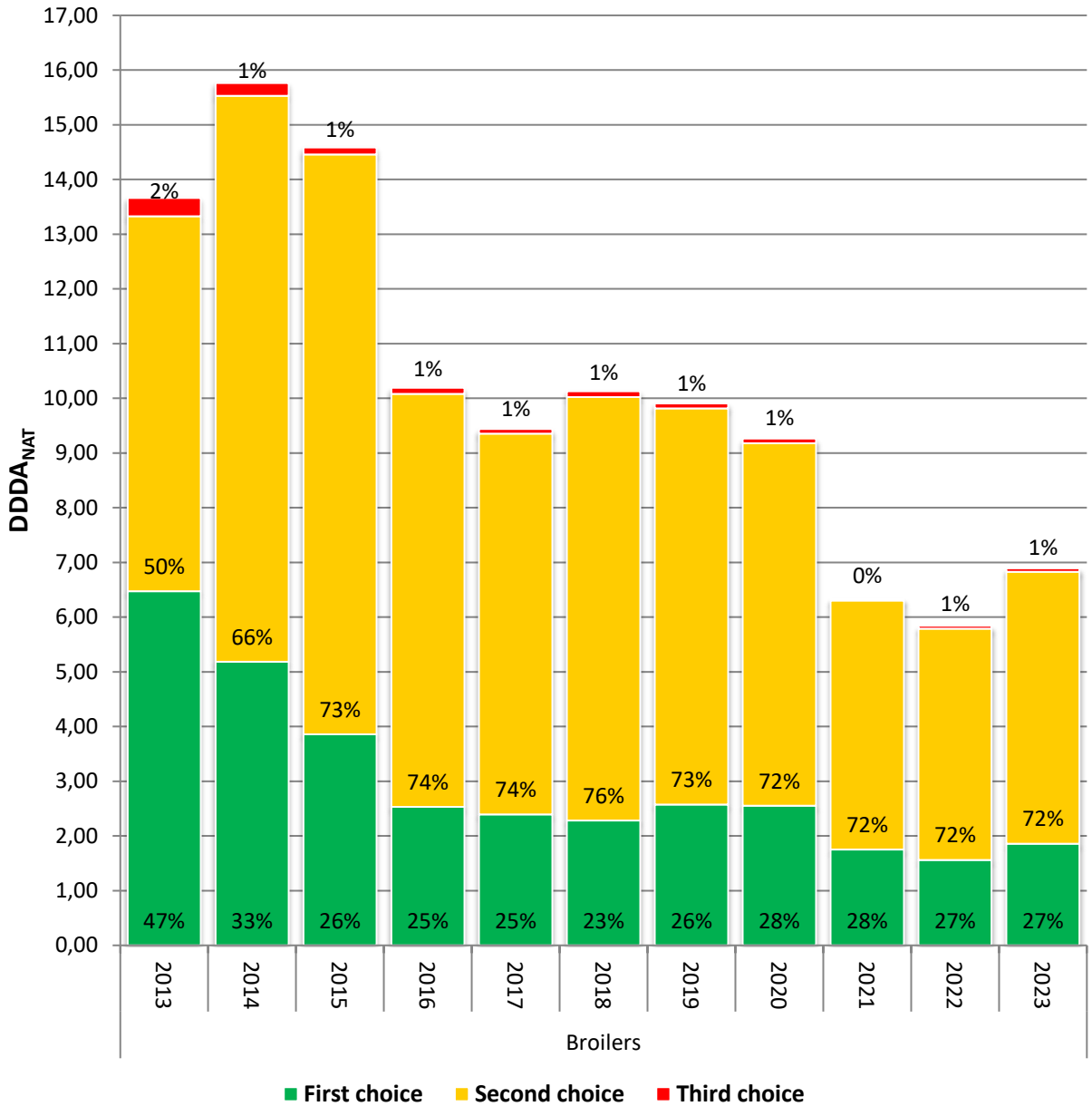
Table A11. Antibiotic use in $DDDA_F$ at rosé veal combination farms in 2023, by pharmacotherapeutic group and route of administration

Category of antibiotics	Pharmacotherapeutic group	Route of administration	% of farms with $DDDA_F$=0	$DDDA_F$		
				Median	P75	Mean
1	Amphenicols	Parenteral	5.9%	0.81	1.73	1.34
1	Macrolides/lincosamides	Oral	13.2%	2.63	3.77	2.92
1	Macrolides/lincosamides	Parenteral	50.0%	0.00	0.03	0.16
1	Penicillins	Parenteral	11.8%	0.16	0.39	0.28
1	Tetracyclines	Oral	7.4%	7.19	10.91	8.24
1	Tetracyclines	Parenteral	63.2%	0.00	0.02	0.02
1	Trimethoprim/sulfonamides	Oral	35.3%	0.71	2.37	1.57
1	Trimethoprim/sulfonamides	Parenteral	44.1%	0.01	0.03	0.03
2	Aminoglycosides	Oral	42.6%	0.02	0.14	0.14
2	Aminoglycosides	Parenteral	42.6%	0.01	0.06	0.05
2	Aminopenicillins	Oral	58.8%	0.00	1.03	0.69
2	Aminopenicillins	Parenteral	8.8%	0.10	0.22	0.15
2	Quinolones	Oral	64.7%	0.00	0.67	0.45
2	Fixed-dose combinations	Parenteral	80.9%	0.00	0.00	0.01
2	Long-acting macrolides	Parenteral	25.0%	0.21	0.58	0.42
3	Fluoroquinolones	Oral	98.5%	0.00	0.00	0.01
3	Fluoroquinolones	Parenteral	77.9%	0.00	0.00	0.02
3	Polymyxins	Parenteral	97.1%	0.00	0.00	0.00

Broiler farming sector

1. DDDA$_{NAT}$

Figure A11. DDDA$_{NAT}$ trends in the broiler farming sector over the 2013-2023 period, by antibiotics category



2. DDDA$_F$

2.1 All breeds

Number of farms: 783*
Number of farms with DDDA$_F$=0: 417 (55.8%)
Number of farms that used third- and fourth-generation cephalosporins**: 0 (0.0%)
Number of farms that used fluoroquinolones: 13 (1.7%)
Number of farms that used polymyxins: 6 (0.8%)

Table A12. Antibiotic use in DDDA$_F$ at broiler farms from 2016 to 2023***

Year	N	Mean	Median	P75	P90
2016	853	8.6	4.8	12.5	22.2
2017	852	8.3	4.1	12.9	21.9
2018	834	8.3	4.9	12.4	22.5
2019	819	8.6	3.4	13.6	24.0
2020	816	7.0	2.3	10.0	21.5
2021	805	5.0	1.1	7.4	15.6
2022	788	4.8	0.0	7.0	14.9
2023	783	4.6	0.0	6.6	14.1

* This number also includes broiler farms with both conventional and slower growing breeds. As a result, the number of broiler farms with conventional breeds and broiler farms with slower growing breeds combined, differs from the total number of broiler farms stated above.
** These antibiotics are not authorized for use in poultry.
*** Only years for which similar DDDA$_F$ calculation methods were used have been included.

Figure A12. 2016 and 2023 DDDA$_F$ distributions for broiler farms

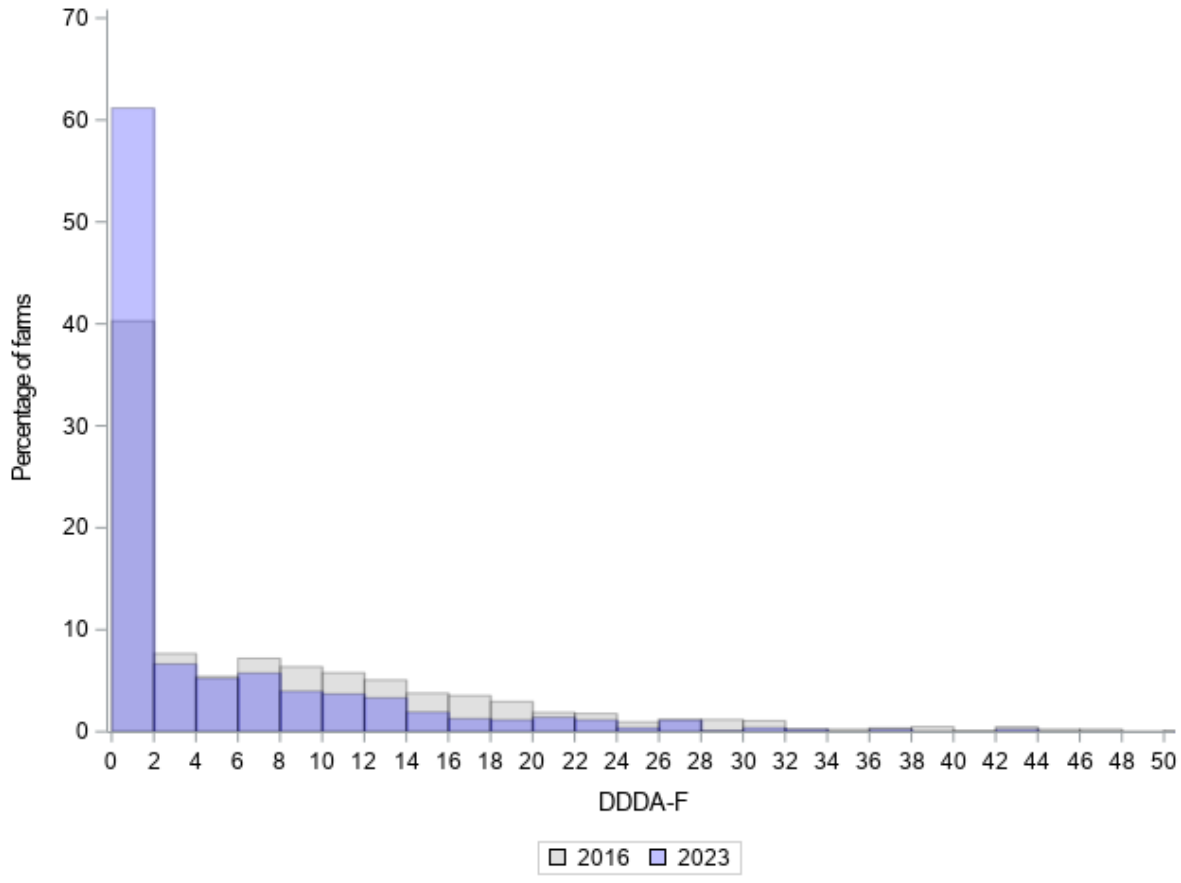


Table A13. Antibiotic use in $DDDA_F$ at broiler farms in 2023, by pharmacotherapeutic group and route of administration

Category of antibiotics	Pharmacotherapeutic group	Route of administration	% of farms with $DDDA_F$=0	$DDDA_F$		
				Median	P75	Mean
1	Macrolides/lincosamides	Oral	98.3%	0.00	0.00	0.06
1	Penicillins	Oral	90.4%	0.00	0.00	0.52
1	Tetracyclines	Oral	84.8%	0.00	0.00	0.57
1	Trimethoprim/sulfonamides	Oral	72.7%	0.00	1.19	1.43
2	Aminoglycosides	Oral	99.5%	0.00	0.00	0.00
2	Aminopenicillins	Oral	75.2%	0.00	0.00	1.42
2	Quinolones	Oral	86.7%	0.00	0.00	0.52
2	Fixed-dose combinations	Oral	99.1%	0.00	0.00	0.04
2	Macrolides/lincosamides	Oral	96.0%	0.00	0.00	0.04
3	Fluoroquinolones	Oral	98.3%	0.00	0.00	0.03
3	Polymyxins	Oral	99.2%	0.00	0.00	0.01

2.2 Broiler farms with conventional breeds

Number of farms: 306
Number of farms with $DDDA_F$=0: 80 (26.1%)
Number of farms that used third- and fourth-generation cephalosporins*: 0 (0.0%)
Number of farms that used fluoroquinolones: 12 (1.7%)
Number of farms that used polymyxins: 6 (0.8%)

Table A14. Antibiotic use in $DDDA_F$ at broiler farms with conventional breeds from 2016 to 2023**

Year	N	Mean	Median	P75	P90
2016	570	12.3	8.5	17.5	29.7
2017	487	13.9	9.3	19.5	33.3
2018	498	14.3	10.1	20.0	34.0
2019	455	13.1	10.1	19.2	30.4
2020	394	13.4	10.2	19.7	30.9
2021	363	10.7	7.5	15.5	23.6
2022	357	12.4	7.5	17.8	31.0
2023	306	11.7	8.9	16.6	26.7

* These antibiotics are not authorized for use in poultry.
** Only years for which similar $DDDA_F$ calculation methods were used have been included.

Figure A13. 2016 and 2023 $DDDA_F$ distributions for broiler farms with conventional breeds

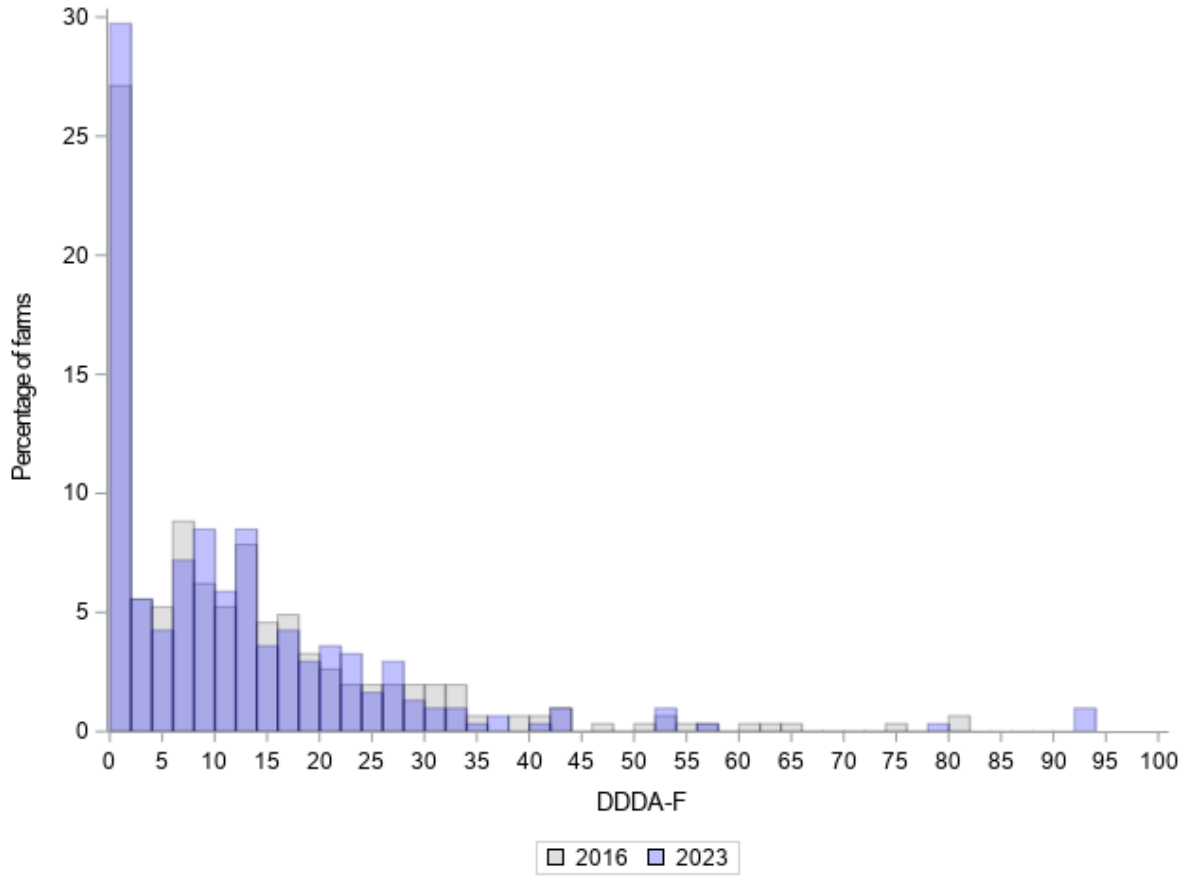


Figure A14. Scatter plot of 2022 and 2023 $DDDA_F$ values for broiler farms with conventional breeds. The red solid lines represent the action threshold defined by the SDa. The red dotted lines represent the transitional action threshold negotiated by the livestock sector. For each type of action threshold, the number of farms with persistently high usage levels is listed in the upper-right corner of the scatter plot

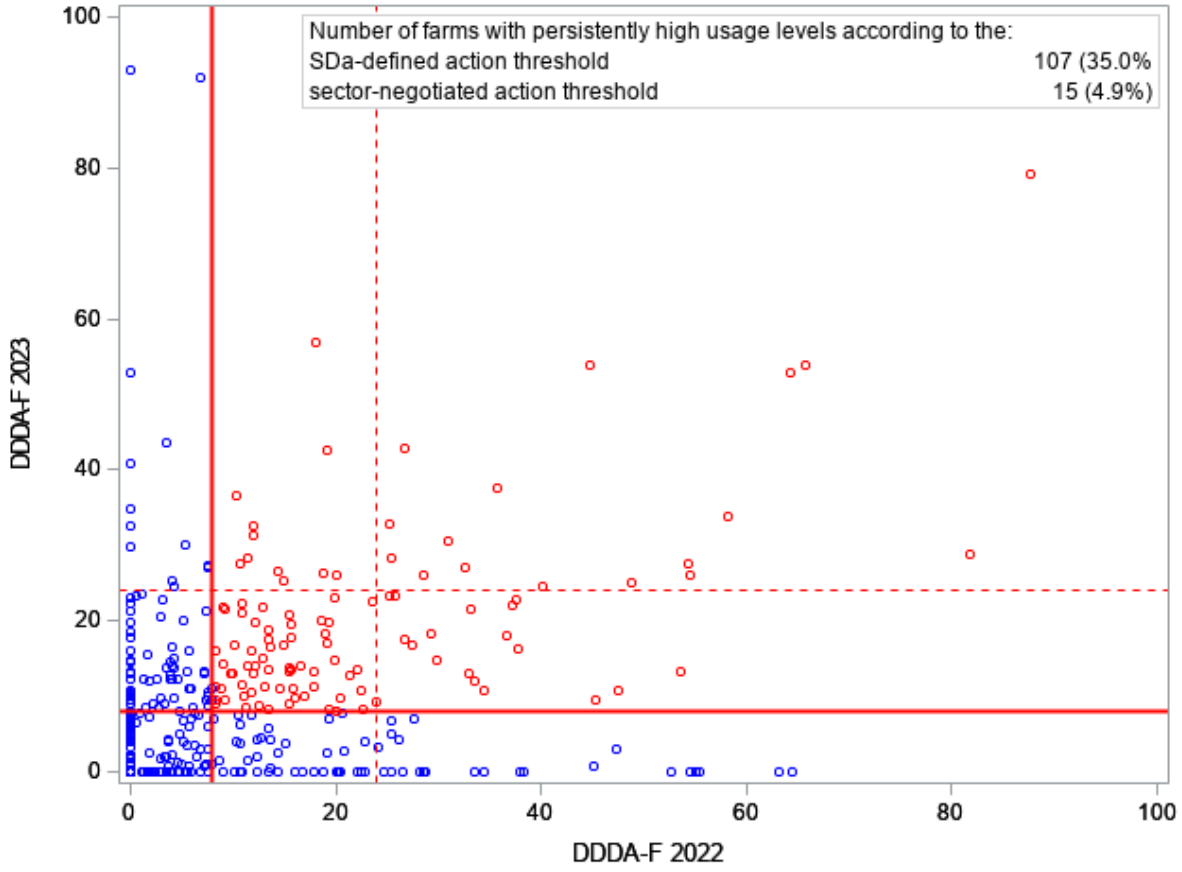


Table A15. Antibiotic use in $DDDA_F$ at broiler farms with conventional breeds in 2023, by pharmacotherapeutic group and route of administration

Category of antibiotics	Pharmacotherapeutic group	Route of administration	% of farms with $DDDA_F$=0	$DDDA_F$		
				Median	P75	Mean
1	Macrolides/lincosamides	Oral	95.8%	0.00	0.00	0.15
1	Penicillins	Oral	83.7%	0.00	0.00	1.20
1	Tetracyclines	Oral	67.0%	0.00	1.34	1.59
1	Trimethoprim/sulfonamides	Oral	51.0%	0.00	4.52	3.32
2	Aminoglycosides	Oral	98.7%	0.00	0.00	0.01
2	Aminopenicillins	Oral	51.6%	0.00	4.37	3.55
2	Quinolones	Oral	69.3%	0.00	1.60	1.62
2	Fixed-dose combinations	Oral	97.7%	0.00	0.00	0.10
2	Macrolides/lincosamides	Oral	90.8%	0.00	0.00	0.12
3	Fluoroquinolones	Oral	96.1%	0.00	0.00	0.05
3	Polymyxins	Oral	98.0%	0.00	0.00	0.03

2.3 Broiler farms with slower growing breeds

Number of farms: 595
Number of farms with $DDDA_F$=0: 459 (77.1%)
Number of farms that used third- and fourth-generation cephalosporins*: 0 (0.0%)
Number of farms that used fluoroquinolones: 1 (0.2%)
Number of farms that used polymyxins: 0 (0.0%)

Table A16. Antibiotic use in $DDDA_F$ at broiler farms with slower growing breeds from 2016 to 2023**

Year	N	Mean	Median	P75	P90
2016	461	3.6	0.0	3.8	11.9
2017	493	4.1	0.0	5.0	12.6
2018	475	3.6	0.0	4.9	10.6
2019	471	2.3	0.0	2.8	7.8
2020	525	2.1	0.0	2.3	6.9
2021	560	1.7	0.0	1.9	5.4
2022	599	1.4	0.0	0.0	4.1
2023	595	1.6	0.0	0.0	5.1

* These antibiotics are not authorized for use in poultry.
** Only years for which similar $DDDA_F$ calculation methods were used have been included.

Figure A15. 2016 and 2022 $DDDA_F$ distributions for broiler farms with slower growing breeds

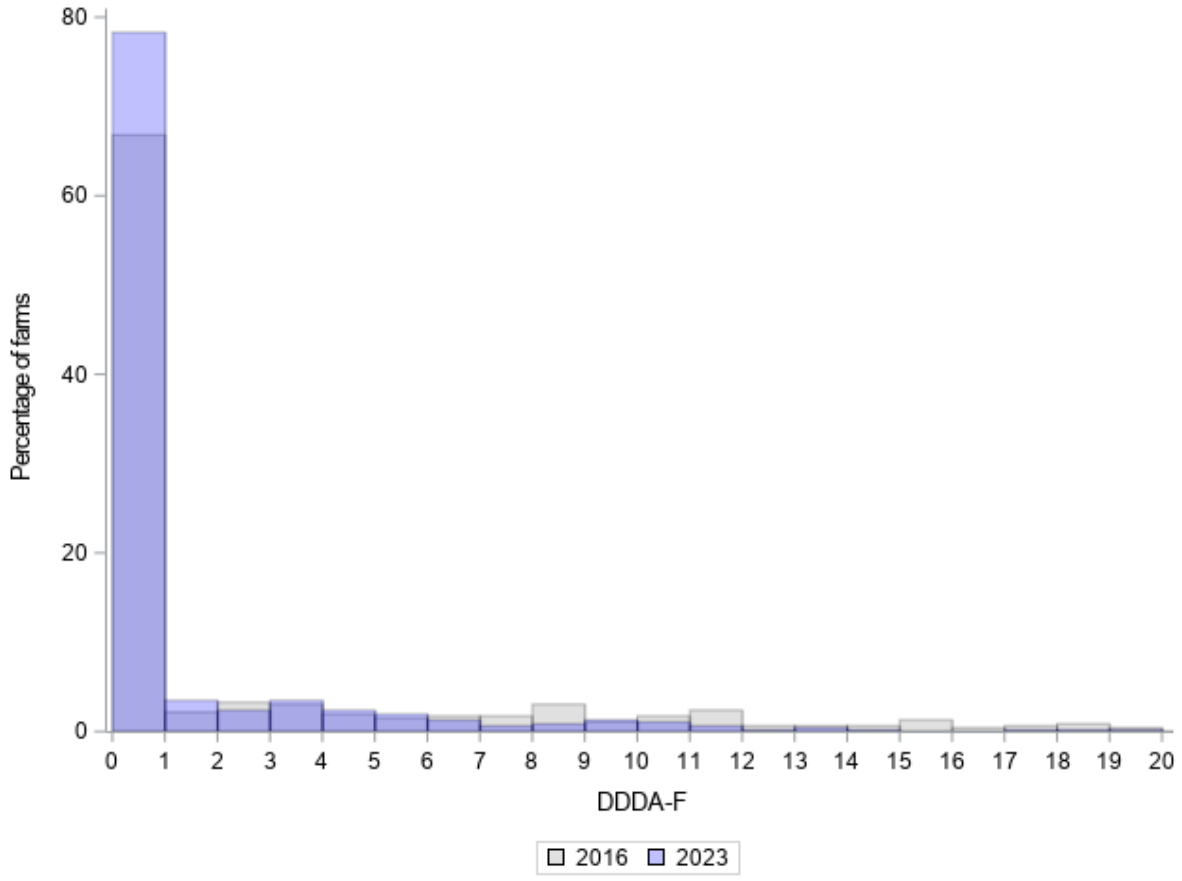


Figure A16. Scatter plot of 2022 and 2023 $DDDA_F$ values for broiler farms with slower growing breeds. The red solid lines represent the action threshold defined by the SDa. The red dotted lines represent the transitional action threshold negotiated by the livestock sector. For each type of action threshold, the number of farms with persistently high usage levels is listed in the upper-right corner of the scatter plot

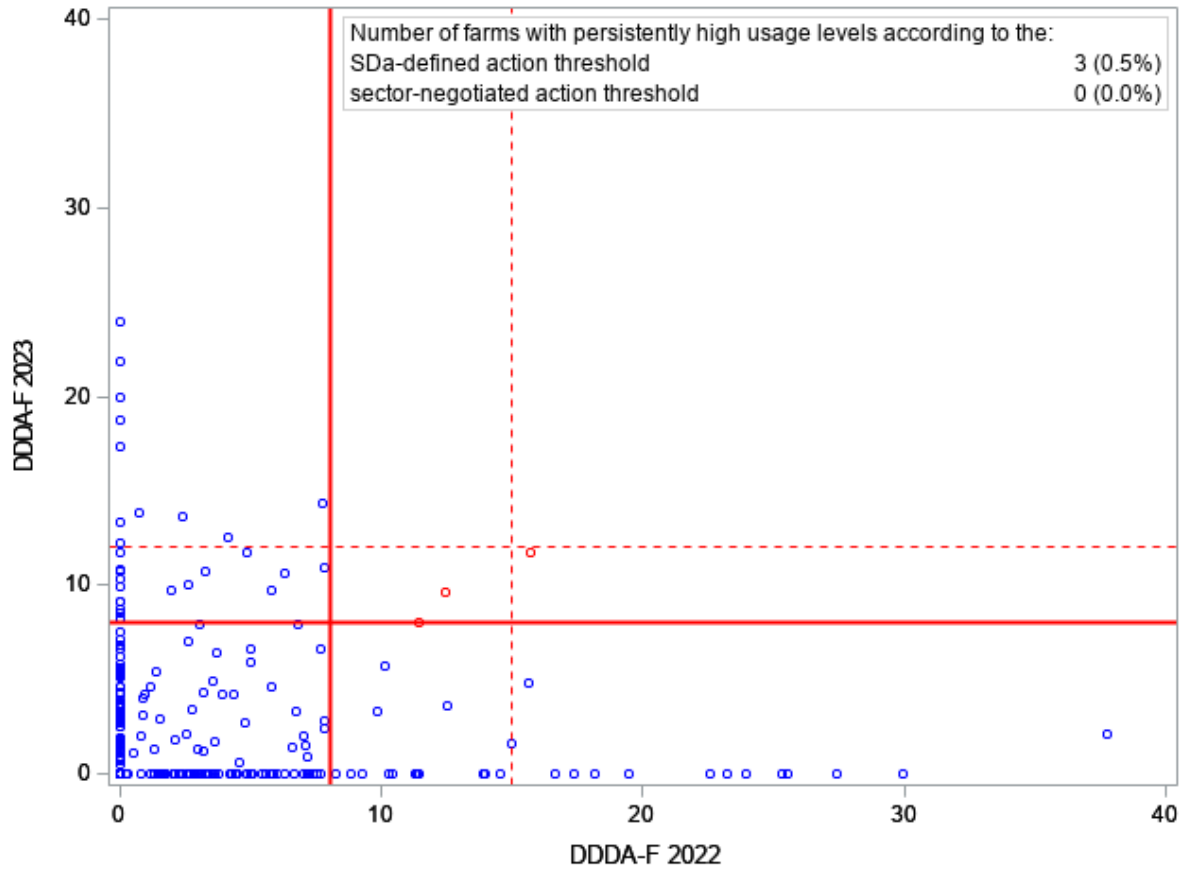


Table A17. Antibiotic use in $DDDA_F$ at broiler farms with slower growing breeds in 2023, by pharmacotherapeutic group and route of administration

Category of antibiotics	Pharmacotherapeutic group	Route of administration	% of farms with $DDDA_F$=0	$DDDA_F$		
				Median	P75	Mean
1	Penicillins	Oral	95.6%	0.00	0.00	0.30
1	Tetracyclines	Oral	96.8%	0.00	0.00	0.14
1	Trimethoprim/sulfonamides	Oral	88.4%	0.00	0.00	0.73
2	Aminopenicillins	Oral	91.6%	0.00	0.00	0.29
2	Quinolones	Oral	98.2%	0.00	0.00	0.07
2	Macrolides/lincosamides	Oral	99.3%	0.00	0.00	0.01
3	Fluoroquinolones	Oral	99.8%	0.00	0.00	0.01

Broiler parent/grandparent stock farming sector

2.4 Parent/grandparent stock rearing farms

Number of farms: 86
Number of farms with $DDDA_F$=0: 21 (24.4%)
Number of farms that used third- and fourth-generation cephalosporins*: 0 (0.0%)
Number of farms that used fluoroquinolones: 3 (3.5%)
Number of farms that used polymyxins: 0 (0.0%)

Table A18. Antibiotic use in $DDDA_F$ at parent/grandparent stock rearing farms from 2017 to 2023**

Year	N	Mean	Median	P75	P90
2017	116	13.3	8.6	17.0	27.8
2018	99	15.7	10.6	22.8	35.2
2019	103	14.5	10.8	19.9	30.5
2020	100	9.6	7.9	13.9	18.1
2021	90	7.2	5.6	12.0	15.9
2022	90	6.4	4.9	7.8	12.6
2023	86	5.0	3.4	7.5	13.2

* These antibiotics are not authorized for use in poultry.
** Only years for which similar $DDDA_F$ calculation methods were used have been included.

Figure A17. 2017 and 2023 $DDDA_F$ distributions for parent/grandparent stock rearing farms

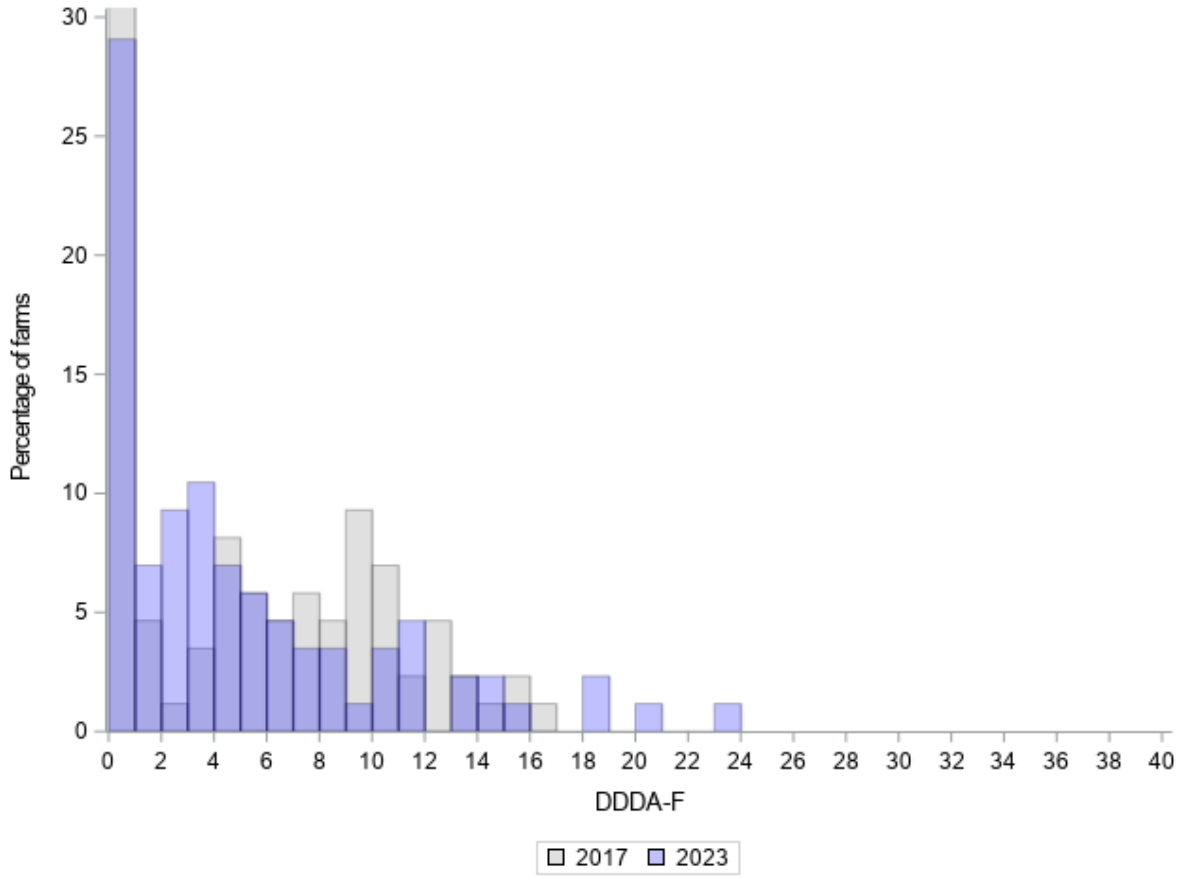


Table A19. Antibiotic use in $DDDA_F$ at parent/grandparent stock rearing farms in 2022, by pharmacotherapeutic group and route of administration

Category of antibiotics	Pharmacotherapeutic group	Route of administration	% of farms with $DDDA_F$=0	$DDDA_F$		
				Median	P75	Mean
1	Penicillins	Oral	73.3%	0.00	0.17	0.83
1	Tetracyclines	Oral	90.7%	0.00	0.00	0.18
1	Trimethoprim/sulfonamides	Oral	40.7%	1.06	2.77	2.02
2	Aminopenicillins	Oral	73.3%	0.00	0.34	1.13
2	Quinolones	Oral	87.2%	0.00	0.00	0.75
3	Fluoroquinolones	Oral	96.5%	0.00	0.00	0.08

2.5 Parent/grandparent stock production farms

Number of farms: 192
Number of farms with $DDDA_F$=0: 139 (72.4%)
Number of farms that used third- and fourth-generation cephalosporins*: 0 (0.0%)
Number of farms that used fluoroquinolones: 1 (0.5%)
Number of farms that used polymyxins: 2 (1.0%)

Table A20. Antibiotic use in $DDDA_F$ at parent/grandparent stock production farms from 2017 to 2023**

Year	N	Mean	Median	P75	P90
2017	250	2.8	0.0	3.7	9.2
2018	215	2.7	0.0	3.9	8.5
2019	224	2.0	0.0	1.6	7.5
2020	220	4.3	0.0	2.4	8.2
2021	209	1.6	0.0	0.8	6.6
2022	200	1.5	0.0	0.6	4.9
2023	192	2.6	0.0	1.0	7.6

* These antibiotics are not authorized for use in poultry.
** Only years for which similar $DDDA_F$ calculation methods were used have been included.

Figure A18. 2017 and 2023 $DDDA_F$ distributions for parent/grandparent stock production farms

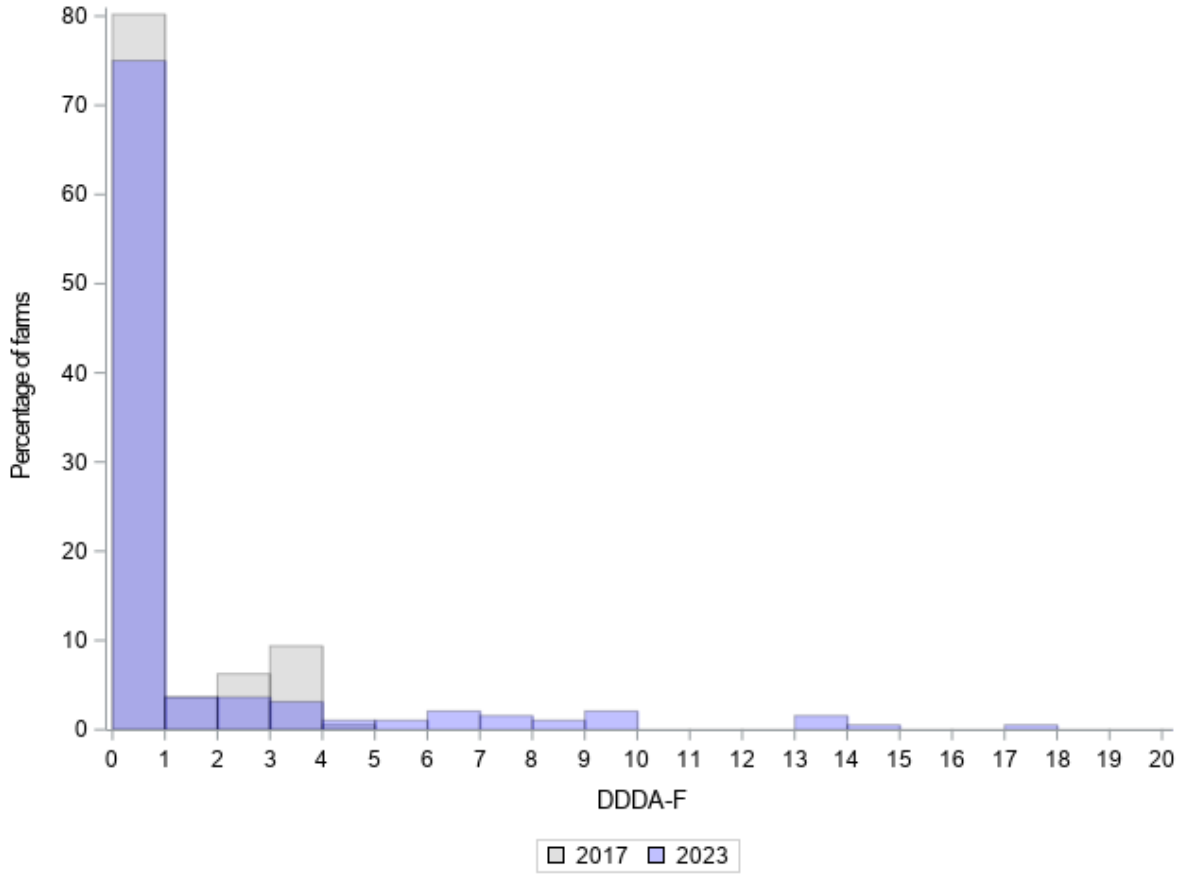


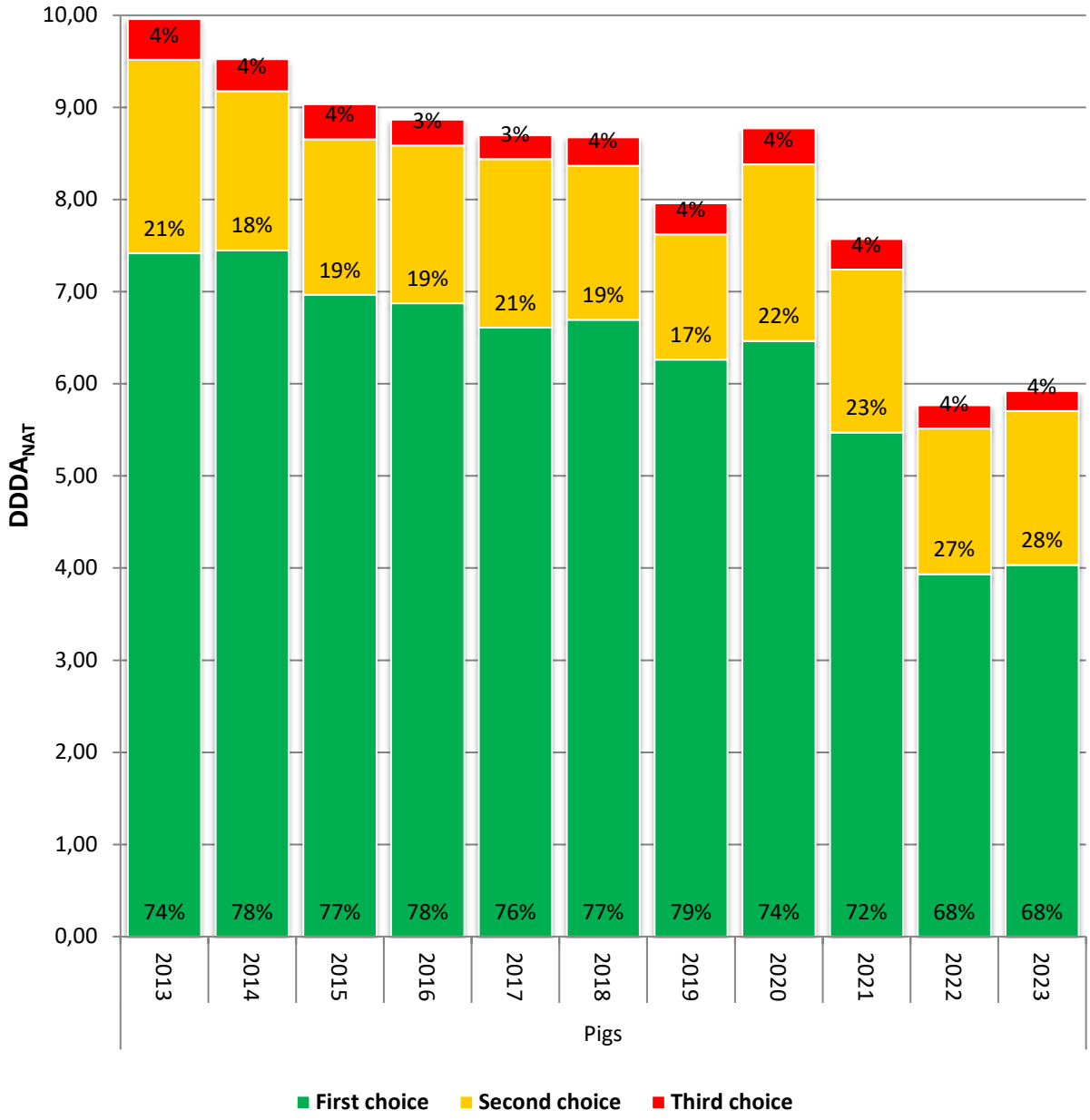
Table A21. Antibiotic use in $DDDA_F$ at parent/grandparent stock production farms in 2023, by pharmacotherapeutic group and route of administration

Category of antibiotics	Pharmacotherapeutic group	Route of administration	% of farms with $DDDA_F$=0	$DDDA_F$		
				Median	P75	Mean
1	Penicillins	Oral	95.3%	0.00	0.00	0.24
1	Pleuromutilines	Oral	99.5%	0.00	0.00	0.01
1	Tetracyclines	Oral	81.3%	0.00	0.00	1.46
1	Trimethoprim/sulfonamides	Oral	98.4%	0.00	0.00	0.06
2	Aminopenicillins	Oral	99.0%	0.00	0.00	0.47
2	Quinolones	Oral	93.8%	0.00	0.00	0.25
2	Macrolides/lincosamides	Oral	95.8%	0.00	0.00	0.04
3	Fluoroquinolones	Oral	99.5%	0.00	0.00	0.01
3	Polymyxins	Oral	99.0%	0.00	0.00	0.07

Pig farming sector

1. $DDDA_{NAT}$

Figure A19. $DDDA_{NAT}$ trends in the pig farming sector over the 2013-2023 period, by antibiotics category



2. $DDDA_F$

2.1 Farms with sows and suckling piglets

Number of farms: 1,250
Number of farms with $DDDA_F$=0: 62 (5.0%)
Number of farms that used third- and fourth-generation cephalosporins: 0 (0.0%)
Number of farms that used fluoroquinolones: 0 (0.0%)
Number of farms that used polymyxins: 423 (33.8%)

Table A22. Antibiotic use in $DDDA_F$ at farms with sows and suckling piglets from 2015 to 2023*

Year	N	Mean	Median	P75	P90
2015	2,109	5.4	3.1	6.8	12.8
2016	1,919	3.5	2.3	4.7	8.1
2017	1,853	3.7	2.2	4.7	8.2
2018	1,780	3.8	2.1	4.5	8.6
2019	1,659	3.5	2.1	4.6	8.2
2020	1,572	3.6	2.2	4.5	7.7
2021	1,498	3.2	2.0	4.2	6.9
2022	1,318	2.8	1.9	3.9	5.6
2023	1,250	3.0	2.2	4.0	5.7

* Only years for which similar $DDDA_F$ calculation methods were used have been included.

Figure A20. 2015 and 2023 $DDDA_F$ distributions for farms with sows and suckling piglets

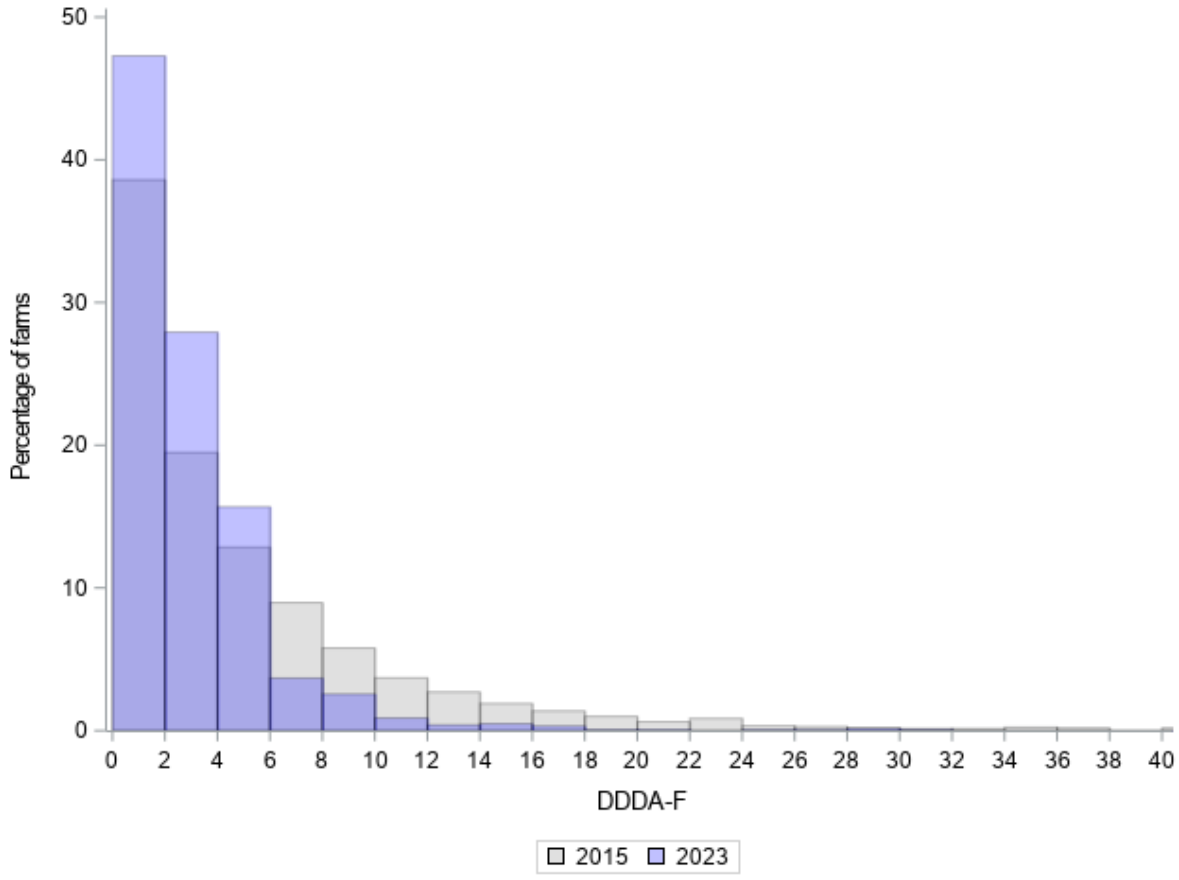


Figure A21. Scatter plot of 2022 and 2023 $DDDA_F$ values for farms with sows and suckling piglets. The red solid lines represent the action threshold defined by the SDa. The number of farms with persistently high usage levels is listed in the upper-right corner of the scatter plot

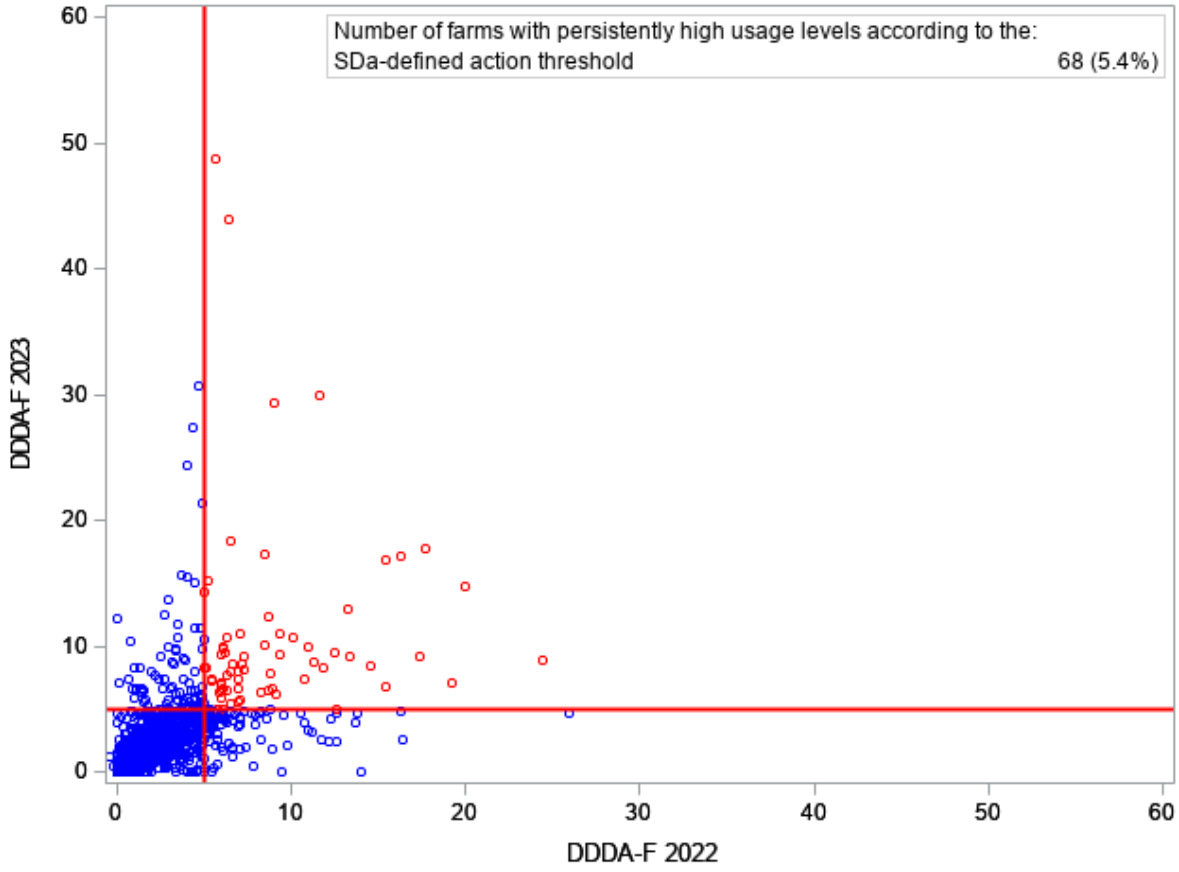


Table A23. Antibiotic use in $DDDA_F$ at farms with sows and suckling piglets in 2023, by pharmacotherapeutic group and route of administration

Category of antibiotics	Pharmacotherapeutic group	Route of administration	% of farms with $DDDA_F$=0	$DDDA_F$		
				Median	P75	Mean
1	Amphenicols	Parenteral	69.1%	0.00	0.10	0.19
1	Macrolides/lincosamides	Oral	95.1%	0.00	0.00	0.06
1	Macrolides/lincosamides	Parenteral	87.4%	0.00	0.00	0.02
1	Penicillins	Parenteral	16.6%	0.41	0.94	0.70
1	Pleuromutilines	Oral	99.5%	0.00	0.00	0.01
1	Pleuromutilines	Parenteral	96.3%	0.00	0.00	0.01
1	Tetracyclines	Oral	86.0%	0.00	0.00	0.28
1	Tetracyclines	Parenteral	43.7%	0.04	0.31	0.30
1	Trimethoprim/sulfonamides	Oral	89.2%	0.00	0.00	0.18
1	Trimethoprim/sulfonamides	Parenteral	37.3%	0.07	0.31	0.26
2	Aminoglycosides	Oral	93.0%	0.00	0.00	0.01
2	Aminopenicillins	Oral	93.7%	0.00	0.00	0.06
2	Aminopenicillins	Parenteral	43.7%	0.05	0.45	0.30
2	Quinolones	Oral	99.8%	0.00	0.00	0.01
2	Fixed-dose combinations	Oral	99.9%	0.00	0.00	0.00
2	Fixed-dose combinations	Parenteral	86.6%	0.00	0.00	0.03
2	Long-acting macrolides	Parenteral	72.7%	0.00	0.22	0.50
3	Polymyxins	Oral	95.0%	0.00	0.00	0.03
3	Polymyxins	Parenteral	68.3%	0.00	0.03	0.05

2.2 Farms with weaner pigs

Number of farms: 1,392
Number of farms with $DDDA_F$=0: 211 (15.2%)
Number of farms that used third- and fourth-generation cephalosporins: 0 (0.0%)
Number of farms that used fluoroquinolones: 1 (0.1%)
Number of farms that used polymyxins: 385 (27.7)

Table A24. Antibiotic use in $DDDA_F$ at farms with weaner pigs from 2015 to 2023*

Year	N	Mean	Median	P75	P90
2015	2,276	19.6	7.6	24.4	52.2
2016	2,088	24.2	11.9	29.1	57.2
2017	2,037	21.7	10.6	25.5	52.9
2018	1,941	19.8	10.1	23.5	44.0
2019	1,833	16.8	8.1	20.7	38.3
2020	1,759	20.5	9.5	21.3	41.3
2021	1,668	20.5	6.9	18.1	32.8
2022	1,463	14.6	7.1	16.8	28.4
2023	1,392	16.0	7.6	17.4	30.7

* Only years for which similar $DDDA_F$ calculation methods were used have been included.

Figure A22. 2015 and 2022 $DDDA_F$ distributions for farms with weaner pigs

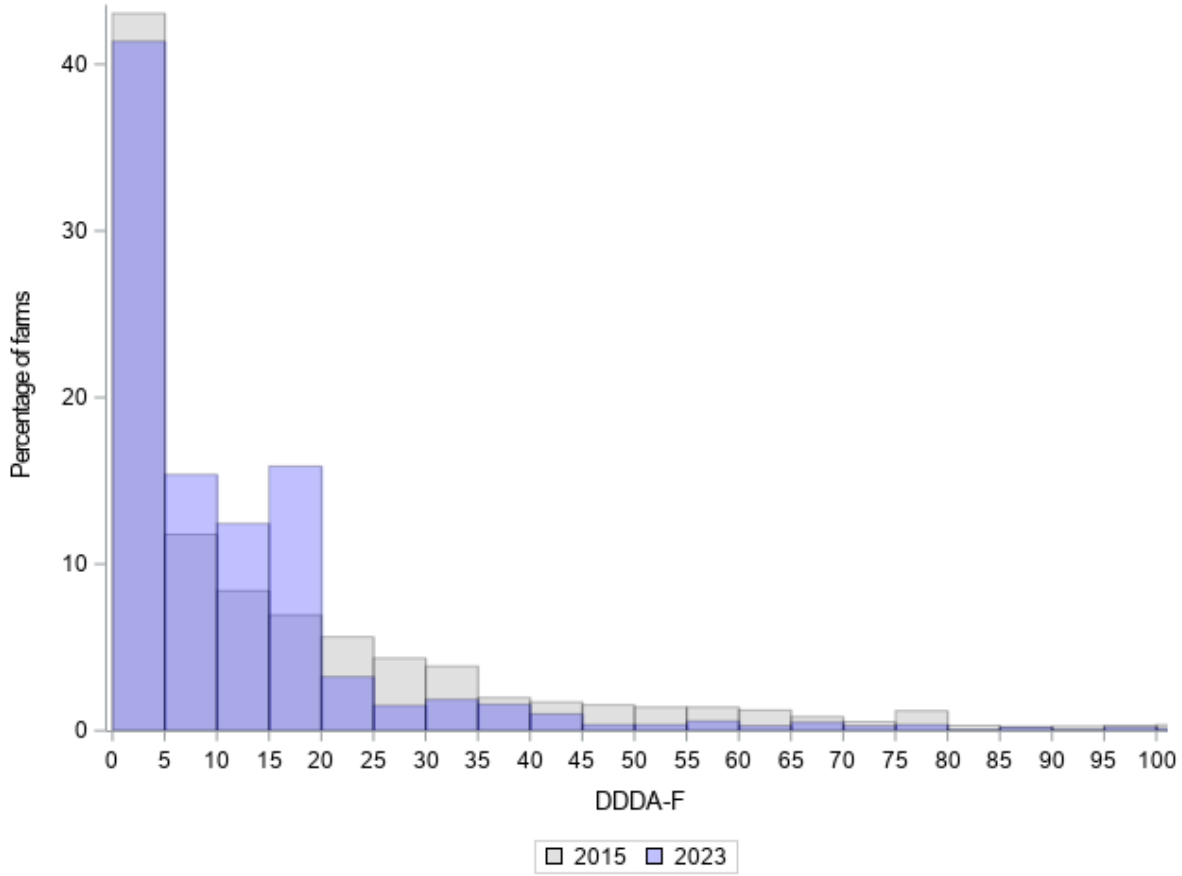


Figure A23. Scatter plot of 2022 and 2023 $DDDA_F$ values for farms with weaner pigs. The red solid lines represent the action threshold defined by the SDa. The number of farms with persistently high usage levels is listed in the upper-right corner of the scatter plot

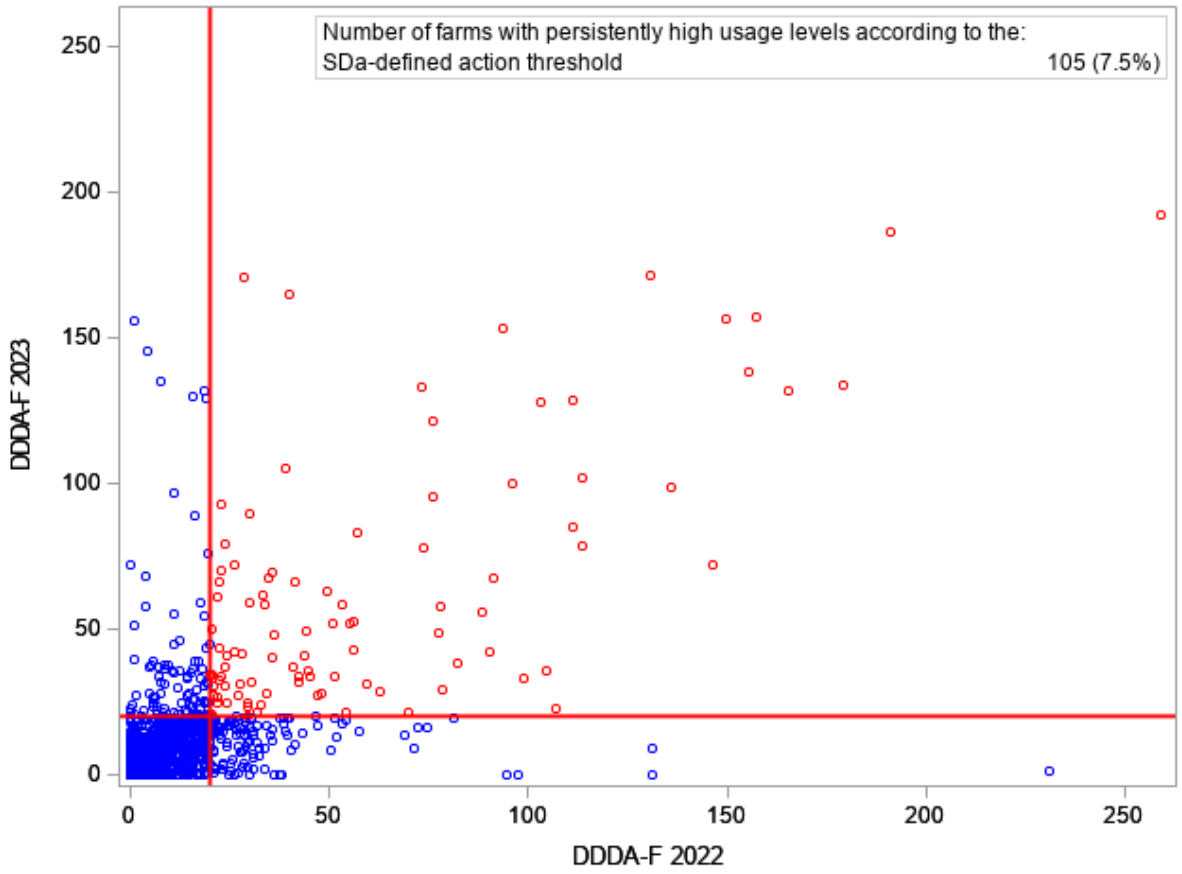


Table A25. Antibiotic use in $DDDA_F$ at farms with weaner pigs in 2023, by pharmacotherapeutic group and route of administration

Category of antibiotics	Pharmacotherapeutic group	Route of administration	% of farms with $DDDA_F$=0	$DDDA_F$		
				Median	P75	Mean
1	Amphenicols	Oral	99.9%	0.00	0.00	0.00
1	Amphenicols	Parenteral	80.3%	0.00	0.00	0.37
1	Macrolides/lincosamides	Oral	89.9%	0.00	0.00	0.53
1	Macrolides/lincosamides	Parenteral	95.3%	0.00	0.00	0.03
1	Penicillins	Parenteral	59.3%	0.00	0.54	0.62
1	Pleuromutilines	Oral	98.8%	0.00	0.00	0.09
1	Pleuromutilines	Parenteral	97.7%	0.00	0.00	0.03
1	Tetracyclines	Oral	66.2%	0.00	2.98	3.97
1	Tetracyclines	Parenteral	77.7%	0.00	0.00	0.39
1	Trimethoprim/sulfonamides	Oral	67.0%	0.00	1.61	2.67
1	Trimethoprim/sulfonamides	Parenteral	89.0%	0.00	0.00	0.05
2	Aminoglycosides	Oral	95.7%	0.00	0.00	0.04
2	Aminoglycosides	Parenteral	99.9%	0.00	0.00	0.00
2	Aminopenicillins	Oral	75.8%	0.00	0.00	3.69
2	Aminopenicillins	Parenteral	60.5%	0.00	0.44	0.71
2	Fixed-dose combinations	Oral	99.9%	0.00	0.00	0.00
2	Fixed-dose combinations	Parenteral	93.2%	0.00	0.00	0.03
2	Long-acting macrolides	Parenteral	78.8%	0.00	0.00	1.57
3	Fluoroquinolones	Parenteral	99.9%	0.00	0.00	0.00
3	Polymyxins	Oral	80.5%	0.00	0.00	1.03
3	Polymyxins	Parenteral	83.5%	0.00	0.00	0.17

2.3 Farms with fattening pigs

Number of farms: 2,820
Number of farms with $DDDA_F$=0: 681 (24.1%)
Number of farms that used third- and fourth-generation cephalosporins: 0 (0.0%)
Number of farms that used fluoroquinolones: 1 (0.1%)
Number of farms that used polymyxins: 83 (2.9%)

Table A26. Antibiotic use in $DDDA_F$ at farms with fattening pigs from 2015 to 2023*

Year	N	Mean	Median	P75	P90
2015	5,072	4.1	1.6	5.4	10.2
2016	4,701	4.0	1.7	5.7	10.1
2017	4,580	3.8	1.7	5.4	9.8
2018	4,323	3.9	1.8	5.4	9.9
2019	4,005	3.8	1.6	5.5	10.2
2020	3,650	3.5	1.2	4.8	9.0
2021	3,142	2.8	1.2	4.1	6.9
2022	2,931	2.2	1.0	3.3	5.3
2023	2,820	2.4	1.0	3.1	5.1

* Only years for which similar $DDDA_F$ calculation methods were used have been included.

Figure A24. 2015 and 2023 $DDDA_F$ distributions for farms with fattening pigs

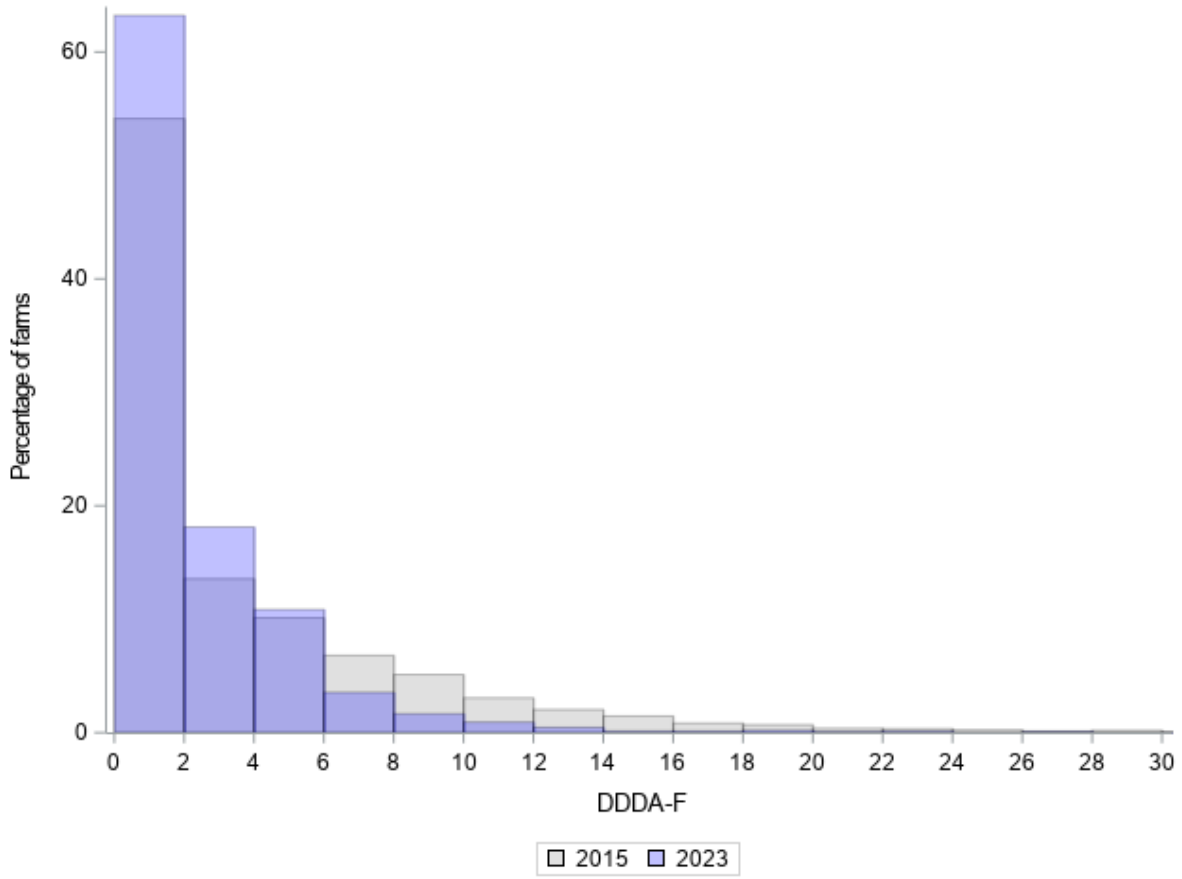


Figure A25. Scatter plot of 2022 and 2023 $DDDA_F$ values for farms with fattening pigs. The red solid lines represent the action threshold defined by the SDa. The number of farms with persistently high usage levels is listed in the upper-right corner of the scatter plot

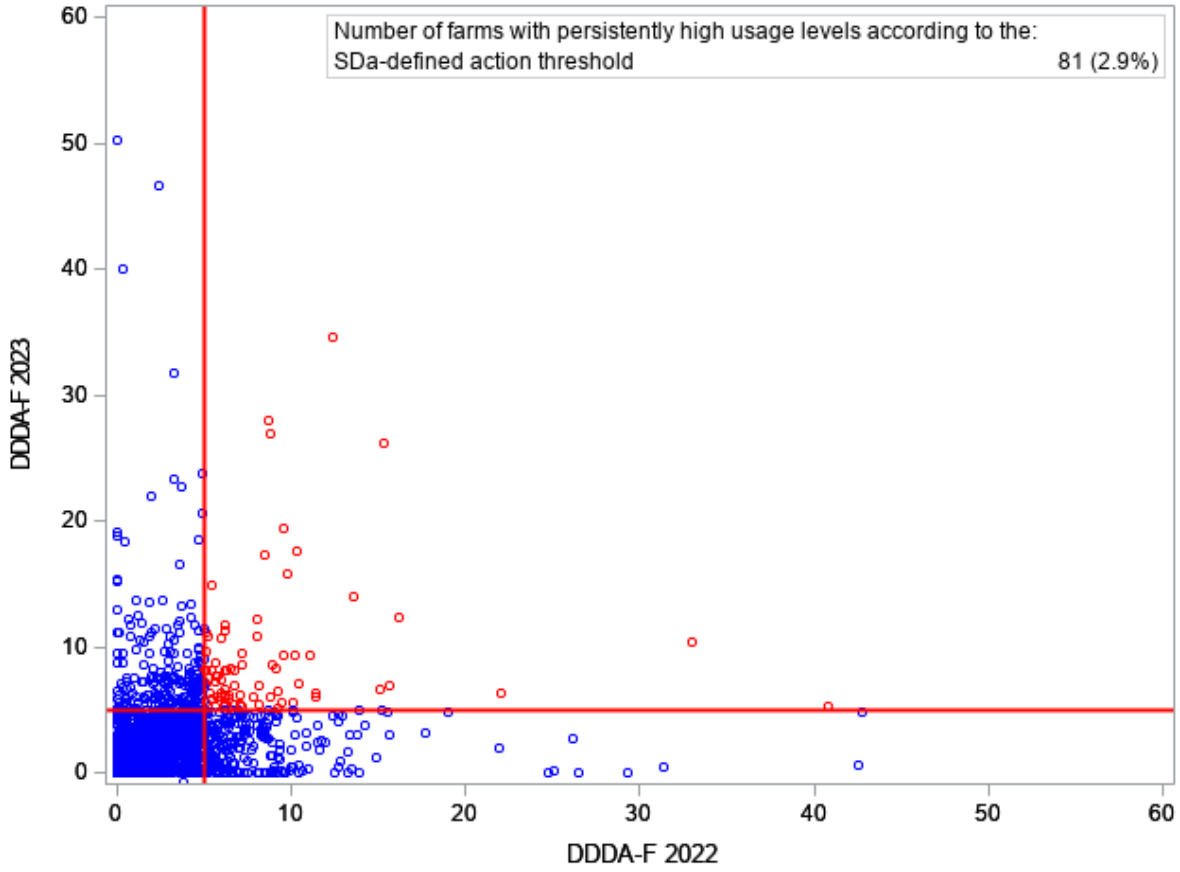


Table A27. Antibiotic use in $DDDA_F$ at farms with fattening pigs in 2023, by pharmacotherapeutic group and route of administration

Category of antibiotics	Pharmacotherapeutic group	Route of administration	% of farms with $DDDA_F$=0	$DDDA_F$		
				Median	P75	Mean
1	Amphenicols	Oral	99.9%	0.00	0.00	0.00
1	Amphenicols	Parenteral	67.5%	0.00	0.12	0.23
1	Macrolides/lincosamides	Oral	82.4%	0.00	0.00	0.29
1	Macrolides/lincosamides	Parenteral	84.5%	0.00	0.00	0.02
1	Penicillins	Intramammary	100.0%	0.00	0.00	0.00
1	Penicillins	Parenteral	41.0%	0.05	0.25	0.23
1	Pleuromutilines	Oral	98.7%	0.00	0.00	0.02
1	Pleuromutilines	Parenteral	96.1%	0.00	0.00	0.00
1	Tetracyclines	Oral	66.8%	0.00	0.95	1.12
1	Tetracyclines	Parenteral	63.9%	0.00	0.08	0.14
1	Trimethoprim/sulfonamides	Oral	81.8%	0.00	0.00	0.25
1	Trimethoprim/sulfonamides	Parenteral	98.8%	0.00	0.00	0.00
2	Aminoglycosides	Oral	99.8%	0.00	0.00	0.00
2	Aminopenicillins	Intramammary	100.0%	0.00	0.00	0.00
2	Aminopenicillins	Oral	96.0%	0.00	0.00	0.08
2	Aminopenicillins	Parenteral	87.1%	0.00	0.00	0.02
2	Quinolones	Oral	99.9%	0.00	0.00	0.00
2	Fixed-dose combinations	Parenteral	97.7%	0.00	0.00	0.00
2	Long-acting macrolides	Parenteral	96.6%	0.00	0.00	0.04
3	Fluoroquinolones	Parenteral	100.0%	0.00	0.00	0.00
3	Polymyxins	Oral	98.9%	0.00	0.00	0.01
3	Polymyxins	Parenteral	97.9%	0.00	0.00	0.00

Dairy goat farming sector

1. $DDDA_F$

Number of farms: 343
Number of farms with $DDDA_F$=0: 67 (19.5%)
Number of farms that used third- and fourth-generation cephalosporins: 0 (0.0%)
Number of farms that used fluoroquinolones: 1 (0.3%)
Number of farms that used polymyxins: 0 (0.0%)

Table A28. Antibiotic use in $DDDA_F$ at dairy goat farms from 2021 to 2023

Year	N	Mean	Median	P75	P90
2021	322	1.2	0.4	1.1	2.1
2022	348	1.3	0.6	1.4	2.7
2023	343	1.2	0.5	1.4	2.7

Figure A26. 2021 and 2023 $DDDA_F$ distributions for dairy goat farms

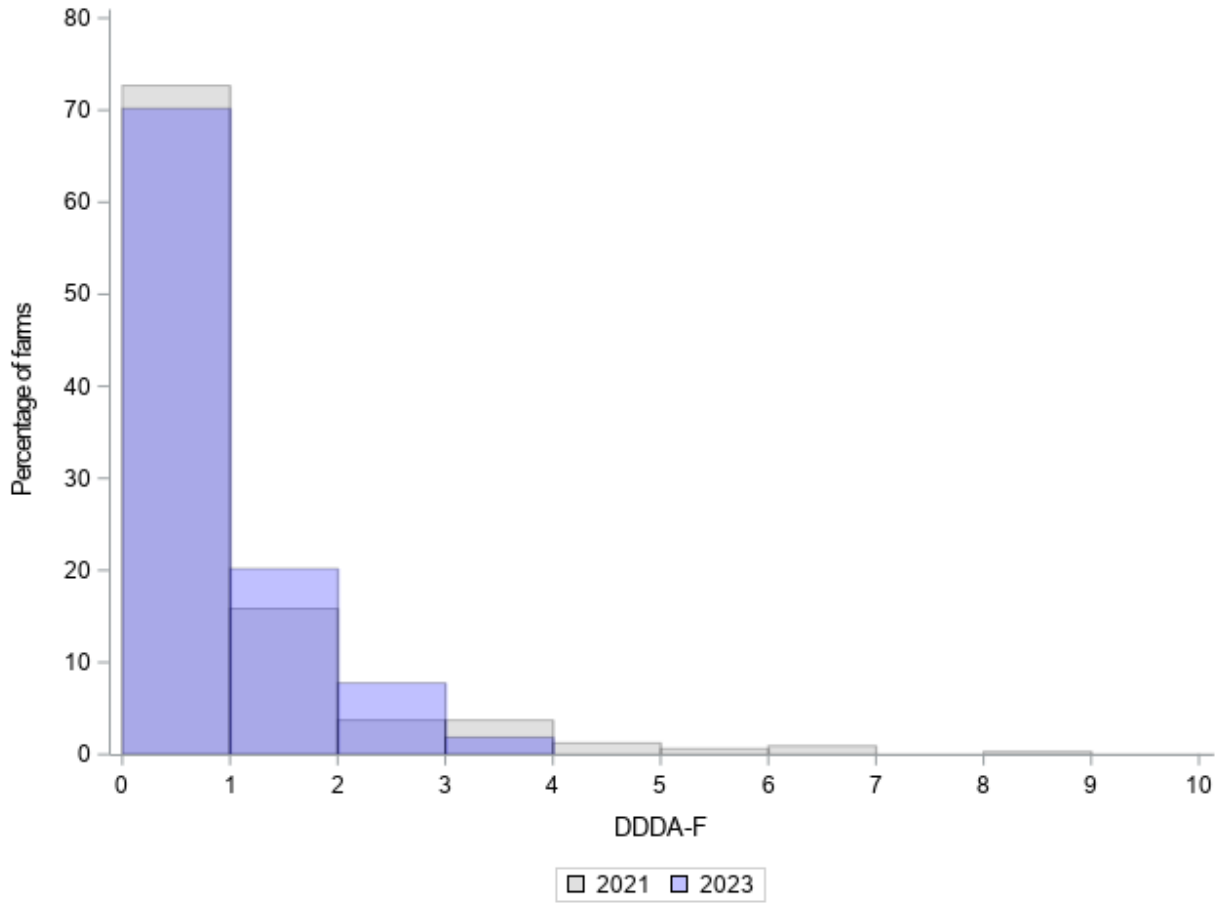


Table A29. Antibiotic use in $DDDA_F$ at farms with dairy goats in 2023, by pharmacotherapeutic group and route of administration

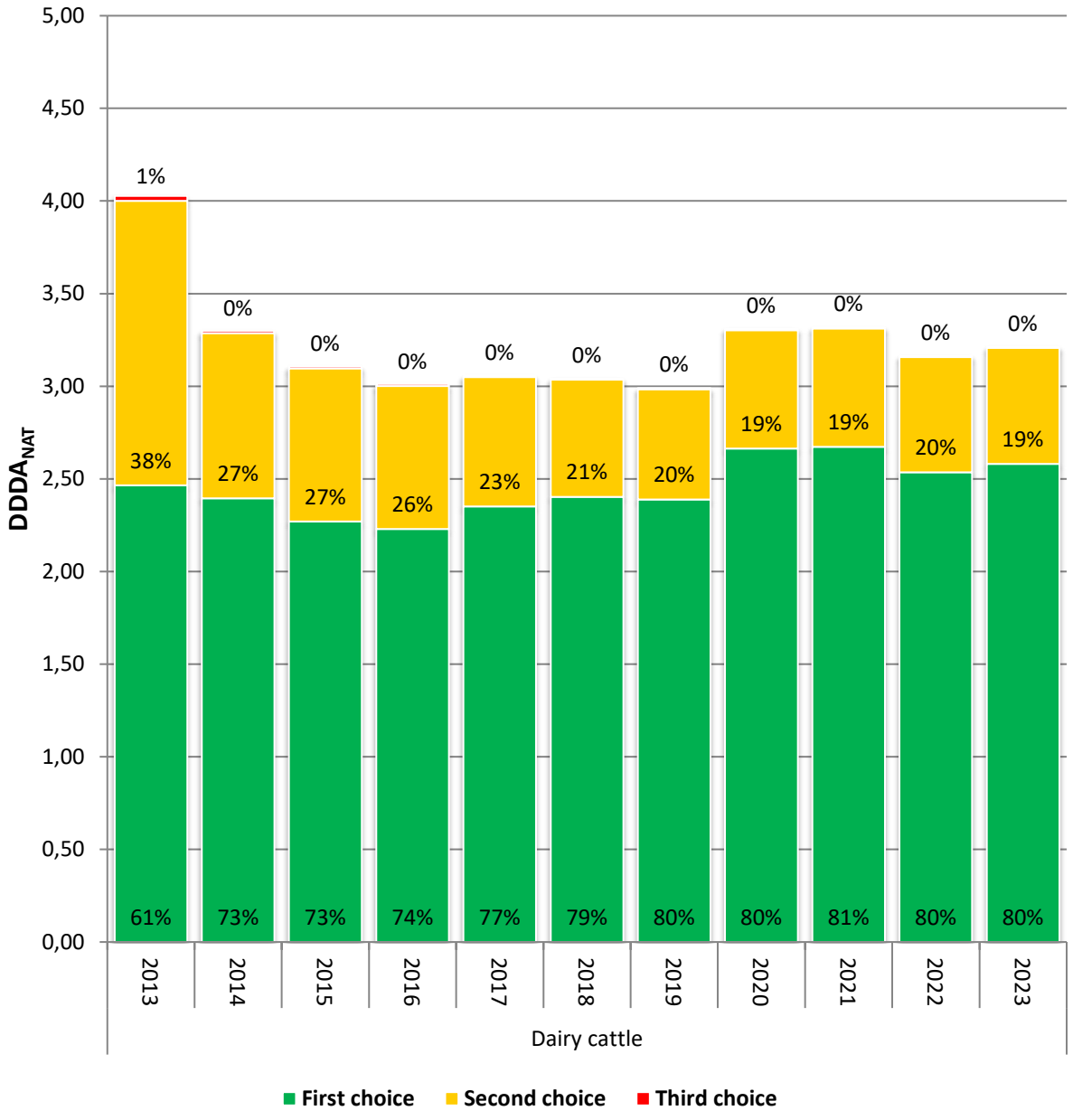
Category of antibiotics	Pharmacotherapeutic group	Route of administration	% of farms with $DDDA_F$=0	$DDDA_F$		
				Median	P75	Mean
1	Amphenicols	Parenteral	54.5%	187	0.00	0.05
1	Macrolides/lincosamides	Oral	98.5%	338	0.00	0.00
1	Macrolides/lincosamides	Parenteral	93.3%	320	0.00	0.00
1	Penicillins	Intramammary	95.3%	327	0.00	0.00
1	Penicillins	Intramammary for dry cow therapy	99.4%	341	0.00	0.00
1	Penicillins	Parenteral	56.9%	195	0.00	0.07
1	Tetracyclines	Oral	70.0%	240	0.00	0.11
1	Tetracyclines	Parenteral	57.7%	198	0.00	0.10
1	Tetracyclines	Intrauterine	90.4%	310	0.00	0.00
1	Trimethoprim/sulfonamides	Oral	88.0%	302	0.00	0.00
1	Trimethoprim/sulfonamides	Parenteral	80.8%	277	0.00	0.00
2	Aminoglycosides	Oral	80.8%	277	0.00	0.00
2	Aminoglycosides	Parenteral	99.7%	342	0.00	0.00
2	Aminopenicillins	Intramammary	95.0%	326	0.00	0.00
2	Aminopenicillins	Oral	79.9%	274	0.00	0.00
2	Aminopenicillins	Parenteral	53.6%	184	0.00	0.04
2	Fixed-dose combinations	Intramammary	97.1%	333	0.00	0.00
2	Fixed-dose combinations	Parenteral	85.7%	294	0.00	0.00
2	Long-acting macrolides	Parenteral	63.3%	217	0.00	0.17
3	Fluoroquinolones	Parenteral	99.7%	342	0.00	0.00

Cattle farming sector

Dairy cattle

1. $DDDA_{NAT}$

Figure A27. $DDDA_{NAT}$ trends in the dairy cattle farming sector over the 2013-2023 period, by antibiotics category



2. $DDDA_F$

Number of farms: 14,080
Number of farms with $DDDA_F$=0: 220 (1.6%)
Number of farms that used third- and fourth-generation cephalosporins: 0 (0.0%)
Number of farms that used fluoroquinolones: 966 (6.9%)
Number of farms that used polymyxins: 122 (0.9%)

Table A30. Antibiotic use at dairy cattle farms, presented as overall antibiotic use from 2012 to 2023 (A), use of dry cow (intramammary) antibiotics (B), use of mastitis injectors (C), and use of oral antibiotics in calves (D)

A **Overall antibiotic use, in $DDDA_F$***

Year	N	Mean	Median	P75	P90
2012	18,053	2.9	2.7	3.8	4.9
2013	18,005	2.8	2.8	3.7	4.7
2014	17,747	2.3	2.2	3.0	3.9
2015	17,737	2.2	2.1	2.9	3.7
2016	17,529	2.1	2.1	2.9	3.7
2017	17,121	2.1	2.1	2.9	3.8
2018	16,499	2.1	2.1	2.9	3.8
2019	15,871	2.2	2.1	3.0	3.9
2020	15,522	2.4	2.3	3.3	4.2
2021	15,379	2.3	2.3	3.2	4.2
2022	14,474	2.3	2.2	3.1	4.0
2023	14,080	2.3	2.2	3.1	4.0

* Only years for which similar $DDDA_F$ calculation methods were used have been included.

B **Use of dry cow (intramammary) antibiotics, in $DDDA_F$ (animals >2 years of age)**

N	Mean	Median	P75	P90
14.080	1.2	1.1	1.8	2.4

C **Use of mastitis injectors, in $DDDA_F$ (animals >2 years of age)**

N	Mean	Median	P75	P90
14.080	0.7	0.5	0.9	1.4

D **Use of oral antibiotics in calves, in $DDDA_F$ (animals <56 days of age)**

N	Mean	Median	P75	P90
14.080	1.8	0.0	0.0	4.2

Figure A28. 2012 and 2023 $DDDA_F$ distributions for dairy cattle farms

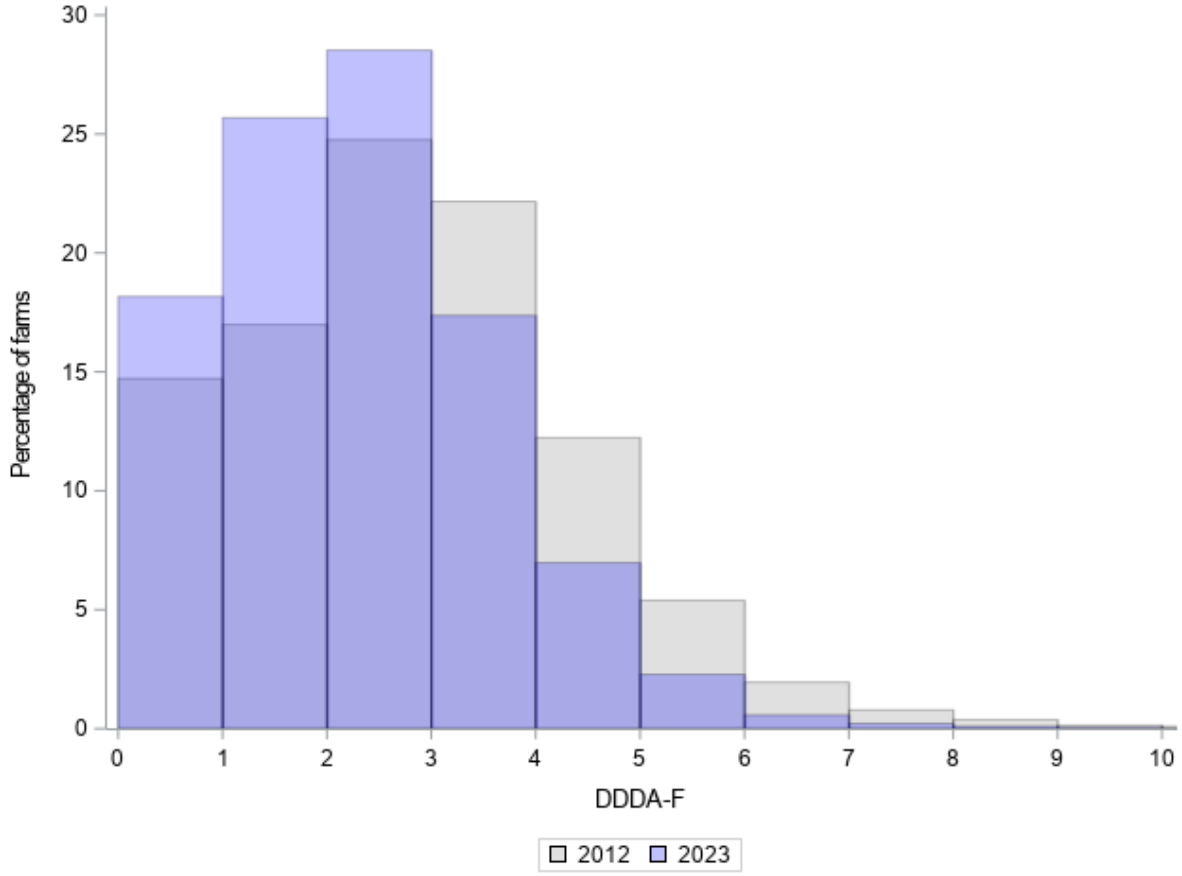


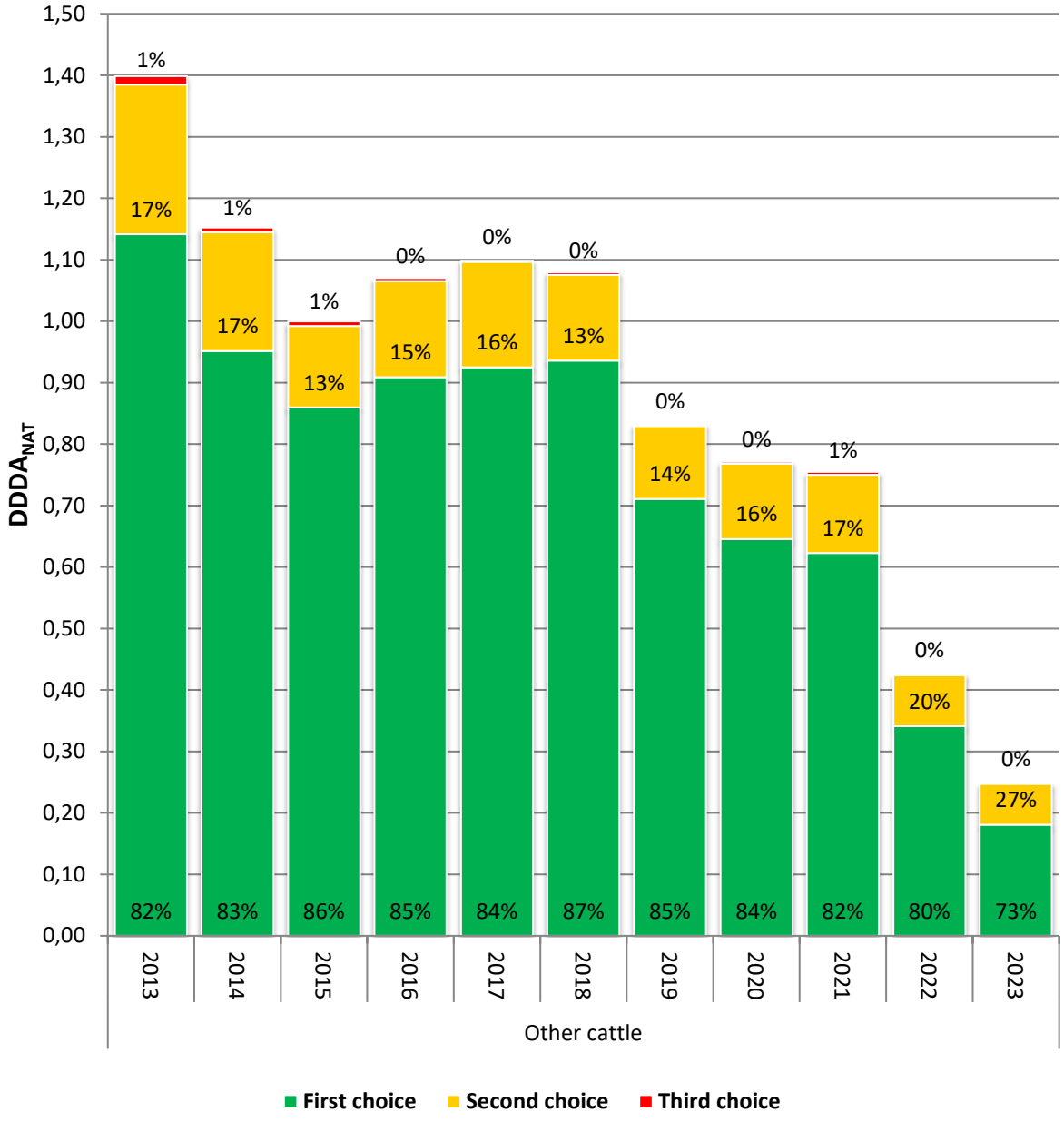
Table A31. Antibiotic use in $DDDA_F$ at dairy cattle farms in 2023, by pharmacotherapeutic group and route of administration

Category of antibiotics	Pharmacotherapeutic group	Route of administration	% of farms with $DDDA_F$=0	$DDDA_F$		
				Median	P75	Mean
1	Amphenicols	Parenteral	57.0%	0.00	0.04	0.03
1	Macrolides/lincosamides	Oral	100.0%	0.00	0.00	0.00
1	Macrolides/lincosamides	Parenteral	63.9%	0.00	0.05	0.06
1	Penicillins	Intramammary	59.9%	0.00	0.29	0.21
1	Penicillins	Intramammary for dry cow therapy	18.0%	0.89	1.41	0.93
1	Penicillins	Parenteral	20.2%	0.13	0.33	0.24
1	Tetracyclines	Oral	98.7%	0.00	0.00	0.00
1	Tetracyclines	Parenteral	22.8%	0.08	0.19	0.14
1	Tetracyclines	Intrauterine	58.6%	0.00	0.06	0.04
1	Trimethoprim/sulfonamides	Oral	99.3%	0.00	0.00	0.00
1	Trimethoprim/sulfonamides	Parenteral	17.4%	0.12	0.25	0.18
2	Aminoglycosides	Oral	82.7%	0.00	0.00	0.01
2	Aminoglycosides	Parenteral	97.3%	0.00	0.00	0.00
2	Aminopenicillins	Intramammary	36.3%	0.08	0.24	0.16
2	Aminopenicillins	Oral	100.0%	0.00	0.00	0.00
2	Aminopenicillins	Parenteral	37.9%	0.03	0.09	0.07
2	1st- and 2nd-gen. cephalosporins	Intramammary	96.2%	0.00	0.00	0.01
2	1st- and 2nd-gen. cephalosporins	Intramammary for dry cow therapy	99.9%	0.00	0.00	0.00
2	1st- and 2nd-gen. cephalosporins	Intrauterine	79.9%	0.00	0.00	0.01
2	Fixed-dose combinations	Intramammary	54.2%	0.00	0.18	0.14
2	Fixed-dose combinations	Intramammary for dry cow therapy	96.7%	0.00	0.00	0.02
2	Fixed-dose combinations	Parenteral	67.4%	0.00	0.03	0.03
2	Long-acting macrolides	Parenteral	84.0%	0.00	0.00	0.01
3	3rd- and 4th-gen. cephalosporins	Intramammary	99.8%	0.00	0.00	0.00
3	3rd- and 4th-gen. cephalosporins	Parenteral	99.9%	0.00	0.00	0.00
3	Fluoroquinolones	Parenteral	93.1%	0.00	0.00	0.00
3	Polymyxins	Oral	99.9%	0.00	0.00	0.00
3	Polymyxins	Parenteral	99.2%	0.00	0.00	0.00

Non-dairy cattle farming sector

1. $DDDA_{NAT}$

Figure A29. $DDDA_{NAT}$ trends in the non-dairy cattle farming sector over the 2013-2023 period, by antibiotics category



2. $DDDA_F$

2.1 Suckler cow farms

Number of farms: 7,937
Number of farms with $DDDA_F$=0: 4,106 (51.7%)
Number of farms that used third- and fourth-generation cephalosporins: 0 (0.0%)
Number of farms that used fluoroquinolones: 75 (0.9%)
Number of farms that used polymyxins: 16 (0.2%)

Table A32. Antibiotic use in $DDDA_F$ at suckler cow farms from 2012 to 2023*

Year	N	Mean	Median	P75	P90
2012	11,927	0.9	0.0	0.6	2.0
2013	9,857	0.7	0.1	0.8	2.2
2014	9,588	0.7	0.1	0.7	2.0
2015	9,305	0.6	0.1	0.7	2.0
2016	9,067	0.6	0.1	0.7	1.9
2017	9,351	0.5	0.0	0.6	1.7
2018	8,932	0.6	0.0	0.6	1.8
2019	8,263	0.6	0.0	0.6	1.9
2020	7,914	0.6	0.0	0.6	2.0
2021	7,540	0.6	0.0	0.6	1.9
2022	7,876	0.5	0.0	0.5	1.7
2023	7,937	0.5	0.0	0.5	1.6

* Only years for which similar $DDDA_F$ calculation methods were used have been included.

Figure A30. 2012 and 2023 $DDDA_F$ distributions for suckler cow farms

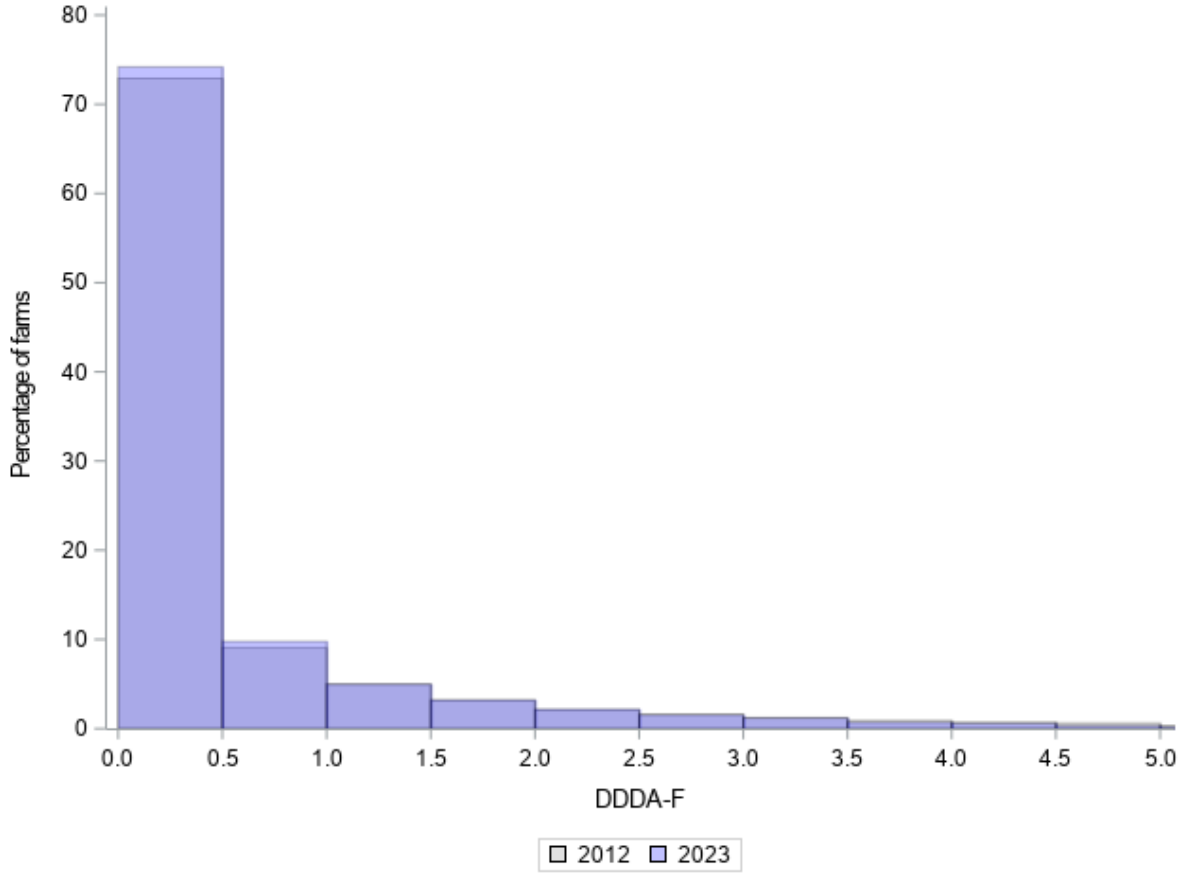


Table A33. Antibiotic use in $DDDA_F$ at suckler cow farms in 2023, by pharmacotherapeutic group and route of administration

Category of antibiotics	Pharmacotherapeutic group	Route of administration	% of farms with $DDDA_F$=0	$DDDA_F$		
				Median	P75	Mean
1	Amphenicols	Parenteral	86.5%	0.00	0.00	0.04
1	Macrolides/lincosamides	Oral	99.9%	0.00	0.00	0.00
1	Macrolides/lincosamides	Parenteral	95.6%	0.00	0.00	0.01
1	Penicillins	Intramammary	99.0%	0.00	0.00	0.01
1	Penicillins	Intramammary for dry cow therapy	97.4%	0.00	0.00	0.03
1	Penicillins	Parenteral	74.8%	0.00	0.01	0.17
1	Tetracyclines	Oral	99.4%	0.00	0.00	0.01
1	Tetracyclines	Parenteral	84.7%	0.00	0.00	0.05
1	Tetracyclines	Intrauterine	91.2%	0.00	0.00	0.02
1	Trimethoprim/sulfonamides	Oral	99.8%	0.00	0.00	0.00
1	Trimethoprim/sulfonamides	Parenteral	90.1%	0.00	0.00	0.02
2	Aminoglycosides	Oral	98.5%	0.00	0.00	0.00
2	Aminoglycosides	Parenteral	99.2%	0.00	0.00	0.00
2	Aminopenicillins	Intramammary	97.2%	0.00	0.00	0.01
2	Aminopenicillins	Parenteral	83.8%	0.00	0.00	0.06
2	1st- and 2nd-gen. cephalosporins	Intramammary	99.8%	0.00	0.00	0.00
2	1st- and 2nd-gen. cephalosporins	Intrauterine	99.2%	0.00	0.00	0.00
2	Fixed-dose combinations	Intramammary	98.3%	0.00	0.00	0.01
2	Fixed-dose combinations	Intramammary for dry cow therapy	99.9%	0.00	0.00	0.00
2	Fixed-dose combinations	Parenteral	88.5%	0.00	0.00	0.08
2	Long-acting macrolides	Parenteral	92.9%	0.00	0.00	0.03
3	3rd- and 4th-gen. cephalosporins	Intramammary	100.0%	0.00	0.00	0.00
3	Fluoroquinolones	Parenteral	99.1%	0.00	0.00	0.00
3	Polymyxins	Oral	100.0%	0.00	0.00	0.00
3	Polymyxins	Parenteral	99.8%	0.00	0.00	0.00

2.2 Rearing farms

Number of farms: 694
Number of farms with $DDDA_F$=0: 532 (76.7%)
Number of farms that used third- and fourth-generation cephalosporins: 0 (0.0%)
Number of farms that used fluoroquinolones: 0 (0.0%)
Number of farms that used polymyxins: 1 (0.1%)

Table A34. Antibiotic use in $DDDA_F$ at rearing farms from 2012 to 2023*

Year	N	Mean	Median	P75	P90
2012**	-	-	-	-	-
2013	472	1.1	0.0	0.2	2.3
2014	474	1.4	0.0	0.2	1.8
2015	470	0.8	0.0	0.2	1.7
2016	435	0.8	0.0	0.1	1.3
2017	520	1.0	0.0	0.0	1.6
2018	544	1.0	0.0	0.0	1.4
2019	573	1.0	0.0	0.1	1.5
2020	634	0.9	0.0	0.2	1.6
2021	664	0.8	0.0	0.2	1.2
2022	713	0.6	0.0	0.2	1.2
2023	694	0.5	0.0	0.0	0.8

* Only years for which similar $DDDA_F$ calculation methods were used have been included.
** Rearing and beef farms were grouped together for 2012, as the available data did not allow for categorization based on sex.

Figure A31. 2013 and 2023 $DDDA_F$ distributions for rearing farms

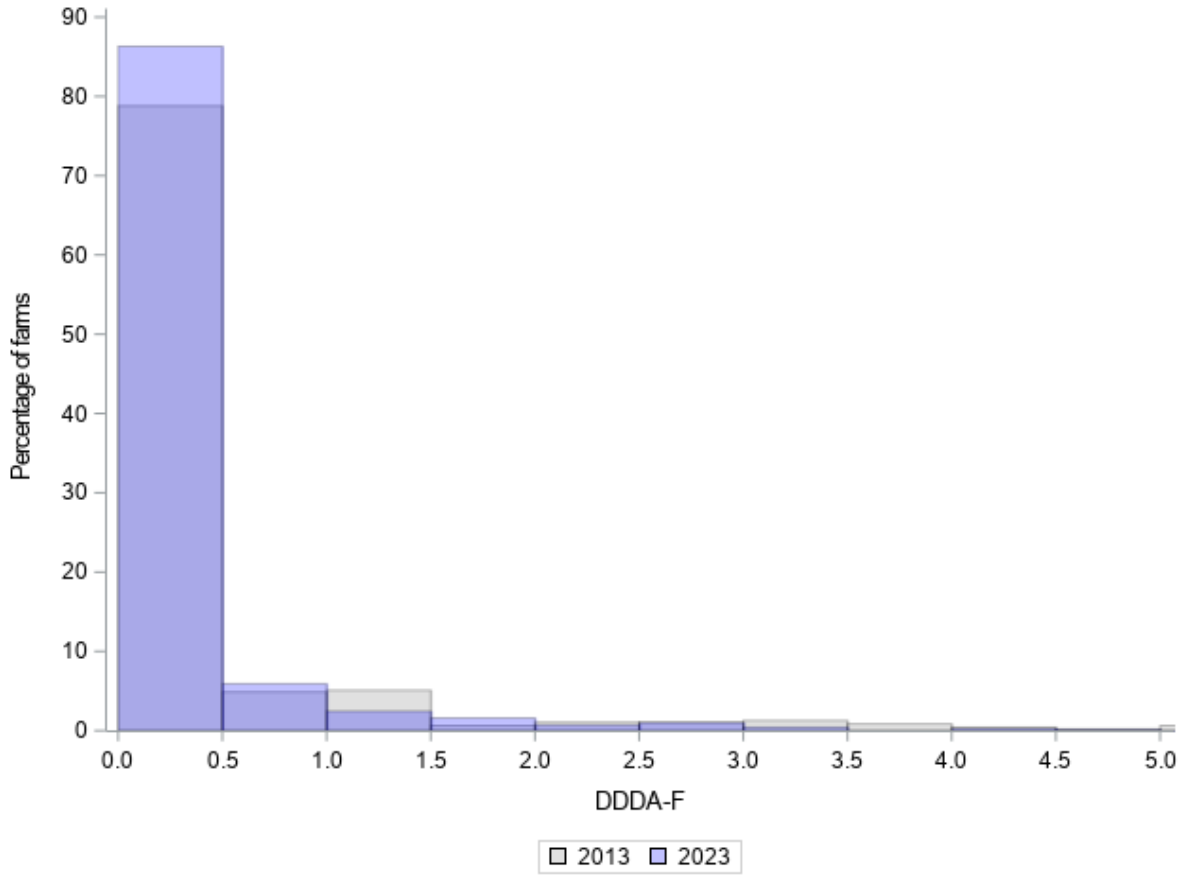


Table A35. Antibiotic use in $DDDA_F$ at rearing farms in 2023, by pharmacotherapeutic group and route of administration

Category of antibiotics	Pharmacotherapeutic group	Route of administration	% of farms with $DDDA_F$=0	$DDDA_F$		
				Median	P75	Mean
1	Amphenicols	Parenteral	81.5%	0.00	0.00	0.12
1	Macrolides/lincosamides	Oral	99.0%	0.00	0.00	0.05
1	Macrolides/lincosamides	Parenteral	97.3%	0.00	0.00	0.01
1	Penicillins	Intramammary for dry cow therapy	99.9%	0.00	0.00	0.02
1	Penicillins	Parenteral	87.7%	0.00	0.00	0.06
1	Tetracyclines	Oral	96.6%	0.00	0.00	0.18
1	Tetracyclines	Parenteral	94.2%	0.00	0.00	0.03
1	Tetracyclines	Intrauterine	99.6%	0.00	0.00	0.01
1	Trimethoprim/sulfonamides	Oral	99.3%	0.00	0.00	0.02
1	Trimethoprim/sulfonamides	Parenteral	95.1%	0.00	0.00	0.02
2	Aminoglycosides	Oral	99.3%	0.00	0.00	0.00
2	Aminoglycosides	Parenteral	99.7%	0.00	0.00	0.00
2	Aminopenicillins	Intramammary	99.9%	0.00	0.00	0.00
2	Aminopenicillins	Oral	99.7%	0.00	0.00	0.00
2	Aminopenicillins	Parenteral	96.4%	0.00	0.00	0.01
2	Fixed-dose combinations	Intramammary	99.7%	0.00	0.00	0.00
2	Fixed-dose combinations	Intramammary for dry cow therapy	99.9%	0.00	0.00	0.02
2	Fixed-dose combinations	Parenteral	98.2%	0.00	0.00	0.01
2	Long-acting macrolides	Parenteral	95.4%	0.00	0.00	0.04
3	Fluoroquinolones	Parenteral	99.9%	0.00	0.00	0.00
3	Polymyxins	Parenteral	99.9%	0.00	0.00	0.00

2.3 Beef farms

Number of farms: 2,579
Number of farms with $DDDA_F$=0: 1,942 (75.3%)
Number of farms that used third- and fourth-generation cephalosporins: 0 (0.0%)
Number of farms that used fluoroquinolones: 15 (0.6%)
Number of farms that used polymyxins: 7 (0.3%)

Table A36. Antibiotic use in $DDDA_F$ at beef farms from 2012 to 2023*

Year	N	Mean	Median	P75	P90
2012**	-	-	-	-	-
2013	3,316	1.8	0.0	0.6	4.2
2014	3,297	1.7	0.0	0.5	4.4
2015	3,196	1.5	0.0	0.4	2.9
2016	3,046	1.6	0.0	0.4	2.9
2017	2,919	1.3	0.0	0.3	2.3
2018	2,852	1.3	0.0	0.3	2.2
2019	2,778	1.0	0.0	0.2	1.5
2020	2,728	0.9	0.0	0.2	1.4
2021	2,589	1.1	0.0	0.2	1.6
2022	2,614	0.6	0.0	0.2	1.2
2023	2,579	0.3	0.0	0.0	0.7

* Only years for which similar $DDDA_F$ calculation methods were used have been included.
** Rearing and beef farms were grouped together for 2012, as the available data did not allow for categorization based on sex.

Figure A32. 2013 and 2023 $DDDA_F$ distributions for beef farms

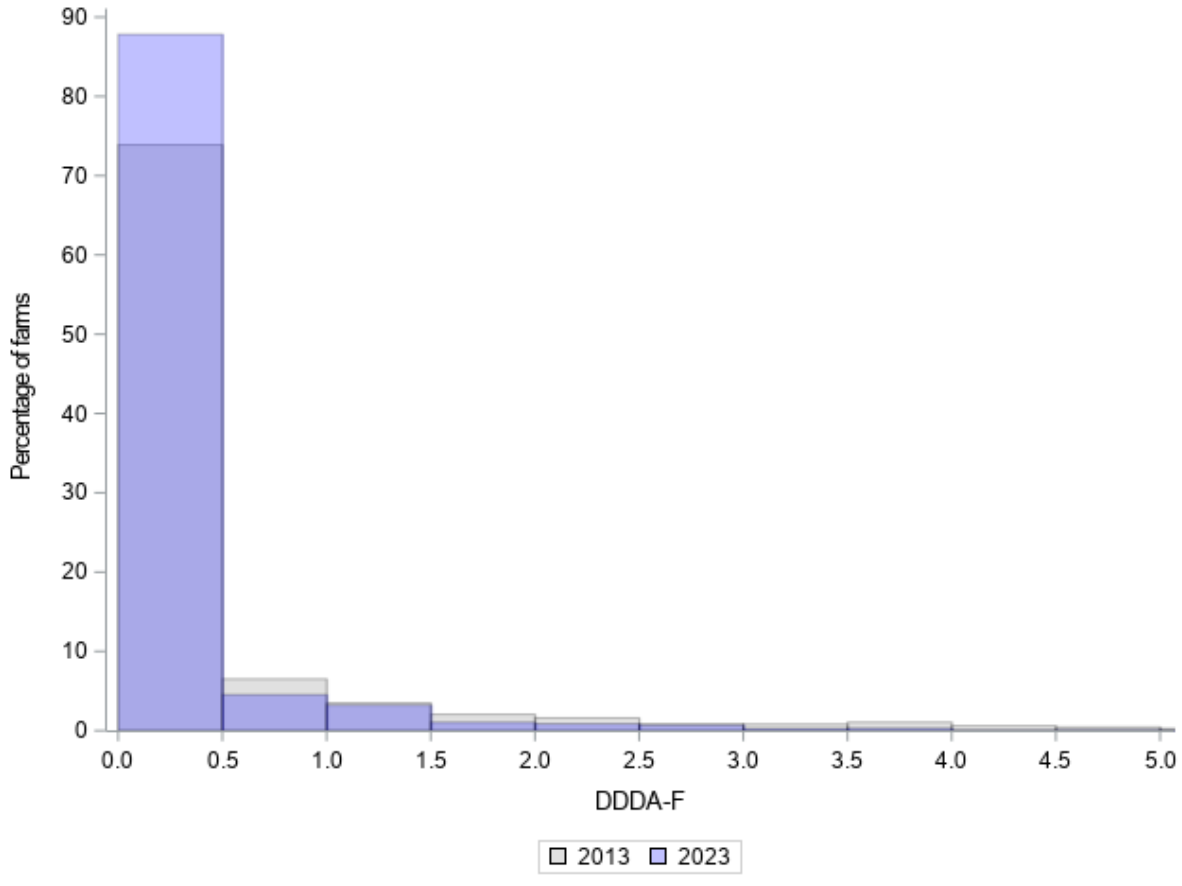


Table A37. Antibiotic use in $DDDA_F$ at beef farms in 2023, by pharmacotherapeutic group and route of administration

Category of antibiotics	Pharmacotherapeutic group	Route of administration	% of farms with $DDDA_F$=0	$DDDA_F$		
				Median	P75	Mean
1	Amphenicols	Parenteral	88.4%	0.00	0.00	0.05
1	Macrolides/lincosamides	Oral	99.8%	0.00	0.00	0.01
1	Macrolides/lincosamides	Parenteral	97.2%	0.00	0.00	0.00
1	Penicillins	Intramammary	99.9%	0.00	0.00	0.00
1	Penicillins	Intramammary for dry cow therapy	99.5%	0.00	0.00	0.00
1	Penicillins	Parenteral	87.9%	0.00	0.00	0.05
1	Tetracyclines	Oral	98.1%	0.00	0.00	0.05
1	Tetracyclines	Parenteral	91.9%	0.00	0.00	0.02
1	Tetracyclines	Intrauterine	97.7%	0.00	0.00	0.00
1	Trimethoprim/sulfonamides	Oral	99.2%	0.00	0.00	0.01
1	Trimethoprim/sulfonamides	Parenteral	95.8%	0.00	0.00	0.01
2	Aminoglycosides	Oral	99.5%	0.00	0.00	0.00
2	Aminoglycosides	Parenteral	99.3%	0.00	0.00	0.00
2	Aminopenicillins	Intramammary	99.3%	0.00	0.00	0.00
2	Aminopenicillins	Oral	100.0%	0.00	0.00	0.00
2	Aminopenicillins	Parenteral	90.1%	0.00	0.00	0.03
2	1st- and 2nd-gen. cephalosporins	Intramammary	100.0%	0.00	0.00	0.00
2	1st- and 2nd-gen. cephalosporins	Intrauterine	99.8%	0.00	0.00	0.00
2	Quinolones	Oral	99.9%	0.00	0.00	0.00
2	Fixed-dose combinations	Intramammary	99.6%	0.00	0.00	0.00
2	Fixed-dose combinations	Intramammary for dry cow therapy	99.9%	0.00	0.00	0.00
2	Fixed-dose combinations	Parenteral	94.8%	0.00	0.00	0.02
2	Long-acting macrolides	Parenteral	93.1%	0.00	0.00	0.04
3	Fluoroquinolones	Parenteral	99.4%	0.00	0.00	0.00
3	Polymyxins	Parenteral	99.7%	0.00	0.00	0.00

Layer farming sector

1. $DDDA_F$

1.1 Layer farms

Number of farms: 814
Number of farms with $DDDA_F$=0: 619 (76.0%)
Number of farms that used third- and fourth-generation cephalosporins*: 0 (0.0%)
Number of farms that used fluoroquinolones: 0 (0.0%)
Number of farms that used polymyxins: 76 (9.3%)

Table A38. Antibiotic use in $DDDA_F$ at layer farms from 2017 to 2023**

Year	N	Mean	Median	P75	P90
2017	875	0.9	0.0	0.0	3.1
2018	844	1.6	0.0	0.8	6.1
2019	844	1.8	0.0	1.0	6.6
2020	818	1.7	0.0	1.2	5.9
2021	824	1.4	0.0	0.0	5.1
2022	816	1.0	0.0	0.0	2.0
2023	814	1.5	0.0	0.0	5.4

* These antibiotics are not authorized for use in poultry.
** Only years for which similar $DDDA_F$ calculation methods were used have been included.

Figure A33. 2017 and 2023 $DDDA_F$ distributions for layer farms

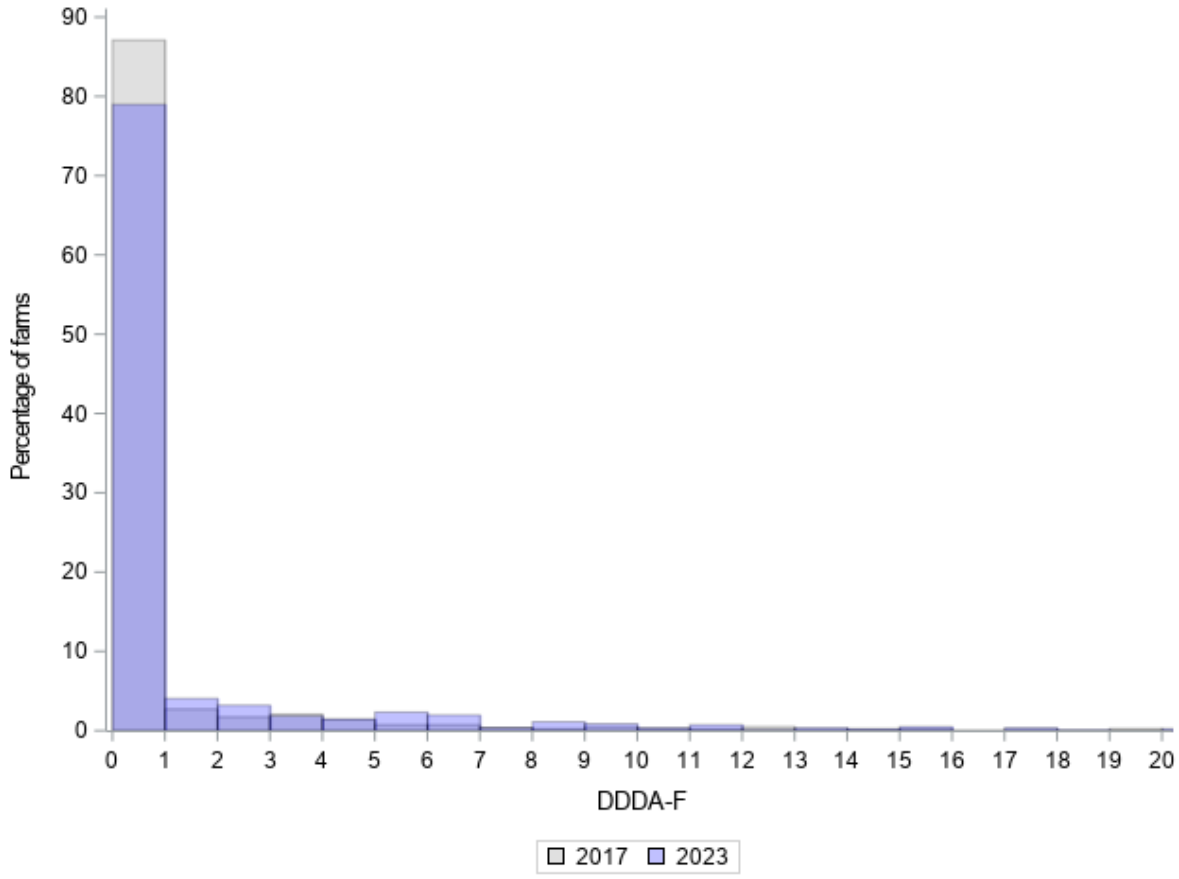


Table A39. Antibiotic use in $DDDA_F$ at layer farms in 2023, by pharmacotherapeutic group and route of administration

Category of antibiotics	Pharmacotherapeutic group	Route of administration	% of farms with $DDDA_F$=0	$DDDA_F$		
				Median	P75	Mean
1	Penicillins	Oral	95.9%	0.00	0.00	0.40
1	Pleuromutilines	Oral	98.5%	0.00	0.00	0.06
1	Tetracyclines	Oral	99.8%	0.00	0.00	0.04
2	Aminoglycosides	Oral	95.5%	0.00	0.00	0.30
2	Macrolides/lincosamides	Oral	89.4%	0.00	0.00	0.21
3	Polymyxins	Oral	90.7%	0.00	0.00	0.53

Layer pullet and layer parent/grandparent stock farming sectors

1.2 Pullet rearing farms

Number of farms: 166
Number of farms with $DDDA_F$=0: 93 (56.0%)
Number of farms that used third- and fourth-generation cephalosporins*: 0 (0.0%)
Number of farms that used fluoroquinolones: 0 (0.0%)
Number of farms that used polymyxins: 0 (0.0%)

Table A40. Antibiotic use in $DDDA_F$ at pullet rearing farms from 2017 to 2023**

Year	N	Mean	Median	P75	P90
2017	187	2.4	0.0	3.6	5.9
2018	176	2.3	0.0	2.7	5.8
2019	177	2.0	0.0	2.9	6.0
2020	175	1.8	0.0	2.7	5.8
2021	175	1.7	0.0	2.4	5.0
2022	169	1.8	0.0	2.8	6.3
2023	166	2.3	0.0	3.0	6.5

* These antibiotics are not authorized for use in poultry.
** Only years for which similar $DDDA_F$ calculation methods were used have been included.

Figure A34. 2017 and 2023 $DDDA_F$ distributions for pullet rearing farms

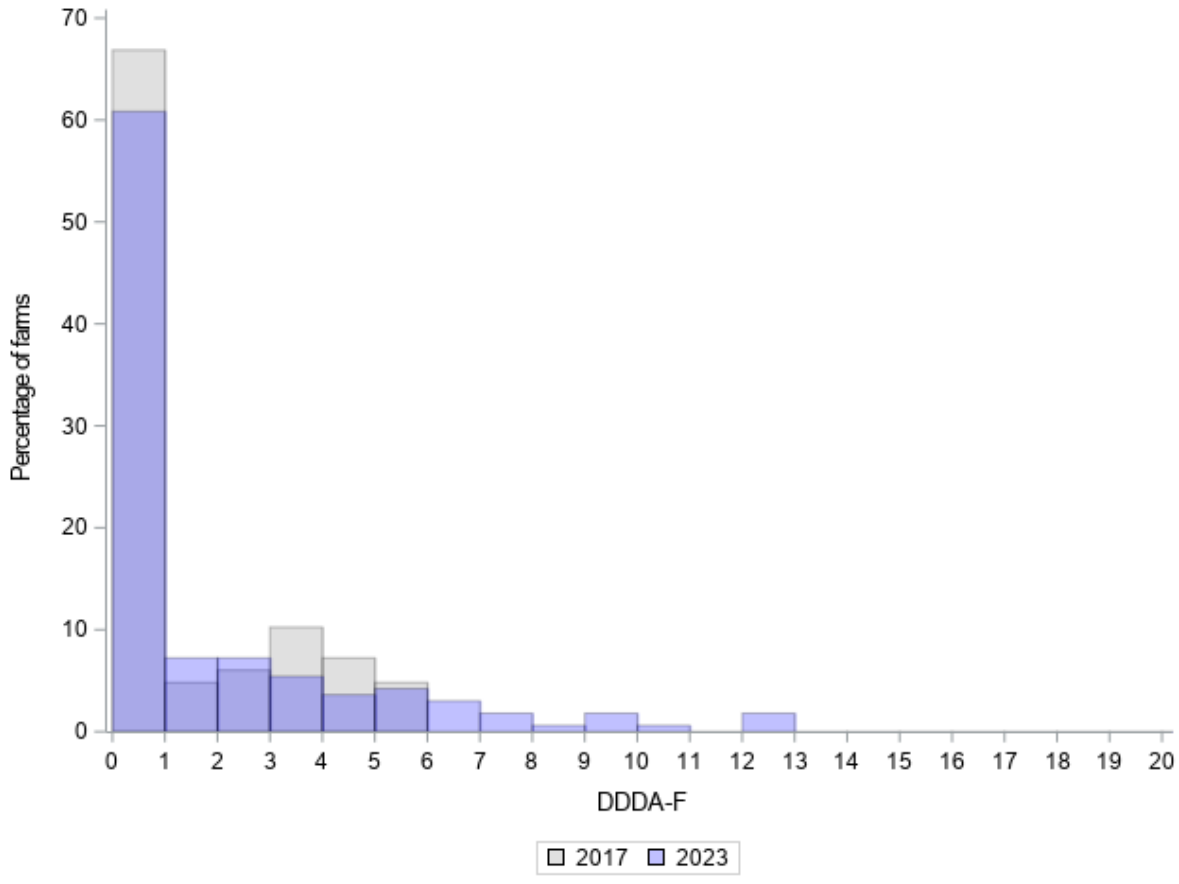


Table A41. Antibiotic use in $DDDA_F$ at pullet rearing farms in 2023, by pharmacotherapeutic group and route of administration

Category of antibiotics	Pharmacotherapeutic group	Route of administration	% of farms with $DDDA_F$=0	$DDDA_F$		
				Median	P75	Mean
1	Penicillins	Oral	76.5%	0.00	0.00	1.01
1	Tetracyclines	Oral	91.6%	0.00	0.00	0.36
1	Trimethoprim/sulfonamides	Oral	98.8%	0.00	0.00	0.01
2	Aminopenicillins	Oral	97.0%	0.00	0.00	0.66
2	Quinolones	Oral	99.4%	0.00	0.00	0.06
2	Macrolides/lincosamides	Oral	82.5%	0.00	0.00	0.24

1.3 Parent/grandparent stock rearing farms

Number of farms: 25
Number of farms with $DDDA_F$=0: 16 (64.0%)
Number of farms that used third- and fourth-generation cephalosporins*: 0 (0.0%)
Number of farms that used fluoroquinolones: 0 (0.0%)
Number of farms that used polymyxins: 0 (0.0%)

Table A42. Antibiotic use in $DDDA_F$ at parent/grandparent stock rearing farms from 2017 to 2023**

Year	N	Mean	Median	P75	P90
2017	20	4.1	0.0	8.6	13.1
2018	20	7.2	0.0	10.8	25.5
2019	19	6.4	0.0	10.5	20.9
2020	17	5.3	0.0	8.7	14.8
2021	21	10.7	0.0	14.4	21.2
2022	24	8.2	0.0	13.5	23.5
2023	25	8.1	0.0	16.3	25.4

* These antibiotics are not authorized for use in poultry.
** Only years for which similar $DDDA_F$ calculation methods were used have been included.

Figure A35. 2017 and 2023 $DDDA_F$ distributions for parent/grandparent stock rearing farms

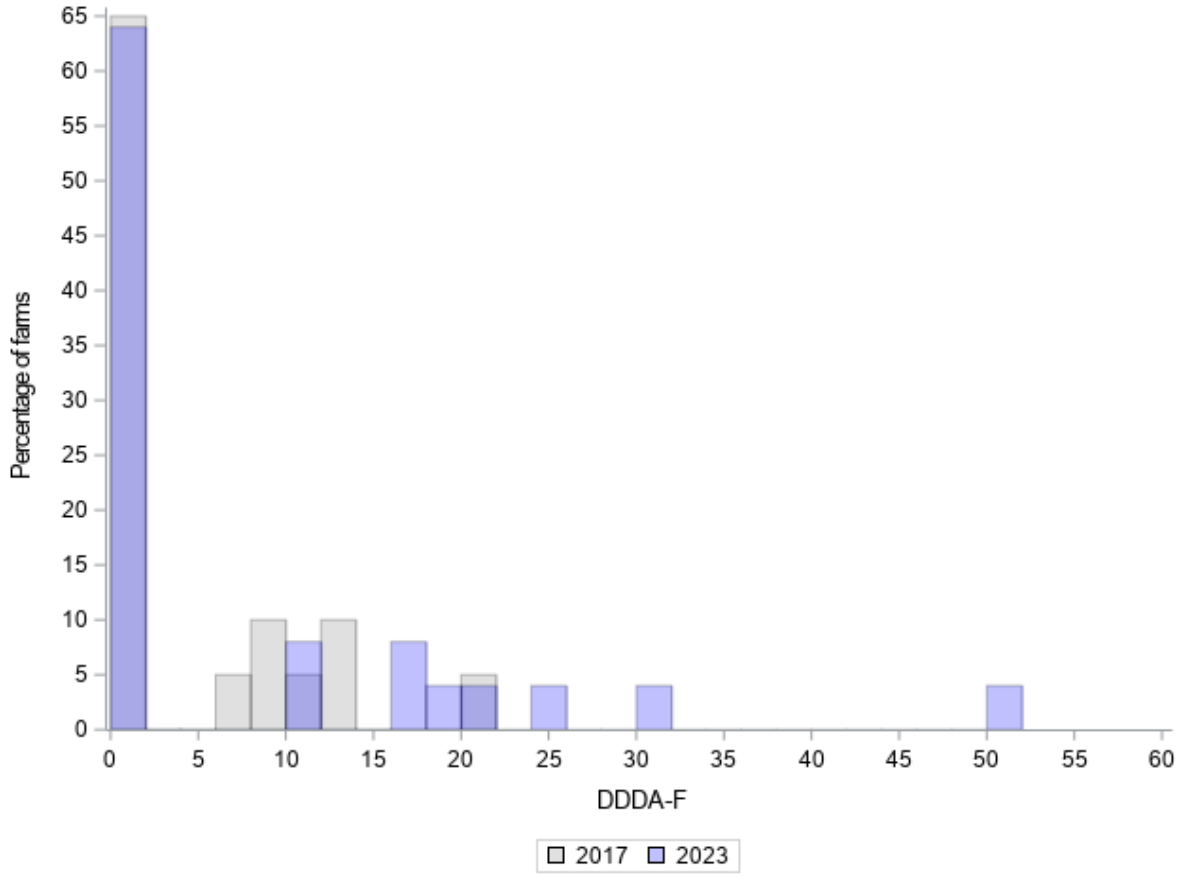


Table A43. Antibiotic use in $DDDA_F$ at parent/grandparent stock rearing farms in 2023, by pharmacotherapeutic group and route of administration

Category of antibiotics	Pharmacotherapeutic group	Route of administration	% of farms with $DDDA_F$=0	$DDDA_F$		
				Median	P75	Mean
1	Penicillins	Oral	88.0%	0.00	0.00	1.82
1	Tetracyclines	Oral	88.0%	0.00	0.00	1.16
1	Trimethoprim/sulfonamides	Oral	96.0%	0.00	0.00	0.09
2	Aminopenicillins	Oral	88.0%	0.00	0.00	2.38
2	Quinolones	Oral	92.0%	0.00	0.00	0.75
2	Macrolides/lincosamides	Oral	92.0%	0.00	0.00	1.87

1.4 Parent/grandparent stock production farms

Number of farms: 50
Number of farms with $DDDA_F$=0: 38 (76.0%)
Number of farms that used third- and fourth-generation cephalosporins*: 0 (0.0%)
Number of farms that used fluoroquinolones: 2 (4.0%)
Number of farms that used polymyxins: 2 (4.0%)

Table A44. Antibiotic use in $DDDA_F$ at parent/grandparent stock production farms from 2017 to 2023**

Year	N	Mean	Median	P75	P90
2017	43	3.3	0.0	5.9	9.6
2018	43	3.2	0.0	5.5	9.7
2019	51	3.5	0.0	2.8	10.5
2020	48	3.0	0.3	4.0	8.9
2021	53	1.9	0.0	2.5	5.9
2022	54	1.6	0.0	1.1	6.4
2023	50	1.2	0.0	0.0	4.6

* These antibiotics are not authorized for use in poultry.
** Only years for which similar $DDDA_F$ calculation methods were used have been included.

Figure A36. 2017 and 2023 $DDDA_F$ distributions for parent/grandparent stock production farms

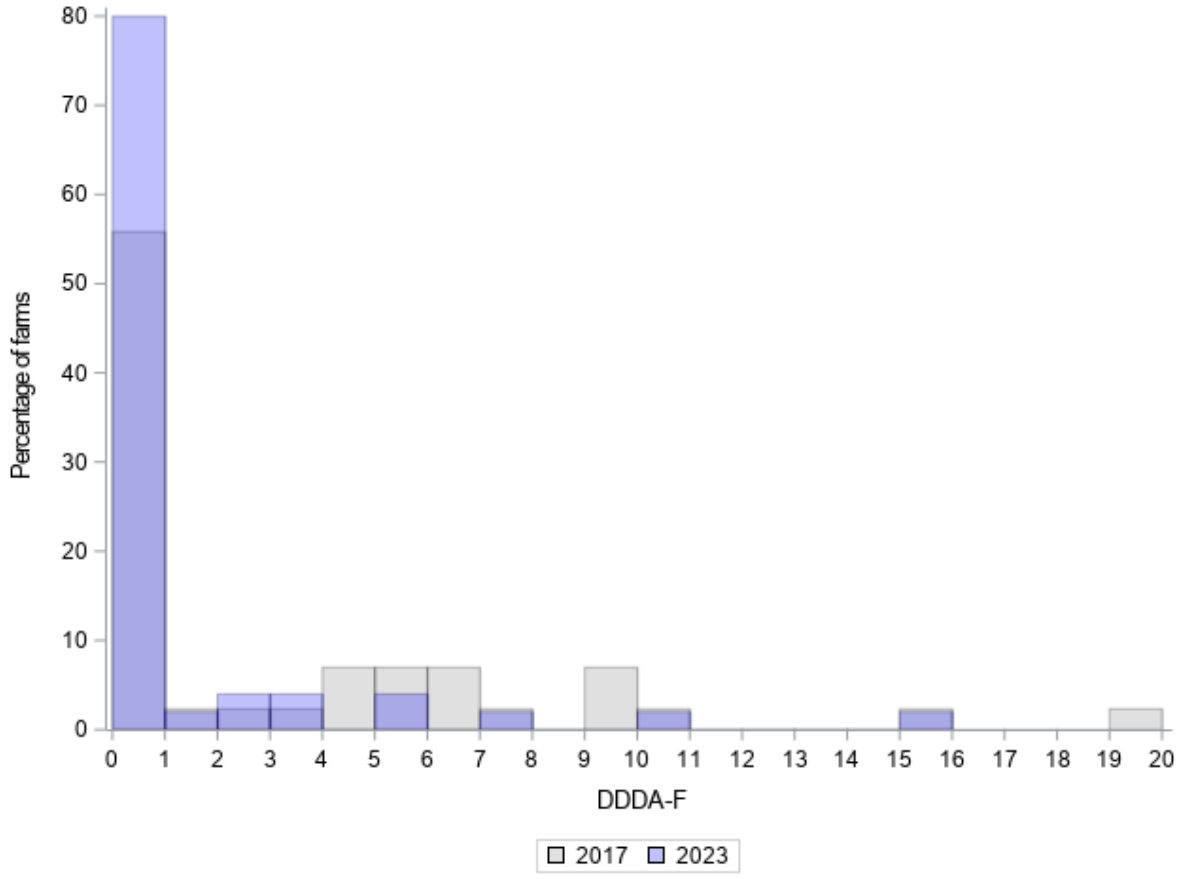


Table A45. Antibiotic use in $DDDA_F$ at parent/grandparent stock production farms in 2023, by pharmacotherapeutic group and route of administration

Category of antibiotics	Pharmacotherapeutic group	Route of administration	% of farms with $DDDA_F$=0	$DDDA_F$		
				Median	P75	Mean
1	Penicillins	Oral	98.0%	0.00	0.00	0.05
1	Tetracyclines	Oral	94.0%	0.00	0.00	0.22
2	Aminoglycosides	Oral	96.0%	0.00	0.00	0.19
2	Quinolones	Oral	94.0%	0.00	0.00	0.20
2	Macrolides/lincosamides	Oral	92.0%	0.00	0.00	0.11
3	Fluoroquinolones	Oral	96.0%	0.00	0.00	0.04
3	Polymyxins	Oral	96.0%	0.00	0.00	0.39

Small food producing livestock sectors

Rabbit farming sector

1. $DDDA_{NAT}$

Figure A37. $DDDA_{NAT}$ trends in the rabbit farming sector over the 2016-2022 period, by antibiotics category

2. $DDDA_F$

Number of farms: 31
Number of farms with $DDDA_F$=0: 1 (3.2%)
Number of farms that used third- and fourth-generation cephalosporins: 0 (0.0%)
Number of farms that used fluoroquinolones: 0 (0.0%)
Number of farms that used polymyxins: 0 (0.0%)

Table A46. Antibiotic use in $DDDA_F$ at rabbit farms from 2016 to 2023*

Year	N	Mean	Median	P75	P90
2016	41	40.9	31.8	60.3	84.4
2017	49	25.4	21.7	37.9	49.4
2018	40	47.9	44.2	61.1	96.3
2019	36	42.5	40.4	60.8	75.9
2020	35	53.5	39.9	75.3	124.4
2021	31	43.4	30.7	58.8	80.9
2022	31	24.7	26.3	35.0	45.2
2023	31	24.7	24.3	31.8	40.5

* Only years for which similar $DDDA_F$ calculation methods were used have been included.

Figure A38. 2016 and 2023 $DDDA_F$ distributions for rabbit farms

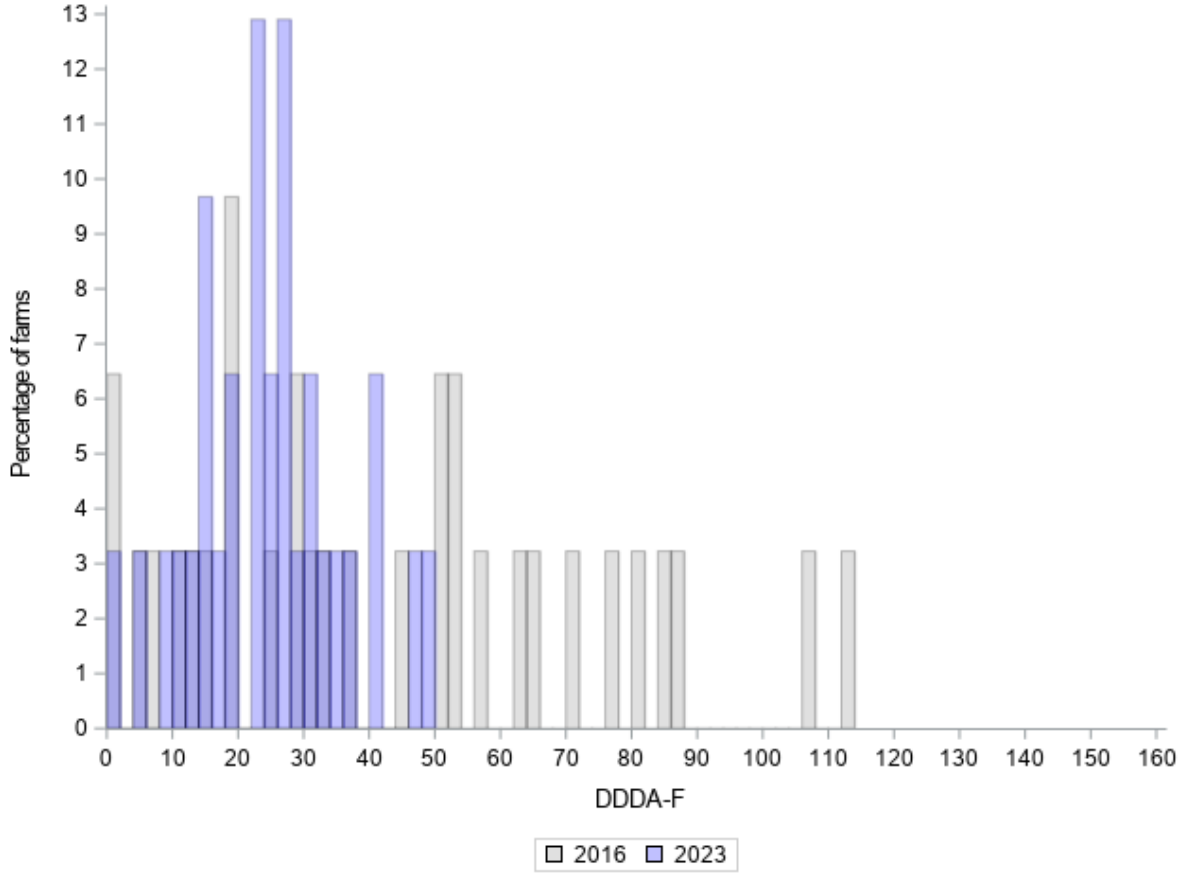


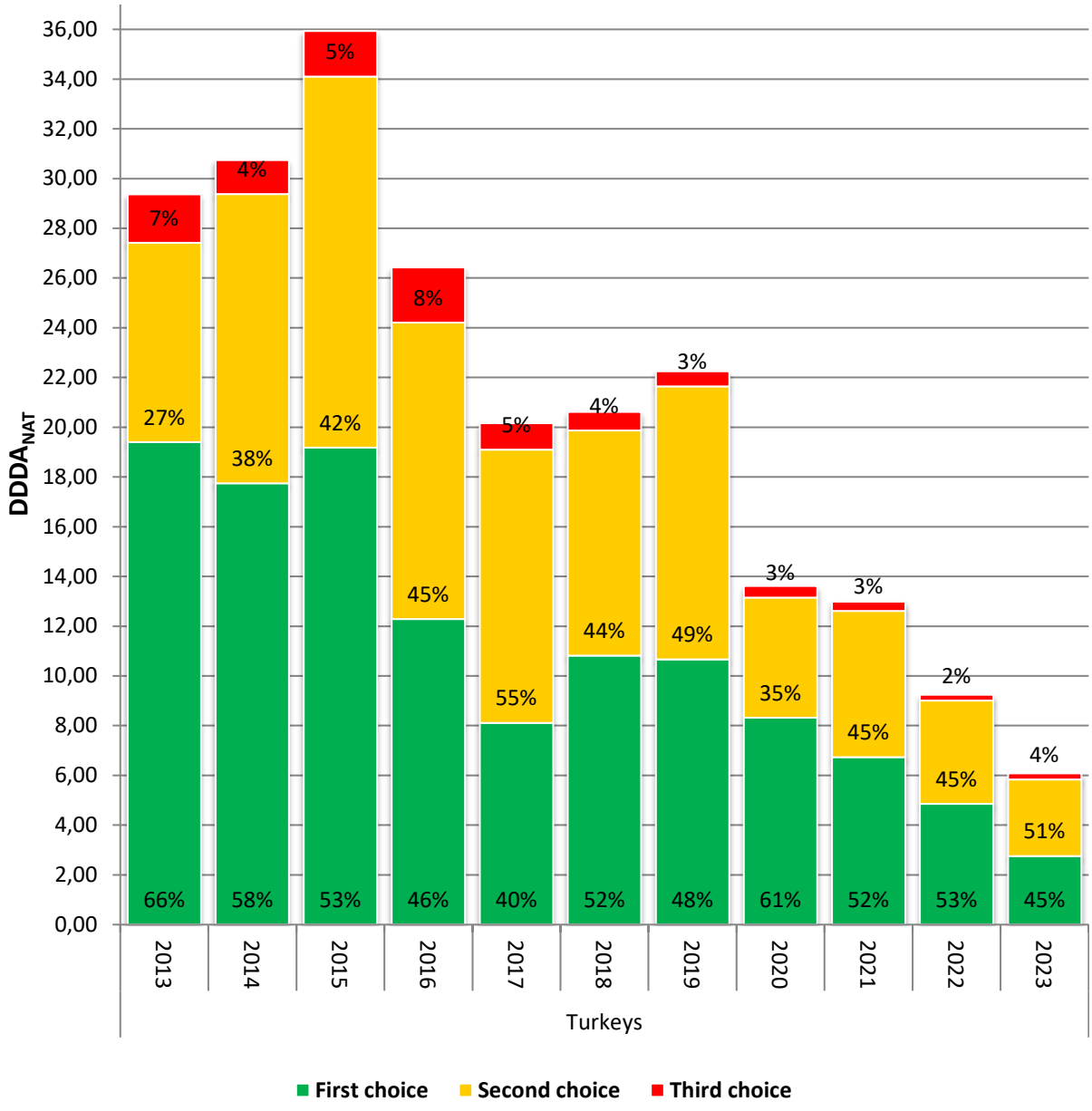
Table A47. Antibiotic use in $DDDA_F$ at rabbit farms in 2023, by pharmacotherapeutic group and route of administration

Category of antibiotics	Pharmacotherapeutic group	Route of administration	% of farms with $DDDA_F$=0	$DDDA_F$		
				Median	P75	Mean
1	Macrolides/lincosamides	Oral	32.3%	4.48	19.19	8.97
1	Other	Oral	32.3%	5.27	13.73	7.84
1	Pleuromutilines	Oral	54.8%	0.00	3.61	1.90
1	Tetracyclines	Oral	83.9%	0.00	0.00	0.54
1	Tetracyclines	Parenteral	38.7%	0.48	2.18	1.39
1	Trimethoprim/sulfonamides	Oral	90.3%	0.00	0.00	0.26
1	Trimethoprim/sulfonamides	Parenteral	96.8%	0.00	0.00	0.01
2	Aminoglycosides	Oral	61.3%	0.00	4.52	3.13
2	Aminoglycosides	Parenteral	96.8%	0.00	0.00	0.00
2	Quinolones	Oral	90.3%	0.00	0.00	0.60
2	Long-acting macrolides	Parenteral	96.8%	0.00	0.00	0.01

Turkey farming sector

1. $DDDA_{NAT}$

Figure A39. $DDDA_{NAT}$ trends in the turkey farming sector over the 2013-2022 period, by antibiotics category



2. $DDDA_F$

Number of farms: 33
Number of farms with $DDDA_F$=0: 13 (39.4%)
Number of farms that used third- and fourth-generation cephalosporins*: 0 (0.0%)
Number of farms that used fluoroquinolones: 7 (21.2%)
Number of farms that used polymyxins: 1 (3.0%)

Table A48. Antibiotic use in $DDDA_F$ at turkey farms from 2016 to 2023**

Year	N	Mean	Median	P75	P90
2016	46	28.0	19.3	34.2	72.8
2017	45	18.7	10.4	25.5	59.8
2018	38	20.9	11.6	24.1	49.7
2019	43	18.7	13.2	21.5	40.1
2020	43	9.3	6.1	15.7	22.2
2021	39	11.1	8.0	13.2	26.3
2022	38	11.6	5.7	13.7	28.1
2023	33	7.5	2.8	12.3	17.5

* These antibiotics are not authorized for use in poultry.
** Only years for which similar $DDDA_F$ calculation methods were used have been included.

Figure A40. 2016 and 2023 $DDDA_F$ distributions for turkey farms

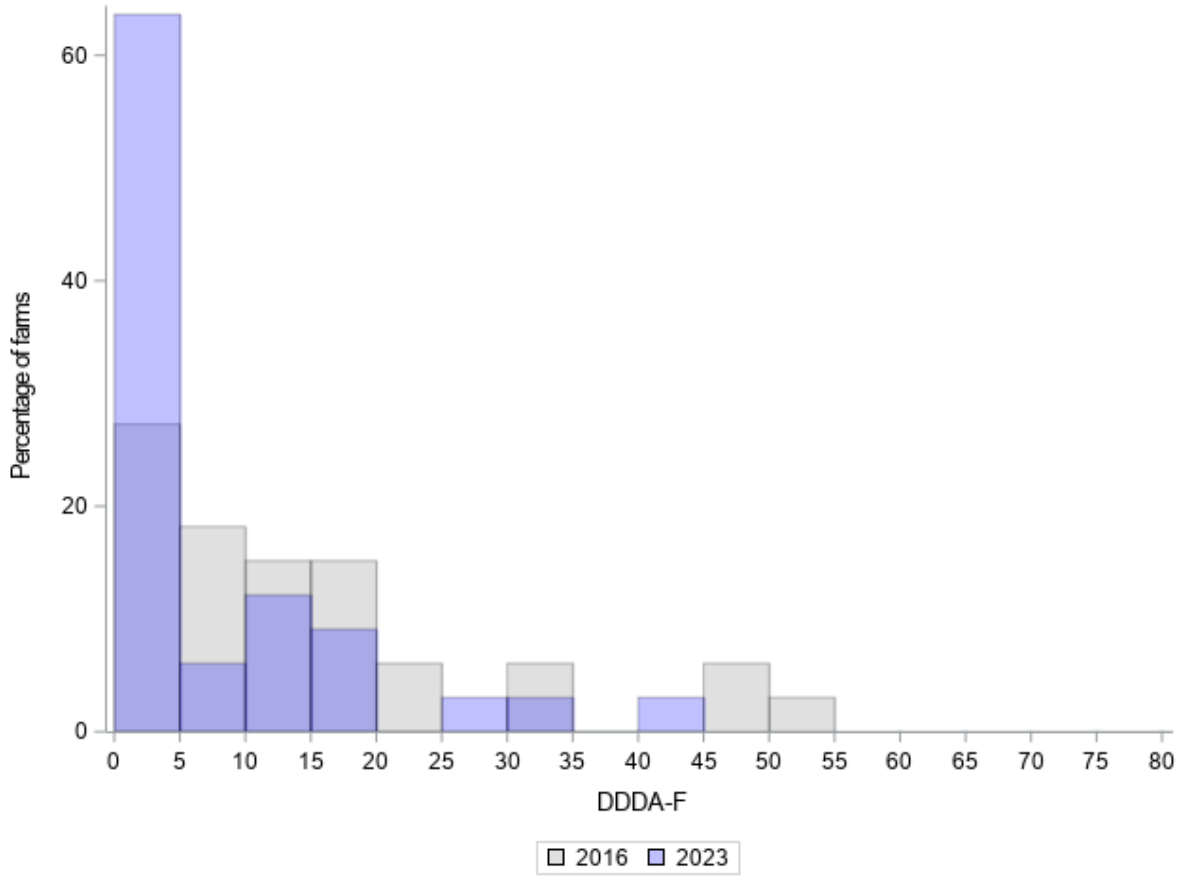


Figure A41. Scatter plot of 2022 and 2023 $DDDA_F$ values for turkey farms. The red solid lines represent the action thresholds defined by the SDa. The red dotted lines represent the transitional action threshold negotiated by the livestock sector. For each type of action threshold, the number of farms with persistently high usage levels is listed in the upper-right corner of the scatter plot

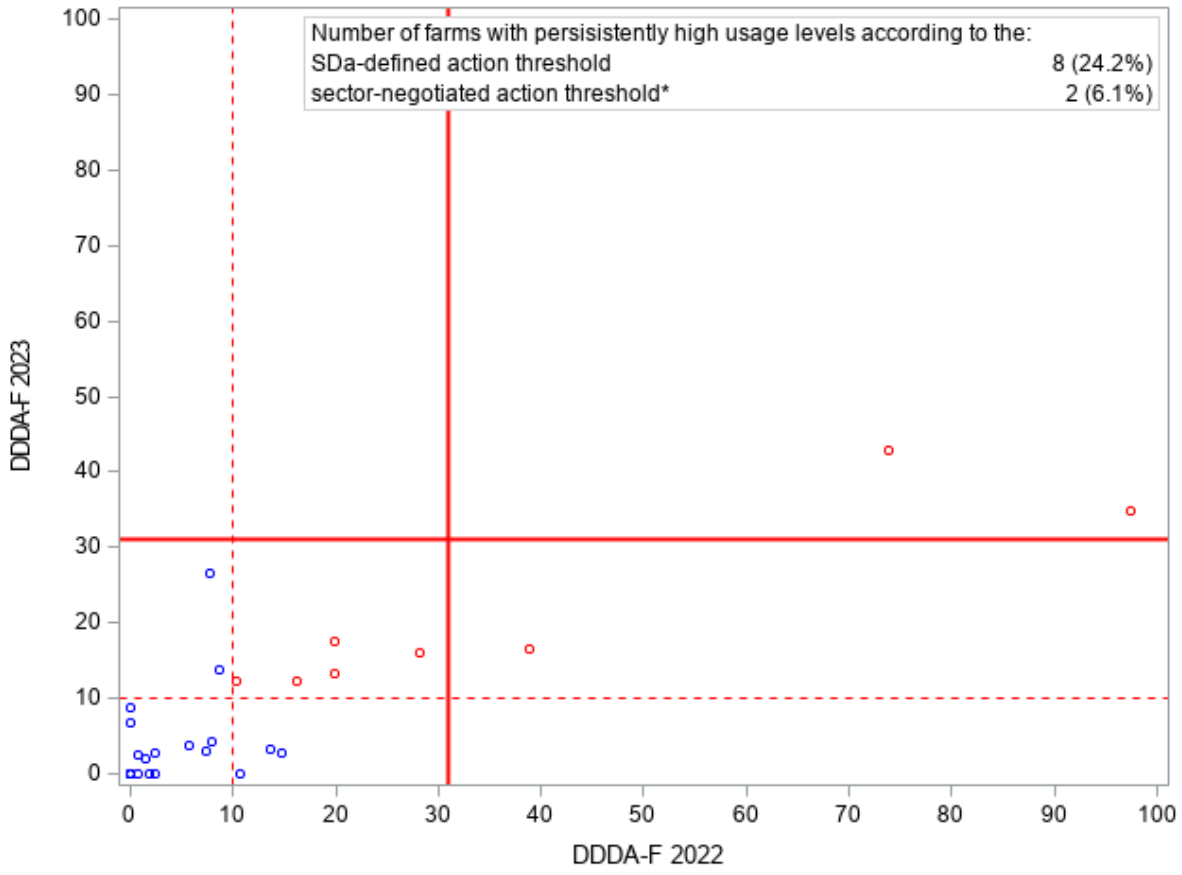


Table A49. Antibiotic use in $DDDA_F$ at turkey farms in 2023, by pharmacotherapeutic group and route of administration

Category of antibiotics	Pharmacotherapeutic group	Route of administration	% of farms with $DDDA_F$=0	$DDDA_F$		
				Median	P75	Mean
1	Penicillins	Oral	72.7%	0.00	1.60	1.82
1	Tetracyclines	Oral	48.5%	0.62	2.39	1.58
1	Trimethoprim/sulfonamides	Oral	87.9%	0.00	0.00	0.58
2	Aminopenicillins	Oral	72.7%	0.00	1.46	2.52
2	Quinolones	Oral	93.9%	0.00	0.00	0.19
2	Macrolides/lincosamides	Oral	75.8%	0.00	0.00	0.40
3	Fluoroquinolones	Oral	78.8%	0.00	0.00	0.31
3	Polymyxins	Oral	97.0%	0.00	0.00	0.06

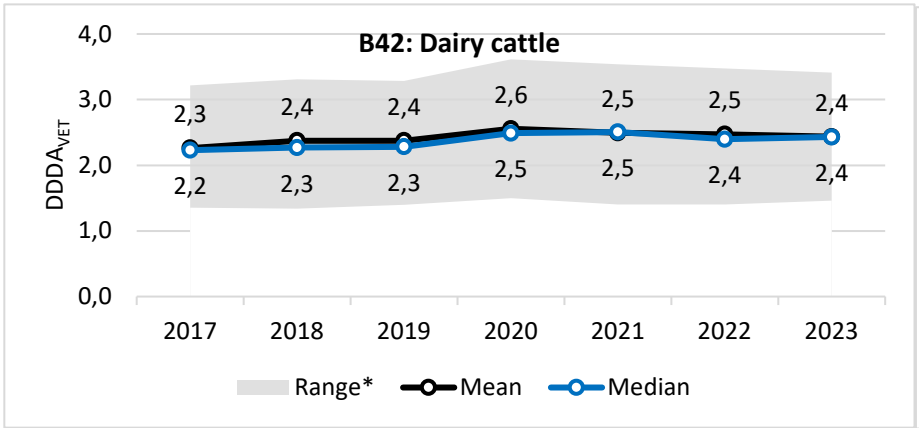
Colistin usage data

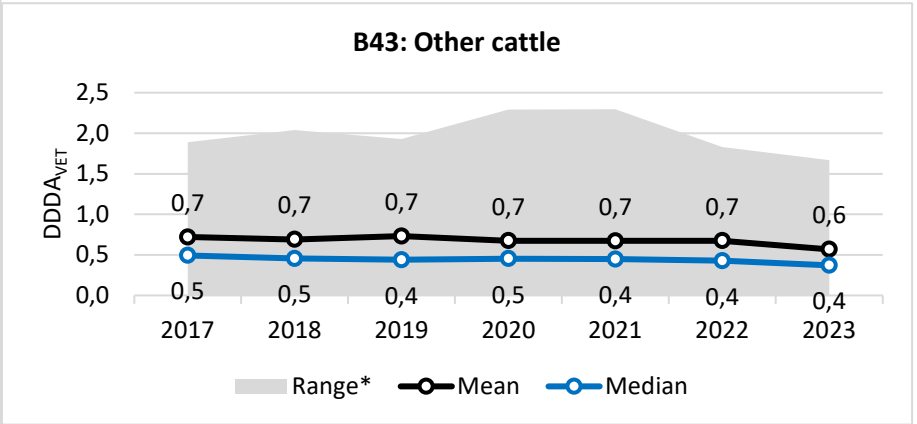
Table A50. Colistin usage data in $DDDA_F$ for 2023, by type of farm/production category. Descriptive statistics are provided for the livestock farms that used colistin, and for all livestock farms combined. Med.=median

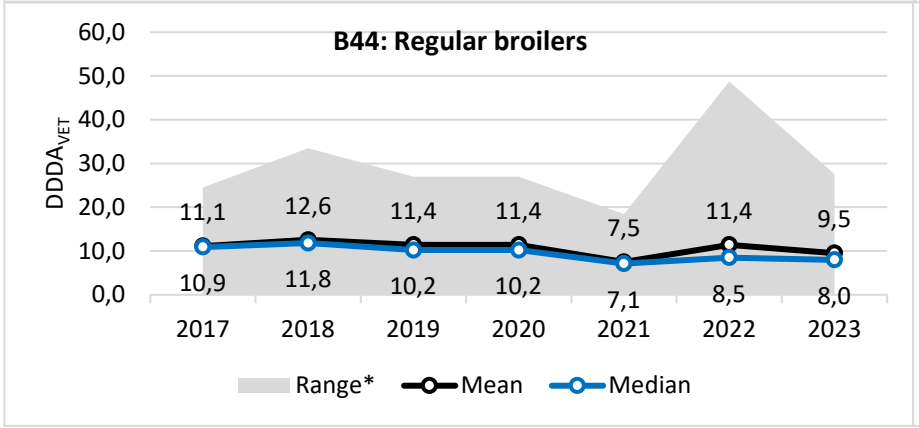
Livestock sector	Type of farm/production category	% of livestock farms that used colistin	Usage data for livestock farms that used colistin					Usage data for all livestock farms combined				
			N	mean	Med.	N	mean	N	N	mean	P75	N
Broiler farming sector	Broiler farms	0.8%	6	1.5	1.2	2.0	3.2	783	0.0	0.0	0.0	0.0
	- Farms with conventional breeds	2.0%	6	1.5	1.2	2.0	3.2	306	0.0	0.0	0.0	0.0
	- Farms with slower growing breeds	0.0%	0	0.0	0.0	0.0	0.0	595	0.0	0.0	0.0	0.0
	Parent/grandparent stock rearing farms	0.0%	0	0.0	0.0	0.0	0.0	86	0.0	0.0	0.0	0.0
	Parent/grandparent stock production farms	1.0%	2	6.3	6.3	7.3	7.3	192	0.1	0.0	0.0	0.0
Layer farming sector	Layer farms	9.3%	76	5.7	5.4	6.6	14.7	814	0.5	0.0	0.0	5.0
	Pullet rearing farms	0.0%	0	0.0	0.0	0.0	0.0	166	0.0	0.0	0.0	0.0
	Parent/grandparent stock rearing farms	0.0%	0	0.0	0.0	0.0	0.0	25	0.0	0.0	0.0	0.0
	Parent/grandparent stock production farms	4.0%	2	9.7	9.7	14.5	14.5	50	0.4	0.0	0.0	0.0
Turkey farming sector	Turkey farms	3.0%	1	2.0	2.0	2.0	2.0	33	0.1	0.0	0.0	0.0
Pig farming sector	Sows/suckling piglets	33.8%	422	0.2	0.1	0.2	0.9	1,250	0.1	0.0	0.0	0.4
	Weaner pigs	27.7%	385	4.3	1.7	4.4	14.4	1,392	1.2	0.0	0.1	6.7
	Fattening pigs	2.9%	83	0.3	0.1	0.3	1.5	2,820	0.0	0.0	0.0	0.0
Veal farming sector	White veal farms	3.3%	25	0.6	0.0	0.1	3.2	747	0.0	0.0	0.0	0.0
	Rosé veal starter farms	3.0%	6	0.1	0.1	0.2	0.3	201	0.0	0.0	0.0	0.0
	Rosé veal fattening farms	1.2%	6	0.1	0.0	0.2	0.3	509	0.0	0.0	0.0	0.0
	Rosé veal combination farms	2.9%	2	0.0	0.0	0.1	0.1	68	0.0	0.0	0.0	0.0
Cattle farming sector	Dairy cattle farms	0.9%	122	0.1	0.0	0.1	0.3	14,080	0.0	0.0	0.0	0.0
	Rearing farms	0.2%	16	0.1	0.0	0.1	0.2	7,936	0.0	0.0	0.0	0.0
	Suckler cow farms	0.1%	1	0.1	0.1	0.1	0.1	689	0.0	0.0	0.0	0.0
	Beef farms	0.3%	7	0.1	0.0	0.1	0.1	2,578	0.0	0.0	0.0	0.0
Rabbit farming sector	Rabbit farms	0.0%	0	0.0	0.0	0.0	0.0	31	0.0	0.0	0.0	0.0

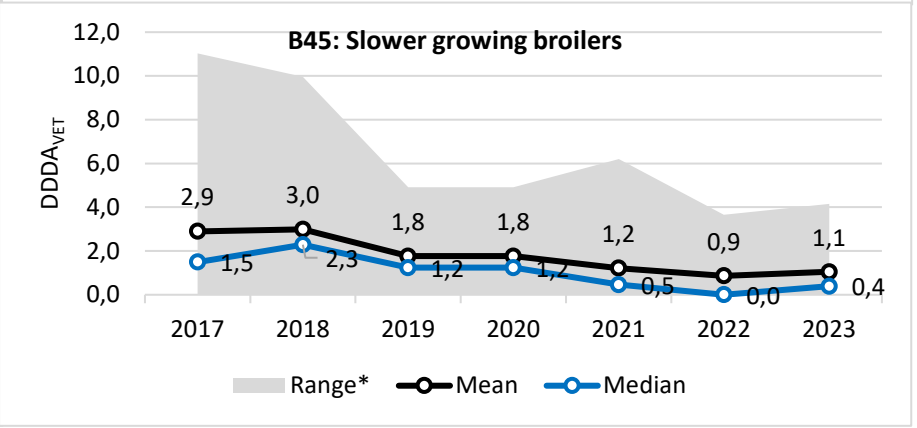
Veterinarians' prescription patterns

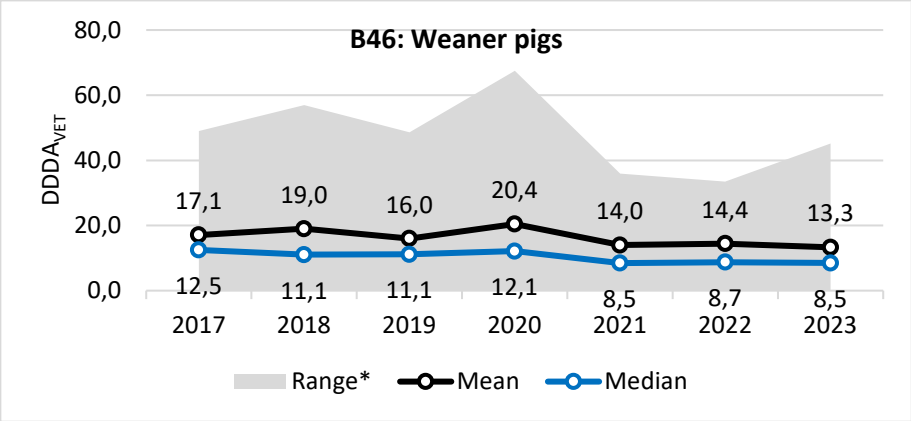
Figures A42 t/m A52. Long term $DDDA_{VET}$ trends by production category. Each production category has its own figure, the production category concerned is shown in the heading of the figure. Here shown are the mean and median $DDDA_{VET}$ values and the $DDDA_{VET}$ ranges. * $DDDA_{VET}$ ranges represent the middle 90% of farms, with the lower limit corresponding to the 5th percentile and the upper limit corresponding to the 95th percentile.

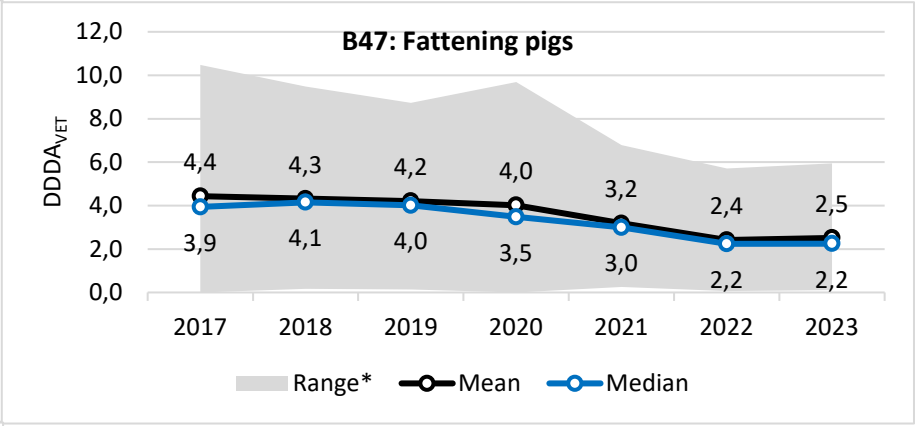


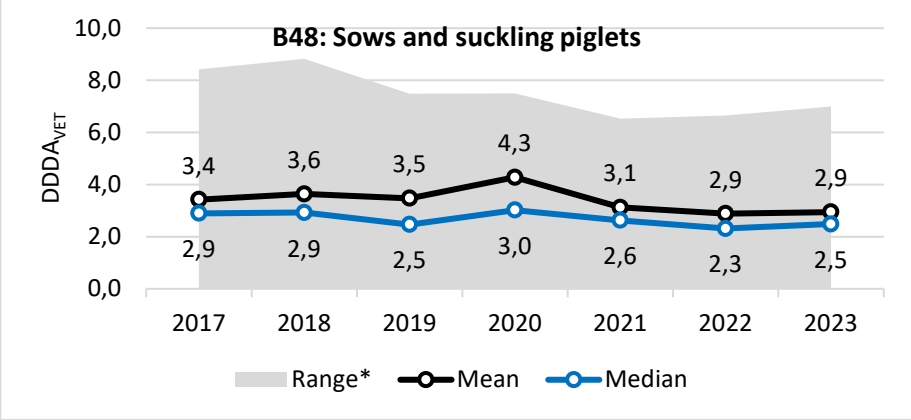


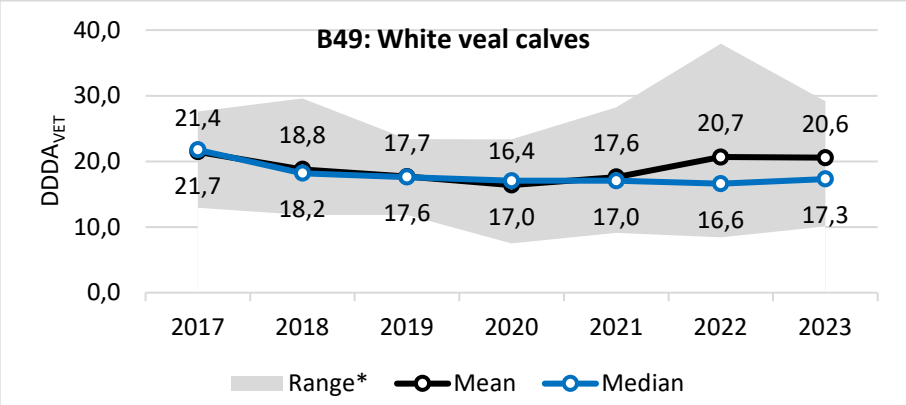


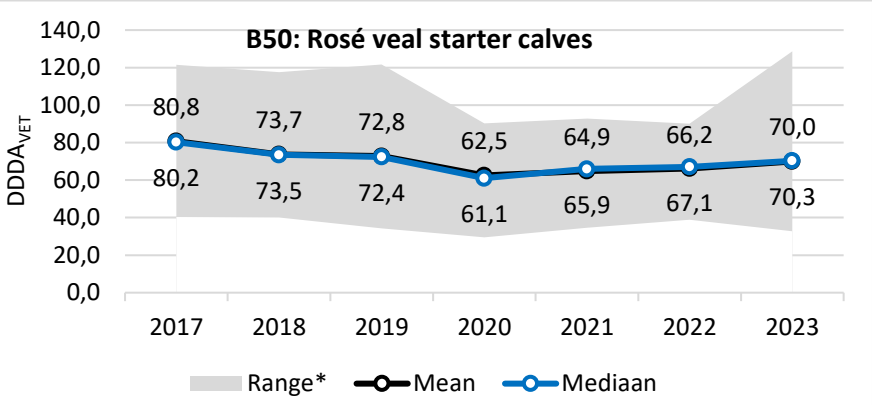


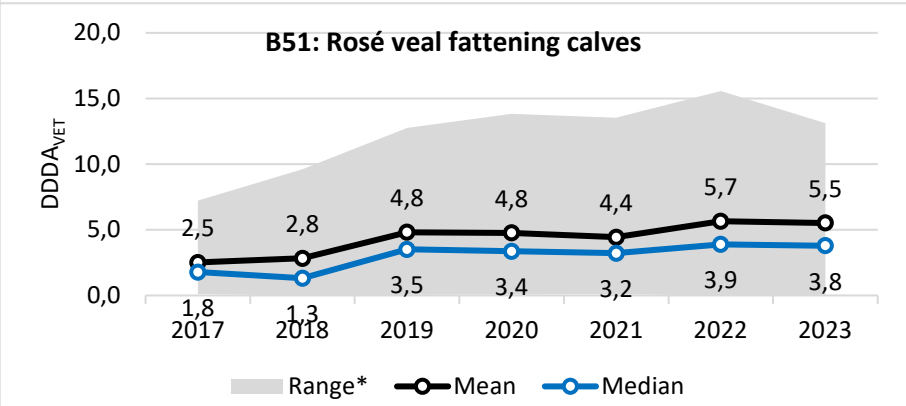

B46: Weaner pigs
DDDA$_{VET}$
80,0
60,0
40,0
20,0
0,0
17,1
19,0
16,0
20,4
14,0
14,4
13,3
12,5
11,1
11,1
12,1
8,5
8,7
8,5
2017
2018
2019
2020
2021
2022
2023
Range*
Mean
Median

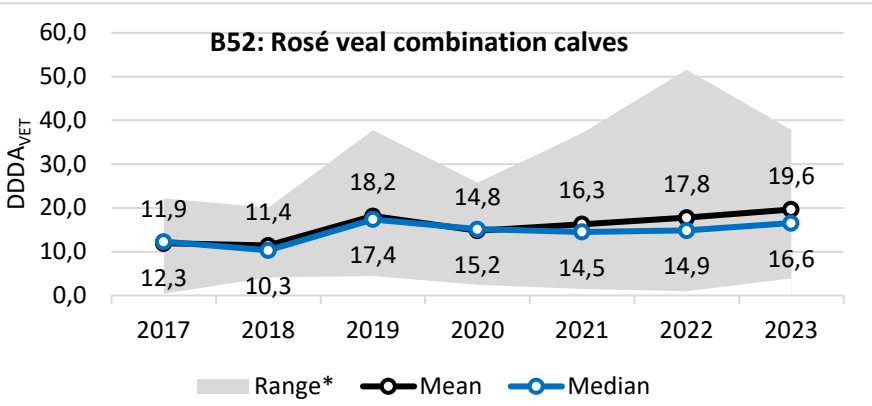

B47: Fattening pigs
DDDA$_{VET}$
12,0
10,0
8,0
6,0
4,0
2,0
0,0
4,4
4,3
4,2
4,0
3,2
2,4
2,5
3,9
4,1
4,0
3,5
3,0
2,2
2,2
2017
2018
2019
2020
2021
2022
2023
Range*
Mean
Median


B48: Sows and suckling piglets
DDDA$_{VET}$
10,0
8,0
6,0
4,0
2,0
0,0
3,4
3,6
3,5
4,3
3,1
2,9
2,9
2,9
2,9
2,5
3,0
2,6
2,3
2,5
2017
2018
2019
2020
2021
2022
2023
Range*
Mean
Median


B49: White veal calves
DDDA VET
40,0
30,0
20,0
10,0
0,0
21,4
18,8
17,7
16,4
17,6
20,7
20,6
21,7
18,2
17,6
17,0
17,0
16,6
17,3
2017
2018
2019
2020
2021
2022
2023
Range*
Mean
Median


B50: Rosé veal starter calves
DDDA VET
140,0
120,0
100,0
80,0
60,0
40,0
20,0
0,0
80,8
73,7
72,8
62,5
64,9
66,2
70,0
80,2
73,5
72,4
61,1
65,9
67,1
70,3
2017
2018
2019
2020
2021
2022
2023
Range*
Mean
Mediaan


B51: Rosé veal fattening calves
DDDA VET
20,0
15,0
10,0
5,0
0,0
2,5
2,8
4,8
4,8
4,4
5,7
5,5
1,8
1,3
3,5
3,4
3,2
3,9
3,8
2017
2018
2019
2020
2021
2022
2023
Range*
Mean
Median


B52: Rosé veal combination calves
DDDA VET
60,0
50,0
40,0
30,0
20,0
10,0
0,0
11,9
11,4
18,2
14,8
16,3
17,8
19,6
12,3
10,3
17,4
15,2
14,5
14,9
16,6
2017
2018
2019
2020
2021
2022
2023
Range*
Mean
Median

VBI distributions of veterinarians

Table A51. 2023 VBI data, by type of farm/production category. Livestock farms with persistently high usage levels (i.e., $DDDA_F$ values that have exceeded the benchmark threshold for the type of farm/production category concerned two years in a row) according to their 2023 benchmark thresholds, were not included in the VBI calculations

Livestock sector	Type of farm/ production category	SDa-defined benchmark threshold	N	Mean	Median	P75	P90
Broiler farming sector	Farms with conventional breeds	8	63	11.3	4.8	9.2	16.2
	Farms with slower growing breeds	8	71	1.0	0.4	1.5	2.7
Turkey farming sector	Turkey farms	10	9	3.0	0.0	3.0	17.0
Pig farming sector	Sows/suckling piglets	5	158	2.5	2.3	3.4	4.4
	Weaner pigs	20	158	9.2	7.9	12.9	17.4
	Fattening pigs	5	188	2.2	2.0	2.8	4.1
Veal farming sector	White veal farms	23	56	20.6	17.3	19.1	22.4
	Rosé veal starter farms	67	51	58.5	54.8	71.3	83.2
	Rosé veal fattening farms	4	83	2.3	1.1	2.2	4.6
	Rosé veal combination farms	12	19	9.4	10.1	12.1	14.0
Cattle farming sector	Dairy cattle farms	5	671	2.4	2.4	2.7	3.0
	Non-dairy cattle farms	2	678	0.4	0.3	0.6	0.9

Table A52. 2023 VBI data for veterinarians active in livestock sectors with transitional benchmark thresholds, by type of farm/production category. Livestock farms with persistently high usage levels (i.e., $DDDA_F$ values that have exceeded the benchmark threshold for the type of farm/production category concerned two years in a row) according to their transitional benchmark thresholds, were not included in the VBI calculations. As transitional benchmark thresholds are higher than SDa-defined benchmark thresholds, fewer livestock farms are excluded from VBI calculations when VBI data are based on transitional benchmark thresholds.

Livestock sector	Type of farm/ production category	Transitional benchmark threshold(s)*	N	Mean	Median	P75	P90
Broiler farming sector	Farms with conventional breeds	12 and 24	67	9.0	7.6	13.4	17.3
	Farms with slower growing breeds	8 and 12	71	1.1	0.4	1.5	2.9
Turkey farming sector	Turkey farms	14 and 20	10	5.2	4.0	6.4	15.9

* This column lists the action thresholds and, if applicable, the (lower) signaling threshold

Numbers of animals in the Dutch livestock sector

Table A53. Numbers of agricultural livestock (x1,000) in the Netherlands from 2009 to 2023, according to data provided by CBS (for poultry, veal calves, meat rabbits and goats) and EUROSTAT (for the other types of livestock)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Piglets (<20 kg)	4,809	4,649	4,797	4,993	4,920	5,116	5,408	4,986	5,522	5,287	5,002	4,883	4,773	4,444	4,542
Sows	1,100	1,098	1,106	1,081	1,095	1,106	1,053	1,022	1,066	967	1,047	926	910	888	915
Fattening pigs	4,099	4,419	4,179	4,189	4,209	4,087	4,223	4,140	3,967	4,032	4,163	4,032	3,632	3,827	3,548
Other pigs	2,100	2,040	2,021	1,841	1,789	1,765	1,769	1,733	1,741	1,623	1,709	1,697	1,557	1,547	1,466
Turkeys	1,060	1,036	990	827	841	794	863	762	671	556	532	585	604	576	588
Broilers	41,914	43,352	44,358	43,285	44,748	47,020	49,107	48,378	48,237	48,971	48,684	49,229	47,056	45,903	40,809
Laying hens	45,547	47,904	44,460	42,810	44,816	46,570	47,684	46,212	46,442	47,302	44,319	43,166	43,160	42,239	42,856
Veal calves	894	928	906	908	925	921	909	956	953	1,017	1,066	1,071	1,047	1,042	1,024
All cattle	3,112	3,039	2,993	3,045	3,064	3,230	3,360	3,353	3,082	2,634	2,679	2,689	2,683	2,729	2,701
Dairy cattle	1,562	1,518	1,504	1,541	1,597	1,610	1,717	1,794	1,665	1,552	1,590	1,569	1,554	1,570	1,546
Goats	374	353	380	397	413	431	470	500	533	588	615	633	643	645	647
Sheep	1,091	1,211	1,113	1,093	1,074	1,070	1,032	1,040	1,015	743	758	708	729	724	662
Weaned meat rabbits	271	260	262	284	270	278	333	318	300	291	289	297	283	266	235
Breeding does	41	39	39	43	41	43	48	45	43	41	48	38	38	35	30

Antibiotic use in terms of DDD_{VET}/animal-year

Table A54. Antibiotic use in terms of DDD_{VET}/animal-year from 2018 to 2023, by livestock sector (intramammary and intrauterine use of antibiotics not included)

	Broiler farming sector					Turkey farming sector					Pig farming sector				
Pharmacotherapeutic group	**2019**	**2020**	**2021**	**2022**	**2023**	**2019**	**2020**	**2021**	**2022**	**2023**	**2019**	**2020**	**2021**	**2022**	**2023**
1st-choice antibiotics	**3.86**	**3.76**	**2.73**	**2.47**	**2.76**	**15.43**	**12.83**	**10.21**	**7.48**	**3.57**	**6.30**	**6.47**	**5.49**	**3.76**	**4.21**
As a proportion of overall AB use	**34.55%**	**35.62%**	**37.15%**	**36.67%**	**35.12%**	**57.68%**	**71.14%**	**62.48%**	**63.34%**	**53.12%**	**78.89%**	**74.58%**	**72.45%**	**68.78%**	**68.49%**
Amphenicols	*	*	*	*	*	*	*	*	*	*	0.19	0.24	0.25	0.23	0.25
Macrolides/lincosamides	0.05	0.11	0.15	0.08	0.06	*	*	*	*	*	0.95	0.90	0.49	0.33	0.38
Penicillins	0.86	0.87	0.57	0.39	0.55	1.58	0.81	0.94	0.64	0.94	0.49	0.52	0.52	0.46	0.46
Pleuromutilins	*	*	*	*	*	0.00	*	0.13	*	*	0.10	0.04	0.03	0.03	0.04
Tetracyclines	1.17	1.32	0.77	0.78	1.14	13.42	11.83	8.98	6.75	2.49	2.96	3.12	2.63	1.57	1.71
Trimethoprim/sulfonamides	1.78	1.46	1.25	1.22	1.02	0.43	0.19	0.16	0.09	0.14	1.60	1.64	1.58	1.13	1.37
2nd-choice antibiotics	**7.24**	**6.73**	**4.60**	**4.22**	**5.04**	**10.72**	**4.74**	**5.75**	**4.11**	**2.94**	**1.30**	**1.76**	**1.70**	**1.43**	**1.66**
As a proportion of overall AB use	**64.80%**	**63.76%**	**62.60%**	**62.67%**	**64.15%**	**40.07%**	**26.30%**	**35.17%**	**34.75%**	**43.64%**	**16.25%**	**20.25%**	**22.39%**	**26.17%**	**27.06%**
Aminoglycosides	0.01	0.00	0.00	0.00	0.02	0.00	0.02	*	*	*	0.01	0.01	0.01	0.01	0.02
Aminopenicillins	5.91	5.49	3.63	3.28	3.91	8.81	3.79	3.61	2.73	2.42	0.78	1.04	0.95	0.70	0.90
1st- and 2nd-gen. cephalosporins	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Quinolones	1.16	1.12	0.88	0.83	1.02	0.11	*	0.23	0.04	0.13	0.03	0.02	0.01	0.00	0.00
Fixed-dose combinations	0.01	0.02	0.02	*	0.03	*	*	*	*	*	0.02	0.02	0.02	0.04	0.04
Long-acting macrolides	*	*	*	*	*	*	*	*	*	*	0.45	0.67	0.65	0.68	0.70
Macrolides/lincosamides	0.16	0.10	0.07	0.11	0.07	1.80	0.93	1.91	1.33	0.38	*	*	0.05	*	*
3rd-choice antibiotics	**0.07**	**0.07**	**0.02**	**0.04**	**0.06**	**0.60**	**0.46**	**0.38**	**0.23**	**0.22**	**0.39**	**0.45**	**0.39**	**0.28**	**0.27**
As a proportion of overall AB use	**0.65%**	**0.62%**	**0.25%**	**0.66%**	**0.74%**	**2.25%**	**2.56%**	**2.35%**	**1.91%**	**3.25%**	**4.86%**	**5.17%**	**5.16%**	**5.05%**	**4.45%**
3rd- and 4th-gen. cephalosporins	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Fluoroquinolones	0.04	0.03	0.01	0.02	0.03	0.59	0.46	0.38	0.23	0.15	0.00	0.00	0.00	0.00	0.00
Polymyxins	0.03	0.03	0.01	0.02	0.02	0.01	*	*	*	0.07	0.39	0.45	0.39	0.28	0.27
Overall antibiotic use	**11.17**	**10.56**	**7.36**	**6.73**	**7.86**	**26.75**	**18.03**	**16.34**	**11.81**	**6.73**	**7.99**	**8.67**	**7.58**	**5.46**	**6.14**

Table A54 (continued)

Pharmacotherapeutic group	Dairy cattle farming sector					Veal farming sector					Non-dairy cattle farming sector				
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023
1st-choice antibiotics	**0.86**	**0.92**	**0.89**	**0.83**	**0.86**	**13.93**	**13.11**	**13.60**	**13.42**	**14.12**	**0.68**	**0.61**	**0.58**	**0.29**	**0.11**
As a proportion of overall AB use	**87.11%**	**85.08%**	**83.32%**	**82.75%**	**81.62%**	**86.86%**	**85.76%**	**87.66%**	**87.63%**	**85.53%**	**86.82%**	**84.81%**	**83.32%**	**81.46%**	**69.99%**
Amphenicols	0.04	0.04	0.04	0.04	0.03	0.95	0.85	0.84	0.80	0.81	0.06	0.05	0.05	0.03	0.02
Macrolides/lincosamides	0.03	0.05	0.05	0.05	0.05	3.40	3.18	3.36	3.45	3.63	0.13	0.11	0.11	0.05	0.01
Penicillins	0.17	0.19	0.18	0.17	0.18	0.20	0.19	0.18	0.17	0.14	0.04	0.04	0.04	0.03	0.03
Pleuromutilins	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Tetracyclines	0.21	0.23	0.22	0.19	0.19	7.51	7.33	7.69	7.41	7.55	0.37	0.35	0.31	0.13	0.04
Trimethoprim/sulfonamides	0.41	0.42	0.41	0.38	0.40	1.85	1.57	1.54	1.60	1.99	0.09	0.07	0.07	0.04	0.02
2nd-choice antibiotics	**0.12**	**0.15**	**0.17**	**0.17**	**0.19**	**2.09**	**2.15**	**1.88**	**1.87**	**2.34**	**0.10**	**0.11**	**0.11**	**0.06**	**0.05**
As a proportion of overall AB use	**12.18%**	**14.11%**	**15.99%**	**16.64%**	**17.81%**	**13.04%**	**14.07%**	**12.11%**	**12.19%**	**14.20%**	**12.76%**	**14.60%**	**15.90%**	**18.19%**	**29.59%**
Aminoglycosides	0.01	0.01	0.01	0.01	0.01	0.07	0.06	0.07	0.08	0.16	0.00	0.00	0.00	0.00	0.00
Aminopenicillins	0.09	0.11	0.12	0.12	0.13	1.35	1.38	1.25	1.10	1.46	0.05	0.06	0.06	0.03	0.02
1st- and 2nd-gen. cephalosporins	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Quinolones	0.00	0.00	0.00	0.00	*	0.51	0.58	0.43	0.56	0.57	0.02	0.02	0.02	0.01	0.00
Fixed-dose combinations	0.02	0.02	0.04	0.03	0.03	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.01	0.02
Long-acting macrolides	0.01	0.01	0.01	0.01	0.01	0.16	0.13	0.12	0.13	0.16	0.01	0.01	0.01	0.01	0.01
Macrolides/lincosamides	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
3rd-choice antibiotics	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.02**	**0.03**	**0.04**	**0.03**	**0.04**	**0.00**	**0.00**	**0.01**	**0.00**	**0.00**
As a proportion of overall AB use	**0.71%**	**0.81%**	**0.69%**	**0.61%**	**0.57%**	**0.12%**	**0.16%**	**0.23%**	**0.18%**	**0.27%**	**0.42%**	**0.59%**	**0.78%**	**0.35%**	**0.43%**
3rd- and 4th-gen. cephalosporins	0.00	0.00	0.00	0.00	0.00	*	*	*	*	*	*	*	0.00	*	*
Fluoroquinolones	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.01	0.01	0.02	0.00	0.00	0.00	0.00	0.00
Polymyxins	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.03	0.02	0.02	0.00	0.00	0.00	0.00	0.00
Overall antibiotic use	**0.99**	**1.09**	**1.07**	**1.01**	**1.05**	**16.03**	**15.29**	**15.52**	**15.32**	**16.51**	**0.79**	**0.72**	**0.69**	**0.35**	**0.16**

Phased implementation of the new benchmark thresholds

Table A55. The transitional benchmark thresholds for broiler farms with conventional breeds agreed between the broiler farming sector and the Ministry of Agriculture, Nature and Food Quality*

Phase	Signaling threshold	Action threshold
1	14	26
2	12	24
3	10	20

* The proposed phases for the transitional period are as follows: Phase 1: second half of 2019 + 2020 + 2021; Phase 2: 2022 + 2023; Phase 3: 2024 + 2025. The specified periods are not set in stone. At the end of each phase, evaluation will take place to determine whether it is feasible for broiler farms with conventional breeds to enter the next phase.

Table A56. The transitional benchmark thresholds for broiler farms with slower growing breeds agreed between the broiler farming sector and the Ministry of Agriculture, Nature and Food Quality*

Phase	Signaling threshold	Action threshold
1	8	15
2 and 3	8	12

* The proposed phases for the transitional period are as follows: Phase 1: second half of 2019 + 2020 + 2021; Phase 2: 2022 + 2023; Phase 3: 2024 + 2025. The specified periods are not set in stone. At the end of each phase, evaluation will take place to determine whether it is feasible for broiler farms with slower growing breeds to enter the next phase.

Table A57. The transitional benchmark thresholds for turkey farms agreed between the turkey farming sector and the Ministry of Agriculture, Nature and Food Quality*

Phase	Signaling threshold	Action threshold
1	14	20
2	12	16
3	10	12
4	-	10

* The specified periods are not set in stone. At the end of each phase, evaluation will take place to determine whether it is feasible for turkey farms to enter the next phase.

Table A58. The transitional benchmark thresholds for rabbit farms agreed between the rabbit farming sector and the Ministry of Agriculture, Nature and Food Quality

Year	Signaling threshold	Action threshold
2022	30	40
2023	30	40
2024	-	30

Livestock sectors' progress towards government-defined reduction targets

Table A59. Livestock sectors' progress towards their government-defined reduction targets. The reduction targets were introduced to reduce the number of farms with usage levels exceeding their livestock sector's 2018 signaling threshold (in the case of the pig farming sector) or 2018 action threshold (in the case of the broiler, turkey and veal farming sectors) by 50% over the 2017-2024 period. The table includes both unadjusted percentages and percentages adjusted for changes in the number of active livestock farms

Livestock sector	Type of farm/production category	Percentage change in the number of livestock farms exceeding their signaling/action threshold*						Percentage change in the number of livestock farms exceeding their signaling/action threshold* (adjusted for the number of active livestock farms)					
		2018	2019	2020	2021	2022	2023	2018	2019	2020	2021	2022	2023
Broiler farming sector	Broiler farms	-15.9%	11.4%	-13.6%	-75.0%	-56.8%	-70.5%	-14.1%	15.9%	-9.8%	-73.5%	-53.3%	-67.9%
Turkey farming sector	Turkey farms	0.0%	-44.4%	-88.9%	-77.8%	-66.7%	-77.8%	18.4%	-41.9%	-88.4%	-74.4%	-60.5%	-69.7%
Pig farming sector	Sows/suckling piglets	-3.7%	-24.3%	-36.0%	-57.4%	-70.6%	-73.5%	0.3%	-15.4%	-24.6%	-47.2%	-58.6%	-60.8%
	Weaner pigs	-10.3%	-25.3%	-24.1%	-45.0%	-64.1%	-67.5%	-5.9%	-17.0%	-12.1%	-32.8%	-50.0%	-52.4%
	Fattening pigs	-2.3%	-5.7%	-34.9%	-68.1%	-82.9%	-83.4%	3.5%	7.8%	-18.3%	-53.5%	-73.3%	-73.0%
Veal farming sector	White veal farms	-52.9%	-73.5%	-73.5%	-73.5%	-85.3%	-76.5%	-53.9%	-71.6%	-71.4%	-71.2%	-83.6%	-73.6%
	Rosé veal starter farms	-2.9%	-52.9%	-58.8%	-67.6%	-61.8%	-41.2%	-9.8%	-50.2%	-53.3%	-61.1%	-54.7%	-30.3%
	Rosé veal fattening farms	-5.5%	147.9%	134.2%	104.1%	97.3%	89.0%	-8.8%	100.3%	101.3%	105.9%	113.5%	115.4%

* Reduction targets are based on the number of farms with usage levels exceeding their livestock sector's 2018 signaling threshold (in the case of the pig farming sector) or 2018 action threshold (in the case of the broiler, turkey and veal farming sectors).

Standardized body weights

Table A60. Standardized average body weights used for determining $DDDA_{NAT}$ values, by livestock sector and production category

Livestock sector	Production category	Standardized body weight in kg[1]
Veal farming sector	Veal calves	172
Pig farming sector	Piglets (<20 kg)	10
	Sows	220
	Fattening pigs	70.2
	Other pigs	70
Broiler farming sector	Broilers	1
Turkey farming sector	Turkeys	6
Cattle farming sector	Dairy cattle	600
	Non-dairy cattle	500
Rabbit farming sector	Weaned meat rabbits	1.8
	Breeding does with kits	8.4

[1] Body weights as defined by LEI Wageningen UR, determined at the start of the agricultural census in the Netherlands. The standardized body weights are to be multiplied by the numbers of animals reported by CBS/EUROSTAT.

Table A61. Standardized average body weights used by the SDa for determining $DDDA_F$ values, by livestock sector and production category

Livestock sector	Production category	Age group	Standardized body weight in kg[1]
Veal farming sector	Calves at white veal farms	0 - 222 days	160
	Calves at rosé veal starter farms	0 - 98 days	77.5
	Calves at rosé veal fattening farms	98 - 256 days	232.5
	Calves at rosé veal combination farms	0 - 256 days	205
Pig farming sector	Sows (all females that have been inseminated), breeding boars and heat-check boars		220
	Suckling piglets	0 - 25 days	4.5
	Replacement gilts	7 months - 1st insemination	135
	Weaned piglets	25 - 74 days	17.5
	Fattening pigs	Until ready for slaughter	70
	Gilts	74 days - 7 months	70
Broiler farming sector[2]	Conventional broilers	0 - 45 days	n/a
	Slower growing broiler breeds	0 - 70 days	n/a
	Parent stock at rearing farms	0 - 20 weeks	n/a
	Grandparent stock at rearing farms	0 - 20 weeks	n/a
	Parent stock at production farms	>20 weeks	3
	Grandparent stock at production farms	>20 weeks	3
Layer farming sector[2]	Layers	>18 weeks	1.6
	Layer pullets at rearing farms	0 - 18 weeks	n/a
	Parent stock at rearing farms	0 - 18 weeks	n/a
	Grandparent stock at rearing farms	0 - 18 weeks	n/a
	Parent stock at production farms	>18 weeks	1.9
	Grandparent stock at production farms	>18 weeks	1.9
Turkey farming sector[2]	Toms		n/a
	Hens		n/a
Cattle farming sector[3]	Dairy cattle	>2 years	600
	Heifers	1 - 2 years	440
	Yearlings	56 days - 1 year	235
	Calves (female)	<56 days	56.5
	Beef bulls	>2 years	800
	Beef bulls	1-2 years	628
	Beef bulls	56 days - 1 year	283
	Calves (male)	<56 days	79
Rabbit farming sector	Breeding does/kits	>4 months and <4.5 weeks	8.4
	Weaned meat rabbits	4.5 - 12 weeks	1.8
	Replacement breeding does	12 weeks - 4 months	3.4
Goat farming sector		<60 days	11.5
		60 days – 1 year	42
		>1 year	75

[1] Body weights (in kilograms) as determined in consultation with the livestock sectors concerned. They may be adjusted if deemed necessary (e.g., in order to refine the benchmarking method).

[2] As of 2017, the body weights used for determining poultry farms' $DDDA_F$ values are based on the age of the animals at the time of treatment, unless a standardized body weight has been defined for the production category concerned.

[3] Livestock farms in the cattle farming sector are categorized based on whether or not they produce milk. They are classified as either dairy cattle farms or non-dairy cattle farms. Non-dairy cattle farms include rearing farms (with <40% of cattle present being male and none of the animals being over 2 years of age), suckler cow farms (with <40% of cattle present being male and some of the animals being over 2 years of age), and beef farms (with >40% of cattle present being male).

Computational basis for Figure 5: Long-term developments in antibiotic use

- Until 2010, defined daily doses animal were based on data reported by LEI Wageningen UR (DD/AY data). From 2011 onwards, SDa-reported defined daily doses animal ($DDDA_F$ data) have been used.
- The 2011 $DDDA_{NAT}$ values were estimated as follows:
    - For the veal and pig farming sectors: by means of the 2011:2012 $DDDA_F$ ratio (with weighting based on the average number of kilograms present at individual farms);
    - For the dairy cattle farming sector: by means of the 2011:2012 DD/AY ratio;
    - For the broiler farming sector: by means of the 2011:2012 treatment days ratio (with weighting based on the number of animal-days at individual farms).
- Data on the overall number of kilograms of animal in a particular livestock sector, required for calculating the $DDDA_{NAT}$ values, were provided by EUROSTAT (for the pig and dairy cattle farming sectors) and Statistics Netherlands (for the broiler, turkey and veal farming sectors).
- 95% confidence intervals were based on the corresponding confidence intervals for the weighted $DDDA_F$ values.

Revised results veal farming sector 2019-2022

For the veal farming sector revised data for the 2019-2022 period was provided, below the most critical changes are shown.

Table A62. Changes in $DDDA_{NAT}$ values for the veal farming sector, given the revised data for the 2019-2022 period.

	Before revision				After revision			
Pharmacotherapeutic group	**2019**	**2020**	**2021**	**2022**	**2019**	**2020**	**2021**	**2022**
1st-choice antibiotics	**14.15**	**13.02**	**13.28**	**13.99**	**13.63**	**12.88**	**13.39**	**13.17**
As a proportion of overall AB use	**85.6%**	**85.1%**	**86.4%**	**86.3%**	**85.6%**	**84.6%**	**86.4%**	**86.2%**
Amphenicols	1.28	1.12	1.07	1.12	1.23	1.10	1.09	1.04
Macrolides/lincosamides	3.05	2.76	2.85	3.13	2.94	2.73	2.88	2.95
Other	*	*	*	*	*	*	*	*
Penicillins	0.39	0.36	0.33	0.33	0.37	0.34	0.33	0.30
Pleuromutilins	*	*	*	*	*	*	*	*
Tetracyclines	8.23	7.80	8.08	8.35	7.93	7.74	8.14	7.90
Trimethoprim/sulfonamides	1.21	0.98	0.95	1.06	1.16	0.97	0.96	0.98
2nd-choice antibiotics	**2.35**	**2.26**	**2.06**	**2.20**	**2.28**	**2.32**	**2.10**	**2.09**
As a proportion of overall AB use	**14.2%**	**14.8%**	**13.4%**	**13.6%**	**14.3%**	**15.3%**	**13.5%**	**13.7%**
Aminoglycosides	0.16	0.12	0.17	0.22	0.16	0.13	0.17	0.19
Aminopenicillins	1.52	1.48	1.34	1.23	1.48	1.52	1.37	1.20
1st- and 2nd-gen. cephalosporins	*	*	*	*	*	*	*	*
Quinolones	0.41	0.43	0.33	0.44	0.40	0.45	0.33	0.43
Fixed-dose combinations	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Long-acting macrolides	0.26	0.23	0.21	0.31	0.25	0.23	0.22	0.27
Macrolides/lincosamides	*	*	*	*	*	*	*	*
3rd-choice antibiotics	**0.02**	**0.02**	**0.03**	**0.03**	**0.02**	**0.02**	**0.01**	**0.01**
As a proportion of overall AB use	**0.1%**	**0.1%**	**0.2%**	**0.2%**	**0.1%**	**0.2%**	**0.0%**	**0.1%**
3rd- and 4th-gen. cephalosporins	*	*	*	*	*	*	*	*
Fluoroquinolones	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Polymyxins	0.01	0.02	0.03	0.02	0.01	0.02	0.00	0.00
Overall antibiotic use	**16.52**	**15.31**	**15.37**	**16.22**	**15.93**	**15.23**	**15.50**	**15.27**

Table A63. Changes in $DDDA_F$ values for the veal farming sector, given the revised data for the 2019-2022 period.

	Year	Type of farm/ production category	N	Mean	Median	P75	P90
Before revision	2019	White veal farms	823	19.9	19.3	23.9	29.6
		Rosé veal starter farms	210	75.9	74.3	94.1	107.1
		Rosé veal fattening farms	732	3.9	1.9	6.1	10.5
		Rosé veal combination farms	76	16.5	14.7	22.1	30.5
	2020	White veal farms	813	19.1	18.5	22.9	27.9
		Rosé veal starter farms	197	69.1	69.7	83.2	95.0
		Rosé veal fattening farms	680	4.1	1.7	5.9	11.9
		Rosé veal combination farms	74	16.0	15.7	21.3	25.2
	2021	White veal farms	798	19.0	18.5	22.7	27.5
		Rosé veal starter farms	185	69.2	69.9	83.4	97.8
		Rosé veal fattening farms	579	3.9	1.6	6.0	11.2
		Rosé veal combination farms	64	16.3	15.5	19.7	28.7
	2022	White veal farms	765	19.0	18.4	23.0	28.1
		Rosé veal starter farms	195	69.2	68.9	85.1	99.7
		Rosé veal fattening farms	536	4.8	1.6	7.3	14.8
		Rosé veal combination farms	66	16.9	15.4	23.8	30.8
After revision	2019	White veal farms	782	20.0	19.2	23.9	29.8
		Rosé veal starter farms	225	71.5	70.4	90.7	106.5
		Rosé veal fattening farms	718	4.0	1.9	6.0	10.7
		Rosé veal combination farms	70	16.1	14.1	21.9	31.4
	2020	White veal farms	776	19.8	18.7	23.9	29.3
		Rosé veal starter farms	210	68.4	69.4	85.5	98.1
		Rosé veal fattening farms	675	4.0	1.8	6.1	11.0
		Rosé veal combination farms	68	16.0	15.6	21.7	27.7
	2021	White veal farms	771	20.2	19.8	24.0	29.0
		Rosé veal starter farms	198	71.6	71.2	88.9	104.7
		Rosé veal fattening farms	575	4.0	1.8	6.3	11.5
		Rosé veal combination farms	64	16.3	14.0	21.1	30.5
	2022	White veal farms	752	19.4	18.5	23.3	27.9
		Rosé veal starter farms	201	70.6	69.7	88.1	103.2
		Rosé veal fattening farms	536	3.9	1.7	6.6	11.5
		Rosé veal combination farms	65	16.7	14.5	22.1	31.7

Table A64. Changes in benchmarking results for the veal farming sector, given the revised data for the 2019-2022 period.

	Year	Type of farm/ production category	Target zone		Action zone	
			N	%	N	%
Before revision	2019	White veal farms	579	70%	244	30%
		Rosé veal starter farms	78	37%	132	63%
		Rosé veal fattening farms	481	66%	251	34%
		Rosé veal combination farms	22	29%	54	71%
	2020	White veal farms	613	75%	200	25%
		Rosé veal starter farms	86	44%	111	56%
		Rosé veal fattening farms	460	68%	220	32%
		Rosé veal combination farms	26	35%	48	65%
	2021	White veal farms	615	77%	183	23%
		Rosé veal starter farms	84	45%	101	55%
		Rosé veal fattening farms	389	67%	190	33%
		Rosé veal combination farms	21	33%	43	67%
	2022	White veal farms	572	75%	193	25%
		Rosé veal starter farms	90	46%	105	54%
		Rosé veal fattening farms	352	66%	184	34%
		Rosé veal combination farms	26	39%	40	61%
After revision	2019	White veal farms	559	71%	223	29%
		Rosé veal starter farms	101	45%	124	55%
		Rosé veal fattening farms	474	66%	244	34%
		Rosé veal combination farms	22	31%	48	69%
	2020	White veal farms	555	72%	221	28%
		Rosé veal starter farms	99	47%	111	53%
		Rosé veal fattening farms	444	66%	231	34%
		Rosé veal combination farms	23	34%	45	66%
	2021	White veal farms	543	70%	228	30%
		Rosé veal starter farms	86	43%	112	57%
		Rosé veal fattening farms	379	66%	196	34%
		Rosé veal combination farms	23	36%	41	64%
	2022	White veal farms	554	74%	198	26%
		Rosé veal starter farms	93	46%	108	54%
		Rosé veal fattening farms	352	66%	184	34%
		Rosé veal combination farms	26	40%	39	60%

SDa, Veterinary Medicines Institute
Yalelaan 114
3584 CM Utrecht
The Netherlands

Phone: 088 – 0307 222
E-mail: info@autoriteitdiergeneesmiddelen.nl
www.autoriteitdiergeneesmiddelen.nl

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