Autoriteit Diergeneesmiddelen

Appendix to the report

Usage of Antibiotics in Agricultural Livestock in the Netherlands in 2021

Trends and benchmarking of livestock farms and veterinarians

June 2022

Autoriteit Diergeneesmiddelen

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$DDDA_{NAT}$ summary

Table A1. $DDDA_{NAT}$ values for the 2017-2021 period, by livestock sector and pharmacotherapeutic group

	Broiler farming sector					Turkey farming sector					Pig farming sector				
Pharmacotherapeutic group	**2017**	**2018**	**2019**	**2020**	**2021**	**2017**	**2018**	**2019**	**2020**	**2021**	**2017**	**2018**	**2019**	**2020**	**2021**
1st-choice antibiotics	**2.39**	**2.28**	**2.57**	**2.55**	**1.75**	**8.11**	**10.82**	**10.66**	**8.32**	**6.73**	**6.61**	**6.70**	**6.26**	**6.46**	**5.47**
As a proportion of overall AB use	**25.4%**	**22.6%**	**26.0%**	**27.5%**	**27.7%**	**40.2%**	**52.5%**	**47.9%**	**61.1%**	**51.8%**	**76.0%**	**77.2%**	**78.7%**	**73.7%**	**72.3%**
Amphenicols	*	*	*	*	*	*	*	*	*	*	0.25	0.25	0.26	0.32	0.33
Macrolides/lincosamides	0.04	0.03	0.02	0.05	0.06	*	*	*	*	*	0.76	0.77	0.84	0.80	0.44
Other	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Penicillins	0.59	0.44	0.87	0.88	0.58	1.64	2.62	1.61	0.82	0.95	0.55	0.68	0.51	0.53	0.53
Pleuromutilins	*	*	*	*	*	0.10	0.12	*	*	0.09	0.09	0.12	0.09	0.04	0.03
Tetracyclines	0.95	1.04	0.90	1.00	0.60	5.51	7.15	8.13	7.10	5.36	4.05	3.86	3.54	3.77	3.18
Trimethoprim/sulfonamides	0.82	0.78	0.78	0.62	0.52	0.86	0.93	0.93	0.40	0.33	0.90	1.01	1.01	1.00	0.97
2nd-choice antibiotics	**6.96**	**7.74**	**7.24**	**6.63**	**4.55**	**10.99**	**9.06**	**10.99**	**4.83**	**5.88**	**1.83**	**1.67**	**1.36**	**1.92**	**1.77**
As a proportion of overall AB use	**73.7%**	**76.4%**	**73.1%**	**71.6%**	**71.9%**	**54.5%**	**43.9%**	**49.4%**	**35.5%**	**45.2%**	**21.1%**	**19.3%**	**17.1%**	**21.9%**	**23.4%**
Aminoglycosides	0.03	0.02	0.01	0.00	0.00	0.05	0.00	*	0.00	*	0.01	0.03	0.03	0.02	0.02
Aminopenicillins	5.00	5.19	5.37	4.90	3.20	9.37	7.52	9.16	3.97	3.79	1.41	1.24	0.97	1.41	1.25
1st- and 2nd-gen. cephalosporins	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Quinolones	1.72	2.29	1.62	1.57	1.23	0.26	0.18	0.16	*	0.32	0.03	0.02	0.04	0.03	0.01
Fixed-dose combinations	0.01	0.02	0.01	0.01	0.01	*	*	0.01	*	*	0.02	0.02	0.02	0.02	0.02
Long-acting macrolides	*	*	*	*	*	*	*	*	*	*	0.37	0.37	0.30	0.45	0.46
Macrolides/lincosamides	0.20	0.22	0.24	0.15	0.11	1.30	1.35	1.66	0.86	1.77	*	*	*	*	*
3rd-choice antibiotics	**0.08**	**0.10**	**0.09**	**0.08**	**0.02**	**1.06**	**0.75**	**0.61**	**0.46**	**0.38**	**0.26**	**0.31**	**0.34**	**0.39**	**0.33**
As a proportion of overall AB use	**0.9%**	**1.0%**	**0.9%**	**0.9%**	**0.4%**	**5.3%**	**3.6%**	**2.7%**	**3.4%**	**3.0%**	**2.9%**	**3.6%**	**4.3%**	**4.5%**	**4.4%**
3rd- and 4th-gen. cephalosporins	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Fluoroquinolones	0.05	0.06	0.04	0.03	0.01	1.06	0.75	0.59	0.46	0.38	0.00	0.00	0.00	0.00	0.00
Polymyxins	0.03	0.04	0.05	0.05	0.01	*	*	0.02	*	*	0.26	0.31	0.34	0.39	0.33
Overall antibiotic use	**9.44**	**10.13**	**9.90**	**9.26**	**6.33**	**20.16**	**20.62**	**22.25**	**13.62**	**12.99**	**8.70**	**8.68**	**7.96**	**8.77**	**7.57**

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				
	2017	2018	2019	2020	2021	2017	2018	2019	2020	2021	2017	2018	2019	2020	2021
1st-choice antibiotics	**2.35**	**2.40**	**2.39**	**2.66**	**2.67**	**17.30**	**16.09**	**14.15**	**13.02**	**13.28**	**0.92**	**0.94**	**0.71**	**0.65**	**0.62**
As a proportion of overall AB use	**76.9%**	**79.0%**	**79.9%**	**80.5%**	**80.6%**	**85.9%**	**86.4%**	**85.6%**	**85.1%**	**86.4%**	**84.2%**	**86.7%**	**85.5%**	**83.7%**	**82.5%**
Amphenicols	0.05	0.05	0.05	0.05	0.05	1.44	1.33	1.28	1.12	1.07	0.11	0.10	0.08	0.07	0.06
Macrolides/lincosamides	0.05	0.05	0.06	0.08	0.09	3.43	3.21	3.05	2.76	2.85	0.16	0.14	0.11	0.10	0.10
Other	*	*	*	*	*	*	*	*	*	*	*	0.00	0.00	0.00	0.00
Penicillins	1.69	1.76	1.75	1.96	1.98	0.46	0.43	0.39	0.36	0.33	0.11	0.10	0.09	0.09	0.09
Pleuromutilins	*	*	*	*	*	*	*	*	*	*	*	0.00	0.00	0.00	0.00
Tetracyclines	0.32	0.32	0.30	0.32	0.30	10.35	9.86	8.23	7.80	8.08	0.45	0.53	0.38	0.35	0.33
Trimethoprim/sulfonamides	0.24	0.23	0.24	0.26	0.26	1.61	1.25	1.21	0.98	0.95	0.09	0.06	0.05	0.04	0.04
2nd-choice antibiotics	**0.70**	**0.63**	**0.59**	**0.64**	**0.64**	**2.78**	**2.50**	**2.35**	**2.26**	**2.06**	**0.17**	**0.14**	**0.12**	**0.12**	**0.13**
As a proportion of overall AB use	**22.8%**	**20.8%**	**19.9%**	**19.3%**	**19.2%**	**13.8%**	**13.4%**	**14.2%**	**14.8%**	**13.4%**	**15.6%**	**12.9%**	**14.2%**	**15.8%**	**16.8%**
Aminoglycosides	0.01	0.01	0.01	0.01	0.01	0.23	0.20	0.16	0.12	0.17	0.01	0.01	0.00	0.00	0.00
Aminopenicillins	0.31	0.29	0.28	0.28	0.30	1.75	1.65	1.52	1.48	1.34	0.08	0.06	0.06	0.06	0.06
1st- and 2nd-gen. cephalosporins	0.03	0.03	0.03	0.02	0.02	*	*	*	*	*	0.00	0.00	0.00	0.00	0.00
Quinolones	0.00	0.00	0.00	0.00	0.00	0.57	0.36	0.41	0.43	0.33	0.02	0.01	0.01	0.02	0.01
Fixed-dose combinations	0.34	0.29	0.27	0.31	0.29	0.01	0.00	0.00	0.00	0.00	0.04	0.03	0.02	0.02	0.02
Long-acting macrolides	0.01	0.01	0.01	0.01	0.02	0.23	0.28	0.26	0.23	0.21	0.02	0.03	0.02	0.02	0.02
Macrolides/lincosamides	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
3rd-choice antibiotics	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.06**	**0.04**	**0.02**	**0.02**	**0.03**	**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%**	**0.3%**	**0.2%**	**0.1%**	**0.1%**	**0.2%**	**0.2%**	**0.4%**	**0.3%**	**0.5%**	**0.7%**
3rd- and 4th-gen. cephalosporins	0.00	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	0.04	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00
Polymyxins	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.01	0.02	0.03	0.00	0.00	0.00	0.00	0.00
Overall antibiotic use	**3.06**	**3.04**	**2.99**	**3.31**	**3.32**	**20.13**	**18.63**	**16.52**	**15.31**	**15.37**	**1.10**	**1.08**	**0.83**	**0.78**	**0.75**

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

Table A1 (continued)

Pharmacotherapeutic group	Rabbit farming sector 2017	2018	2019	2020	2021
1st-choice antibiotics	**24.22**	**32.66**	**30.44**	**35.27**	**29.54**
As a proportion of overall AB use	**80.5%**	**74.8%**	**77.0%**	**83.3%**	**84.2%**
Amphenicols	*	*	*	*	*
Macrolides/lincosamides	1.74	2.67	5.15	3.93	6.74
Other	12.36	16.55	13.25	12.54	11.00
Penicillins	*	0.00	*	*	*
Pleuromutilins	1.68	3.37	4.02	3.86	2.74
Tetracyclines	7.76	9.93	7.13	11.22	3.23
Trimethoprim/sulfonamides	0.69	0.13	0.89	3.73	5.82
2nd-choice antibiotics	**5.73**	**10.46**	**8.39**	**7.09**	**5.53**
As a proportion of overall AB use	**19.0%**	**24.0%**	**21.2%**	**16.7%**	**15.8%**
Aminoglycosides	5.73	10.22	8.33	6.97	5.09
Aminopenicillins	*	*	*	*	*
1st- and 2nd-gen. cephalosporins	*	*	*	*	*
Quinolones	*	*	*	0.12	0.44
Fixed-dose combinations	*	*	*	*	*
Long-acting macrolides	*	0.24	0.05	*	*
Macrolides/lincosamides	*	*	*	*	*
3rd-choice antibiotics	**0.12**	**0.57**	**0.68**	**0.00**	**0.00**
As a proportion of overall AB use	**0.4%**	**1.3%**	**1.7%**	**0.0%**	**0.0%**
3rd- and 4th-gen. cephalosporins	*	*	*	*	*
Fluoroquinolones	0.12	0.29	0.11	*	*
Polymyxins	*	0.28	0.57	*	*
Overall antibiotic use	**30.07**	**43.69**	**39.51**	**42.35**	**35.07**

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	$DDDA_{NAT}$ 2021
Broiler farming sector	36.76	37	43	52	65	57	60	72	74	72	73	75	83	6.33
Pig farming sector	20.51	26	29	30	51	54	56	57	58	58	61	57	63	7.57
Dairy cattle farming sector	5.78	-10	-1	30	30	43	46	48	47	47	48	43	43	3.32
Veal farming sector*	33.80	9	14	24	36	37	35	38	40	45	51	55	55	15.37

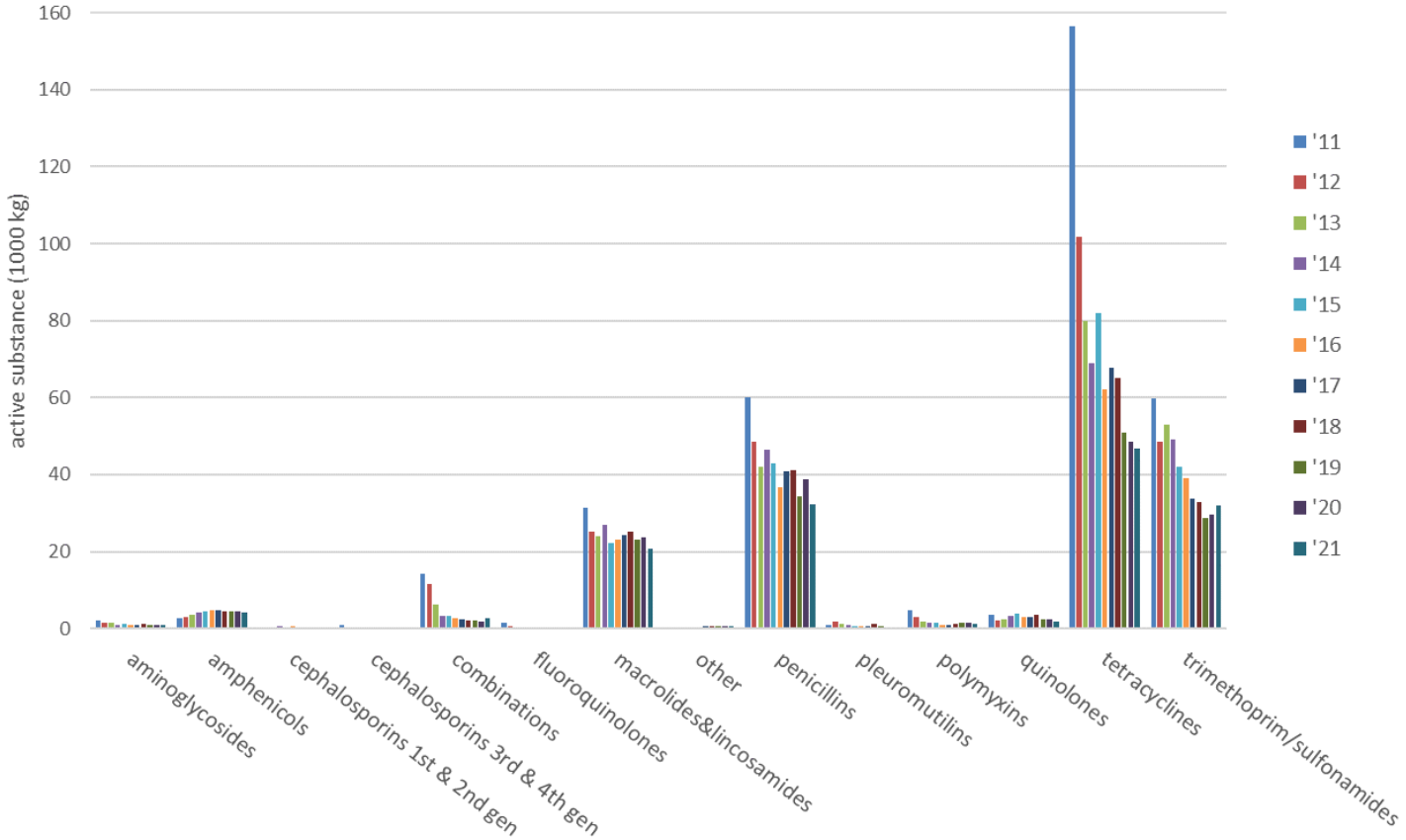
* In 2021, the reduction from its 2007 level amounted to 61%.

Mass balance

Table A3. Kilograms of antibiotics used (by livestock sector and for all livestock sectors combined) and sold in 2021, 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	**2,396**	**1,051**	**40,991**	**9,875**	**36,864**	**4,676**	**284**	**1,799**	**97,937**	**114,902**
As a proportion of overall AB use/sales	**41.6%**	**81.7%**	**78.8%**	**81.0%**	**83.4%**	**80.9%**	**75.5%**	**82.4%**	**79.1%**	**79.4%**
Amphenicols	0	0	1,503	472	1,923	362	0	0	4,261	4,315
Fixed-dose combinations	0	0	0	0	0	0	0	0	0	662
Macrolides/lincosamides	342	461	3,691	586	12,715	1,310	57	723	19,886	20,744
Other	0	0	0	0	0	0	52	0	52	648
Penicillins	453	58	4,148	3,387	421	290	0	517	9,273	9,527
Pleuromutilins	0	11	172	0	0	0	37	13	232	183
Tetracyclines	541	489	19,254	1,578	17,112	2,178	20	297	41,469	46,857
Trimethoprim/sulfonamides	1,060	33	12,224	3,852	4,693	536	119	249	22,765	31,967
2nd-choice antibiotics	**3,350**	**221**	**10,115**	**2,300**	**7,316**	**1,093**	**92**	**194**	**24,681**	**29,607**
As a proportion of overall AB use/sales	**58.2%**	**17.2%**	**19.4%**	**18.9%**	**16.5%**	**18.9%**	**24.5%**	**8.9%**	**19.9%**	**19.5%**
Aminoglycosides	8	0	131	292	260	35	88	0	814	1,089
Aminopenicillins	2,734	209	9,290	1,340	5,961	766	0	91	20,391	22,842
1st- and 2nd-gen. cephalosporins	0	0	0	16	0	0	0	0	16	451
Quinolones	579	12	66	3	1,073	149	4	102	1,986	1,938
Fixed-dose combinations	29	0	535	645	8	140	0	0	1,357	1,992
Long-acting macrolides	0	0	94	5	14	4	0	0	117	130
3rd-choice antibiotics	**6**	**14**	**905**	**20**	**28**	**12**	**0**	**190**	**1,175**	**1,287**
As a proportion of overall AB use/sales	**0.1%**	**1.1%**	**1.7%**	**0.2%**	**0.1%**	**0.2%**	**0.0%**	**8.7%**	**0.9%**	**0.9%**
3rd- and 4th-gen. cephalosporins	0	0	0	0	0	0	0	0	0	5
Fluoroquinolones	4	14	0	16	5	2	0	12	52	116
Polymyxins	3	0	905	4	23	11	0	179	1,123	1,166
Overall	**5,752**	**1,286**	**52,011**	**12,195**	**44,208**	**5,782**	**377**	**2,184**	**123,793**	**144,630**

Figure A1. Trends in the number of kilograms of active substances sold over the 2011-2021 period, by pharmacotherapeutic group

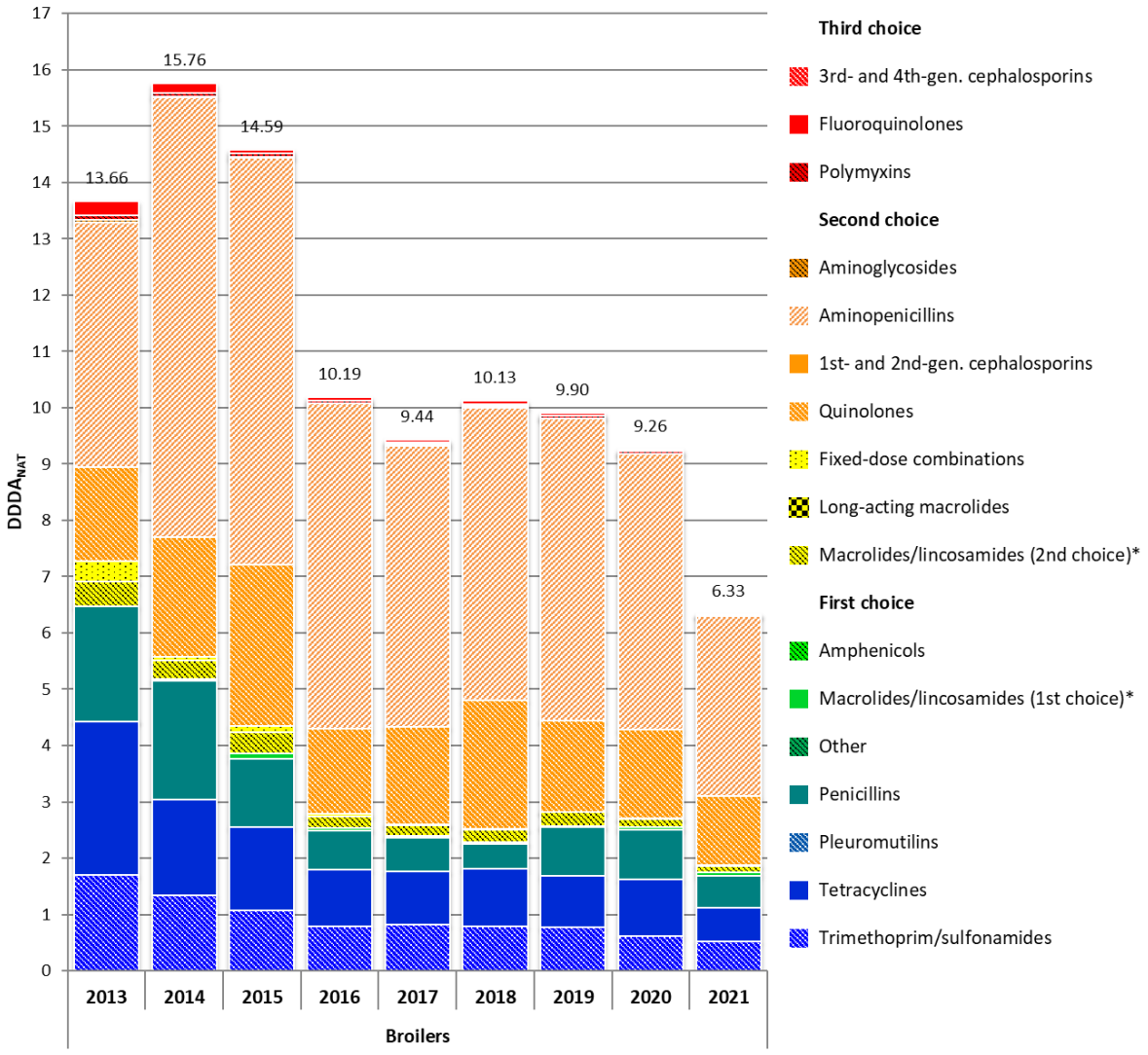


Detailed antibiotic usage data by livestock sector

Broiler farming sector

1. Antibiotic use in $DDDA_{NAT}$

Figure A2. $DDDA_{NAT}$ trends in the broiler farming sector over the 2013-2021 period, by pharmacotherapeutic group



* In the poultry farming sector, all macrolides/lincosamides except for lincomycin and spiramycin are categorized as second-choice antibiotics. In other livestock sectors, only long-acting macrolides are categorized as second-choice antibiotics.

2. Antibiotic use in $DDDA_F$

2.1 All broiler farms combined

Number of broiler farms: 805*
Number of broiler farms with $DDDA_F$=0: 378 (47.0%)
Number of broiler farms that used third- and fourth-generation cephalosporins**: 0 (0.0%)
Number of broiler farms that used fluoroquinolones: 9 (1.1%)
Number of broiler farms that used polymyxins: 3 (0.4%)

Table A4. Antibiotic use in $DDDA_F$ at broiler farms from 2016 to 2021***

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

* This number also includes broiler farms with both conventional and alternative breeds. As a result, the number of broiler farms with conventional breeds and broiler farms with alternative 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 A3. 2016, 2020 and 2021 $DDDA_F$ distributions for broiler farms

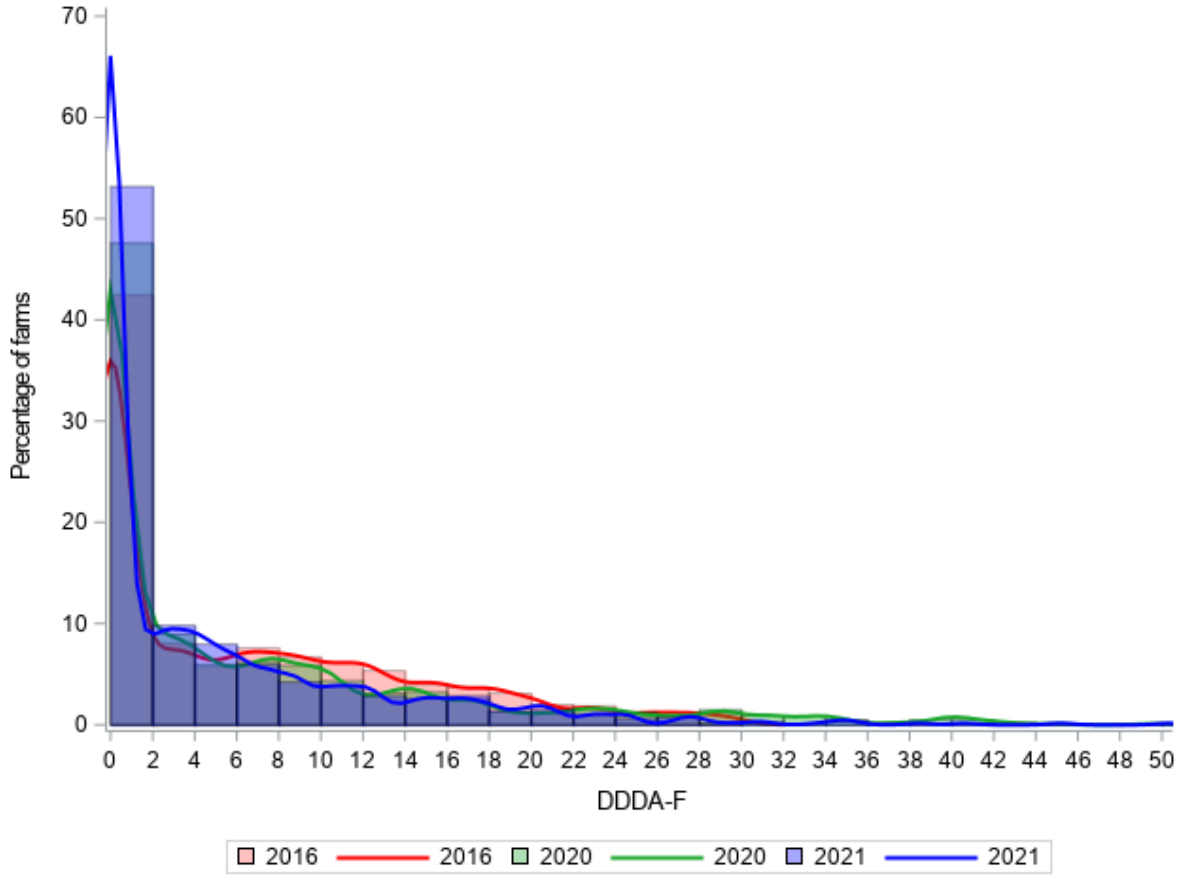


Table A5. Antibiotic use in $DDDA_F$ at broiler farms in 2021, by pharmacotherapeutic group and route of administration

Category of antibiotics	Pharmacotherapeutic group	Route of administration	# of farms with $DDDA_F$=0	$DDDA_F$		
				Median	P75	Mean
1	Macrolides/lincosamides	Oral	777	0.00	0.00	0.19
1	Penicillins	Oral	729	0.00	0.00	0.36
1	Tetracyclines	Oral	676	0.00	0.00	0.44
1	Trimethoprim/sulfonamides	Oral	512	0.00	2.44	1.92
2	Aminoglycosides	Oral	802	0.00	0.00	0.01
2	Aminopenicillins	Oral	581	0.00	1.09	1.34
2	Quinolones	Oral	703	0.00	0.00	0.50
2	Fixed-dose combinations	Oral	797	0.00	0.00	0.09
2	Macrolides/lincosamides	Oral	765	0.00	0.00	0.07
3	Fluoroquinolones	Oral	796	0.00	0.00	0.03
3	Polymyxins	Oral	802	0.00	0.00	0.01

2.2 Broiler farms with conventional breeds

Number of broiler farms with conventional breeds: 363
Number of broiler farms with conventional breeds with $DDDA_F$=0: 90 (24.8%)
Number of broiler farms with conventional breeds that used third- and fourth-generation cephalosporins*: 0 (0.0%)
Number of broiler farms with conventional breeds that used fluoroquinolones: 9 (2.5%)
Number of broiler farms with conventional breeds that used polymyxins: 3 (0.8%)

Table A6. Antibiotic use in $DDDA_F$ at broiler farms with conventional breeds from 2016 to 2021**

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

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

Figure A4. 2016, 2020 and 2021 $DDDA_F$ distributions for broiler farms with conventional breeds

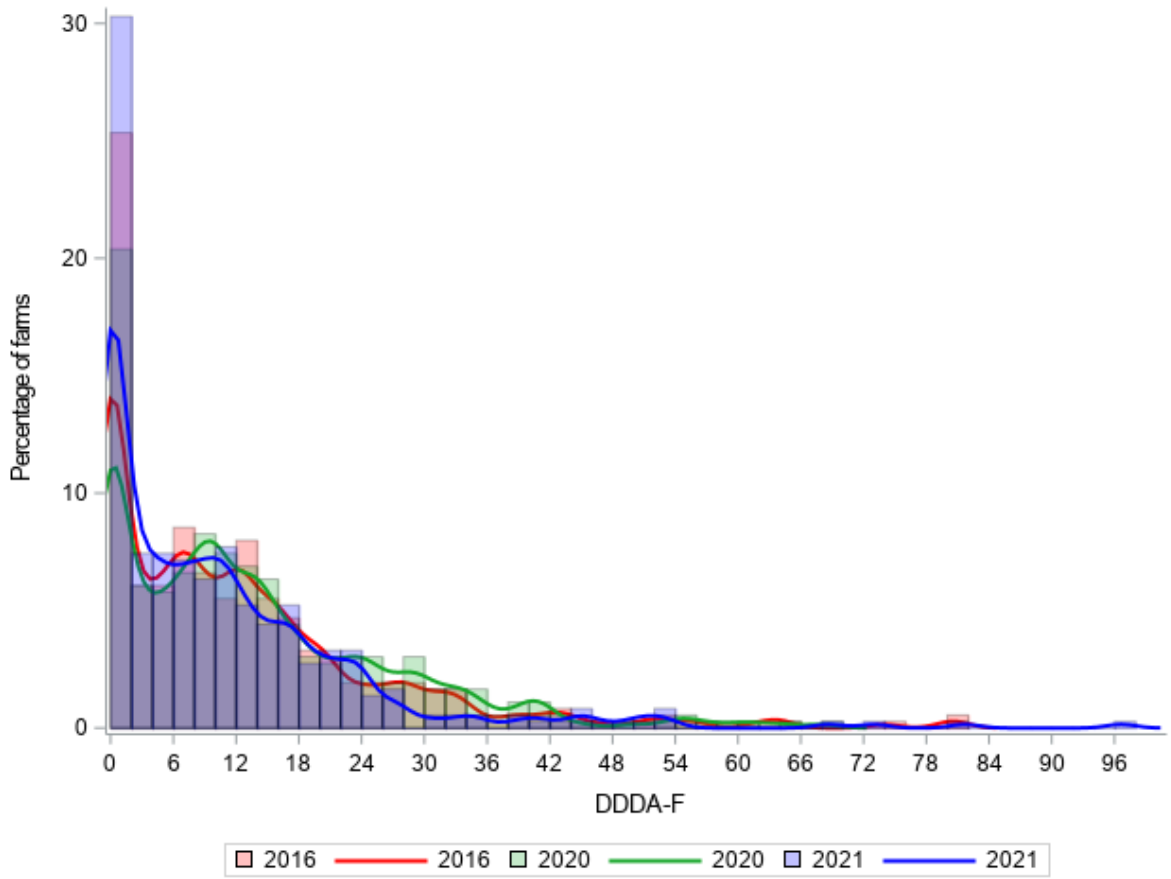


Figure A5. Scatter plot of 2020 and 2021 $DDDA_F$ values for broiler farms with conventional breeds. The red solid lines represent the action threshold defined by the SDa. The red dotted lines represent the transitional action threshold negotiated by the livestock sector. For each type of action threshold, the number of farms with persistently high usage levels is listed in the upper-right corner of the scatter plot

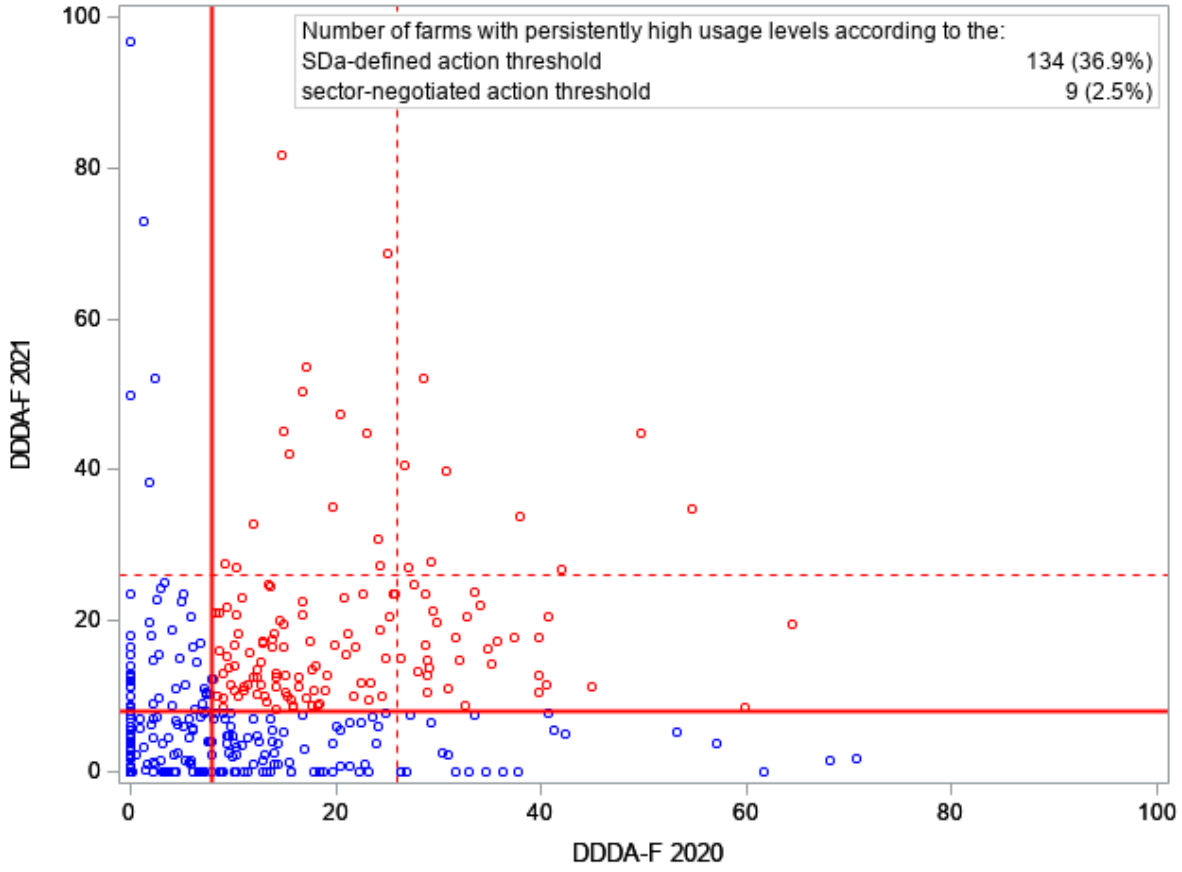


Table A7. Antibiotic use in $DDDA_F$ at broiler farms with conventional breeds in 2021, by pharmacotherapeutic group and route of administration

Category of antibiotics	Pharmacotherapeutic group	Route of administration	# of farms with $DDDA_F$=0	$DDDA_F$		
				Median	P75	Mean
1	Macrolides/lincosamides	Oral	336	0.00	0.00	0.52
1	Penicillins	Oral	313	0.00	0.00	0.70
1	Tetracyclines	Oral	277	0.00	0.00	0.69
1	Trimethoprim/sulfonamides	Oral	162	1.07	5.27	4.05
2	Aminoglycosides	Oral	360	0.00	0.00	0.01
2	Aminopenicillins	Oral	175	0.70	4.57	3.15
2	Quinolones	Oral	279	0.00	0.00	1.18
2	Fixed-dose combinations	Oral	355	0.00	0.00	0.20
2	Macrolides/lincosamides	Oral	325	0.00	0.00	0.10
3	Fluoroquinolones	Oral	354	0.00	0.00	0.07
3	Polymyxins	Oral	360	0.00	0.00	0.01

2.3 Broiler farms with alternative breeds

Number of broiler farms with alternative breeds: 560
Number of broiler farms with alternative breeds with $DDDA_F$=0: 387 (69.1%)
Number of broiler farms with alternative breeds that used third- and fourth-generation cephalosporins*: 0 (0.0%)
Number of broiler farms with alternative breeds that used fluoroquinolones: 0 (0.0%)
Number of broiler farms with alternative breeds that used polymyxins: 0 (0.0%)

Table A8. Antibiotic use in $DDDA_F$ at broiler farms with alternative breeds from 2016 to 2021**

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

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

Figure A6. 2016, 2020 and 2021 $DDDA_F$ distributions for broiler farms with alternative breeds

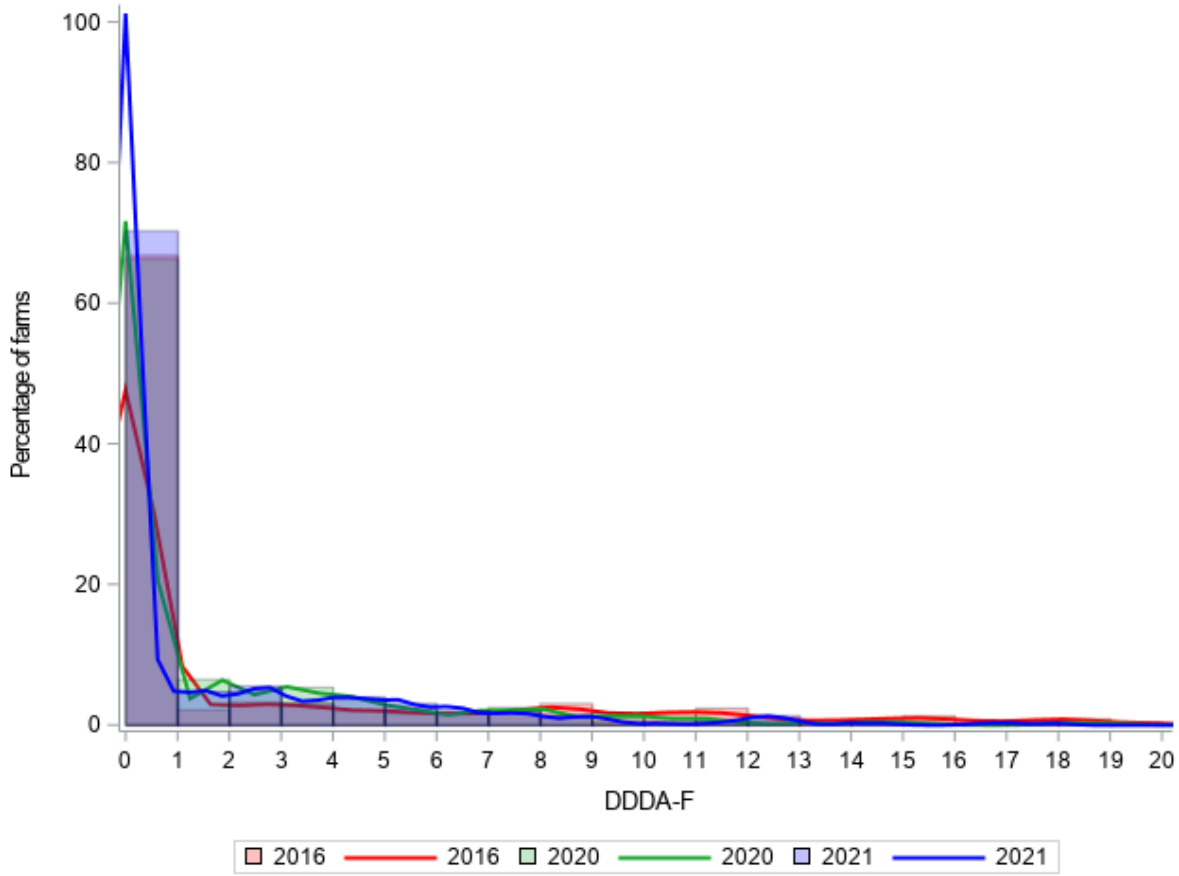


Figure A7. Scatter plot of 2020 and 2021 $DDDA_F$ values for broiler farms with alternative breeds. The red solid lines represent the action threshold defined by the SDa. The red dotted lines represent the transitional action threshold negotiated by the livestock sector. For each type of action threshold, the number of farms with persistently high usage levels is listed in the upper-right corner of the scatter plot

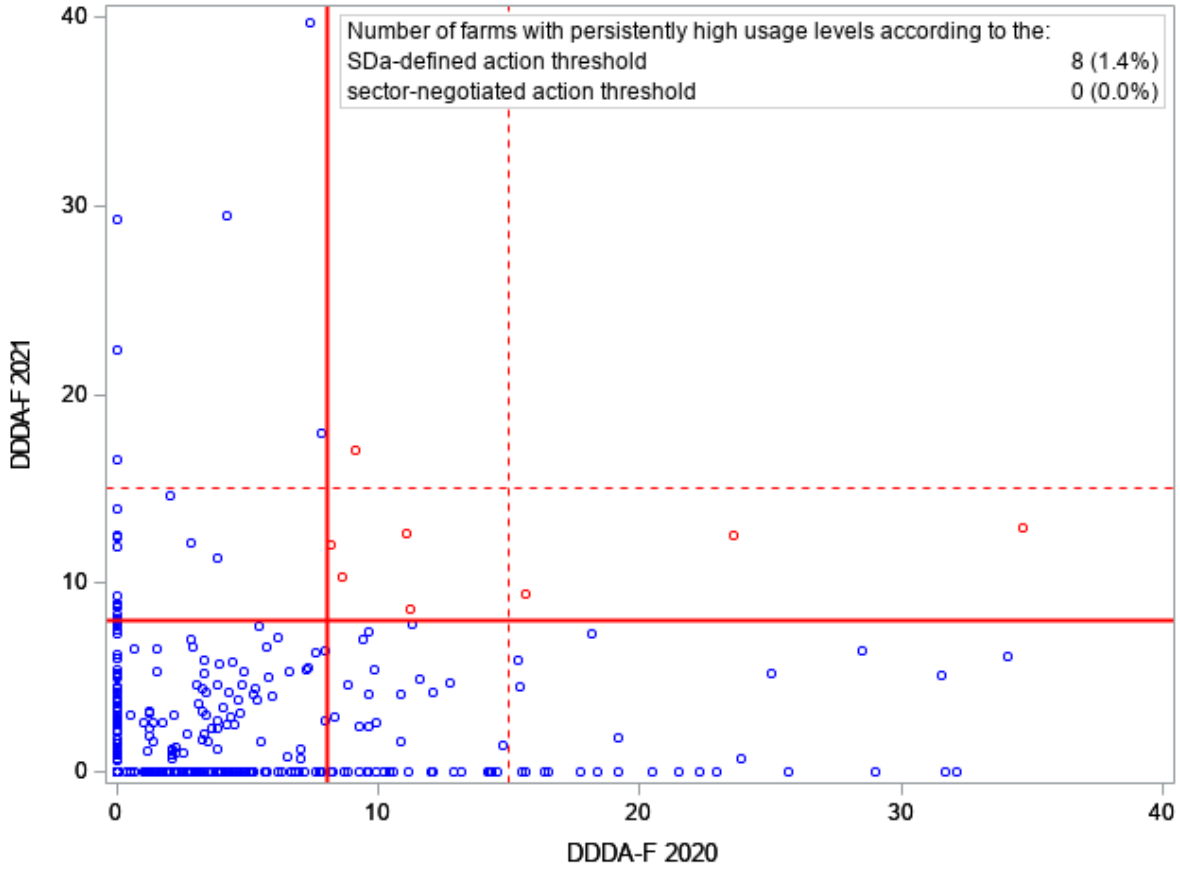


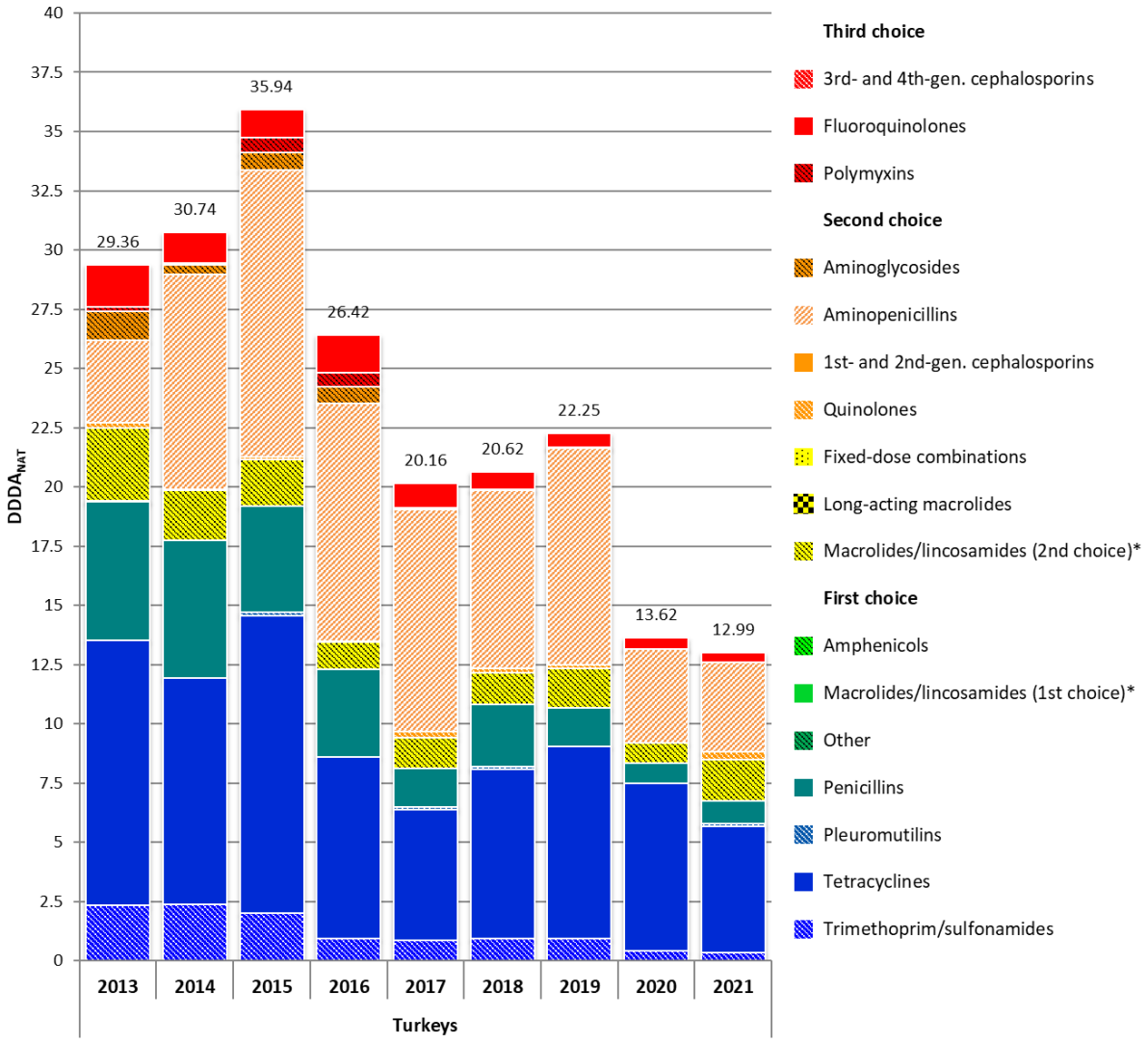
Table A9. Antibiotic use in $DDDA_F$ at broiler farms with alternative breeds in 2021, by pharmacotherapeutic group and route of administration

Category of antibiotics	Pharmacotherapeutic group	Route of administration	# of farms with $DDDA_F$=0	$DDDA_F$		
				Median	P75	Mean
1	Macrolides/lincosamides	Oral	559	0.00	0.00	0.01
1	Penicillins	Oral	535	0.00	0.00	0.14
1	Tetracyclines	Oral	516	0.00	0.00	0.23
1	Trimethoprim/sulfonamides	Oral	457	0.00	0.00	0.90
2	Aminopenicillins	Oral	520	0.00	0.00	0.28
2	Quinolones	Oral	543	0.00	0.00	0.11
2	Macrolides/lincosamides	Oral	559	0.00	0.00	0.00

Turkey farming sector

1. Antibiotic use in $DDDA_{NAT}$

Figure A8. $DDDA_{NAT}$ trends in the turkey farming sector over the 2013-2021 period, by pharmacotherapeutic group



* In the poultry farming sector, all macrolides/lincosamides except for lincomycin and spiramycin are categorized as second-choice antibiotics. In other livestock sectors, only long-acting macrolides are categorized as second-choice antibiotics.

2. Antibiotic use in $DDDA_F$

Number of turkey farms: 39
Number of turkey farms with $DDDA_F$=0: 4 (17.9%)
Number of turkey farms that used third- and fourth-generation cephalosporins*: 0 (0.0%)
Number of turkey farms that used fluoroquinolones: 10 (25.6%)
Number of turkey farms that used polymyxins: 0 (0.0%)

Table A10. Antibiotic use in $DDDA_F$ at turkey farms from 2016 to 2021**

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

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

Figure A9. 2016, 2020 and 2021 $DDDA_F$ distributions for turkey farms

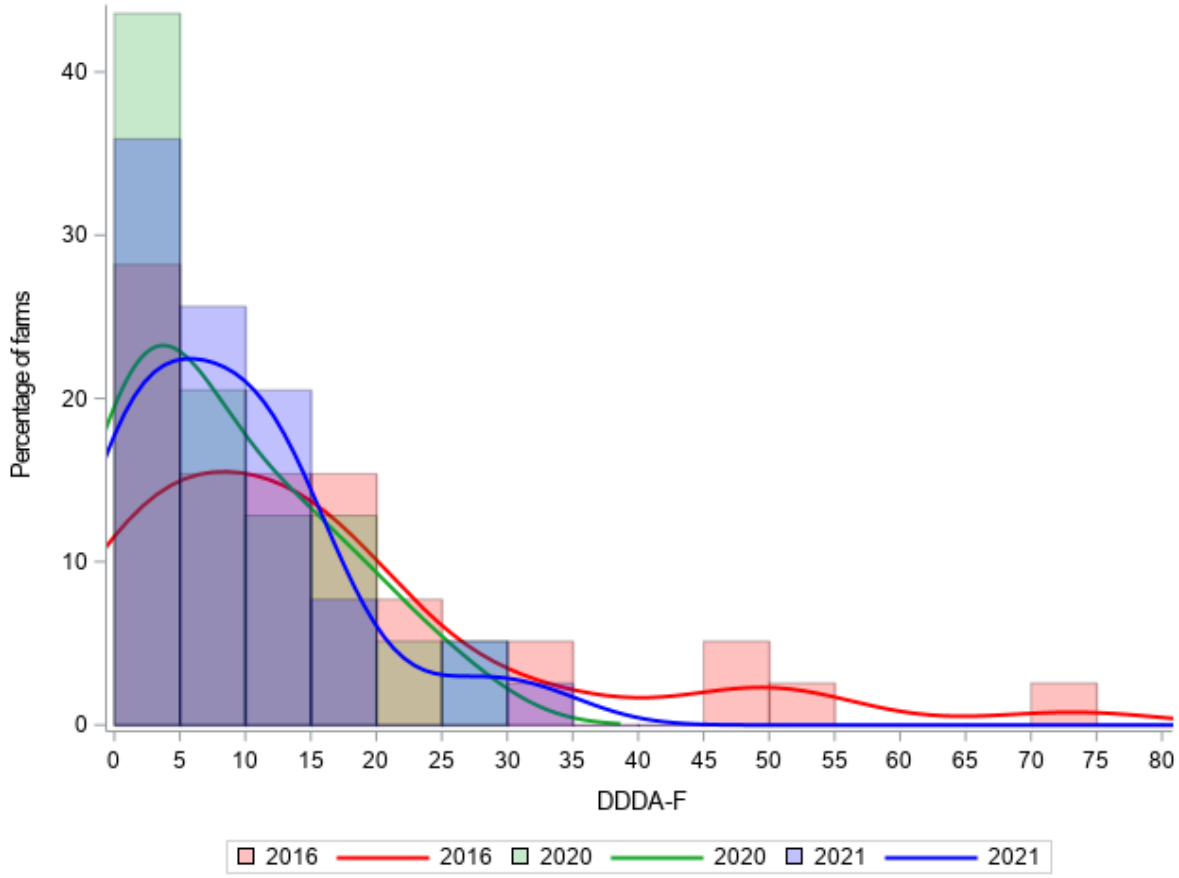
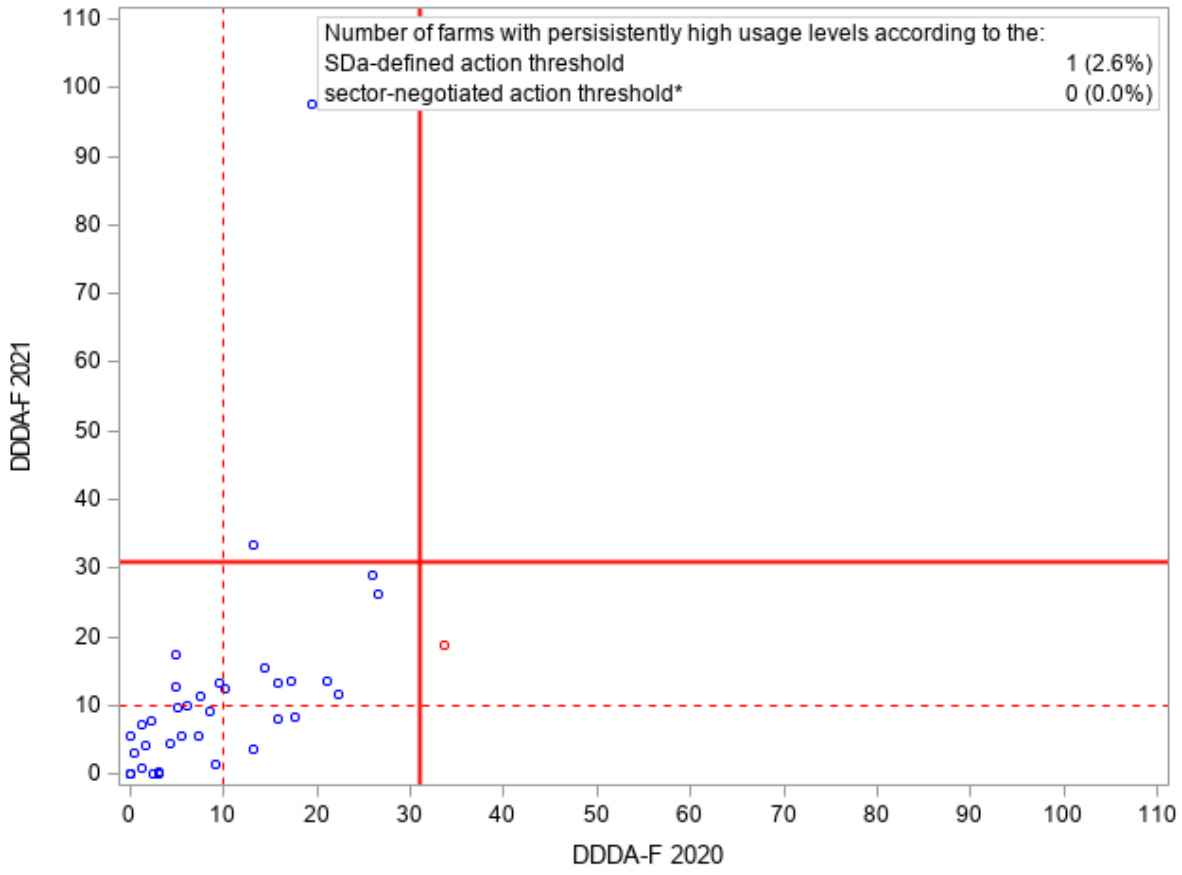


Figure A10. Scatter plot of 2020 and 2021 $DDDA_F$ values for turkey farms. The red solid lines represent the action thresholds defined by the SDa. The red dotted line represents the transitional action threshold negotiated by the livestock sector. For each type of action threshold, the number of farms with persistently high usage levels is listed in the upper-right corner of the scatter plot



* The transitional action threshold only applies to the 2021 data. For 2020 data, the older SDa-defined action threshold of 31 was used.

Table A11. Antibiotic use in $DDDA_F$ at turkey farms in 2021, 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	32	0.00	0.00	1.03
1	Pleuromutilins	Oral	37	0.00	0.00	0.02
1	Tetracyclines	Oral	12	2.33	5.56	3.22
1	Trimethoprim/sulfonamides	Oral	33	0.00	0.00	0.52
2	Aminopenicillins	Oral	23	0.00	4.51	3.85
2	Quinolones	Oral	36	0.00	0.00	0.49
2	Macrolides/lincosamides	Oral	14	0.72	1.99	1.36
3	Fluoroquinolones	Oral	29	0.00	0.16	0.64

Layer farming sector

1. $DDDA_F$

1.1 Layer farms

Number of layer farms: 824
Number of layer farms with $DDDA_F$=0: 630 (76.5%)
Number of layer farms that used third- and fourth-generation cephalosporins*: 0 (0.0%)
Number of layer farms that used fluoroquinolones: 0 (0.0%)
Number of layer farms that used polymyxins: 107 (13.0%)

Table A12. Antibiotic use in $DDDA_F$ at layer farms from 2017 to 2021**

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

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

Figure A11. 2017 and 2021 $DDDA_F$ distributions for layer farms (no probability density functions can be shown due to too little variation)

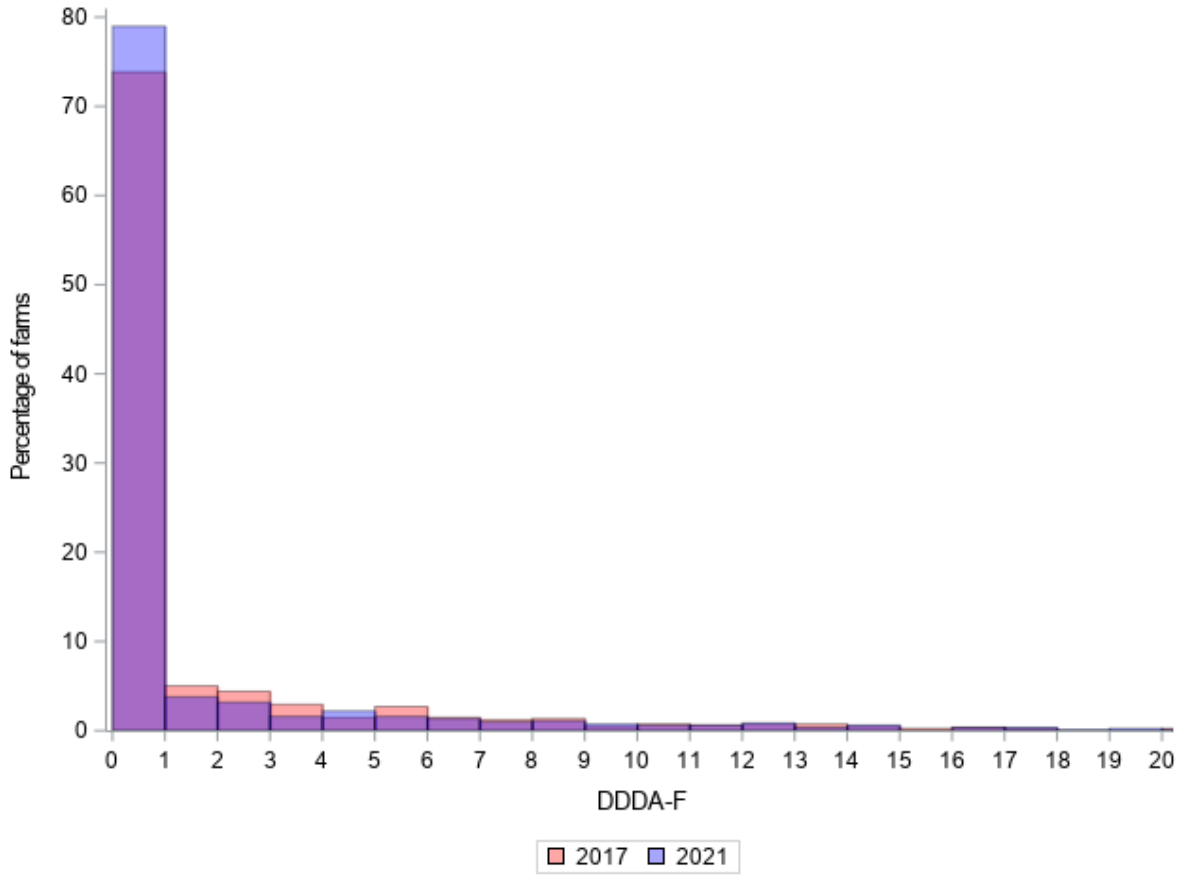


Table A13. Antibiotic use in $DDDA_F$ at layer farms in 2021, by pharmacotherapeutic group and route of administration

Category of antibiotics	Pharmacotherapeutic group	Route of administration	# of farms with $DDDA_F$=0	$DDDA_F$		
				Median	P75	Mean
1	Penicillins	Oral	781	0.00	0.00	0.37
1	Pleuromutilins	Oral	821	0.00	0.00	0.01
1	Tetracyclines	Oral	823	0.00	0.00	0.00
2	Macrolides/lincosamides	Oral	743	0.00	0.00	0.16
3	Polymyxins	Oral	717	0.00	0.00	0.84

Layer pullet and layer parent/grandparent stock farming sectors

1. $DDDA_F$

1.1 Pullet rearing farms

Number of pullet rearing farms: 175
Number of pullet rearing farms with $DDDA_F$=0: 105 (60.0%)
Number of pullet rearing farms that used third- and fourth-generation cephalosporins*: 0 (0.0%)
Number of pullet rearing farms that used fluoroquinolones: 2 (1.1%)
Number of pullet rearing farms that used polymyxins: 0 (0.0%)

Table A14. Antibiotic use in $DDDA_F$ at pullet rearing farms from 2017 to 2021**

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

* 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. 2017 and 2021 $DDDA_F$ distributions for pullet rearing farms (no probability density functions can be shown due to too little variation)

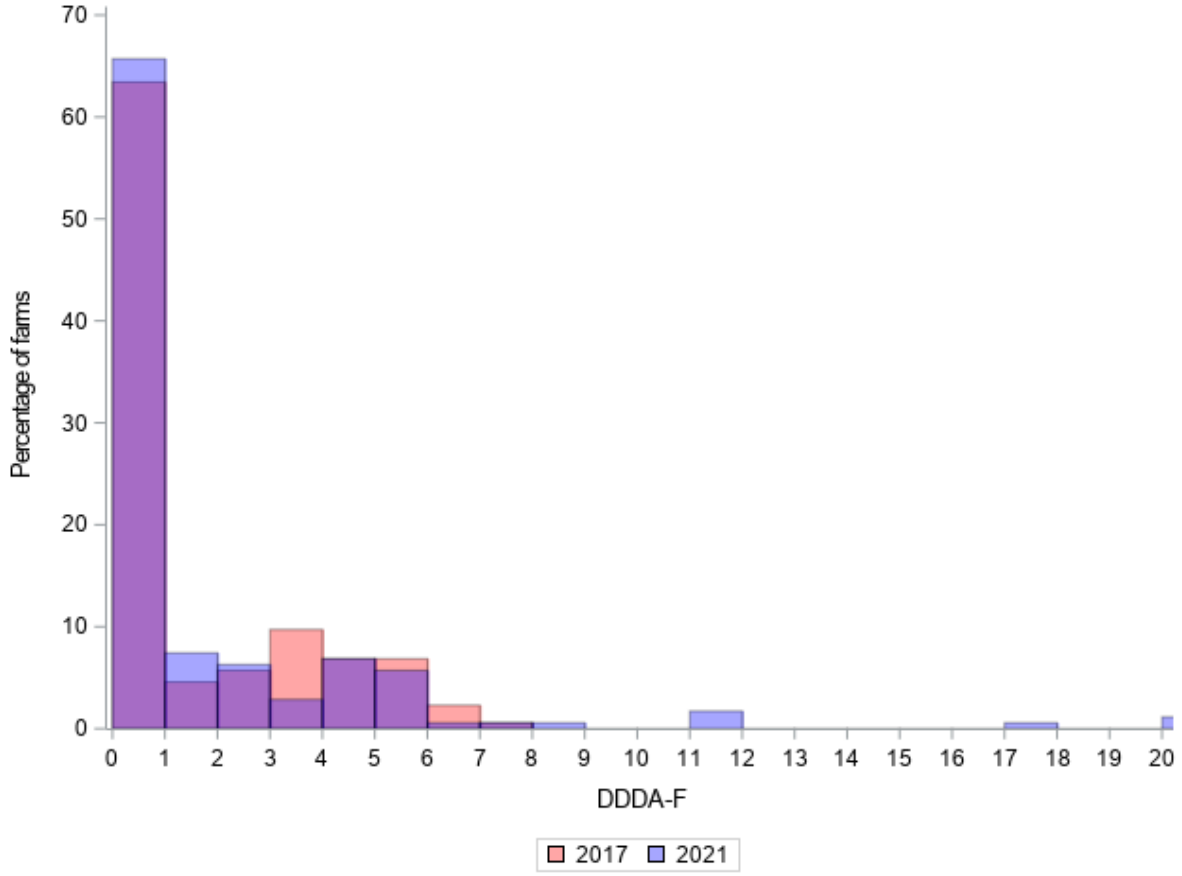


Table A15. Antibiotic use in $DDDA_F$ at pullet rearing farms in 2021, by pharmacotherapeutic group and route of administration

Category of antibiotics	Pharmacotherapeutic group	Route of administration	# of farms with $DDDA_F$=0	$DDDA_F$		
				Median	P75	Mean
1	Penicillins	Oral	132	0.00	0.00	0.90
1	Tetracyclines	Oral	168	0.00	0.00	0.23
1	Trimethoprim/sulfonamides	Oral	172	0.00	0.00	0.01
2	Aminopenicillins	Oral	173	0.00	0.00	0.14
2	Quinolones	Oral	173	0.00	0.00	0.09
2	Macrolides/lincosamides	Oral	148	0.00	0.00	0.31
3	Fluoroquinolones	Oral	173	0.00	0.00	0.02

1.2 Parent/grandparent stock rearing farms

Number of parent/grandparent stock rearing farms: 21
Number of parent/grandparent stock rearing farms with $DDDA_F$=0: 13 (61.9%)
Number of parent/grandparent stock rearing farms that used third- and fourth-generation cephalosporins*: 0 (0.0%)
Number of parent/grandparent stock rearing farms that used fluoroquinolones: 0 (0.0%)
Number of parent/grandparent stock rearing farms that used polymyxins: 0 (0.0%)

Table A16. Antibiotic use in $DDDA_F$ at parent/grandparent stock rearing farms from 2017 to 2021**

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

* 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. 2017 and 2021 $DDDA_F$ distributions for parent/grandparent stock rearing farms (no probability density functions can be shown due to too little variation)

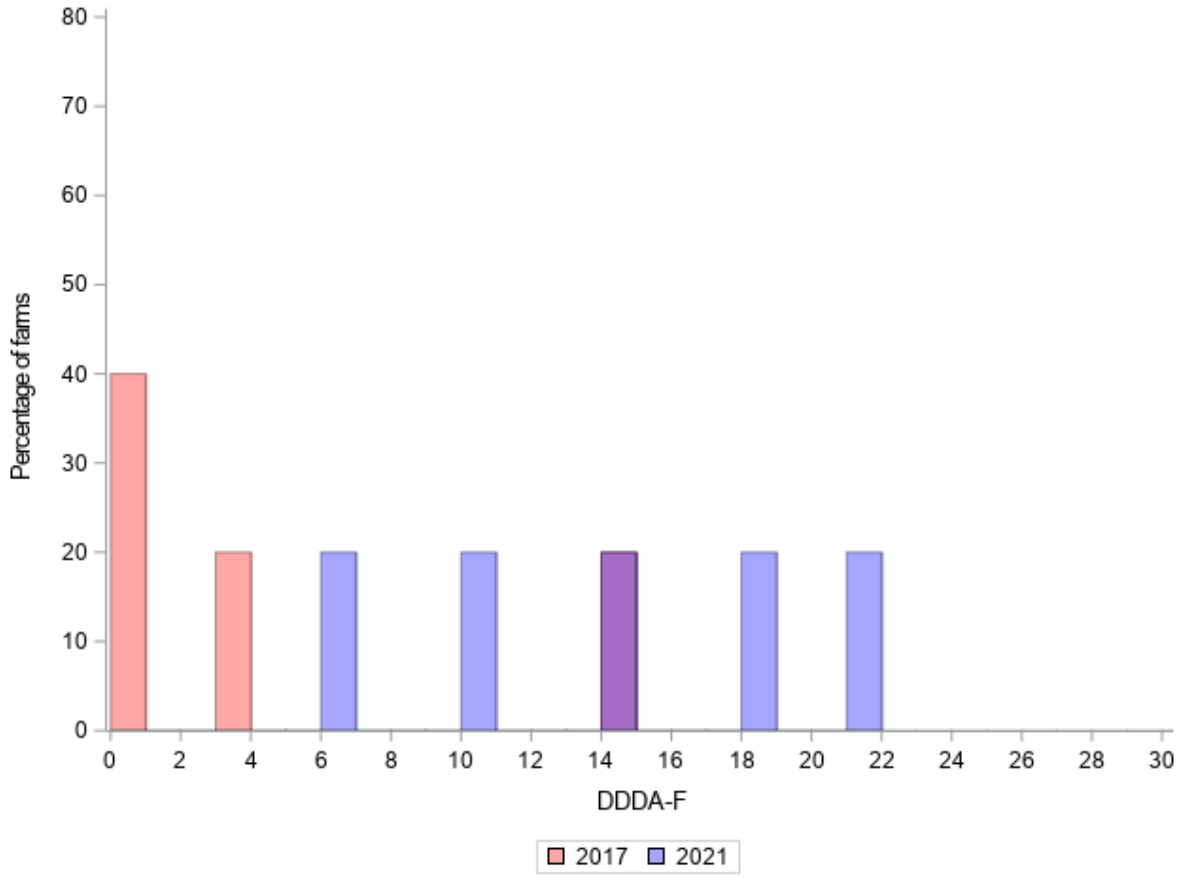


Table A17. Antibiotic use in $DDDA_F$ at parent/grandparent stock rearing farms in 2021, by pharmacotherapeutic group and route of administration

Category of antibiotics	Pharmacotherapeutic group	Route of administration	# of farms with $DDDA_F$=0	$DDDA_F$		
				Median	P75	Mean
1	Penicillins	Oral	20	0.00	0.00	0.31
1	Tetracyclines	Oral	20	0.00	0.00	0.69
2	Aminopenicillins	Oral	17	0.00	0.00	4.92
2	Quinolones	Oral	16	0.00	0.00	4.80

1.3 Parent/grandparent stock production farms

Number of parent/grandparent stock production farms: 53
Number of parent/grandparent stock production farms with $DDDA_F$=0: 32 (60.4%)
Number of parent/grandparent stock production farms that used third- and fourth-generation cephalosporins*: 0 (0.0%)
Number of parent/grandparent stock production farms that used fluoroquinolones: 1 (1.9%)
Number of parent/grandparent stock production farms that used polymyxins: 1 (1.9%)

Table A18. Antibiotic use in $DDDA_F$ at parent/grandparent stock production farms from 2017 to 2021**

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

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

Figure A14. 2017 and 2021 $DDDA_F$ distributions for parent/grandparent stock production farms (no probability density functions can be shown due to too little variation)

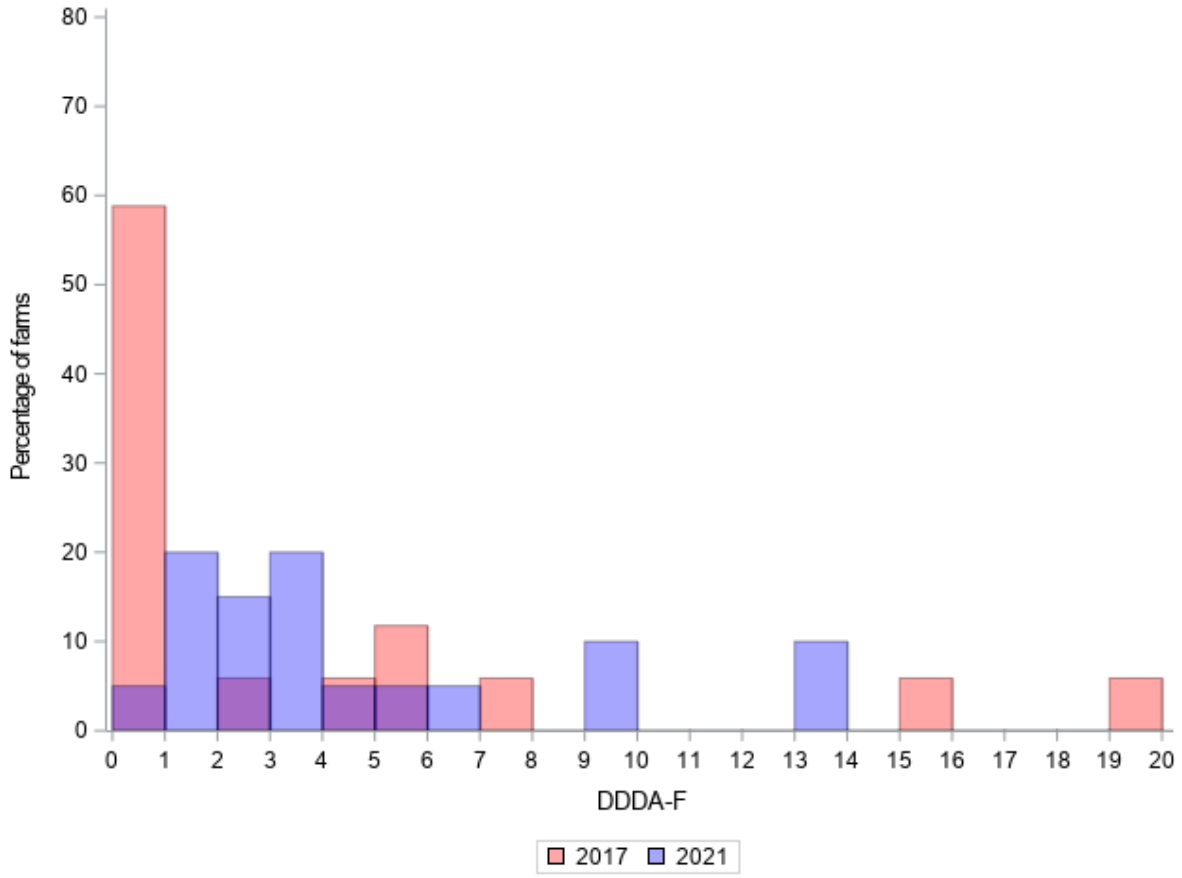


Table A19. Antibiotic use in $DDDA_F$ at parent/grandparent stock production farms in 2021, by pharmacotherapeutic group and route of administration

Category of antibiotics	Pharmacotherapeutic group	Route of administration	# of farms with $DDDA_F$=0	$DDDA_F$		
				Median	P75	Mean
1	Penicillins	Oral	41	0.00	0.00	0.66
1	Tetracyclines	Oral	49	0.00	0.00	0.23
2	Aminopenicillins	Oral	52	0.00	0.00	0.07
2	Quinolones	Oral	50	0.00	0.00	0.41
2	Macrolides/lincosamides	Oral	44	0.00	0.00	0.30
3	Fluoroquinolones	Oral	52	0.00	0.00	0.03
3	Polymyxins	Oral	52	0.00	0.00	0.18

Broiler parent/grandparent stock farming sector

1. Antibiotic use in $DDDA_F$

1.1 Parent/grandparent stock rearing farms

Number of parent/grandparent stock rearing farms: 90
Number of parent/grandparent stock rearing farms with $DDDA_F$=0: 22 (24.4%)
Number of parent/grandparent stock rearing farms that used third- and fourth-generation cephalosporins*: 0 (0.0%)
Number of parent/grandparent stock rearing farms that used fluoroquinolones: 6 (6.7%)
Number of parent/grandparent stock rearing farms that used polymyxins: 0 (0.0%)

Table A20. Antibiotic use in $DDDA_F$ at parent/grandparent stock rearing farms from 2017 to 2021**

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

* 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. 2017 and 2021 $DDDA_F$ distributions for parent/grandparent stock rearing farms

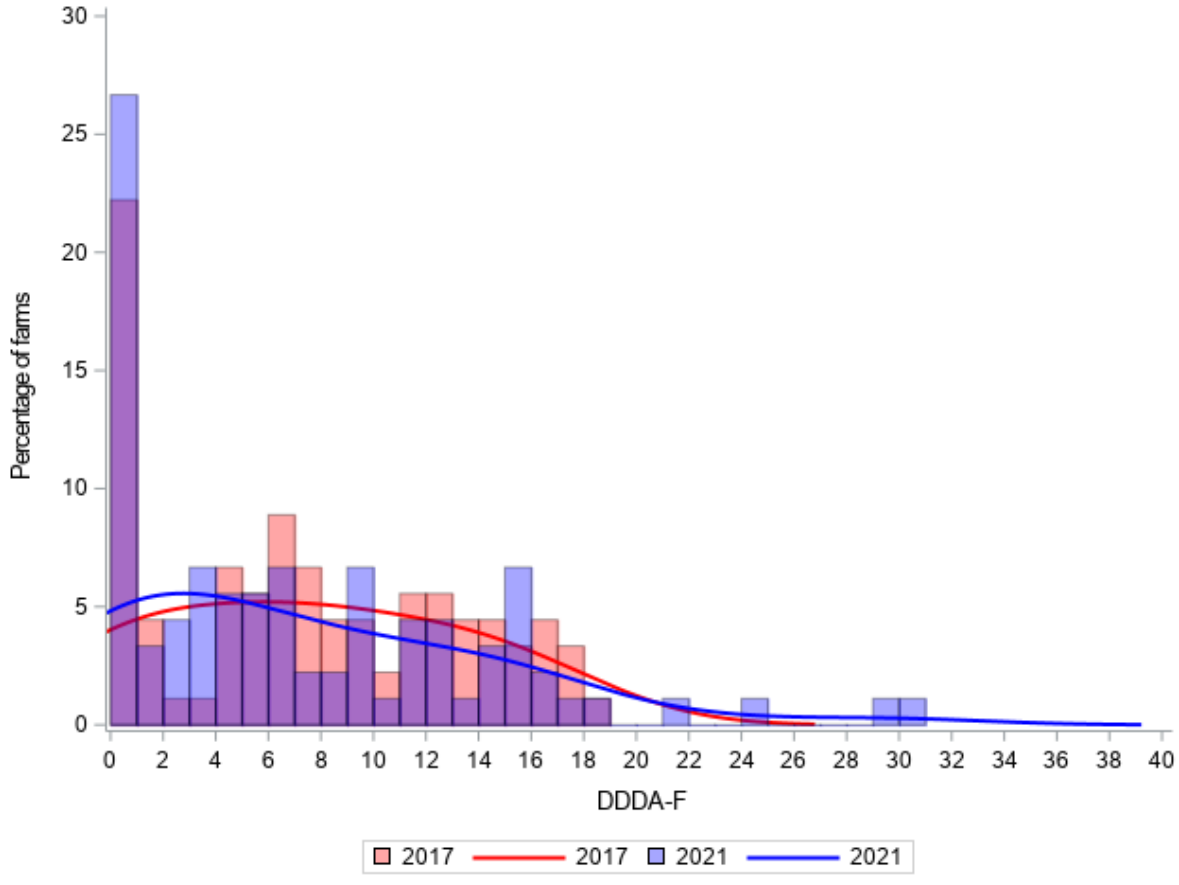


Table A21. Antibiotic use in $DDDA_F$ at parent/grandparent stock rearing farms in 2021, by pharmacotherapeutic group and route of administration

Category of antibiotics	Pharmacotherapeutic group	Route of administration	# of farms with $DDDA_F$=0	$DDDA_F$		
				Median	P75	Mean
1	Penicillins	Oral	52	0.00	2.63	1.79
1	Tetracyclines	Oral	69	0.00	0.00	1.04
1	Trimethoprim/sulfonamides	Oral	41	0.88	3.49	2.35
2	Aminopenicillins	Oral	67	0.00	1.29	1.43
2	Quinolones	Oral	80	0.00	0.00	0.40
2	Macrolides/lincosamides	Oral	88	0.00	0.00	0.01
3	Fluoroquinolones	Oral	84	0.00	0.00	0.16

1.2 Parent/grandparent stock production farms

Number of parent/grandparent stock production farms: 209
Number of parent/grandparent stock production farms with $DDDA_F$=0: 153 (73.2%)
Number of parent/grandparent stock production farms that used third- and fourth-generation cephalosporins*: 0 (0.0%)
Number of parent/grandparent stock production farms that used fluoroquinolones: 7 (3.3%)
Number of parent/grandparent stock production farms that used polymyxins: 1 (0.5%)

Table A22. Antibiotic use in $DDDA_F$ at parent/grandparent stock production farms from 2017 to 2021**

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

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

Figure A16. 2017 and 2021 $DDDA_F$ distributions for parent/grandparent stock production farms (no probability density functions can be shown due to too little variation)

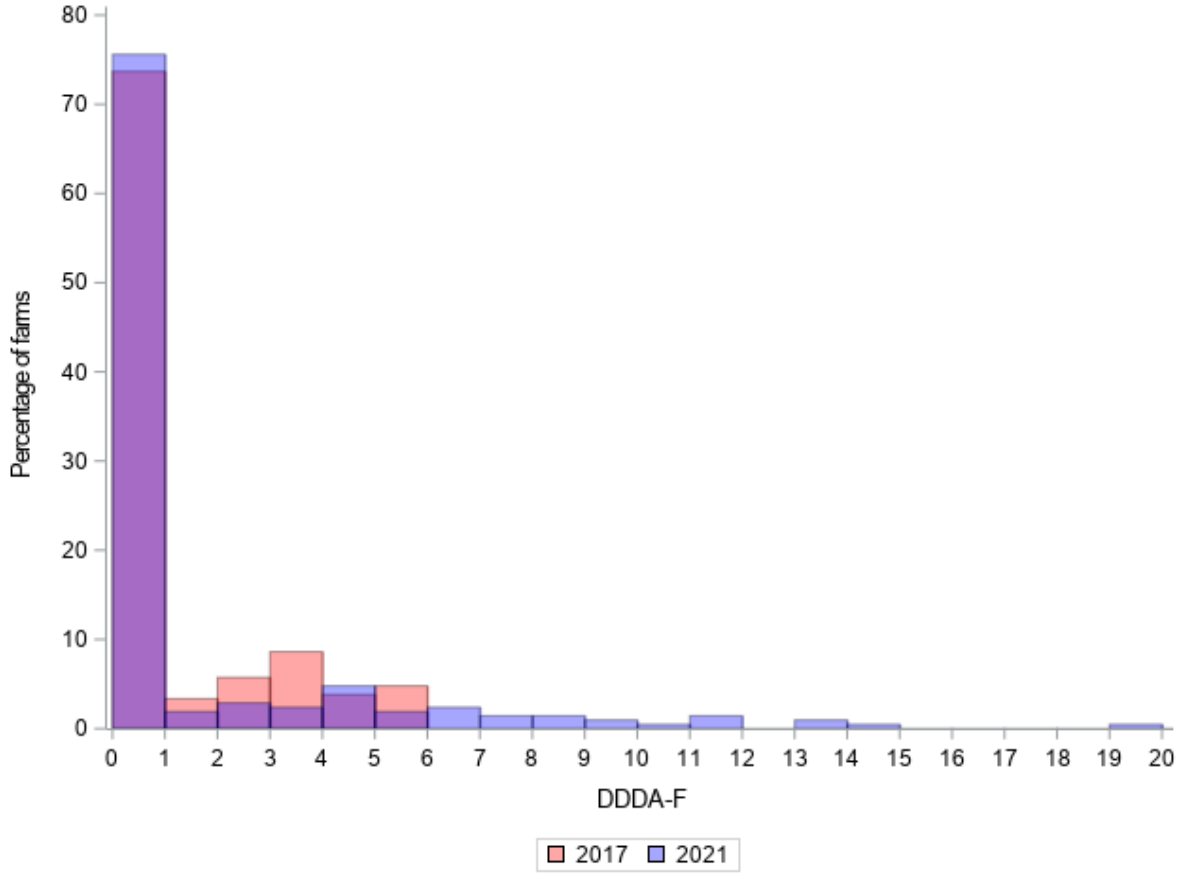


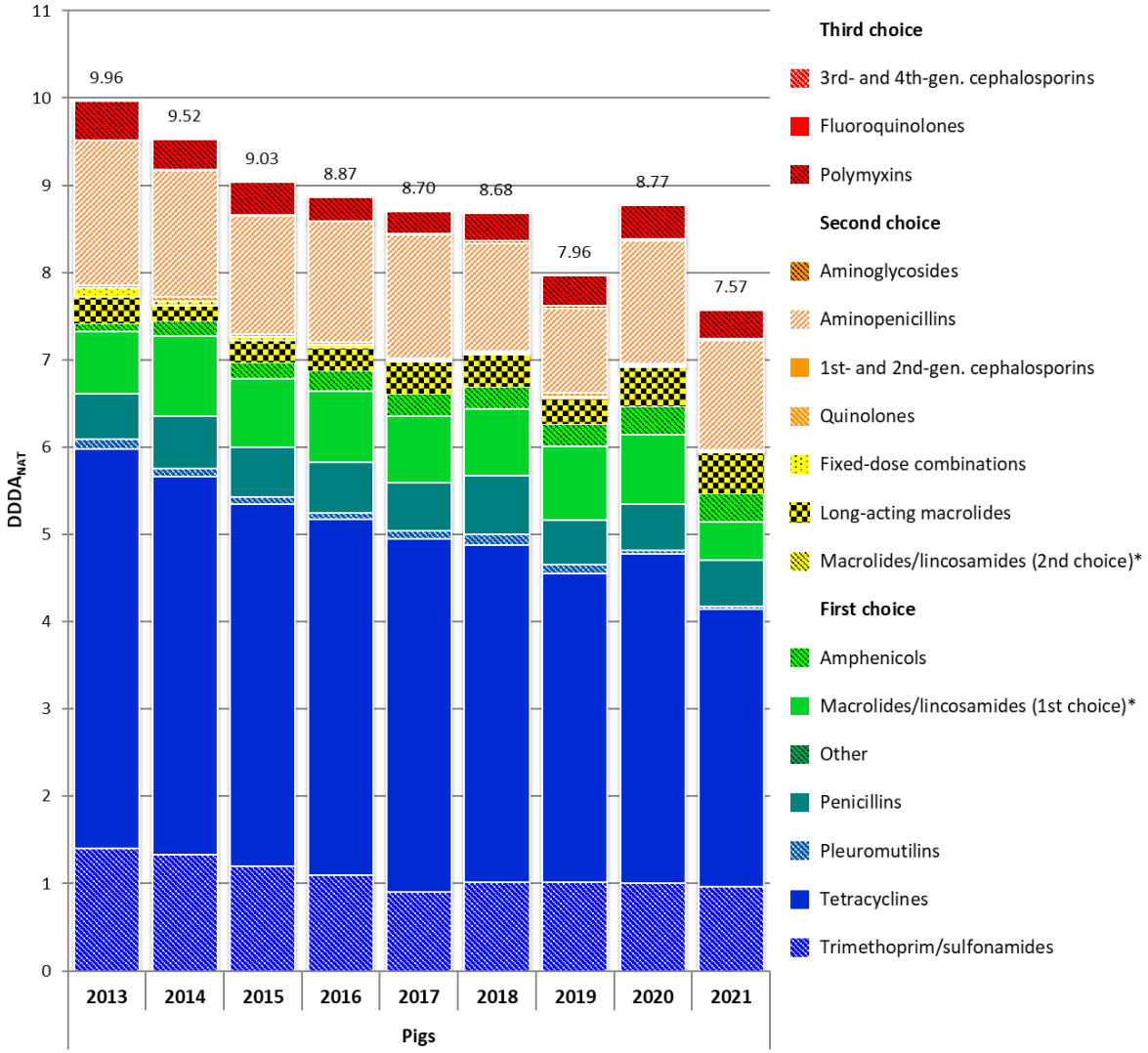
Table A23. Antibiotic use in $DDDA_F$ at parent/grandparent stock production farms in 2021, by pharmacotherapeutic group and route of administration

Category of antibiotics	Pharmacotherapeutic group	Route of administration	# of farms with $DDDA_F$=0	$DDDA_F$		
				Median	P75	Mean
1	Penicillins	Oral	201	0.00	0.00	0.16
1	Tetracyclines	Oral	180	0.00	0.00	0.67
1	Trimethoprim/sulfonamides	Oral	195	0.00	0.00	0.25
2	Quinolones	Oral	194	0.00	0.00	0.47
2	Macrolides/lincosamides	Oral	205	0.00	0.00	0.01
2	Polymyxins	Oral	208	0.00	0.00	0.00
3	Fluoroquinolones	Oral	202	0.00	0.00	0.05

Pig farming sector

1. Antibiotic use in $DDDA_{NAT}$

Figure A17. $DDDA_{NAT}$ trends in the pig farming sector over the 2013-2021 period, by pharmacotherapeutic group



* In the poultry farming sector, all macrolides/lincosamides except for lincomycin and spiramycin are categorized as second-choice antibiotics. In other livestock sectors, only long-acting macrolides are categorized as second-choice antibiotics.

2. Antibiotic use in $DDDA_F$

2.1 Farms with sows and suckling piglets

Number of farms with sows and suckling piglets: 1,498
Number of farms with sows and suckling piglets with $DDDA_F$=0: 142 (9.5%)
Number of farms with sows and suckling piglets that used third- and fourth-generation cephalosporins: 0 (0.0%)
Number of farms with sows and suckling piglets that used fluoroquinolones: 2 (0.1%)
Number of farms with sows and suckling piglets that used polymyxins: 447 (29.8%)

Table A24. Antibiotic use in $DDDA_F$ at farms with sows and suckling piglets from 2015 to 2021*

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

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

Figure A18. 2015, 2020 and 2021 $DDDA_F$ distributions for farms with sows and suckling piglets

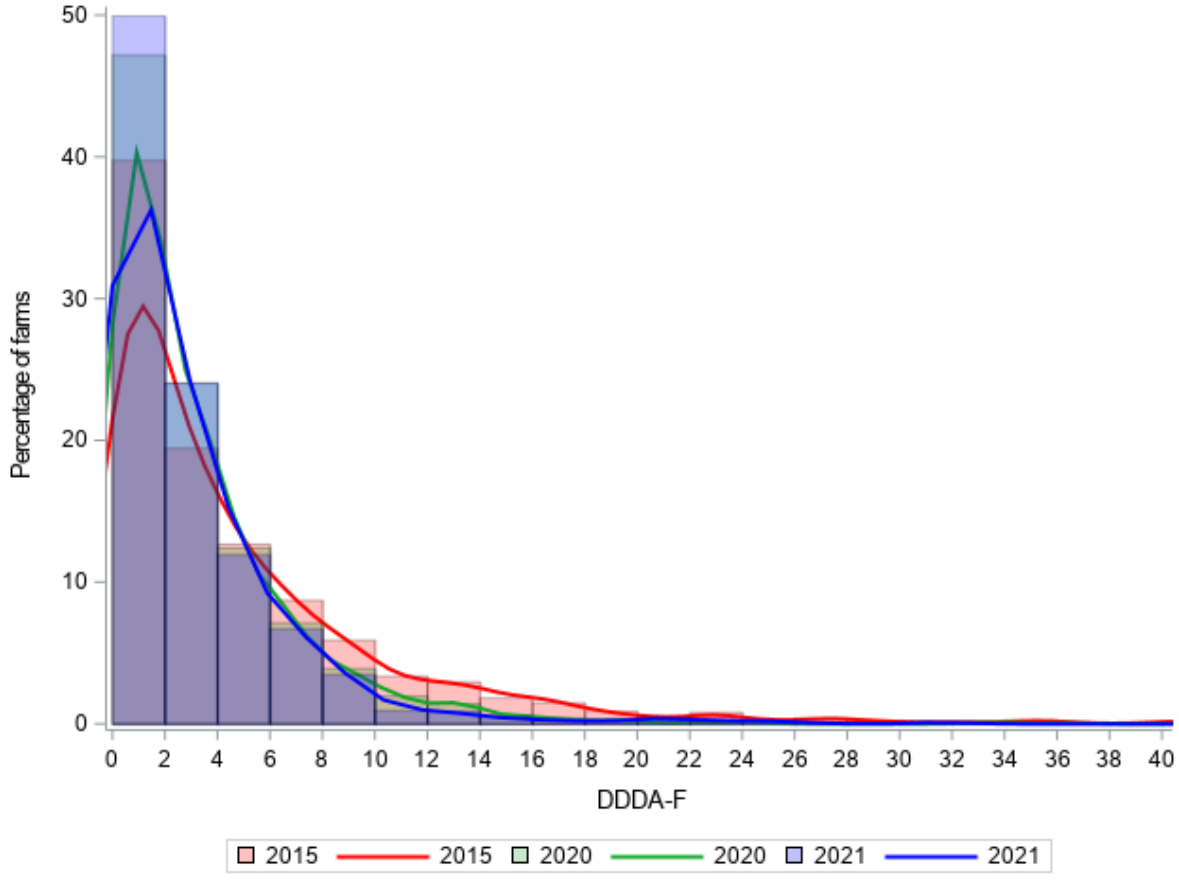


Figure A19. Scatter plot of 2020 and 2021 $DDDA_F$ values for farms with sows and suckling piglets. The red solid lines represent the action threshold defined by the SDa. The red dotted lines represent the transitional action thresholds negotiated by the livestock sector. For each type of action threshold, the number of farms with persistently high usage levels is listed in the upper-right corner of the scatter plot

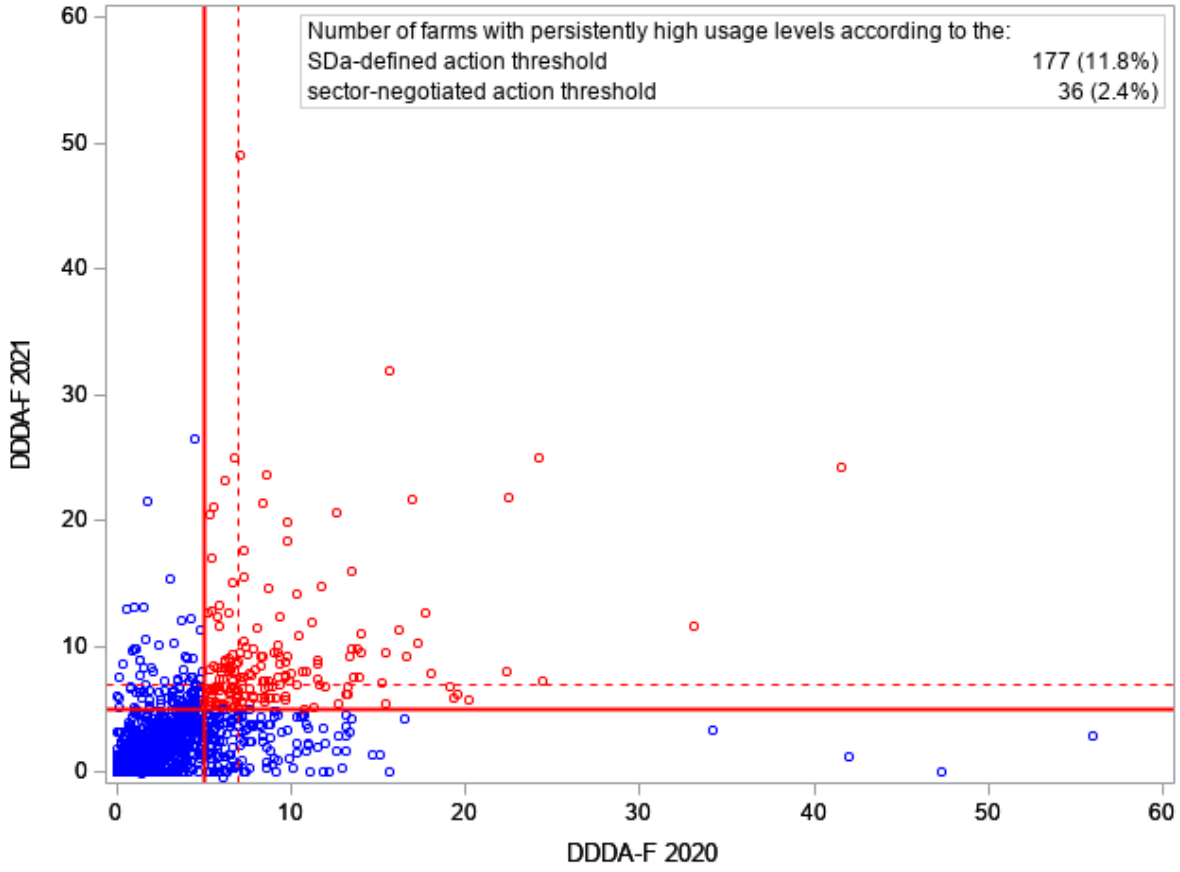


Table A25. Antibiotic use in $DDDA_F$ at farms with sows and suckling piglets in 2021, by pharmacotherapeutic group and route of administration

Category of antibiotics	Pharmacotherapeutic group	Route of administration	# of farms with $DDDA_F$=0	$DDDA_F$		
				Median	P75	Mean
1	Amphenicols	Parenteral	1,082	0.00	0.07	0.21
1	Macrolides/lincosamides	Oral	1,422	0.00	0.00	0.08
1	Macrolides/lincosamides	Parenteral	1,324	0.00	0.00	0.02
1	Penicillins	Parenteral	306	0.37	0.99	0.79
1	Pleuromutilins	Oral	1,494	0.00	0.00	0.01
1	Pleuromutilins	Parenteral	1,457	0.00	0.00	0.00
1	Tetracyclines	Oral	1,242	0.00	0.00	0.44
1	Tetracyclines	Parenteral	676	0.03	0.31	0.40
1	Trimethoprim/sulfonamides	Oral	1,291	0.00	0.00	0.17
1	Trimethoprim/sulfonamides	Parenteral	640	0.03	0.23	0.20
2	Aminoglycosides	Oral	1,429	0.00	0.00	0.01
2	Aminopenicillins	Oral	1,410	0.00	0.00	0.07
2	Aminopenicillins	Parenteral	763	0.00	0.33	0.28
2	Quinolones	Oral	1,489	0.00	0.00	0.02
2	Fixed-dose combinations	Parenteral	1,326	0.00	0.00	0.03
2	Long-acting macrolides	Parenteral	1,117	0.00	0.05	0.37
2	Macrolides/lincosamides	Parenteral	1,454	0.00	0.00	0.05
3	Fluoroquinolones	Parenteral	1,496	0.00	0.00	0.00
3	Polymyxins	Oral	1,398	0.00	0.00	0.03
3	Polymyxins	Parenteral	1,079	0.00	0.01	0.05

2.2 Farms with weaner pigs

Number of farms with weaner pigs: 1,668
Number of farms with weaner pigs with $DDDA_F$=0: 330 (19.8%)
Number of farms with weaner pigs that used third- and fourth-generation cephalosporins: 0 (0.0%)
Number of farms with weaner pigs that used fluoroquinolones: 0 (0.0%)
Number of farms with weaner pigs that used polymyxins: 440 (26.4%)

Table A26. Antibiotic use in $DDDA_F$ at farms with weaner pigs from 2015 to 2021*

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

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

Figure A20. 2015, 2020 and 2021 $DDDA_F$ distributions for farms with weaner pigs

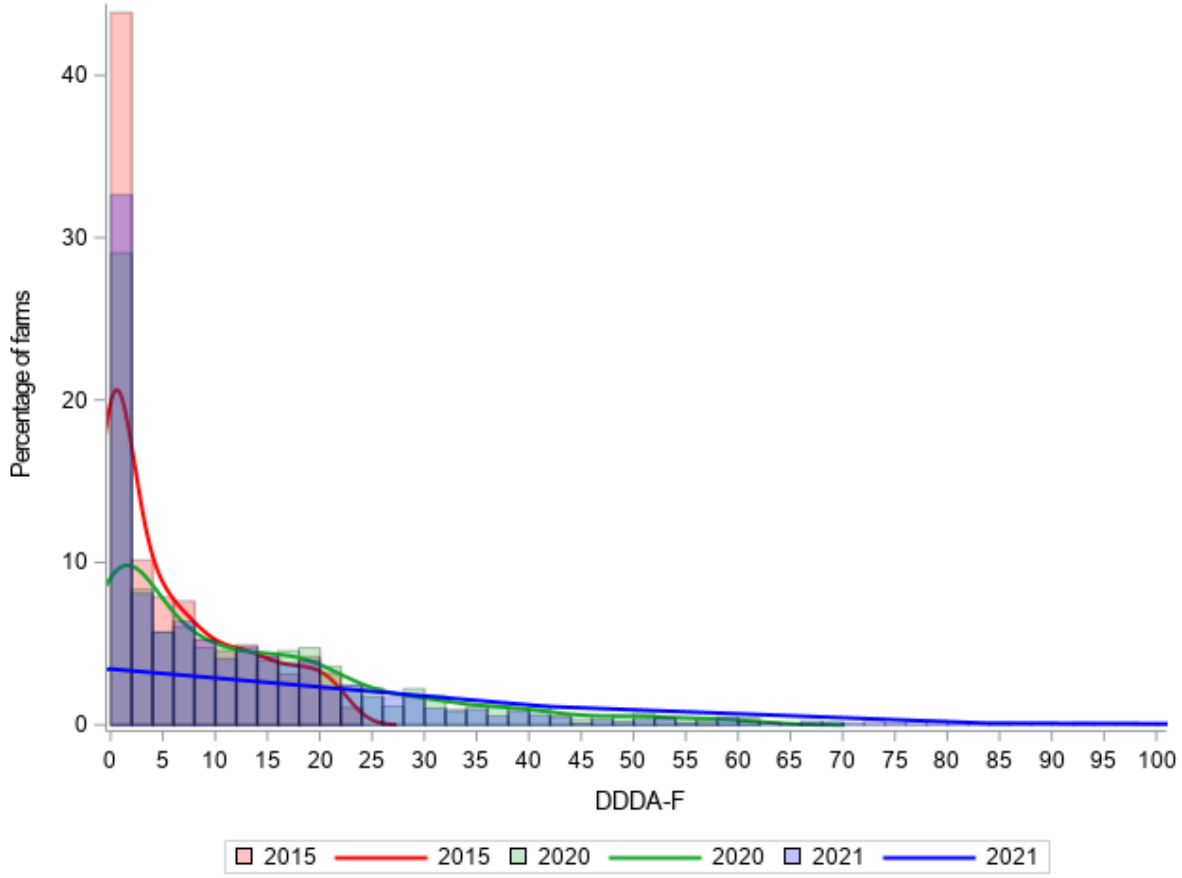


Figure A21. Scatter plot of 2020 and 2021 $DDDA_F$ values for farms with weaner pigs. The red solid lines represent the action threshold defined by the SDa. The red dotted lines represent the transitional action thresholds negotiated by the livestock sector. The number of farms with persistently high usage levels (farms whose usage levels exceeded the action threshold in both years) is listed in the upper-right corner of the scatter plot

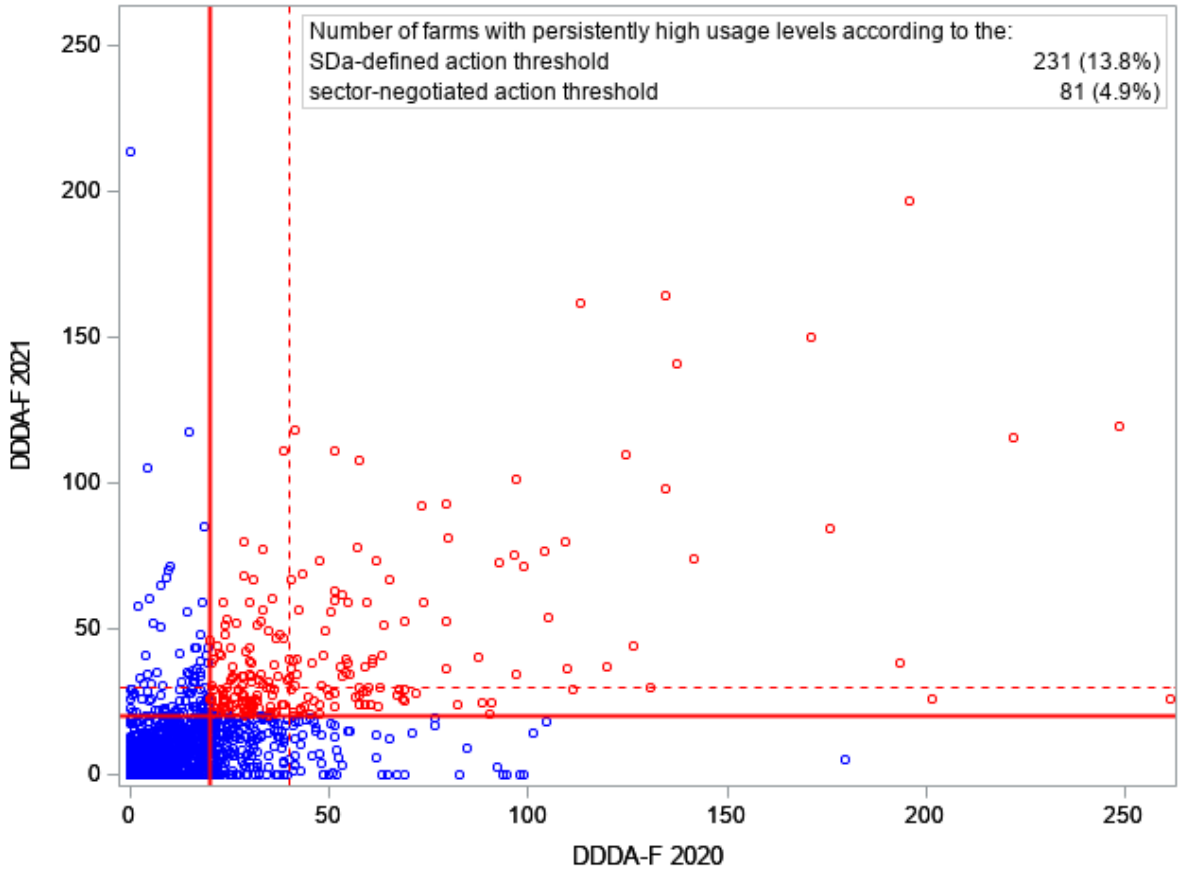


Table A27. Antibiotic use in $DDDA_F$ at farms with weaner pigs in 2021, by pharmacotherapeutic group and route of administration

Category of antibiotics	Pharmacotherapeutic group	Route of administration	# of farms with $DDDA_F$=0	$DDDA_F$		
				Median	P75	Mean
1	Amphenicols	Parenteral	1,384	0.00	0.00	0.30
1	Macrolides/lincosamides	Oral	1,523	0.00	0.00	0.45
1	Macrolides/lincosamides	Parenteral	1,601	0.00	0.00	0.02
1	Penicillins	Parenteral	1,043	0.00	0.43	0.60
1	Pleuromutilins	Oral	1,657	0.00	0.00	0.05
1	Pleuromutilins	Parenteral	1,653	0.00	0.00	0.02
1	Tetracyclines	Oral	1,074	0.00	3.84	6.93
1	Tetracyclines	Parenteral	1,300	0.00	0.00	0.46
1	Trimethoprim/sulfonamides	Oral	1,135	0.00	1.61	2.78
1	Trimethoprim/sulfonamides	Parenteral	1,501	0.00	0.00	0.04
2	Aminoglycosides	Oral	1,615	0.00	0.00	0.12
2	Aminopenicillins	Oral	1,240	0.00	0.70	5.30
2	Aminopenicillins	Parenteral	1,122	0.00	0.18	0.47
2	Quinolones	Oral	1,662	0.00	0.00	0.01
2	Fixed-dose combinations	Oral	1,667	0.00	0.00	0.00
2	Fixed-dose combinations	Parenteral	1,572	0.00	0.00	0.03
2	Long-acting macrolides	Parenteral	1,344	0.00	0.00	1.19
2	Macrolides/lincosamides	Parenteral	1,638	0.00	0.00	0.06
3	Polymyxins	Oral	1,350	0.00	0.00	1.53
3	Polymyxins	Parenteral	1,400	0.00	0.00	0.21

2.3 Farms with fattening pigs

Number of farms with fattening pigs: 3,142
Number of farms with fattening pigs with $DDDA_F$=0: 768 (24.4%)
Number of farms with fattening pigs that used third- and fourth-generation cephalosporins: 0 (0.0%)
Number of farms with fattening pigs that used fluoroquinolones: 0 (0.0%)
Number of farms with fattening pigs that used polymyxins: 83 (2.6%)

Table A28. Antibiotic use in $DDDA_F$ at farms with fattening pigs from 2015 to 2021*

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

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

Figure A22. 2015, 2020 and 2021 $DDDA_F$ distributions for farms with fattening pigs

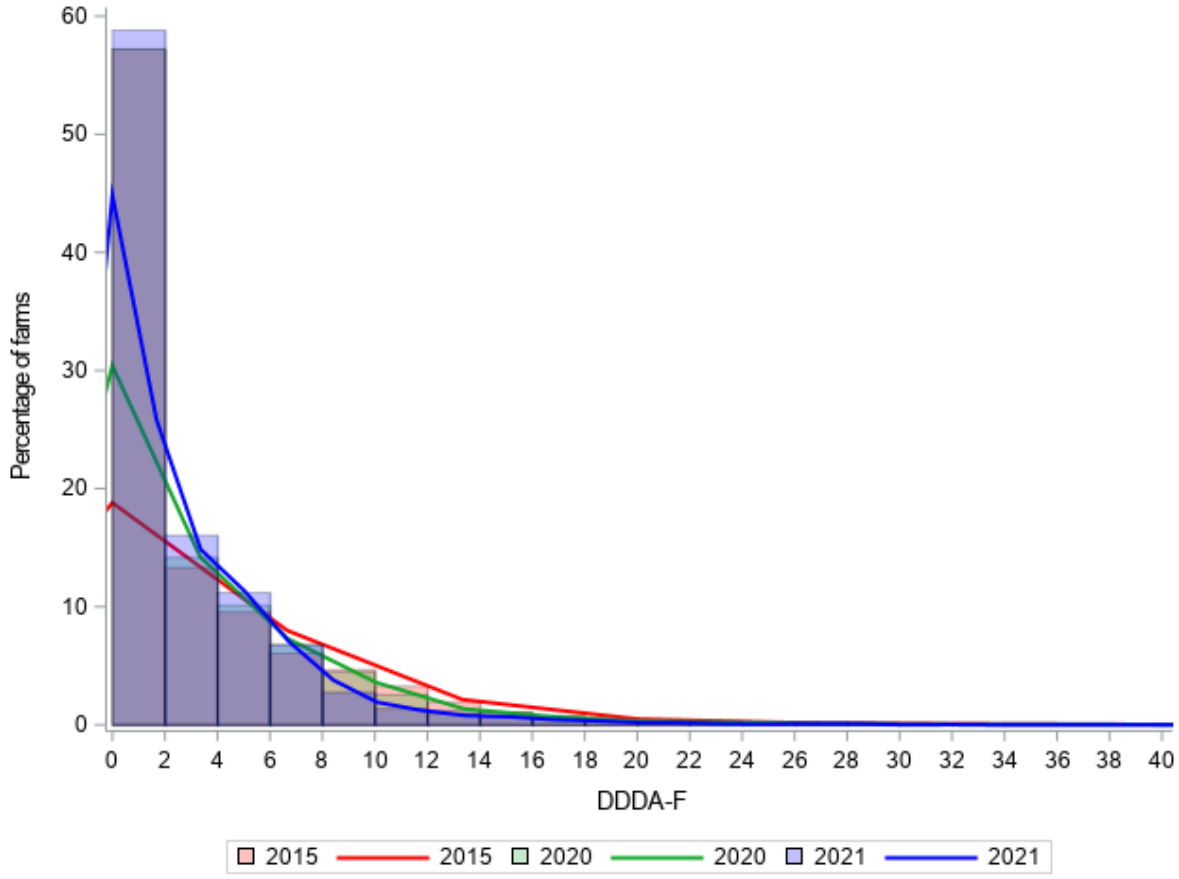


Figure A23. Scatter plot of 2020 and 2021 $DDDA_F$ values for farms with fattening pigs. The red solid lines represent the action threshold defined by the SDa. The red dotted lines represent the transitional action thresholds negotiated by the livestock sector. For each type of action threshold, the number of farms with persistently high usage levels is listed in the upper-right corner of the scatter plot

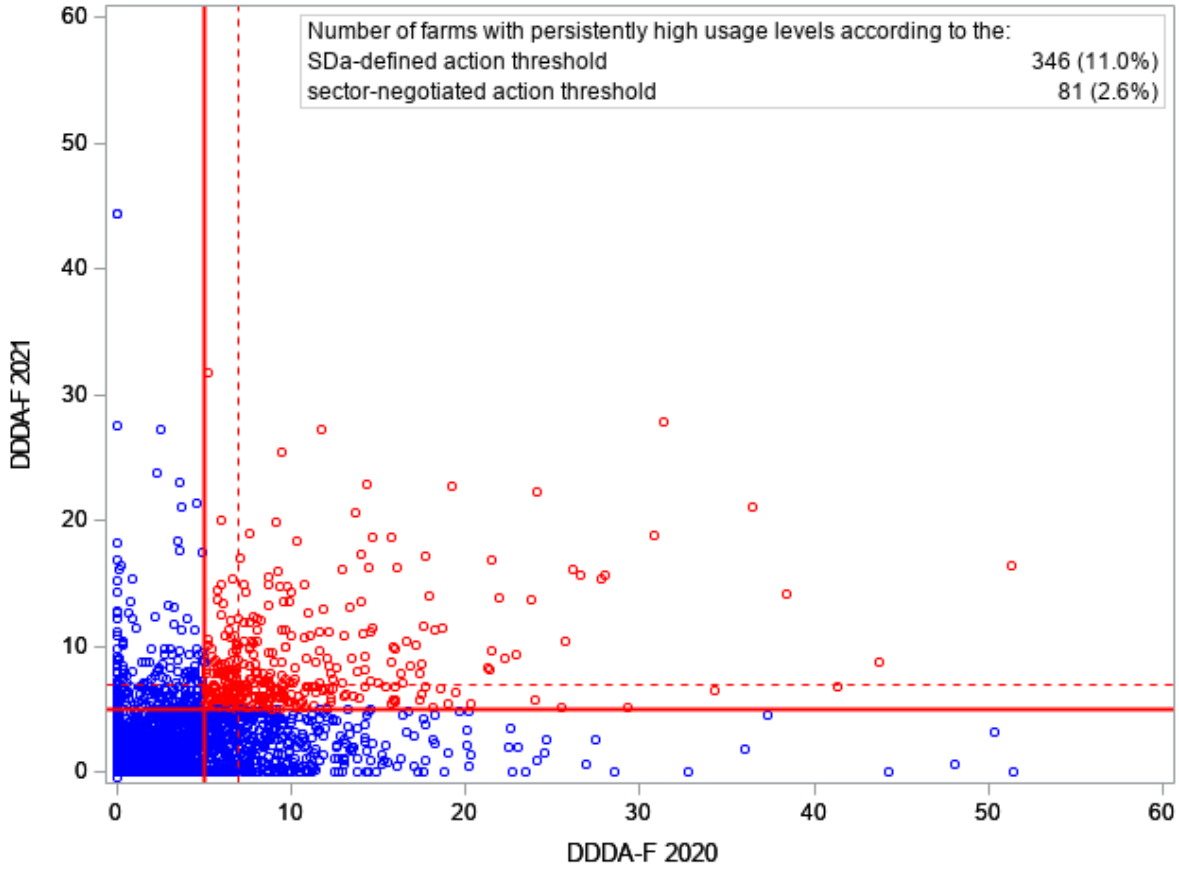


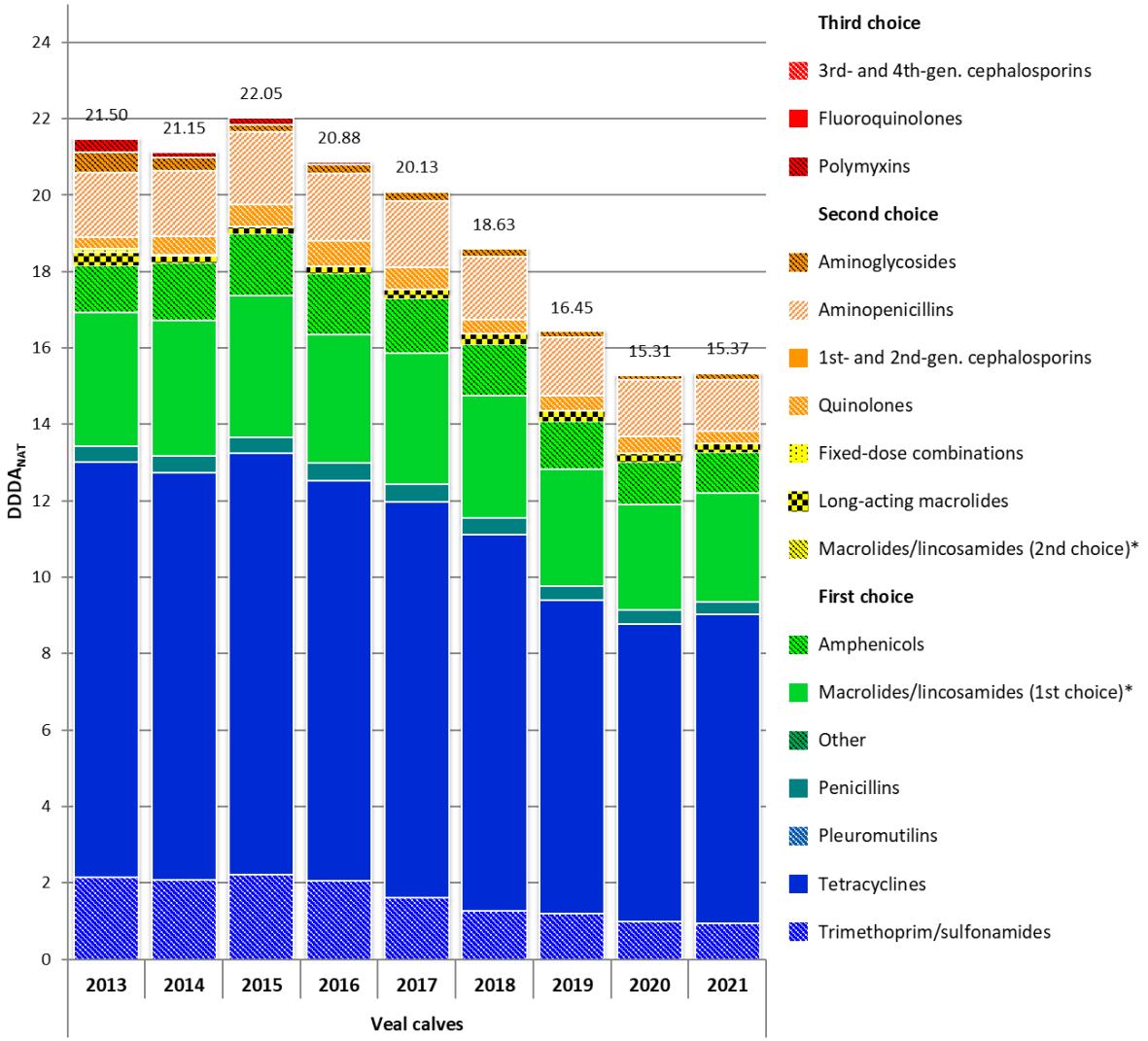
Table A29. Antibiotic use in $DDDA_F$ at farms with fattening pigs in 2021, by pharmacotherapeutic group and route of administration

Category of antibiotics	Pharmacotherapeutic group	Route of administration	# of farms with $DDDA_F$=0	$DDDA_F$		
				Median	P75	Mean
1	Amphenicols	Parenteral	2,195	0.00	0.09	0.21
1	Macrolides/lincosamides	Oral	2,492	0.00	0.00	0.37
1	Macrolides/lincosamides	Parenteral	2,629	0.00	0.00	0.02
1	Penicillins	Parenteral	1,270	0.06	0.29	0.27
1	Pleuromutilins	Oral	3,105	0.00	0.00	0.02
1	Pleuromutilins	Parenteral	3,033	0.00	0.00	0.00
1	Tetracyclines	Oral	1,985	0.00	1.43	1.32
1	Tetracyclines	Parenteral	1,901	0.00	0.11	0.19
1	Trimethoprim/sulfonamides	Oral	2,556	0.00	0.00	0.29
1	Trimethoprim/sulfonamides	Parenteral	3,111	0.00	0.00	0.00
2	Aminoglycosides	Oral	3,140	0.00	0.00	0.00
2	Aminopenicillins	Oral	3,028	0.00	0.00	0.07
2	Aminopenicillins	Parenteral	2,757	0.00	0.00	0.02
2	Quinolones	Oral	3,133	0.00	0.00	0.00
2	Fixed-dose combinations	Parenteral	3,097	0.00	0.00	0.00
2	Long-acting macrolides	Parenteral	3,066	0.00	0.00	0.02
2	Macrolides/lincosamides	Parenteral	3,140	0.00	0.00	0.00
3	Polymyxins	Oral	3,110	0.00	0.00	0.01
3	Polymyxins	Parenteral	3,085	0.00	0.00	0.00

Veal farming sector

1. Antibiotic use in $DDDA_{NAT}$

Figure A24. $DDDA_{NAT}$ trends in the veal farming sector over the 2013-2021 period, by pharmacotherapeutic group



* In the poultry farming sector, all macrolides/lincosamides except for lincomycin and spiramycin are categorized as second-choice antibiotics. In other livestock sectors, only long-acting macrolides are categorized as second-choice antibiotics.

2. Antibiotic use in $DDDA_F$

2.1 White veal farms

Number of white veal farms: 798
Number of white veal farms with $DDDA_F$=0: 0 (0.0%)
Number of white veal farms that used third- and fourth-generation cephalosporins: 0 (0.0%)
Number of white veal farms that used fluoroquinolones: 87 (10.9%)
Number of white veal farms that used polymyxins: 57 (7.1%)

Table A30. Antibiotic use in $DDDA_F$ at white veal farms from 2011 to 2021*

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	823	19.9	19.3	23.9	29.6
2020	813	19.1	18.5	22.9	27.9
2021	798	19.0	18.5	22.7	27.5

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

Figure A25. 2012, 2020 and 2021 $DDDA_F$ distributions for white veal farms

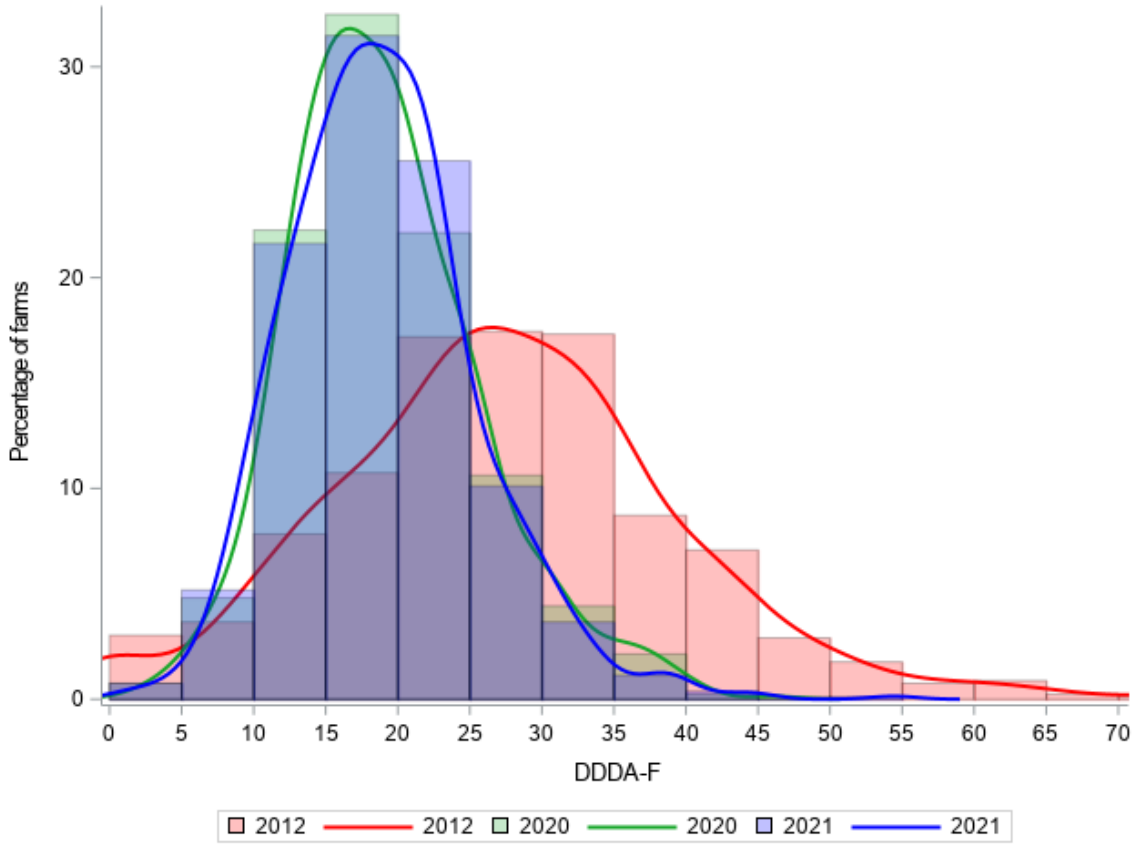


Figure A26. Scatter plot of 2020 and 2021 $DDDA_F$ values for white veal farms. The red solid lines represent the action threshold defined by the SDa. The number of farms with persistently high usage levels (farms whose usage levels exceeded the action threshold in both years) is listed in the upper-left corner of the scatter plot

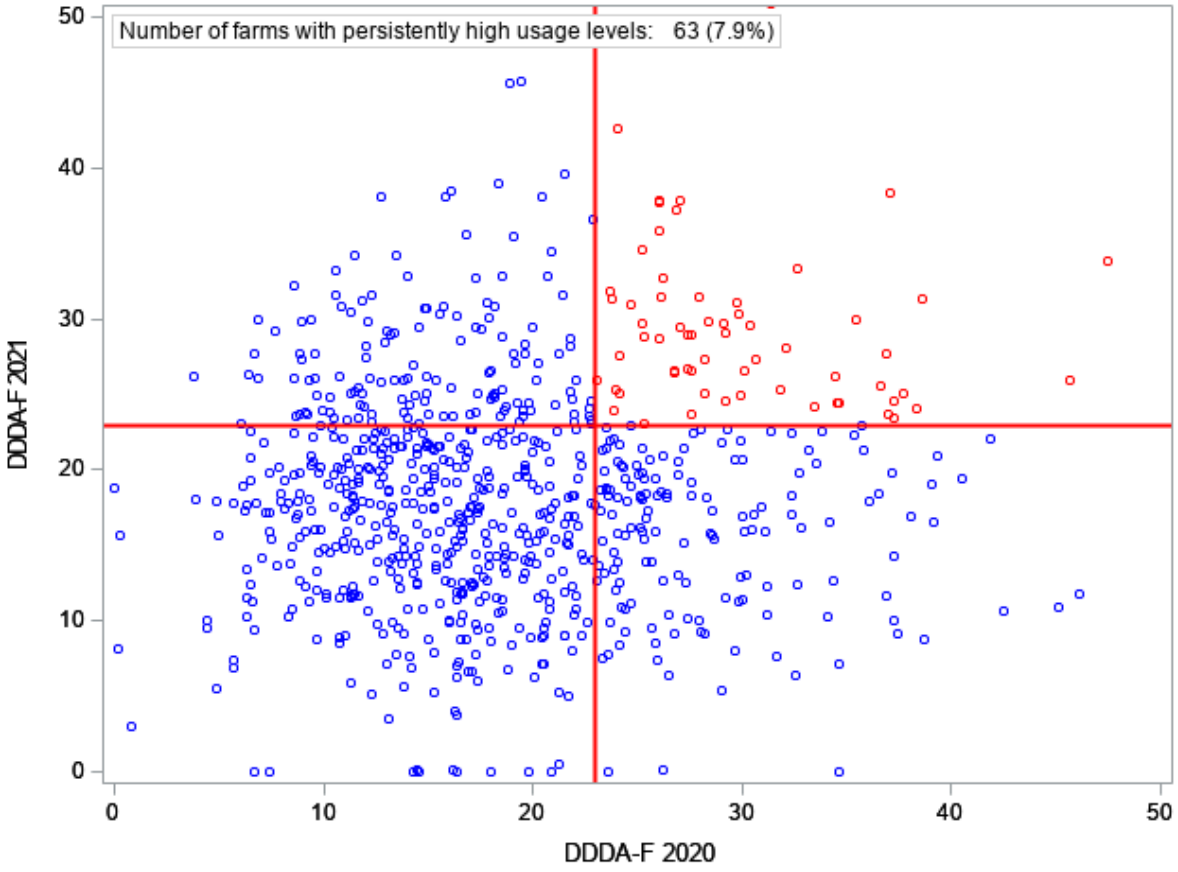


Table A31. Antibiotic use in $DDDA_F$ at white veal farms in 2021, by pharmacotherapeutic group and route of administration

Category of antibiotics	Pharmacotherapeutic group	Route of administration	# of farms with $DDDA_F$=0	$DDDA_F$		
				Median	P75	Mean
1	Amphenicols	Parenteral	4	0.85	1.29	1.01
1	Macrolides/lincosamides	Oral	25	3.32	4.34	3.39
1	Macrolides/lincosamides	Parenteral	288	0.01	0.06	0.06
1	Penicillins	Intramammary for dry cow therapy	796	0.00	0.00	0.00
1	Penicillins	Parenteral	32	0.31	0.51	0.40
1	Tetracyclines	Oral	4	9.61	12.54	10.22
1	Tetracyclines	Parenteral	542	0.00	0.02	0.02
1	Trimethoprim/sulfonamides	Oral	439	0.00	1.23	0.92
1	Trimethoprim/sulfonamides	Parenteral	218	0.03	0.07	0.06
2	Aminoglycosides	Oral	280	0.01	0.05	0.12
2	Aminoglycosides	Parenteral	446	0.00	0.05	0.06
2	Aminopenicillins	Oral	260	0.44	3.02	1.87
2	Aminopenicillins	Parenteral	77	0.09	0.17	0.12
2	Quinolones	Oral	615	0.00	0.00	0.50
2	Fixed-dose combinations	Parenteral	719	0.00	0.00	0.00
2	Long-acting macrolides	Parenteral	206	0.14	0.33	0.23
3	Fluoroquinolones	Oral	797	0.00	0.00	0.00
3	Fluoroquinolones	Parenteral	712	0.00	0.00	0.00
3	Polymyxins	Oral	787	0.00	0.00	0.02
3	Polymyxins	Parenteral	747	0.00	0.00	0.00

2.2 Rosé veal starter farms

Number of rosé veal starter farms: 185
Number of rosé veal starter farms with $DDDA_F$=0: 1 (0.5%)
Number of rosé veal starter farms that used third- and fourth-generation cephalosporins: 0 (0.0%)
Number of rosé veal starter farms that used fluoroquinolones: 15 (8.1%)
Number of rosé veal starter farms that used polymyxins: 5 (2.7%)

Table A32. Antibiotic use in $DDDA_F$ at rosé veal starter farms from 2011 to 2021*

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	111.6
2017	238	83.0	83.1	102.0	113.3
2018	256	79.9	79.3	96.1	115.6
2019	210	75.9	74.3	94.1	107.1
2020	197	69.1	69.7	83.2	95.0
2021	185	69.2	69.9	83.4	97.8

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

Figure A27. 2012, 2020 and 2021 $DDDA_F$ distributions for rosé veal starter farms

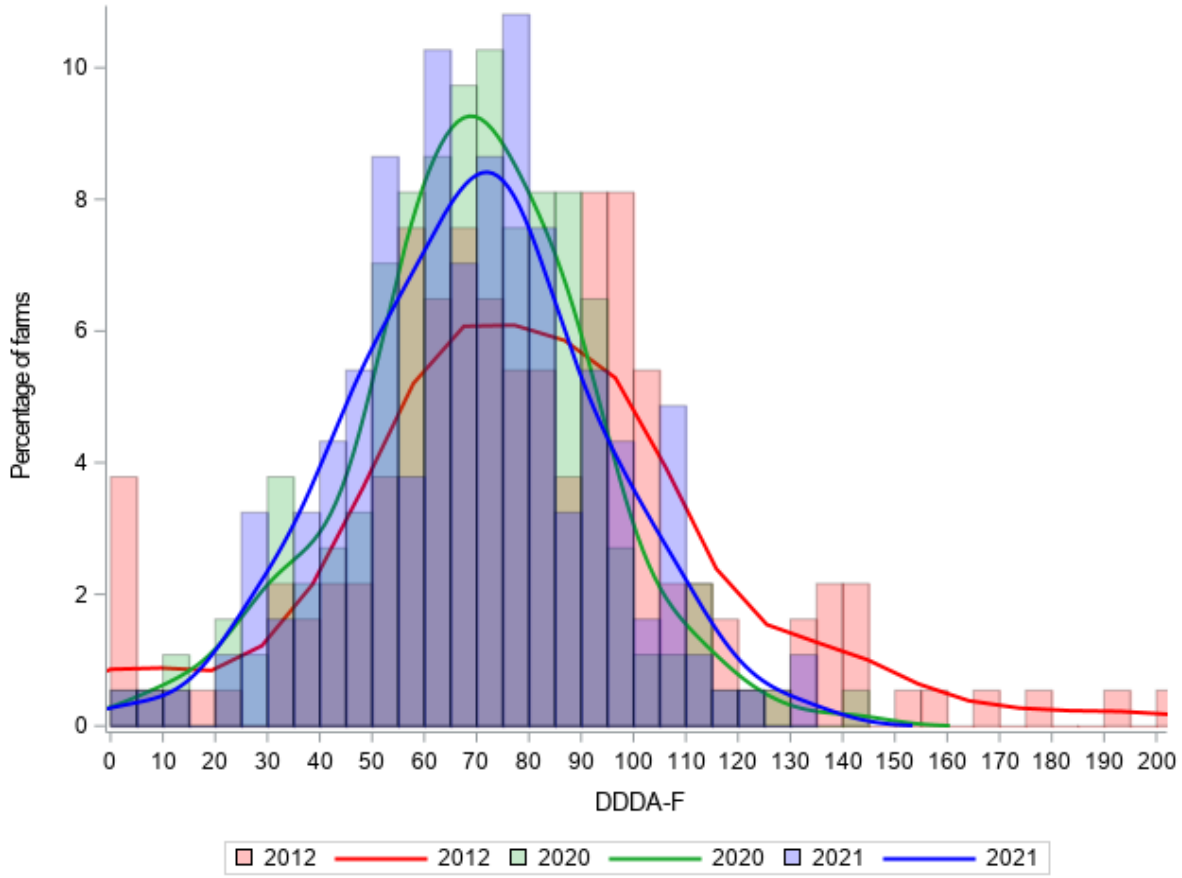


Figure A28. Scatter plot of 2020 and 2021 $DDDA_F$ values for rosé veal starter farms. The red solid lines represent the action threshold defined by the SDa. The number of farms with persistently high usage levels (farms whose usage levels exceeded the action threshold in both years) is listed in the upper-right corner of the scatter plot

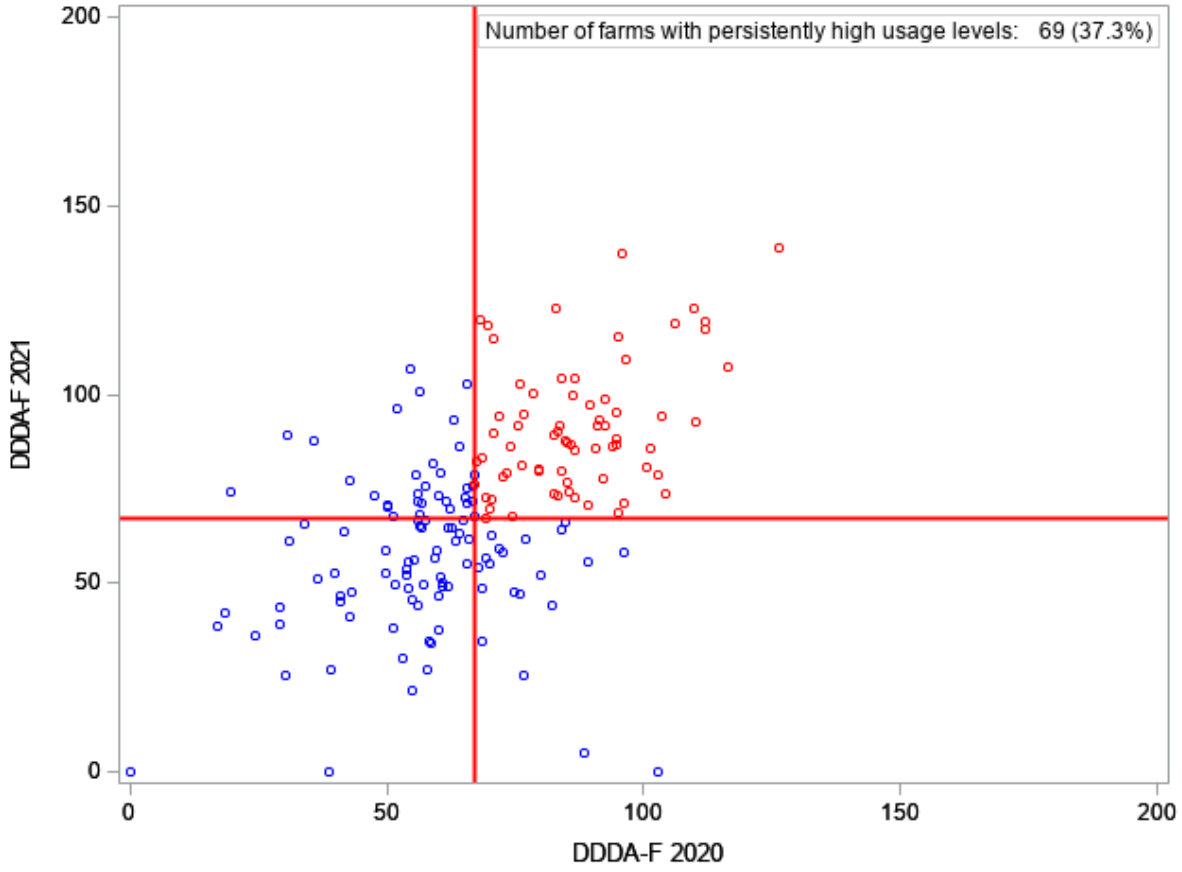


Table A33. Antibiotic use in $DDDA_F$ at rosé veal starter farms in 2021, by pharmacotherapeutic group and route of administration

Category of antibiotics	Pharmacotherapeutic group	Route of administration	# of farms with $DDDA_F$=0	$DDDA_F$		
				Median	P75	Mean
1	Amphenicols	Parenteral	2	4.66	7.61	5.90
1	Macrolides/lincosamides	Oral	10	15.98	20.39	15.61
1	Macrolides/lincosamides	Parenteral	59	0.07	0.33	0.32
1	Penicillins	Parenteral	15	1.15	1.78	1.48
1	Tetracyclines	Oral	2	35.72	44.54	35.11
1	Tetracyclines	Parenteral	125	0.00	0.06	0.14
1	Trimethoprim/sulfonamides	Oral	60	3.49	8.98	5.63
1	Trimethoprim/sulfonamides	Parenteral	64	0.09	0.35	0.29
2	Aminoglycosides	Oral	106	0.00	0.17	0.60
2	Aminoglycosides	Parenteral	88	0.04	0.46	0.32
2	Aminopenicillins	Intramammary	184	0.00	0.00	0.00
2	Aminopenicillins	Oral	113	0.00	2.18	1.77
2	Aminopenicillins	Parenteral	22	0.27	0.66	0.46
2	Quinolones	Oral	158	0.00	0.00	0.59
2	Fixed-dose combinations	Parenteral	178	0.00	0.00	0.00
2	Long-acting macrolides	Parenteral	58	0.44	1.21	0.98
3	Fluoroquinolones	Parenteral	170	0.00	0.00	0.03
3	Polymyxins	Oral	184	0.00	0.00	0.02
3	Polymyxins	Parenteral	180	0.00	0.00	0.00

2.3 Rosé veal fattening farms

Number of rosé veal fattening farms: 579
Number of rosé veal fattening farms with $DDDA_F$=0: 48 (8.3%)
Number of rosé veal fattening farms that used third- and fourth-generation cephalosporins: 0 (0.0%)
Number of rosé veal fattening farms that used fluoroquinolones: 10 (1.7%)
Number of rosé veal fattening farms that used polymyxins: 6 (1.0%)

Table A34. Antibiotic use in $DDDA_F$ at rosé veal fattening farms from 2011 to 2021*

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	732	3.9	1.9	6.1	10.5
2020	680	4.1	1.7	5.9	11.9
2021	579	3.9	1.6	6.0	11.2

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

Figure A29. 2012, 2020 and 2021 $DDDA_F$ distributions for rosé veal fattening farms

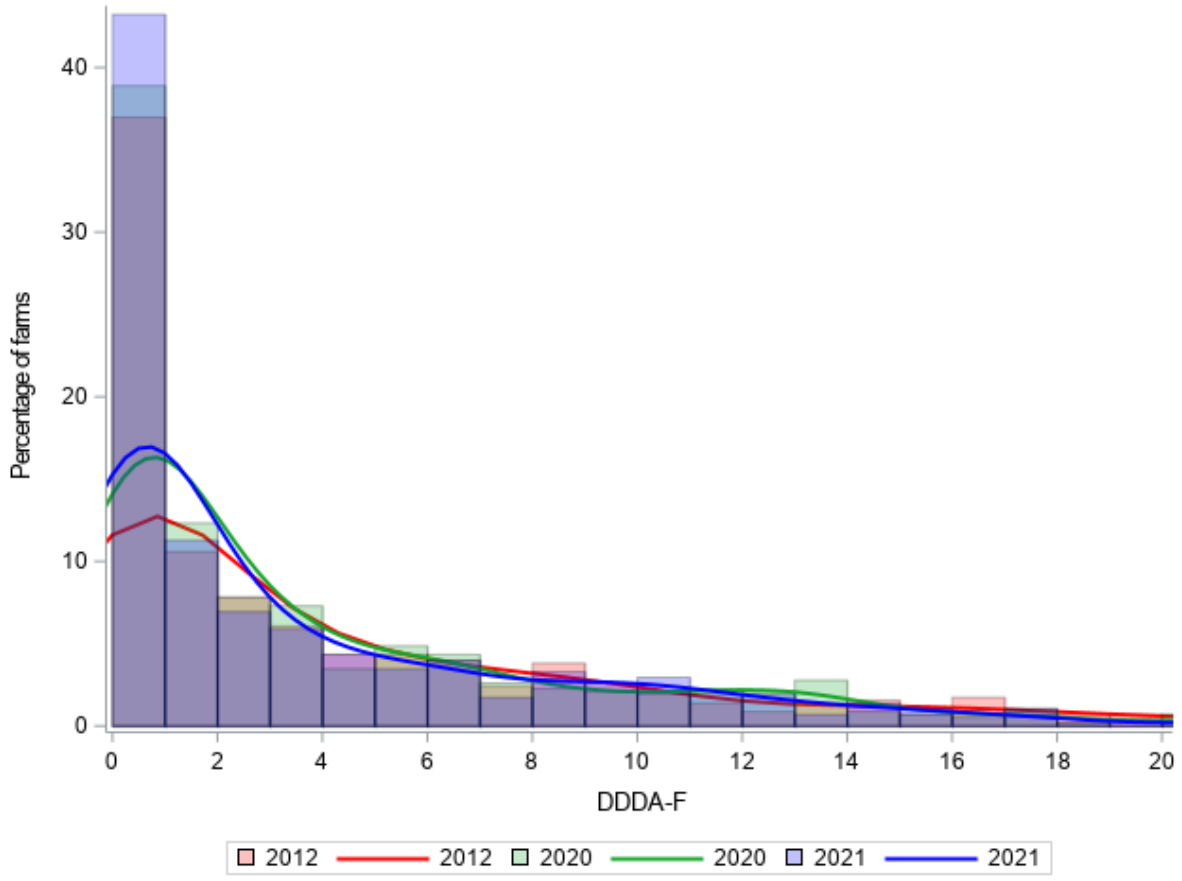


Figure A30. Scatter plot of 2020 and 2021 $DDDA_F$ values for rosé veal fattening farms. The red solid lines represent the action threshold defined by the SDa. The number of farms with persistently high usage levels (farms whose usage levels exceeded the action threshold in both years) is listed in the upper-left corner of the scatter plot

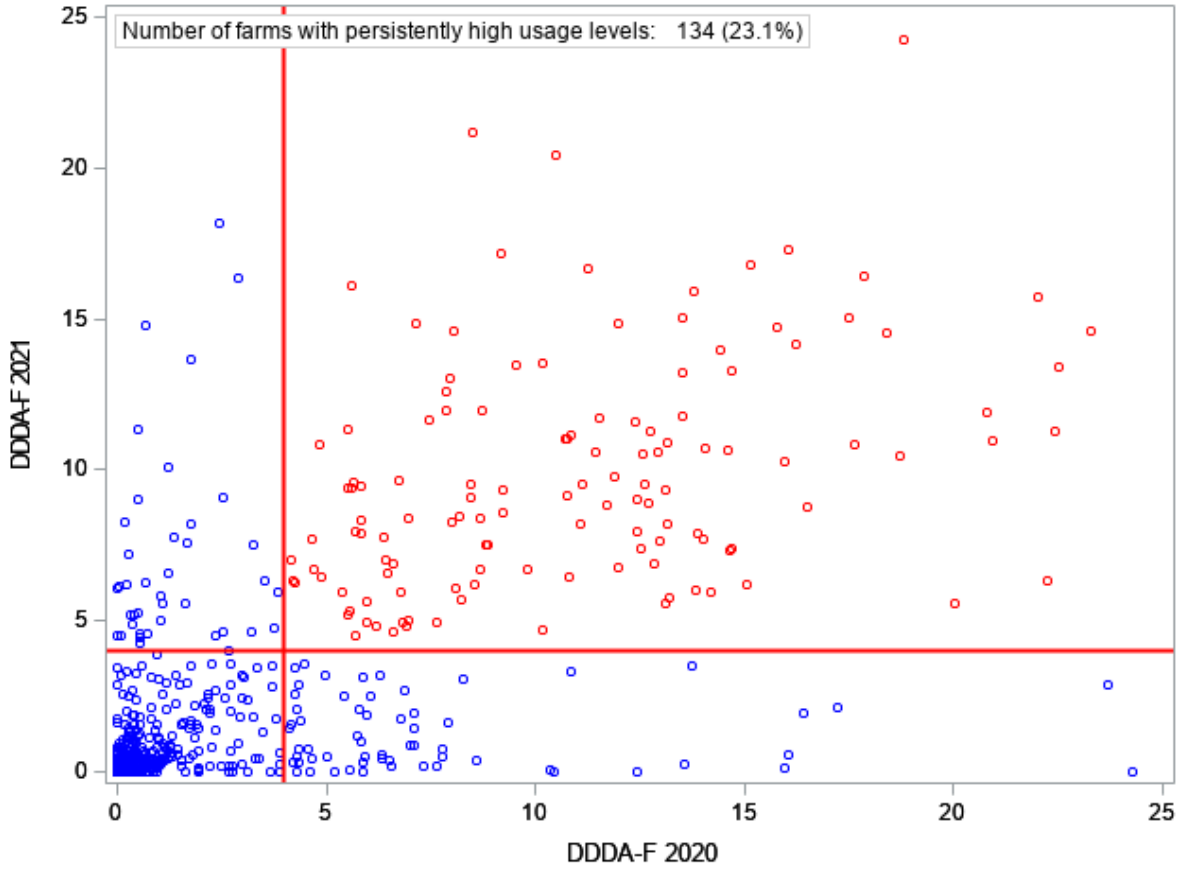


Table A35. Antibiotic use in $DDDA_F$ at rosé veal fattening farms in 2021, by pharmacotherapeutic group and route of administration

Category of antibiotics	Pharmacotherapeutic group	Route of administration	# of farms with $DDDA_F$=0	$DDDA_F$		
				Median	P75	Mean
1	Amphenicols	Parenteral	89	0.34	0.68	0.55
1	Macrolides/lincosamides	Oral	439	0.00	0.00	0.48
1	Macrolides/lincosamides	Parenteral	432	0.00	0.00	0.03
1	Penicillins	Parenteral	207	0.08	0.24	0.18
1	Tetracyclines	Oral	295	0.00	3.62	1.98
1	Tetracyclines	Parenteral	489	0.00	0.00	0.02
1	Trimethoprim/sulfonamides	Oral	415	0.00	0.15	0.33
1	Trimethoprim/sulfonamides	Parenteral	413	0.00	0.01	0.02
2	Aminoglycosides	Oral	516	0.00	0.00	0.01
2	Aminoglycosides	Parenteral	523	0.00	0.00	0.01
2	Aminopenicillins	Oral	536	0.00	0.00	0.07
2	Aminopenicillins	Parenteral	279	0.01	0.06	0.06
2	Quinolones	Oral	563	0.00	0.00	0.02
2	Fixed-dose combinations	Parenteral	546	0.00	0.00	0.00
2	Long-acting macrolides	Parenteral	340	0.00	0.14	0.13
3	Fluoroquinolones	Parenteral	569	0.00	0.00	0.00
3	Polymyxins	Oral	578	0.00	0.00	0.00
3	Polymyxins	Parenteral	574	0.00	0.00	0.00

2.4 Rosé veal combination farms

Number of rosé veal combination farms: 64
Number of rosé veal combination farms with $DDDA_F$=0: 0 (0.0%)
Number of rosé veal combination farms that used third- and fourth-generation cephalosporins: 0 (0.0%)
Number of rosé veal combination farms that used fluoroquinolones: 7 (10.9%)
Number of rosé veal combination farms that used polymyxins: 3 (4.7%)

Table A36. Antibiotic use in $DDDA_F$ at rosé veal combination farms from 2011 to 2021*

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	76	16.5	14.7	22.1	30.5
2020	74	16.0	15.7	21.3	25.2
2021	64	16.3	15.5	19.7	28.7

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

Figure A31. 2012, 2020 and 2021 $DDDA_F$ distributions for rosé veal combination farms

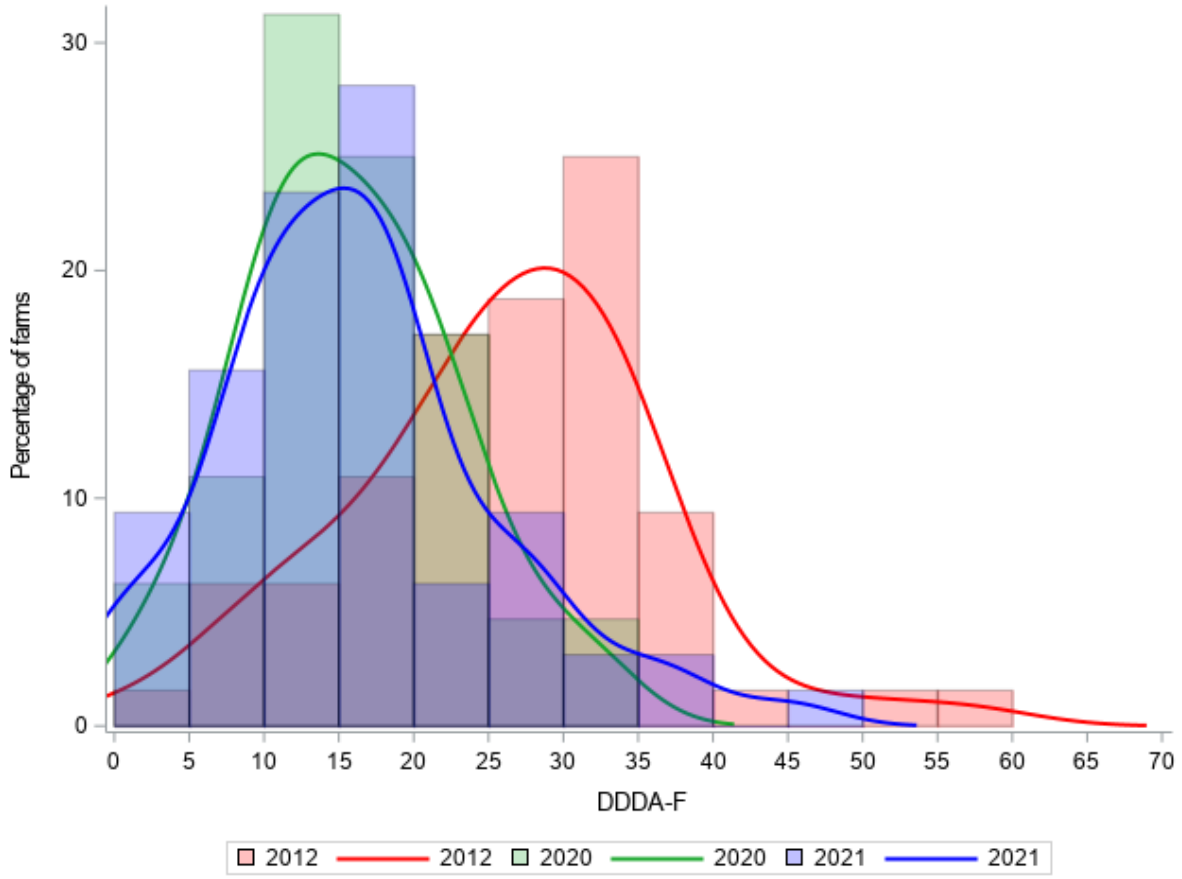


Figure A32. Scatter plot of 2020 and 2021 $DDDA_F$ values for rosé veal combination farms. The red solid lines represent the action threshold defined by the SDa. The number of farms with persistently high usage levels (farms whose usage levels exceeded the action threshold in both years) is listed in the upper-right corner of the scatter plot

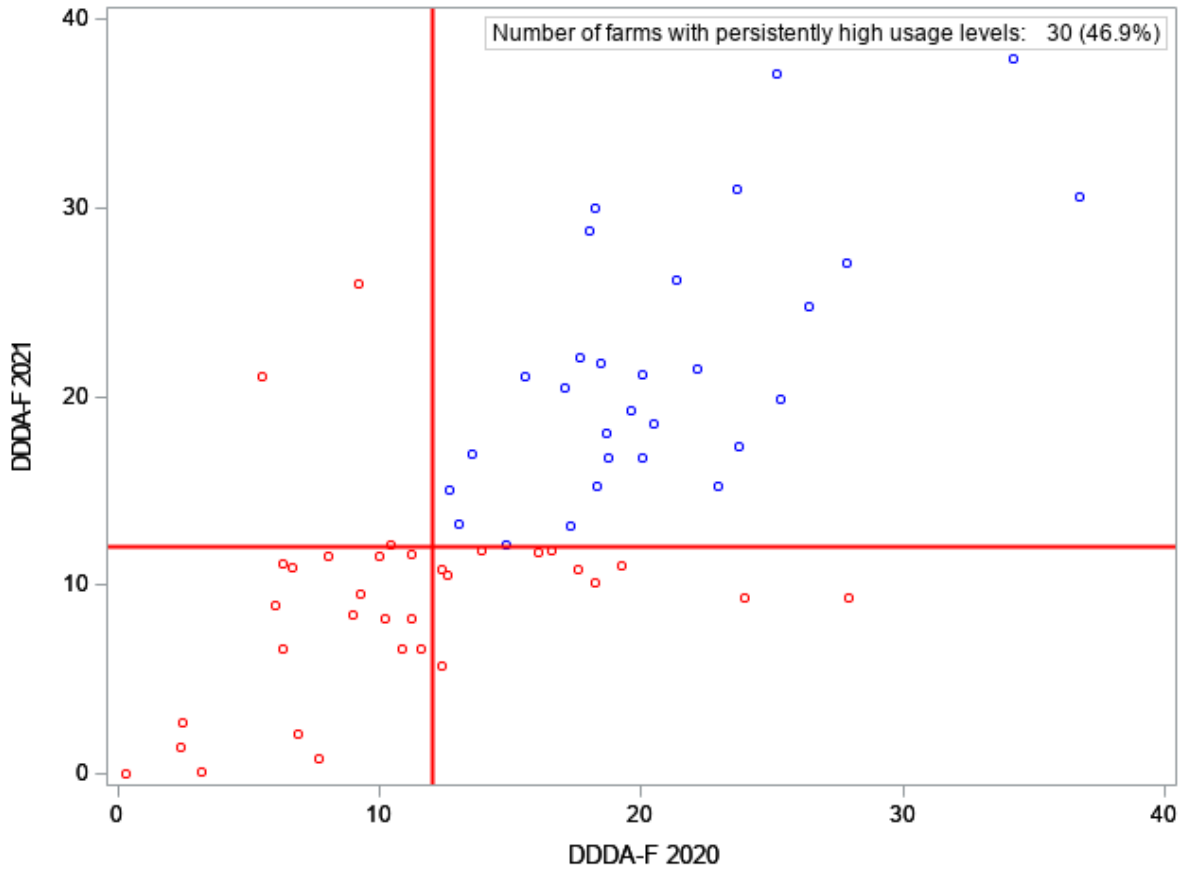


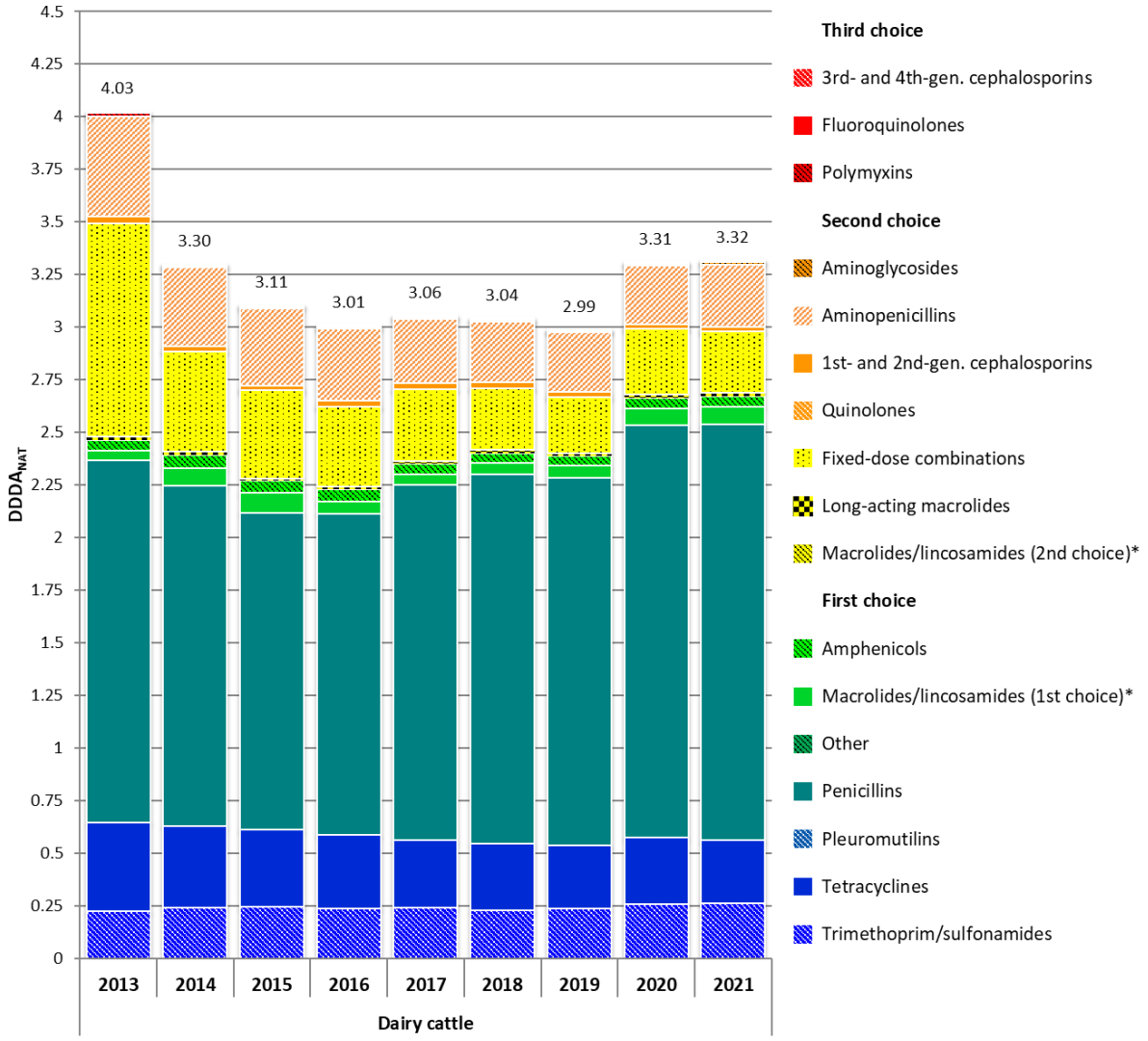
Table A37. Antibiotic use in $DDDA_F$ at rosé veal combination farms in 2021, by pharmacotherapeutic group and route of administration

Category of antibiotics	Pharmacotherapeutic group	Route of administration	# of farms with $DDDA_F$=0	$DDDA_F$		
				Median	P75	Mean
1	Amphenicols	Parenteral	1	0.98	1.70	1.36
1	Macrolides/lincosamides	Oral	9	2.72	4.11	3.06
1	Macrolides/lincosamides	Parenteral	20	0.01	0.04	0.07
1	Penicillins	Parenteral	5	0.21	0.43	0.32
1	Tetracyclines	Oral	5	8.35	10.67	8.83
1	Tetracyclines	Parenteral	41	0.00	0.02	0.02
1	Trimethoprim/sulfonamides	Oral	28	0.35	1.32	0.90
1	Trimethoprim/sulfonamides	Parenteral	24	0.02	0.05	0.04
2	Aminoglycosides	Oral	29	0.01	0.07	0.17
2	Aminoglycosides	Parenteral	36	0.00	0.06	0.05
2	Aminopenicillins	Oral	30	0.08	1.14	0.74
2	Aminopenicillins	Parenteral	6	0.07	0.15	0.10
2	Quinolones	Oral	50	0.00	0.00	0.31
2	Fixed-dose combinations	Parenteral	56	0.00	0.00	0.01
2	Long-acting macrolides	Parenteral	19	0.14	0.33	0.28
3	Fluoroquinolones	Oral	63	0.00	0.00	0.02
3	Fluoroquinolones	Parenteral	58	0.00	0.00	0.00
3	Polymyxins	Oral	63	0.00	0.00	0.00
3	Polymyxins	Parenteral	62	0.00	0.00	0.00

Dairy cattle farming sector

1. Antibiotic use in $DDDA_{NAT}$

Figure A33. $DDDA_{NAT}$ trends in the dairy cattle farming sector over the 2013-2021 period, by pharmacotherapeutic group



* In the poultry farming sector, all macrolides/lincosamides except for lincomycin and spiramycin are categorized as second-choice antibiotics. In other livestock sectors, only long-acting macrolides are categorized as second-choice antibiotics.

2. Antibiotic use in $DDDA_F$

Number of dairy cattle farms: 15,379
Number of dairy cattle farms with $DDDA_F$=0: 390 (2.5%)
Number of dairy cattle farms that used third- and fourth-generation cephalosporins: 35 (0.2%)
Number of dairy cattle farms that used fluoroquinolones: 931 (6.1%)
Number of dairy cattle farms that used polymyxins: 261 (1.7%)

Table A38. Antibiotic use at dairy cattle farms, presented as overall antibiotic use from 2012 to 2021 (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

* 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
15,379	1.2	1.1	1.8	2.5

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

N	Mean	Median	P75	P90
15,379	0.7	0.5	1.0	1.6

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

N	Mean	Median	P75	P90
15,379	1.8	0.0	0.0	4.0

Figure A34. 2012, 2020 and 2021 $DDDA_F$ distributions for dairy cattle farms

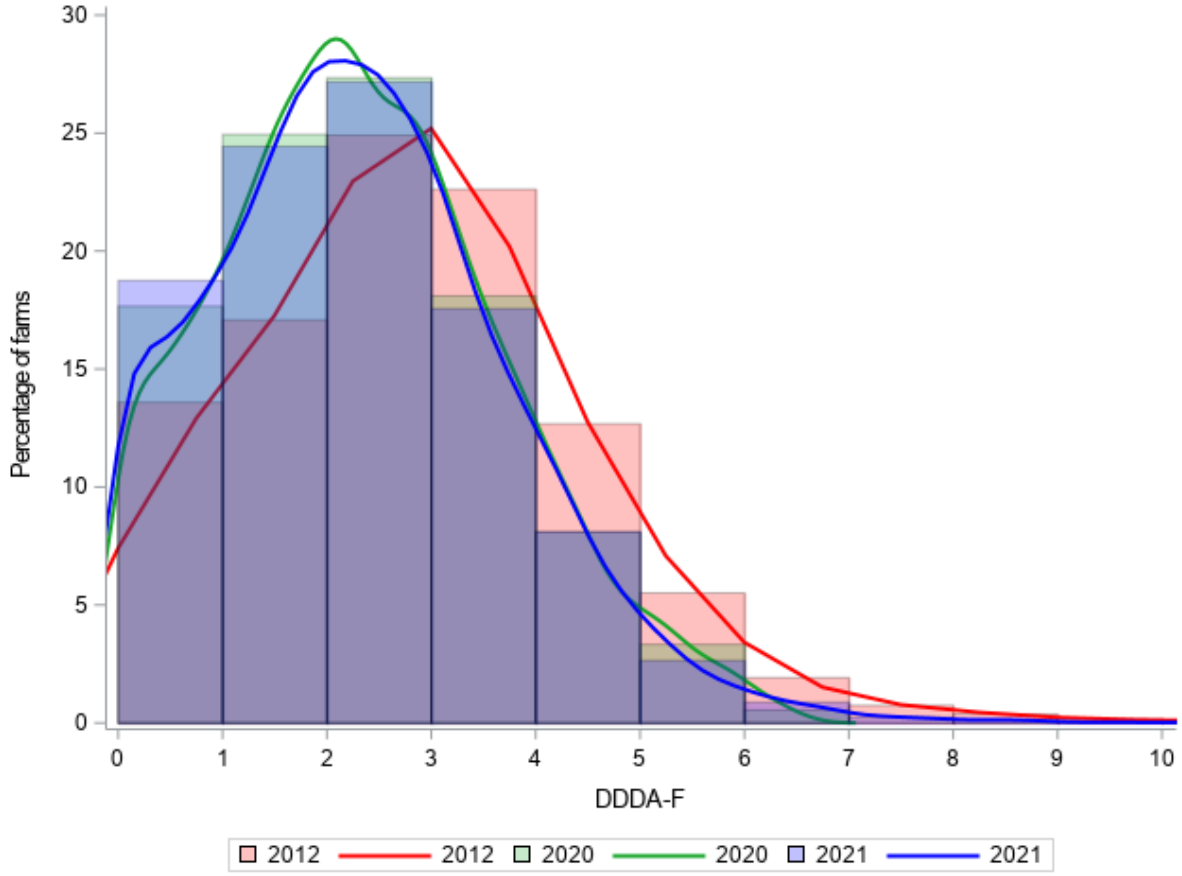


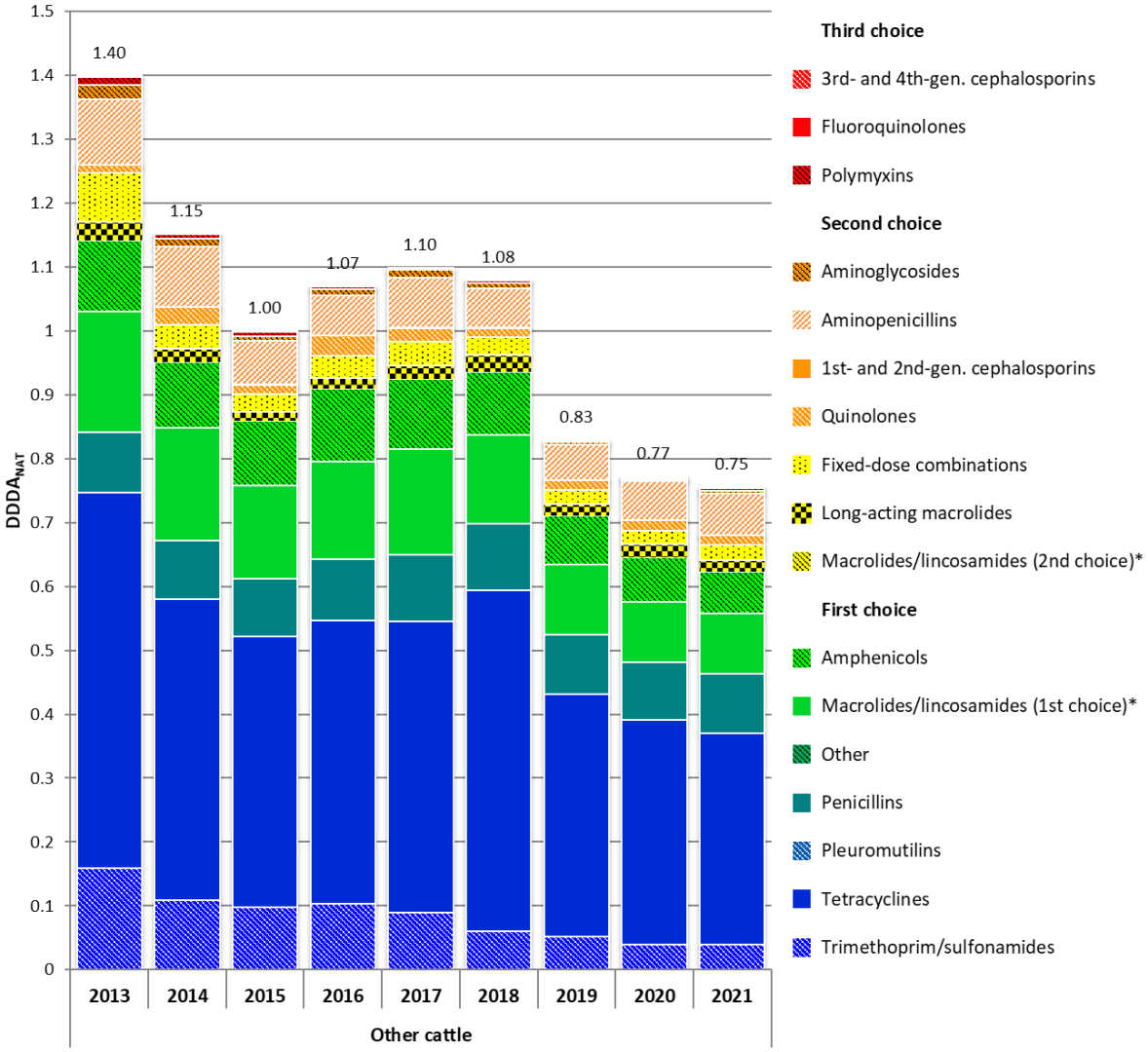
Table A39. Antibiotic use in $DDDA_F$ at dairy cattle farms in 2021, by pharmacotherapeutic group and route of administration

Category of antibiotics	Pharmacotherapeutic group	Route of administration	# of farms with $DDDA_F$=0	$DDDA_F$		
				Median	P75	Mean
1	Amphenicols	Parenteral	8,708	0.00	0.04	0.03
1	Macrolides/lincosamides	Intramammary	15,378	0.00	0.00	0.00
1	Macrolides/lincosamides	Oral	15,369	0.00	0.00	0.00
1	Macrolides/lincosamides	Parenteral	10,435	0.00	0.04	0.06
1	Penicillins	Intramammary	9,092	0.00	0.31	0.23
1	Penicillins	Intramammary for dry cow therapy	3,103	0.88	1.45	0.93
1	Penicillins	Parenteral	3,384	0.12	0.32	0.24
1	Tetracyclines	Oral	15,091	0.00	0.00	0.00
1	Tetracyclines	Parenteral	3,532	0.09	0.21	0.15
1	Tetracyclines	Intrauterine	8,317	0.00	0.07	0.05
1	Trimethoprim/sulfonamides	Oral	15,215	0.00	0.00	0.00
1	Trimethoprim/sulfonamides	Parenteral	2,875	0.12	0.26	0.18
2	Aminoglycosides	Oral	13,241	0.00	0.00	0.01
2	Aminoglycosides	Parenteral	14,992	0.00	0.00	0.00
2	Aminopenicillins	Intramammary	5,859	0.08	0.24	0.17
2	Aminopenicillins	Oral	15,371	0.00	0.00	0.00
2	Aminopenicillins	Parenteral	6,881	0.02	0.08	0.06
2	1st- and 2nd-gen. cephalosporins	Intramammary	14,841	0.00	0.00	0.01
2	1st- and 2nd-gen. cephalosporins	Intrauterine	11,946	0.00	0.00	0.01
2	Quinolones	Oral	15,374	0.00	0.00	0.00
2	Fixed-dose combinations	Intramammary	8,486	0.00	0.19	0.14
2	Fixed-dose combinations	Intramammary for dry cow therapy	14,912	0.00	0.00	0.02
2	Fixed-dose combinations	Parenteral	10,386	0.00	0.03	0.03
2	Long-acting macrolides	Parenteral	13,300	0.00	0.00	0.01
3	3rd- and 4th-gen. cephalosporins	Intramammary	15,352	0.00	0.00	0.00
3	3rd- and 4th-gen. cephalosporins	Intramammary for dry cow therapy	15,378	0.00	0.00	0.00
3	3rd- and 4th-gen. cephalosporins	Parenteral	15,363	0.00	0.00	0.00
3	Fluoroquinolones	Parenteral	14,448	0.00	0.00	0.00
3	Polymyxins	Oral	15,339	0.00	0.00	0.00
3	Polymyxins	Parenteral	15,157	0.00	0.00	0.00

Non-dairy cattle farming sector

1. Antibiotic use in $DDDA_{NAT}$

Figure A35. $DDDA_{NAT}$ trends in the non-dairy cattle farming sector over the 2013-2021 period, by pharmacotherapeutic group



* In the poultry farming sector, all macrolides/lincosamides except for lincomycin and spiramycin are categorized as second-choice antibiotics. In other livestock sectors, only long-acting macrolides are categorized as second-choice antibiotics.

2. Antibiotic use in $DDDA_F$

2.1 Suckler cow farms

Number of suckler cow farms: 7,540
Number of suckler cow farms with $DDDA_F$=0: 3,857 (51.2%)
Number of suckler cow farms that used third- and fourth-generation cephalosporins: 1 (0.0%)
Number of suckler cow farms that used fluoroquinolones: 87 (1.2%)
Number of suckler cow farms that used polymyxins: 29 (0.4%)

Table A40. Antibiotic use in $DDDA_F$ at suckler cow farms from 2012 to 2021*

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

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

Figure A36. 2012, 2020 and 2021 $DDDA_F$ distributions for suckler cow farms (no probability density functions can be shown due to too little variation)

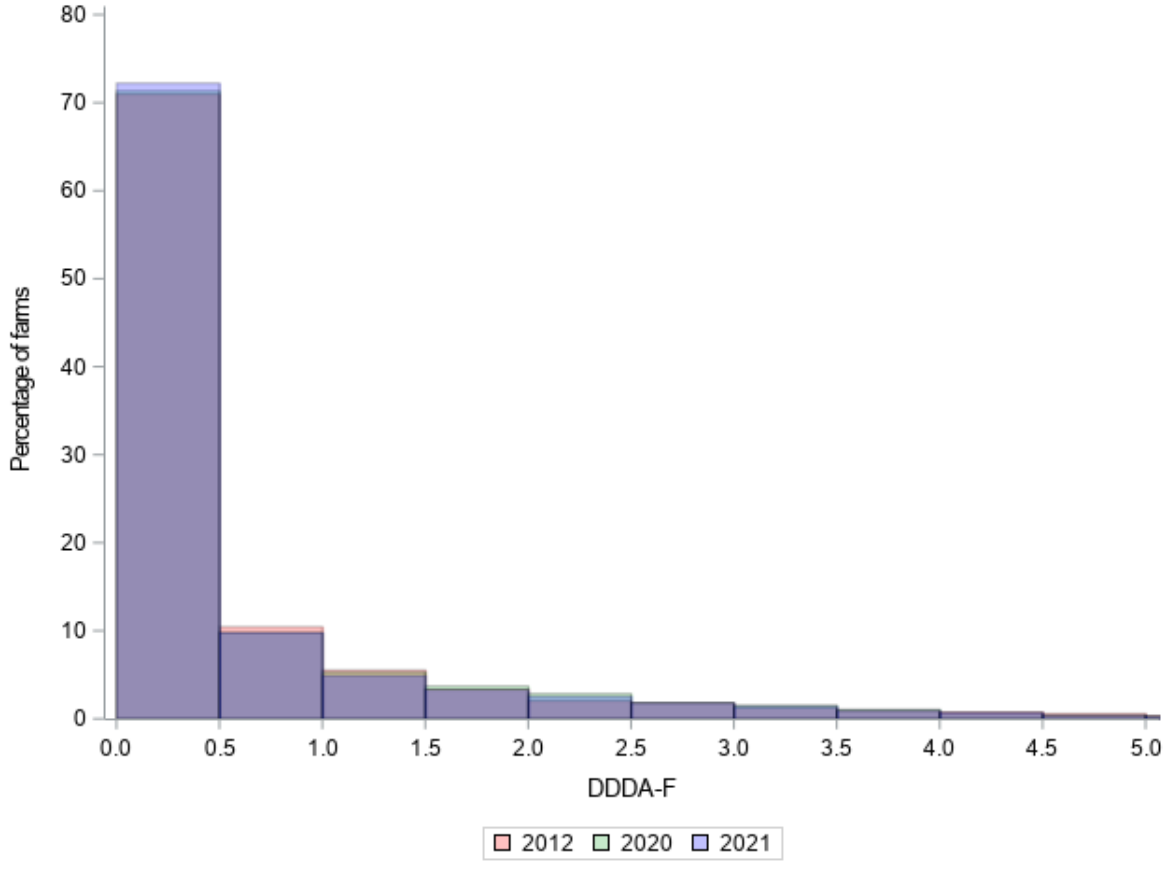


Table A41. Antibiotic use in $DDDA_F$ at suckler cow farms in 2021, by pharmacotherapeutic group and route of administration

Category of antibiotics	Pharmacotherapeutic group	Route of administration	# of farms with $DDDA_F$=0	$DDDA_F$		
				Median	P75	Mean
1	Amphenicols	Parenteral	6,479	0.00	0.00	0.04
1	Macrolides/lincosamides	Oral	7,537	0.00	0.00	0.00
1	Macrolides/lincosamides	Parenteral	7,250	0.00	0.00	0.01
1	Penicillins	Intramammary	7,458	0.00	0.00	0.01
1	Penicillins	Intramammary for dry cow therapy	7,341	0.00	0.00	0.03
1	Penicillins	Parenteral	5,554	0.00	0.06	0.22
1	Tetracyclines	Oral	7,490	0.00	0.00	0.01
1	Tetracyclines	Parenteral	6,393	0.00	0.00	0.06
1	Tetracyclines	Intrauterine	6,626	0.00	0.00	0.03
1	Trimethoprim/sulfonamides	Oral	7,525	0.00	0.00	0.00
1	Trimethoprim/sulfonamides	Parenteral	6,694	0.00	0.00	0.02
2	Aminoglycosides	Oral	7,445	0.00	0.00	0.00
2	Aminoglycosides	Parenteral	7,474	0.00	0.00	0.00
2	Aminopenicillins	Intramammary	7,350	0.00	0.00	0.01
2	Aminopenicillins	Oral	7,538	0.00	0.00	0.00
2	Aminopenicillins	Parenteral	6,420	0.00	0.00	0.06
2	1st- and 2nd-gen. cephalosporins	Intramammary	7,528	0.00	0.00	0.00
2	1st- and 2nd-gen. cephalosporins	Intrauterine	7,468	0.00	0.00	0.00
2	Quinolones	Oral	7,539	0.00	0.00	0.00
2	Fixed-dose combinations	Intramammary	7,407	0.00	0.00	0.01
2	Fixed-dose combinations	Intramammary for dry cow therapy	7,529	0.00	0.00	0.00
2	Fixed-dose combinations	Parenteral	6,567	0.00	0.00	0.09
2	Long-acting macrolides	Parenteral	7,045	0.00	0.00	0.03
3	3rd- and 4th-gen. cephalosporins	Parenteral	7,539	0.00	0.00	0.00
3	Fluoroquinolones	Parenteral	7,453	0.00	0.00	0.00
3	Polymyxins	Oral	7,539	0.00	0.00	0.00
3	Polymyxins	Parenteral	7,512	0.00	0.00	0.00

2.2 Rearing farms

Number of rearing farms: 664
Number of rearing farms with $DDDA_F$=0: 480 (72.3%)
Number of rearing farms that used third- and fourth-generation cephalosporins: 0 (0.0%)
Number of rearing farms that used fluoroquinolones: 1 (0.2%)
Number of rearing farms that used polymyxins: 0 (0.0%)

Table A42. Antibiotic use in $DDDA_F$ at rearing farms from 2012 to 2021*

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

* 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 A37. 2013, 2020 and 2021 $DDDA_F$ distributions for rearing farms (no probability density functions can be shown due to too little variation)

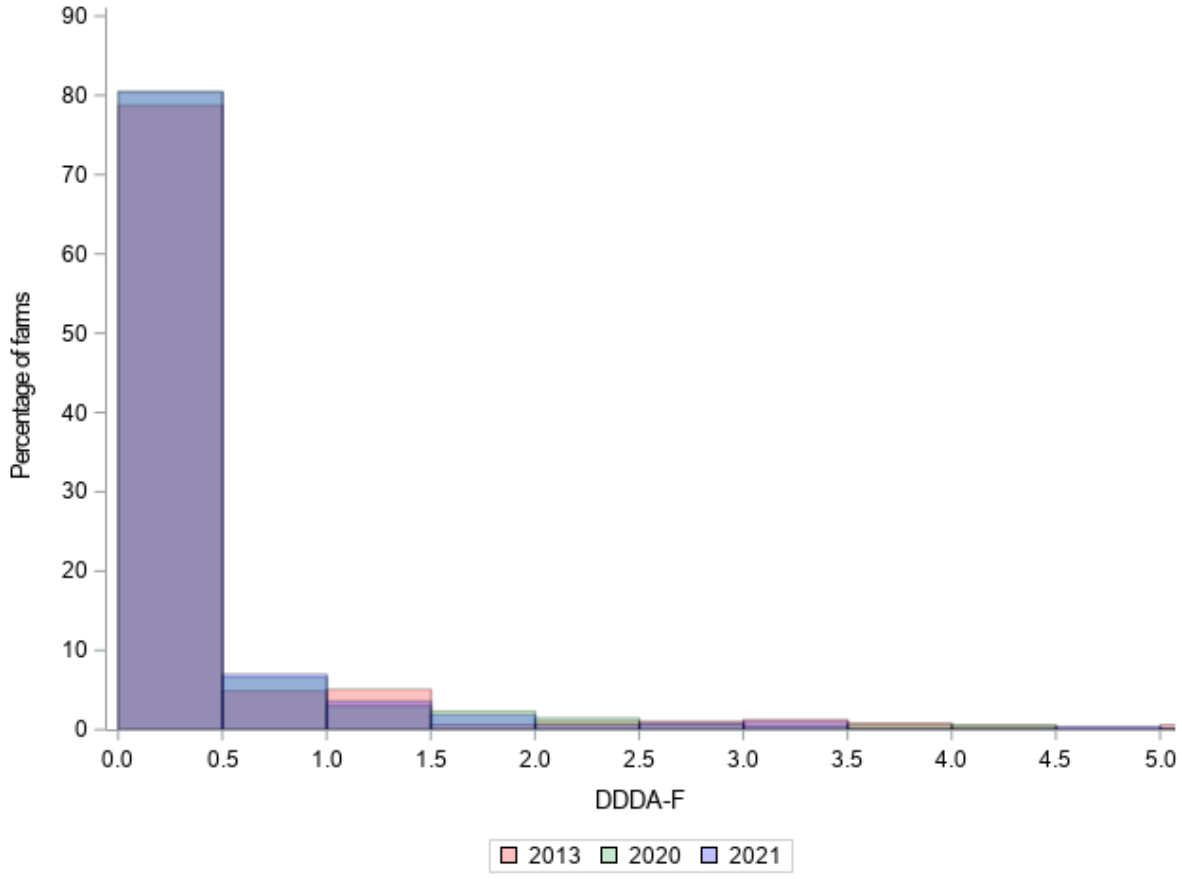


Table A43. Antibiotic use in $DDDA_F$ at rearing farms in 2021, by pharmacotherapeutic group and route of administration

Category of antibiotics	Pharmacotherapeutic group	Route of administration	# of farms with $DDDA_F$=0	$DDDA_F$		
				Median	P75	Mean
1	Amphenicols	Parenteral	546	0.00	0.00	0.14
1	Macrolides/lincosamides	Oral	655	0.00	0.00	0.10
1	Macrolides/lincosamides	Parenteral	648	0.00	0.00	0.00
1	Penicillins	Intramammary	663	0.00	0.00	0.00
1	Penicillins	Intramammary for dry cow therapy	663	0.00	0.00	0.01
1	Penicillins	Parenteral	584	0.00	0.00	0.10
1	Tetracyclines	Oral	639	0.00	0.00	0.31
1	Tetracyclines	Parenteral	617	0.00	0.00	0.05
1	Tetracyclines	Intrauterine	663	0.00	0.00	0.00
1	Trimethoprim/sulfonamides	Oral	660	0.00	0.00	0.02
1	Trimethoprim/sulfonamides	Parenteral	629	0.00	0.00	0.02
2	Aminoglycosides	Oral	654	0.00	0.00	0.00
2	Aminoglycosides	Parenteral	660	0.00	0.00	0.00
2	Aminopenicillins	Intramammary	663	0.00	0.00	0.00
2	Aminopenicillins	Oral	660	0.00	0.00	0.01
2	Aminopenicillins	Parenteral	631	0.00	0.00	0.01
2	Quinolones	Oral	663	0.00	0.00	0.00
2	Fixed-dose combinations	Parenteral	653	0.00	0.00	0.01
2	Long-acting macrolides	Parenteral	624	0.00	0.00	0.05
3	Fluoroquinolones	Parenteral	663	0.00	0.00	0.00

2.3 Beef farms

Number of beef farms: 2,589
Number of beef farms with $DDDA_F$=0: 1,782 (68.8%)
Number of beef farms that used third- and fourth-generation cephalosporins: 0 (0.0%)
Number of beef farms that used fluoroquinolones: 18 (0.7%)
Number of beef farms that used polymyxins: 16 (0.6%)

Table A44. Antibiotic use in $DDDA_F$ at beef farms from 2012 to 2021*

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

* 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 A38. 2013, 2020 and 2021 $DDDA_F$ distributions for beef farms (no probability density functions can be shown due to too little variation)

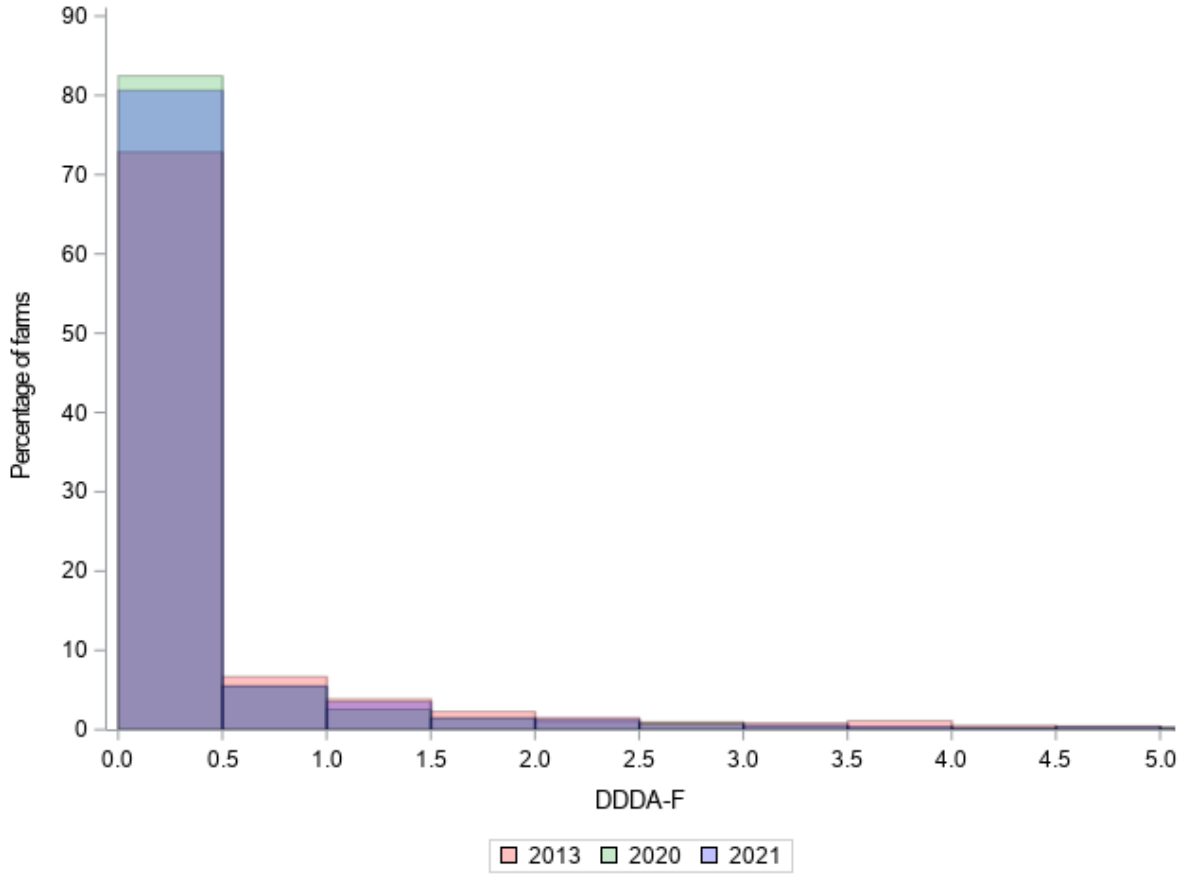


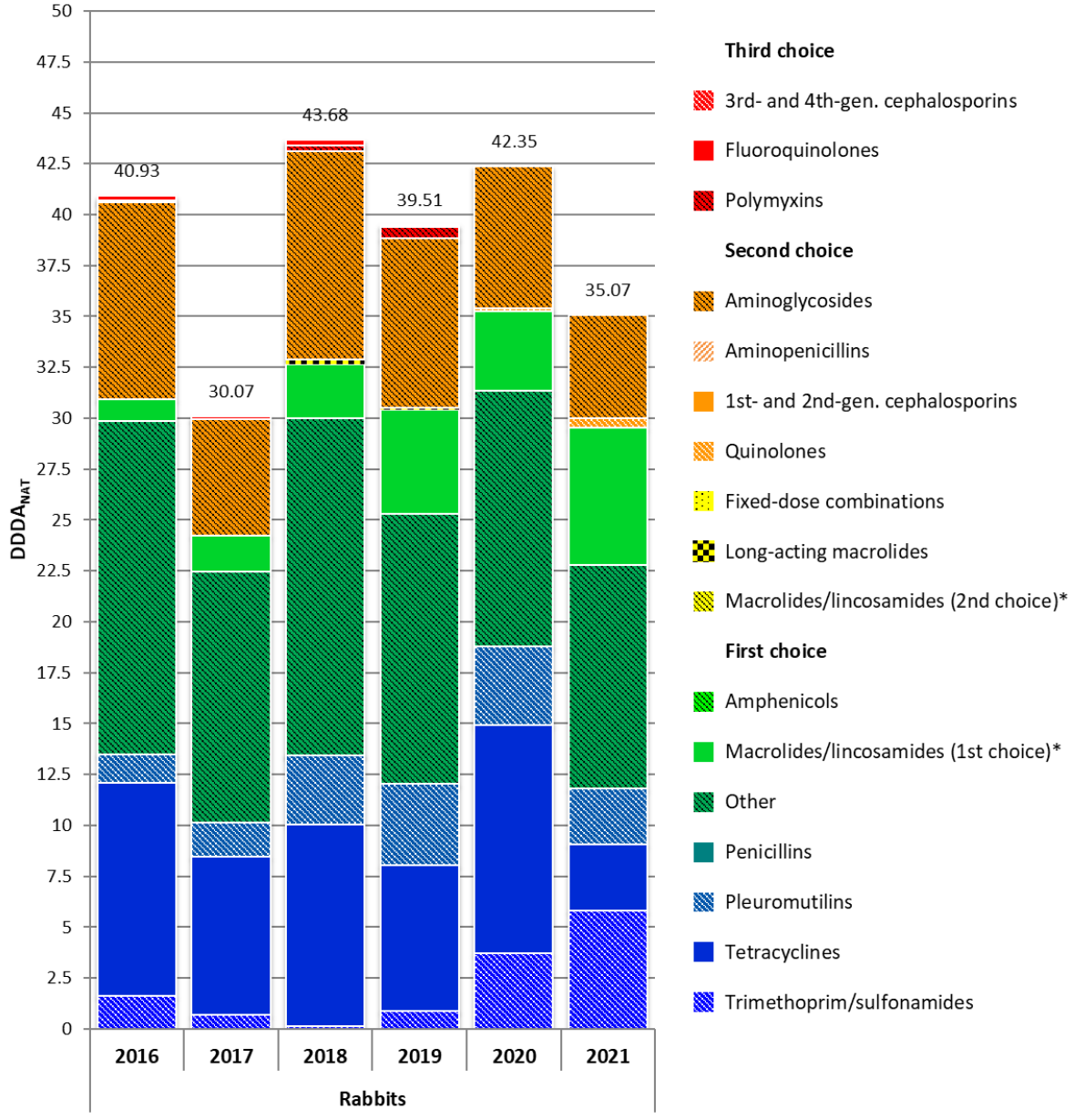
Table A45. Antibiotic use in $DDDA_F$ at beef farms in 2021, by pharmacotherapeutic group and route of administration

Category of antibiotics	Pharmacotherapeutic group	Route of administration	# of farms with $DDDA_F$=0	$DDDA_F$		
				Median	P75	Mean
1	Amphenicols	Parenteral	2,125	0.00	0.00	0.11
1	Macrolides/lincosamides	Oral	2,471	0.00	0.00	0.12
1	Macrolides/lincosamides	Parenteral	2,448	0.00	0.00	0.01
1	Penicillins	Intramammary	2,581	0.00	0.00	0.00
1	Penicillins	Intramammary for dry cow therapy	2,570	0.00	0.00	0.00
1	Penicillins	Parenteral	2,158	0.00	0.00	0.28
1	Tetracyclines	Oral	2,399	0.00	0.00	0.39
1	Tetracyclines	Parenteral	2,319	0.00	0.00	0.03
1	Tetracyclines	Intrauterine	2,506	0.00	0.00	0.00
1	Trimethoprim/sulfonamides	Oral	2,531	0.00	0.00	0.04
1	Trimethoprim/sulfonamides	Parenteral	2,381	0.00	0.00	0.01
2	Aminoglycosides	Oral	2,535	0.00	0.00	0.00
2	Aminoglycosides	Parenteral	2,558	0.00	0.00	0.00
2	Aminopenicillins	Intramammary	2,576	0.00	0.00	0.00
2	Aminopenicillins	Oral	2,540	0.00	0.00	0.04
2	Aminopenicillins	Parenteral	2,275	0.00	0.00	0.02
2	1st- and 2nd-gen. cephalosporins	Intrauterine	2,583	0.00	0.00	0.00
2	Quinolones	Oral	2,564	0.00	0.00	0.01
2	Fixed-dose combinations	Intramammary	2,580	0.00	0.00	0.00
2	Fixed-dose combinations	Intramammary for dry cow therapy	2,587	0.00	0.00	0.00
2	Fixed-dose combinations	Parenteral	2,441	0.00	0.00	0.02
2	Long-acting macrolides	Parenteral	2,356	0.00	0.00	0.03
3	Fluoroquinolones	Parenteral	2,571	0.00	0.00	0.00
3	Polymyxins	Oral	2,587	0.00	0.00	0.00
3	Polymyxins	Parenteral	2,574	0.00	0.00	0.00

Rabbit farming sector

1. Antibiotic use in $DDDA_{NAT}$

Figure A39. $DDDA_{NAT}$ trends in the rabbit farming sector over the 2016-2021 period, by pharmacotherapeutic group



* In the poultry farming sector, all macrolides/lincosamides except for lincomycin and spiramycin are categorized as second-choice antibiotics. In other livestock sectors, only long-acting macrolides are categorized as second-choice antibiotics.

2. Antibiotic use in $DDDA_F$

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

Table A46. Antibiotic use in $DDDA_F$ at rabbit farms from 2016 to 2021*

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

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

Figure A40. 2016, 2020 and 2021 $DDDA_F$ distributions for rabbit farms

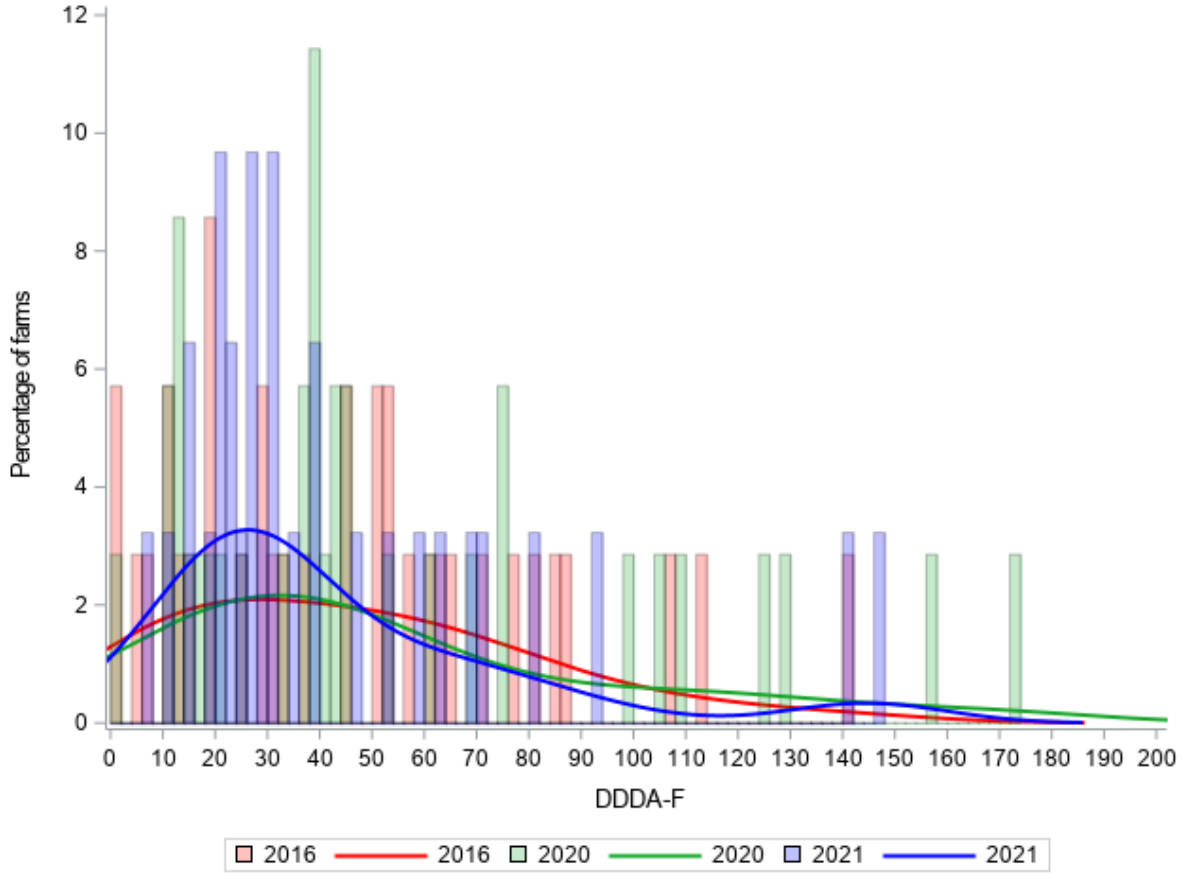


Table A47. Antibiotic use in $DDDA_F$ at rabbit farms in 2021, by pharmacotherapeutic group and route of administration

Category of antibiotics	Pharmacotherapeutic group	Route of administration	# of farms with $DDDA_F$=0	$DDDA_F$		
				Median	P75	Mean
1	Macrolides/lincosamides	Oral	13	2.97	10.84	6.28
1	Other	Oral	5	7.02	20.39	14.84
1	Pleuromutilins	Oral	13	1.20	5.40	3.01
1	Tetracyclines	Oral	22	0.00	1.51	1.31
1	Tetracyclines	Parenteral	11	0.93	3.47	1.84
1	Trimethoprim/sulfonamides	Oral	21	0.00	4.89	10.28
1	Trimethoprim/sulfonamides	Parenteral	30	0.00	0.00	0.01
2	Aminoglycosides	Oral	16	0.00	7.65	5.41
2	Quinolones	Oral	29	0.00	0.00	0.42

Dairy goat farming sector

1. Antibiotic use in $DDDA_F$

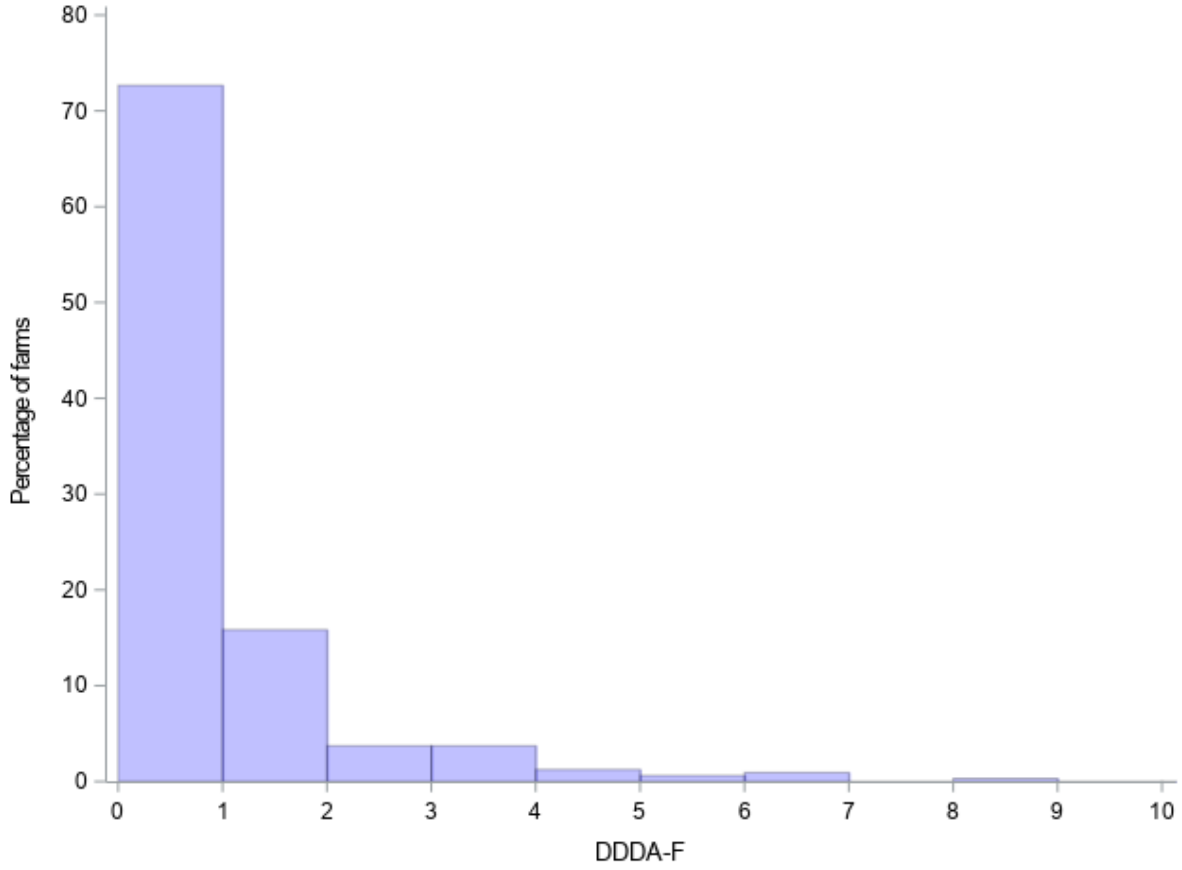
Number of dairy goat farms: 322
Number of dairy goat farms with $DDDA_F$=0: 62 (19.3%)
Number of dairy goat farms that used third- and fourth-generation cephalosporins: 0 (0.0%)
Number of dairy goat farms that used fluoroquinolones: 4 (1.2%)
Number of dairy goat farms that used polymyxins: 0 (0.0%)

Table A48. Antibiotic use in $DDDA_F$ at dairy goat farms in 2021

Year	N	Mean	Median	P75	P90
2021*	322	1.2	0.4	1.1	2.1

* Estimated to include data from 70-85% of all dairy goat farms.

Figure A41. 2021 $DDDA_F$ distribution for dairy goat farms



Colistin usage data

Table A49. Colistin usage data in $DDDA_F$ for 2021, by type of farm/production category. Descriptive statistics are provided for the livestock farms that used colistin, and for all livestock farms combined. M=mean, Mdn=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	M	Mdn	P75	P95	N	M	Mdn	P75	P95
Broiler farming sector	Broiler farms	0.4%	3	1.4	1.4	1.9	1.9	805	0.0	0.0	0.0	0.0
	- Farms with conventional breeds	0.8%	3	1.4	1.4	1.9	1.9	363	0.0	0.0	0.0	0.0
	- Farms with alternative breeds	0.0%	0	0.0	0.0	0.0	0.0	560	0.0	0.0	0.0	0.0
	Parent/grandparent stock rearing farms	0.0%	0	0.0	0.0	0.0	0.0	90	0.0	0.0	0.0	0.0
	Parent/grandparent stock production farms	0.5%	1	0.9	0.9	0.9	0.9	209	0.0	0.0	0.0	0.0
Layer farming sector	Layer farms	13.0%	107	6.5	5.8	8.7	14.8	824	0.8	0.0	0.0	6.8
	Pullet rearing farms	0.0%	0	0.0	0.0	0.0	0.0	175	0.0	0.0	0.0	0.0
	Parent/grandparent stock rearing farms	0.0%	0	0.0	0.0	0.0	0.0	21	0.0	0.0	0.0	0.0
	Parent/grandparent stock production farms	1.9%	1	9.3	9.3	9.3	9.3	53	0.2	0.0	0.0	0.0
Turkey farming sector	Turkey farms	0.0%	0	0.0	0.0	0.0	0.0	32	0.0	0.0	0.0	0.0
Pig farming sector	Sows/suckling piglets	29.8%	446	0.2	0.1	0.3	1.0	1,498	0.1	0.0	0.0	0.4
	Weaner pigs	26.4%	440	6.6	1.8	4.6	17.3	1,668	1.7	0.0	0.1	6.2
	Fattening pigs	2.6%	83	0.4	0.1	0.4	1.7	3,142	0.0	0.0	0.0	0.0
Veal farming sector	White veal farms	7.1%	57	0.4	0.0	0.1	2.9	798	0.0	0.0	0.0	0.0
	Rosé veal starter farms	2.7%	5	1.1	0.1	0.1	5.0	185	0.0	0.0	0.0	0.0
	Rosé veal fattening farms	1.0%	6	0.1	0.0	0.0	0.5	579	0.0	0.0	0.0	0.0
	Rosé veal combination farms	4.7%	3	0.1	0.0	0.3	0.3	64	0.0	0.0	0.0	0.0
Cattle farming sector	Dairy cattle farms	1.7%	261	0.1	0.0	0.1	0.3	15,379	0.0	0.0	0.0	0.0
	Rearing farms	0.0%	0	0.0	0.0	0.0	0.0	664	0.0	0.0	0.0	0.0
	Suckler cow farms	0.4%	29	0.1	0.1	0.2	0.3	7,540	0.0	0.0	0.0	0.0
	Beef farms	0.6%	16	0.5	0.0	0.3	2.9	2,589	0.0	0.0	0.0	0.0
Rabbit farming sector	Rabbit farms	0.0%	0	0.0	0.0	0.0	0.0	32	0.0	0.0	0.0	0.0

VBI data according to the new, DDDA-based benchmarking method for veterinarians

Table A50. 2021 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 2021 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	74	4.1	4.0	6.2	8.4
	Farms with alternative breeds	8	74	1.1	0.4	1.5	2.7
Turkey farming sector	Turkey farms	10	8	11.4	8.8	11.4	45.9
Pig farming sector	Sows/suckling piglets	5	169	2.2	2.1	2.8	3.7
	Weaner pigs	20	171	8.2	6.6	12.7	16.9
	Fattening pigs	5	203	2.3	2.2	2.9	4.1
Veal farming sector	White veal farms	23	55	16.7	16.4	17.9	21.4
	Rosé veal starter farms	67	43	53.1	51.5	62.5	68.1
	Rosé veal fattening farms	4	98	1.4	0.9	1.8	3.3
	Rosé veal combination farms	12	19	8.4	8.6	11.6	12.2
Cattle farming sector	Dairy cattle farms	5	693	2.5	2.4	2.8	3.1
	Non-dairy cattle farms	2	685	0.5	0.4	0.7	1.3

Table A51. 2021 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	14 + 26	74	7.2	7.1	12.2	15.7
	Farms with alternative breeds	8 + 15	75	1.2	0.5	1.6	3.9
Turkey farming sector	Turkey farms	14 + 20	8	11.3	8.8	11.4	44.9
Pig farming sector	Sows/suckling piglets	7	171	2.7	2.5	3.6	5.2
	Weaner pigs	20 + 30	172	9.9	8.2	15.5	20.7
	Fattening pigs	7	203	2.9	2.8	3.7	5.2

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

Numbers of animals in the Dutch livestock sector

Table A52. Numbers of agricultural livestock (x1,000) in the Netherlands from 2009 to 2021, 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
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
Sows	1,100	1,098	1,106	1,081	1,095	1,106	1,053	1,022	1,066	967	1,047	926	910
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
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
Turkeys	1,060	1,036	990	827	841	794	863	762	671	556	532	585	604
All chickens combined	98,706	102,585	98,253	96,268	98,587	103,944	107,743	105,550	105,184	105,104	101,741	101,184	99,881
With broilers accounting for	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
Veal calves	894	928	906	908	925	921	909	956	953	1,017	1,066	1,071	1,047
All cattle combined	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
With dairy cattle accounting for	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
Goats	374	353	380	397	413	431	470	500	533	588	615	633	643
Sheep	1,091	1,211	1,113	1,093	1,074	1,070	1,032	1,040	1,015	743	758	708	729
Weaned meat rabbits	271	260	262	284	270	278	333	318	300	291	289	297	283
Breeding does	41	39	39	43	41	43	48	45	43	41	48	38	38

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

Table A53. Antibiotic use in terms of DDD_{VET}/animal-year from 2017 to 2021, by livestock sector (intramammary and intrauterine use of antibiotics not included)

	Broiler farming sector					Turkey farming sector					Pig farming sector				
Pharmacotherapeutic group	**2017**	**2018**	**2019**	**2020**	**2021**	**2017**	**2018**	**2019**	**2020**	**2021**	**2017**	**2018**	**2019**	**2020**	**2021**
1st-choice antibiotics	**3.79**	**3.73**	**3.86**	**3.76**	**2.73**	**11.37**	**15.15**	**15.43**	**12.83**	**10.21**	**6.62**	**6.64**	**6.30**	**6.11**	**4.86**
As a proportion of overall AB use	**35.15%**	**32.78%**	**34.55%**	**35.62%**	**37.15%**	**49.48%**	**60.76%**	**57.68%**	**71.14%**	**62.48%**	**77.72%**	**77.73%**	**78.89%**	**74.58%**	**72.45%**
Amphenicols	*	*	*	*	*	*	*	*	*	*	0.19	0.19	0.19	0.23	0.22
Macrolides/lincosamides	0.09	0.07	0.05	0.11	0.15	*	*	*	*	*	0.85	0.85	0.95	0.85	0.44
Penicillins	0.58	0.43	0.86	0.87	0.57	1.61	2.58	1.58	0.81	0.94	0.54	0.56	0.49	0.49	0.46
Pleuromutilins	*	*	*	*	*	0.14	0.17	0.00	*	0.13	0.10	0.13	0.10	0.04	0.02
Tetracyclines	1.27	1.42	1.17	1.32	0.77	9.20	11.98	13.42	11.83	8.98	3.42	3.25	2.96	2.95	2.32
Trimethoprim/sulfonamides	1.86	1.81	1.78	1.46	1.25	0.42	0.43	0.43	0.19	0.16	1.51	1.65	1.60	1.55	1.39
2nd-choice antibiotics	**6.92**	**7.57**	**7.24**	**6.73**	**4.60**	**10.54**	**9.04**	**10.72**	**4.74**	**5.75**	**1.59**	**1.53**	**1.30**	**1.66**	**1.50**
As a proportion of overall AB use	**64.17%**	**66.42%**	**64.80%**	**63.76%**	**62.60%**	**45.89%**	**36.24%**	**40.07%**	**26.30%**	**35.17%**	**18.64%**	**17.93%**	**16.25%**	**20.25%**	**22.39%**
Aminoglycosides	0.03	0.01	0.01	0.00	0.00	0.01	0.01	0.00	0.02	*	0.00	0.01	0.01	0.01	0.01
Aminopenicillins	5.53	5.74	5.91	5.49	3.63	8.95	7.44	8.81	3.79	3.61	1.01	0.94	0.78	0.98	0.84
1st- and 2nd-gen. cephalosporins	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Quinolones	1.23	1.64	1.16	1.12	0.88	0.19	0.13	0.11	*	0.23	0.02	0.02	0.03	0.02	0.01
Fixed-dose combinations	0.02	0.03	0.01	0.02	0.02	*	*	*	*	*	0.03	0.02	0.02	0.02	0.02
Long-acting macrolides	*	*	*	*	*	*	*	*	*	*	0.53	0.55	0.45	0.64	0.58
Macrolides/lincosamides	0.11	0.15	0.16	0.10	0.07	1.40	1.46	1.80	0.93	1.91	*	*	*	*	0.05
3rd-choice antibiotics	**0.07**	**0.09**	**0.07**	**0.07**	**0.02**	**1.06**	**0.75**	**0.60**	**0.46**	**0.38**	**0.31**	**0.37**	**0.39**	**0.42**	**0.35**
As a proportion of overall AB use	**0.68%**	**0.80%**	**0.65%**	**0.62%**	**0.25%**	**4.63%**	**2.99%**	**2.25%**	**2.56%**	**2.35%**	**3.64%**	**4.33%**	**4.86%**	**5.17%**	**5.16%**
3rd- and 4th-gen. cephalosporins	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Fluoroquinolones	0.05	0.06	0.04	0.03	0.01	1.06	0.75	0.59	0.46	0.38	0.00	0.00	0.00	0.00	0.00
Polymyxins	0.02	0.03	0.03	0.03	0.01	0.00	0.00	0.01	*	*	0.31	0.37	0.39	0.42	0.35
Overall antibiotic use	**10.78**	**11.39**	**11.17**	**10.56**	**7.36**	**22.98**	**24.94**	**26.75**	**18.03**	**16.34**	**8.52**	**8.54**	**7.99**	**8.20**	**6.70**

Table A53 (continued)

	Dairy cattle farming sector					Veal farming sector					Non-dairy cattle farming sector				
Pharmacotherapeutic group	**2017**	**2018**	**2019**	**2020**	**2021**	**2017**	**2018**	**2019**	**2020**	**2021**	**2017**	**2018**	**2019**	**2020**	**2021**
1st-choice antibiotics	**0.92**	**0.93**	**0.86**	**0.92**	**0.89**	**18.52**	**16.82**	**14.43**	**13.24**	**13.48**	**0.95**	**0.92**	**0.68**	**0.61**	**0.58**
As a proportion of overall AB use	**89.76%**	**88.69%**	**87.11%**	**85.08%**	**83.32%**	**87.61%**	**88.07%**	**86.93%**	**86.23%**	**87.76%**	**86.12%**	**88.58%**	**86.82%**	**84.81%**	**83.32%**
Amphenicols	0.04	0.04	0.04	0.04	0.04	1.11	1.03	0.98	0.86	0.82	0.08	0.08	0.06	0.05	0.05
Macrolides/lincosamides	0.03	0.03	0.03	0.05	0.05	3.94	3.68	3.50	3.22	3.32	0.19	0.16	0.13	0.11	0.11
Penicillins	0.15	0.17	0.17	0.19	0.18	0.26	0.24	0.21	0.20	0.18	0.05	0.04	0.04	0.04	0.04
Pleuromutilins	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Tetracyclines	0.22	0.22	0.21	0.23	0.22	10.61	9.84	7.79	7.38	7.64	0.48	0.54	0.37	0.35	0.31
Trimethoprim/sulfonamides	0.48	0.48	0.41	0.42	0.41	2.61	2.03	1.94	1.58	1.52	0.15	0.10	0.09	0.07	0.07
2nd-choice antibiotics	**0.10**	**0.11**	**0.12**	**0.15**	**0.17**	**2.57**	**2.24**	**2.15**	**2.09**	**1.84**	**0.15**	**0.11**	**0.10**	**0.11**	**0.11**
As a proportion of overall AB use	**9.53%**	**10.59%**	**12.18%**	**14.11%**	**15.99%**	**12.13%**	**11.71%**	**12.95%**	**13.61%**	**12.01%**	**13.65%**	**10.94%**	**12.76%**	**14.60%**	**15.90%**
Aminoglycosides	0.01	0.01	0.01	0.01	0.01	0.09	0.08	0.07	0.06	0.07	0.01	0.00	0.00	0.00	0.00
Aminopenicillins	0.05	0.07	0.09	0.11	0.12	1.59	1.50	1.39	1.35	1.22	0.07	0.06	0.05	0.06	0.06
1st- and 2nd-gen. cephalosporins	*	0.00	*	*	*	*	*	*	*	*	*	0.00	*	*	*
Quinolones	0.00	0.00	0.00	0.00	0.00	0.74	0.47	0.52	0.55	0.43	0.03	0.02	0.02	0.02	0.02
Fixed-dose combinations	0.04	0.02	0.02	0.02	0.04	0.01	0.00	0.00	0.00	0.00	0.03	0.02	0.01	0.01	0.02
Long-acting macrolides	0.01	0.01	0.01	0.01	0.01	0.14	0.18	0.16	0.13	0.12	0.01	0.02	0.01	0.01	0.01
Macrolides/lincosamides	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
3rd-choice antibiotics	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.06**	**0.04**	**0.02**	**0.02**	**0.04**	**0.00**	**0.00**	**0.00**	**0.00**	**0.01**
As a proportion of overall AB use	**0.70%**	**0.72%**	**0.71%**	**0.81%**	**0.69%**	**0.26%**	**0.22%**	**0.12%**	**0.16%**	**0.23%**	**0.23%**	**0.47%**	**0.42%**	**0.59%**	**0.78%**
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	0.03	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00
Polymyxins	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.01	0.02	0.03	0.00	0.00	0.00	0.00	0.00
Overall antibiotic use	**1.03**	**1.05**	**0.99**	**1.09**	**1.07**	**21.15**	**19.10**	**16.60**	**15.36**	**15.36**	**1.10**	**1.04**	**0.79**	**0.72**	**0.69**

Phased implementation of the new benchmark thresholds

Table A54. The transitional benchmark thresholds for farms with sows and piglets agreed between the pig farming sector and the Ministry of Agriculture, Nature and Food Quality

Year	Signaling threshold	Action threshold
2020	7	10
2021	-	7
2022	-	5

Table A55. The transitional benchmark thresholds for farms with fattening pigs agreed between the pig farming sector and the Ministry of Agriculture, Nature and Food Quality

Year	Signaling threshold	Action threshold
2020	7	10
2021	-	7
2022	-	5

Table A56. The transitional benchmark thresholds for farms with weaner pigs agreed between the pig farming sector and the Ministry of Agriculture, Nature and Food Quality

Year	Signaling threshold	Action threshold
2020	20	40
2021	20	30
2022	-	20

Table A57. 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	Years	Signaling threshold	Action threshold
1	2019-2021	14	26
2	2022-2023	12	24
3	2024-2025	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 in order to determine whether it is feasible for broiler farms with conventional breeds to enter the next phase.

Table A58. The transitional benchmark thresholds for broiler farms with alternative breeds agreed between the broiler farming sector and the Ministry of Agriculture, Nature and Food Quality*

Phase	Years	Signaling threshold	Action threshold
1	2019-2021	8	15
2 and 3	2022-2025	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 in order to determine whether it is feasible for broiler farms with alternative breeds to enter the next phase.

Table A59. The transitional benchmark thresholds for turkey farms agreed between the turkey farming sector and the Ministry of Agriculture, Nature and Food Quality*

Phase	Years	Signaling threshold	Action threshold
1	2021-2022	14	20
2	2023-2024	12	16
3	2025-2026	10	12
4	2027-	-	10

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

Table A60. 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 A61. Livestock sectors' progress towards their government-defined reduction targets. The reduction targets were introduced in order 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

		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)**			
Livestock sector	**Type of farm/production category**	**2018**	**2019**	**2020**	**2021**	**2018**	**2019**	**2020**	**2021**
Broiler farming sector	Broiler farms	-15.9%	11.4%	-13.6%	-75.0%	-14.1%	15.9%	-9.8%	-73.5%
	- Farms with conventional breeds	0.0%	-21.7%	-28.3%	-61.7%	-2.2%	-16.2%	-11.4%	-48.6%
	- Farms with alternative breeds	-16.7%	-83.3%	-33.3%	-83.3%	-13.5%	-82.6%	-37.4%	-85.3%
Turkey farming sector	Turkey farms	0.0%	-44.4%	-88.9%	-77.8%	18.4%	-41.9%	-88.4%	-74.4%
Pig farming sector	Sows/suckling piglets	-3.7%	-24.3%	-36.0%	-57.4%	0.3%	-15.4%	-24.6%	-47.2%
	Weaner pigs	-10.3%	-25.3%	-24.1%	-45.0%	-5.9%	-17.0%	-12.1%	-32.8%
	Fattening pigs	-2.3%	-5.7%	-34.9%	-68.1%	3.5%	7.8%	-18.3%	-53.5%
Veal farming sector	White veal farms	-52.9%	-61.8%	-70.6%	-76.5%	-53.9%	-61.1%	-69.7%	-75.3%
	Rosé veal starter farms	-2.9%	-52.9%	-85.3%	-67.6%	-9.8%	-46.7%	-82.2%	-58.4%
	Rosé veal fattening farms	-5.5%	142.5%	115.1%	94.5%	-8.8%	92.1%	83.4%	94.9%
	Rosé veal combination farms	-19.2%	-34.6%	-50.0%	-53.8%	-7.9%	61.2%	43.2%	52.9%

* 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 A62. 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 A63. 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
	Alternative broilers	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

[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 2: 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.

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Appendix to the report
Usage of Antibiotics in Agricultural Livestock in the Netherlands in 2021
Trends and benchmarking of livestock farms and veterinarians
SDa/1157/2022
The Netherlands Veterinary Medicines Institute, 2022