Center for Veterinary Medicine
Protecting Public and Animal Health

DEPARTMENT OF HEALTH & HUMAN SERVICES · USA
FDA

2004 Retail Meat Report

National Antimicrobial Resistance Monitoring System

NARMS

ABBREVIATIONS USED IN THE REPORT, 2004

AR	Antimicrobial Resistance
BAP	Blood Agar Plate
CCA	Campy-Cefex Agar Plate
CDC	Centers for Disease Control and Prevention
CVM	Center for Veterinary Medicine
EAP	Enterococcosel Agar Plate
EIP	Emerging Infections Program
EMB	Eosin Methylene Blue
FDA	Food and Drug Administration
FoodNet	Foodborne Disease Active Surveillance Network
MIC	Minimum Inhibitory Concentration
NARMS	National Antimicrobial Resistance Monitoring System
CLSI	Clinical and Laboratory Standards Institute
PCR	Polymerase Chain Reaction
PFGE	Pulsed Field Gel Electrophoresis
PulseNet	The National Molecular Subtyping Network for Foodborne Disease Surveillance
QC	Quality Control
RVR10	Rappaport-Vassiliadis
USDA	United States Department of Agriculture
XLD	Xylose Lysine Deoxycholate

Antimicrobial Abbreviations:

AMC	Amoxicillin/Clavulanic Acid	FOX	Cefoxitin
AMI	Amikacin	GEN	Gentamicin
AMP	Ampicillin	KAN	Kanamycin
AXO	Ceftriaxone	LIN	Lincomycin
AZI	Azithromycin	LZD	Linezolid
BAC	Bacitracin	NAL	Nalidixic Acid
CHL	Chloramphenicol	NIT	Nitrofurantoin
CIP	Ciprofloxacin	PEN	Penicillin
CLI	Clindamycin	QDA	Quinupristin/Dalfopristin
COT	Trimethoprim/Sulfamethoxazole	STR	Streptomycin
DAP	Daptomycin	TEL	Telithromycin
ERY	Erythromycin	TET	Tetracycline
FFN	Florfenicol	TYL	Tylosin
FIS	Sulfisoxazole	TIO	Ceftiofur
FLA	Flavomycin	VAN	Vancomycin

Meat Types

CB	Chicken Breast	GT	Ground Turkey
GB	Ground Beef	PC	Pork Chop

State Abbreviations:

CA	California	MN	Minnesota
CO	Colorado	NM	New Mexico
CT	Connecticut	NY	New York
GA	Georgia	OR	Oregon
MD	Maryland	TN	Tennessee

NARMS Retail Meat Annual Report 2004

Background:

Food animal products destined for human consumption are known to harbor enteric bacteria, including zoonotic foodborne pathogens. Antimicrobial resistance (AR) among these organisms may be associated with the use of antimicrobial agents in food animals. Retail meats represent a point of exposure close to the consumer and, when combined with data from slaughter plants and on-farm studies, provides insight into the prevalence of AR in foodborne pathogens originating from food animals. To gain a better understanding of AR among enteric bacteria in the food supply, the NARMS monitors antimicrobial susceptibility/resistance phenotypes in bacteria isolated from retail meats.

The primary purpose of the NARMS retail meat surveillance program is to monitor the prevalence of antimicrobial resistance among foodborne pathogenic and commensal organisms, in particular, *Salmonella*, *Campylobacter*, *Enterococcus* and *E. coli* The results generated by the NARMS retail meat program will establish a reference point for analyzing trends of antimicrobial resistance among these foodborne bacteria. NARMS retail meat surveillance is an ongoing collaboration between the U.S. Food and Drug Administration (Center for Veterinary Medicine), the Centers for Disease Control and Prevention, and in 2004, all 10 of the current FoodNet laboratories: California, Colorado, Connecticut, Georgia, Maryland, Minnesota, New Mexico, New York, Oregon, and Tennessee. Retail meats are collected at these FoodNet sites and cultured for the presence of the selected organisms. Bacterial isolates are sent to FDA/CVM for confirmation of species, antimicrobial susceptibility testing, and genetic analysis.

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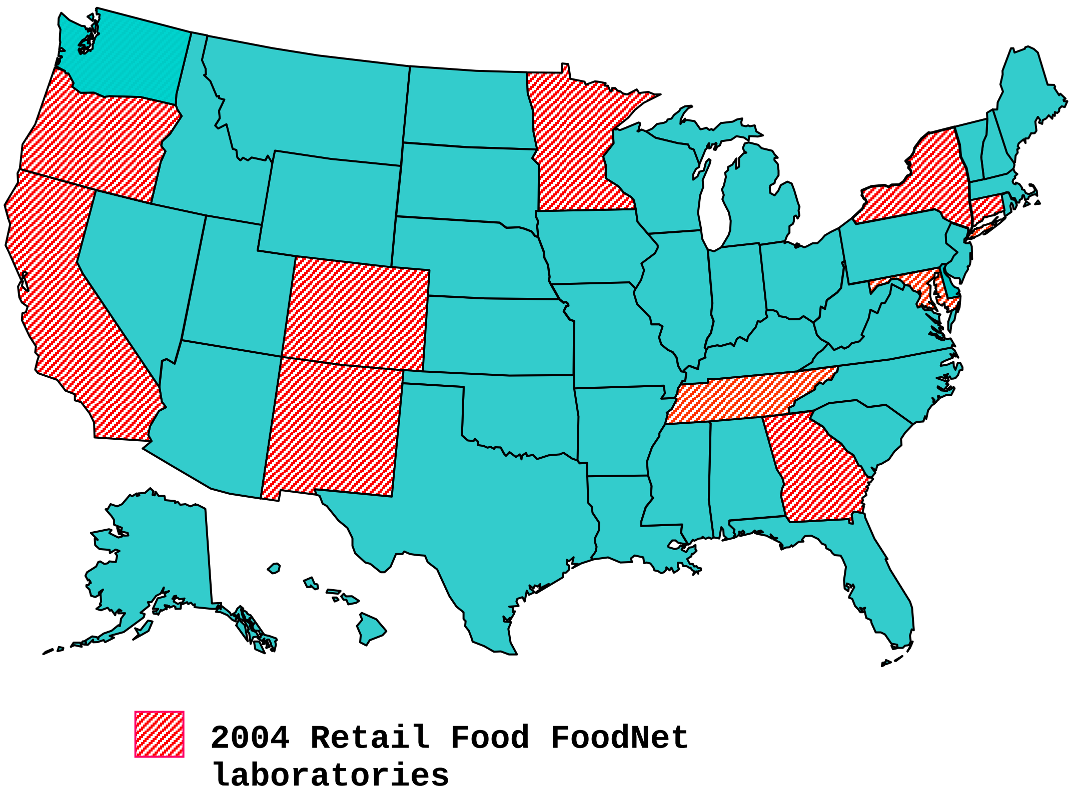

FoodNet is the principal foodborne disease component of CDC's Emerging Infections Program (http://www.cdc.gov/foodnet/). It is a collaborative project of the CDC, ten EIP sites (California, Colorado, Connecticut, Georgia, New York, Maryland, Minnesota, Oregon, Tennessee, and New Mexico), the U.S. Department of Agriculture (USDA), and the Food and Drug Administration (FDA). The project consists of active surveillance for foodborne diseases and related epidemiologic studies designed to help public health officials better understand the epidemiology of foodborne diseases in the United States. The NARMS/FoodNet Retail Food Study was developed to monitor the presence of AR among *E. coli*, *Salmonella*, *Campylobacter*, and *Enterococcus* from convenience samples of fresh meat and poultry purchased monthly from grocery stores in the participating States. These isolates are then subjected to standardized antimicrobial susceptibility testing methods in order to determine the prevalence of resistance.

Retail meat sampling:

For calendar year 2004, retail meat sampling started in January among the 10 participating FoodNet laboratories. In each of the FoodNet sites monthly sampling, an attempt was made to go to as many different stores as possible. The object was to purchase as many different brands of fresh (not frozen) meat and poultry as possible. A total of 40 food samples were purchased per month comprised of 10 samples each of chicken breast, ground turkey, ground beef, and pork chops. For each meat and poultry sample, the FoodNet sites recorded the store name, brand name, lot number (if available), sell-by date, purchase date and lab processing date on log sheets (A-9). Additional information with regard to whether or not the meat or poultry was ground or cut in-store was also collected, if possible. Samples were kept cold during transport from the grocery store(s) to the laboratory.

Microbiological analysis:

In the laboratory, samples were refrigerated at 4°C and were processed no later than 96 hours after purchase. After microbiological examination, the sites recorded on the log sheets whether or not the meat and poultry samples were presumptively positive for *Salmonella*, *Campylobacter*, *E. coli*, and *Enterococcus*. Each laboratory used essentially the same procedure for sample collection. Retail meat and poultry packages were kept intact until they were aseptically opened in the laboratory at the start of examination. For chicken and pork samples, one piece of meat was examined. For ground beef and ground turkey samples, 25 g of ground product was analyzed. The analytical portions from each sample were placed in separate sterile plastic bags, 250 mL of buffered peptone water was added to each bag, and the bags were vigorously shaken. Fifty mL of the rinsate from each sample was transferred to separate sterile containers for isolation and identification of *Salmonella*, *Campylobacter*, *E. coli*, or *Enterococcus* using standard microbiological procedures. Once isolated and identified, bacterial isolates were sent to FDA's CVM Office of Research for further characterization including species confirmation, antimicrobial susceptibility testing and PFGE analysis (S*almonella* and

Campylobacter only).

All ten FoodNet sites cultured the meats and poultry rinsates for the presence of *Salmonella* and *Campylobacter*. Four of the ten FoodNet laboratories (Georgia, Maryland, Oregon, and Tennessee) also cultured meat and poultry rinsates for the presence of *E. coli* and *Enterococcus*.

<u>*Changes in 2004*</u>

Several notable updates in the NARMS Retail Meat program occurred in 2004. A total of 4699 meats samples were collected, up from 3533 in 2003. This was due to the addition of FoodNet laboratories in Colorado and New Mexico, increasing the number of test sites from 8 to 10.

In 2004, we adopted a broth microdilution antimicrobial susceptibility testing method for *Campylobacter*, which also increased the number of agents tested from 5 to 9. The 9 antimicrobials tested in 2004 were: Azithromycin, Ciprofloxacin*, Clindamycin, Erythromycin*, Florfenicol, Gentamicin*, Nalidixic Acid, Telithromycin, and Tetracycline (* indicates agents also tested in 2003). Meropenem and Doxycycline were dropped from the list of *Campylobacter* agents tested.

The interpretive criteria used for *Campylobacter* antimicrobials is shown in Table 1. Based on the upcoming CLSI M45-P document (*Methods for Antimicrobial Dilution and Disk Susceptibility Testing of Infrequently-Isolated or Fastidious Bacteria; Proposed Guideline*, CLSI June 2006), the Erythromycin resistance breakpoint was changed from 8 µg/ml to 32 µg/ml. Based on the MIC distribution published in this report, along with other *Campylobacter* data generated using broth microdilution testing, several other breakpoints have been modified from those used in previous NARMS reports. For resistance breakpoints, these revised values include: Azithromycin (changed from 2 µg/mL to 8 µg/ml); Clindamycin (changed from 4 µg/mL to 8µg/ml); Gentamicin (changed from 16 µg/mL to 8 µg/ml); and Nalidixic acid (changed from 32 µg/mL to 64 µg/mL).

Two content changes were made in the panel formats. Cephalothin was omitted from the *E. coli/Salmonella* testing panel and Sulfamethoxazole was replaced with Sulfisoxazole. Daptomycin was used to replace Salinomycin on the *Enterococcus* panel.

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A-4h *Salmonella* Montevideo
A-4i *Salmonella* Muenster
A-4j *Salmonella* Newport
A-4k *Salmonella* Reading
A-4l *Salmonella* Saintpaul
A-4m *Salmonella* Schwarzengrund
A-4n *Salmonella* Typhimurium
A-4o *Salmonella* IIIa 18:z4,z32:-
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ANTIMICROBIAL RESISTANCE AMONG

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Table 1. Antimicrobial Susceptibility Test Methods and Interpretive Criteria: NARMS Retail Meat, 2004

Genus: *Campylobacter*

Susceptibility Testing Method: Broth microdilution Sensititre Plate: CAMPY

QC Organism: *Campylobacter jejuni* ATCC 33560

Drug	**Susceptible** (µg/ml)	**Intermediate** (µg/ml)	**Resistant** (µg/ml)
Azithromycin*	≤ 2	4	≥ 8
Ciprofloxacin	≤ 1	2	≥ 4
Clindamycin*	≤ 2	4	≥ 8
Erythromycin	≤ 8	16	≥ 32
Florfenicol*^	≤ 4		
Gentamicin*	≤ 2	4	≥ 8
Nalidixic Acid*	≤ 16	32	≥ 64
Telithromycin*	≤ 4	8	≥ 16
Tetracycline	≤ 4	8	≥ 16

Genus: *Enterococcus*

Susceptibility Testing Method: Broth microdilution Sensititre Plate: CMV1AGPF

QC Organisms: *Enterococcus faecalis* ATCC 29212 and *Enterococcus faecalis* ATCC 51299

Drug	**Susceptible** (µg/ml)	**Intermediate** (µg/ml)	**Resistant** (µg/ml)
Bacitracin*	≤ 32	64	≥ 128
Chloramphenicol	≤ 8	16	≥ 32
Ciprofloxacin	≤ 1	2	≥ 4
Daptomycin*	≤ 4		
Erythromycin	≤0.5	1,2,4	≥ 8
Flavomycin*	≤ 8	16	≥ 32
Gentamicin	< 500		≥ 500
Kanamycin*	≤ 128	256	≥ 512
Lincomycin*	≤ 8	16	≥ 32
Linezolid	≤ 2	4	≥ 8
Nitrofurantoin	≤ 32	64	≥ 128
Penicillin	≤ 8		≥ 16
Streptomycin*	< 1000		≥1000
Quinupristin/Dalfopristin	≤ 1	2	≥ 4
Tetracycline	≤ 4	8	≥ 16
Tylosin*	≤ 8	16	≥ 32
Vancomycin	≤ 4	8,16	≥ 32

* No CLSI interpretative criteria for this bacterium / antimicrobial combination currently available.
* ^Absence of resistant strains precludes defining any results category other than "susceptible."

Genus: *Escherichia coli* and *Salmonella*

Susceptibility Testing Method: Broth microdilution   Sensititre Plate: CMV1AGNF

QC Organisms: *Escherichia coli* ATCC 25922, *Staphylococcus aureus* ATCC 29213,
Pseudomonas aeruginosa ATCC 27853, and *Enterococcus faecalis* ATCC 29212

Drug	**Susceptible** (µg/ml)	**Intermediate** (µg/ml)	**Resistant** (µg/ml)
Amikacin	≤ 16	32	≥ 64
Amoxicillin/Clavulanic acid	≤ 8/4	16/8	≥ 32/16
Ampicillin	≤ 8	16	≥ 32
Cefoxitin	≤ 8	16	≥ 32
Ceftiofur	≤ 2	4	≥ 8
Ceftriaxone	≤ 8	16,32	≥ 64
Chloramphenicol	≤ 8	16	≥ 32
Ciprofloxacin	≤ 1	2	≥ 4
Gentamicin	≤ 4	8	≥ 16
Kanamycin	≤ 16	32	≥ 64
Nalidixic acid	≤ 16		≥ 32
Streptomycin*	≤ 32		≥ 64
Sulfisoxazole	≤ 256		≥ 512
Tetracycline	≤ 4	8	≥ 16
Trimethoprim/sulfamethoxazole	≤ 2/38		≥ 4/76

* No CLSI interpretative criteria for this bacterium / antimicrobial combination currently available.

Table 2. Number of Retail Meat Samples Tested by Site and Meat Type, 2004

Site	Chicken Breast	Ground Turkey	Ground Beef	Pork Chop	Total
CA	120	120	120	120	480
CO	97	101	106	99	403
CT	120	120	120	120	480
GA	120	120	120	120	480
MD	120	120	120	120	480
MN	120	120	120	120	480
NM	119	118	120	119	476
NY	120	120	120	120	480
OR	120	120	120	120	480
TN	116	106	120	118	460
Total	1172	1165	1186	1176	4699

Table 3. Percent Positive Samples by Bacterium and Meat Type, 2004

	Chicken Breast		Ground Turkey		Ground Beef		Pork Chop	
Bacterium	**N**	**(%)**	**N**	**(%)**	**N**	**(%)**	**N**	**(%)**
Campylobacter	706	(60.2)	12	(1.0)	0	(0.0)	3	(0.3)
Salmonella	157	(13.4)	142	(12.2)	14	(1.2)	11	(0.9)
Enterococcus	466	(97.9)	437	(93.8)	448	(93.3)	404	(84.5)
Escherichia coli	400	(84.0)	376	(80.7)	338	(70.4)	232	(48.5)

4699 = Total number of retail meats tested for *Salmonella* and *Campylobacter*
1172 = Total Chicken Breast tested
1165 = Total Ground Turkey tested
1186 = Total Ground Beef tested
1176 = Total Pork Chop tested

1900 = Total number of retail meats tested for *Enterococcus* and *Escherichia coli*
476 = Total Chicken Breast tested
466 =Total Ground Turkey tested
480 = Total Ground Beef tested
478 = Total Pork Chop tested

Table 4. Number of Isolates by Site, Bacterium, and Meat Type, 2004

	Chicken Breast	Ground Turkey	Ground Beef	Pork Chops
Site: CA				
Campylobacter	96	0	0	1
Salmonella	17	1	9	1
Site: CO				
Campylobacter	21	0	0	0
Salmonella	1	0	8	0
Site: CT				
Campylobacter	86	0	2	1
Salmonella	30	5	26	5
Site: GA				
Campylobacter	61	0	1	0
Salmonella	6	1	38	64
Enterococcus	120	117	120	116
Escherichia coli	115	91	119	68
Site: MD				
Campylobacter	76	0	2	0
Salmonella	24	1	13	0
Enterococcus	114	100	106	62
Escherichia coli	110	83	109	77
Site: MN				
Campylobacter	73	0	6	0
Salmonella	20	0	14	0
Site: NM				
Campylobacter	53	0	6	0
Salmonella	3	0	14	0
Site: NY				
Campylobacter	96	0	0	0
Salmonella	16	0	11	3
Site: OR				
Campylobacter	73	0	0	0
Salmonella	25	6	6	2
Enterococcus	118	115	105	108
Escherichia coli	73	99	53	51
Site: TN				
Campylobacter	71	0	1	0
Salmonella	15	0	8	0
Enterococcus	114	116	106	103
Escherichia coli	102	65	96	55

Figure 1a. Percent Positive Samples for *Campylobacter* & *Salmonella* by Meat Type and Site, 2004

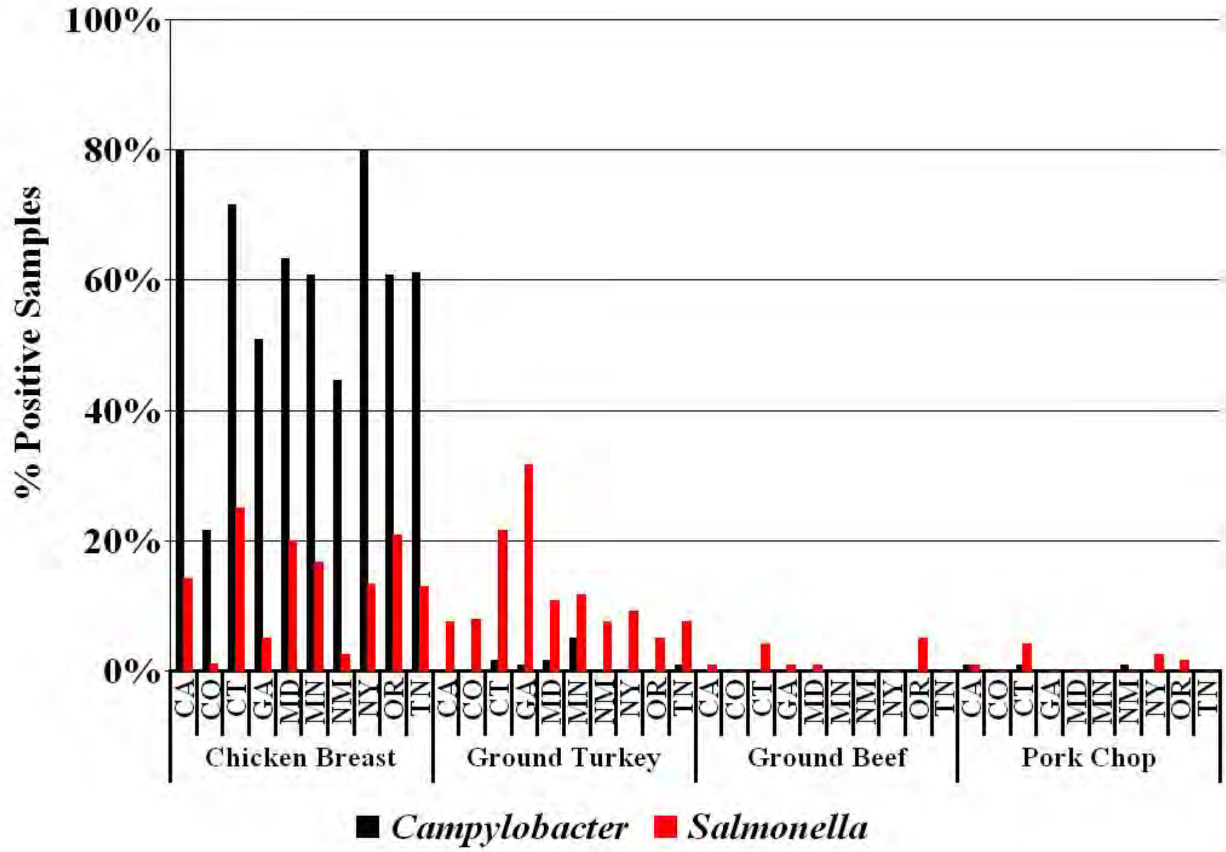


Figure 1b. Percent Positive Samples for *Enterococcus* & *E. coli* by Meat Type and Site, 2004

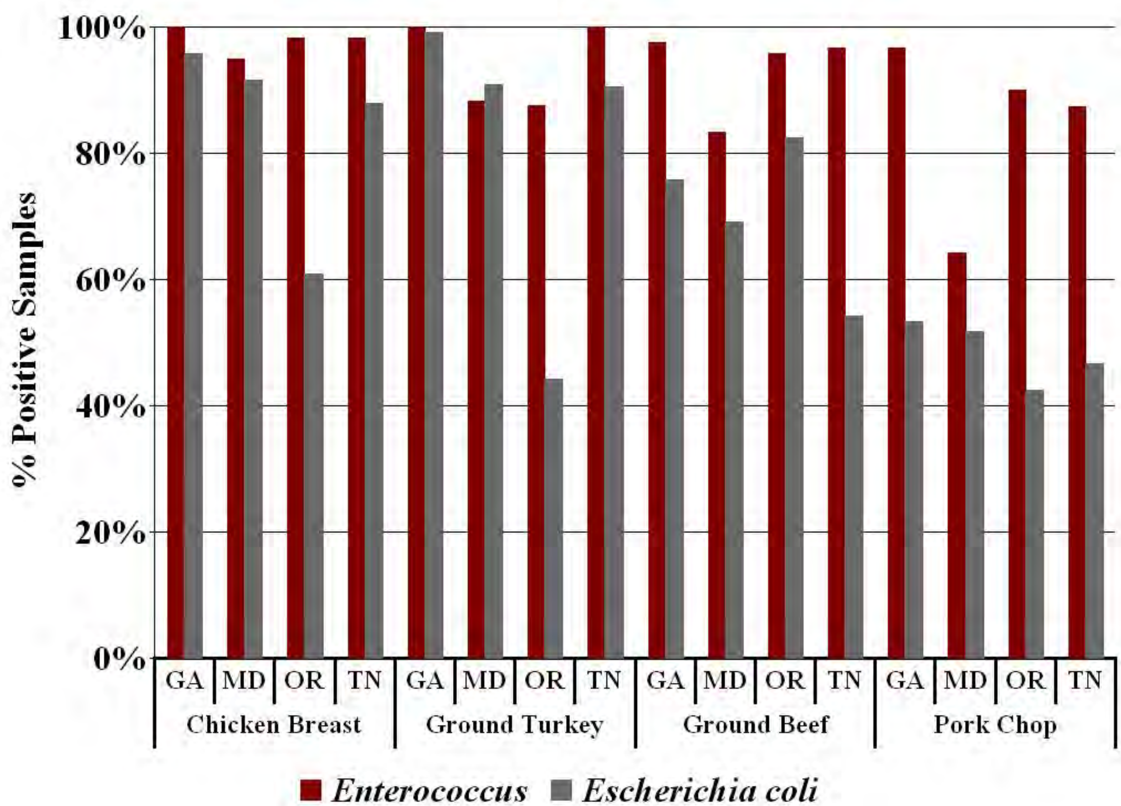


Figure 2a. Percent Positive Samples for *Campylobacter* & *Salmonella* by Meat Type for All Sites, 2004

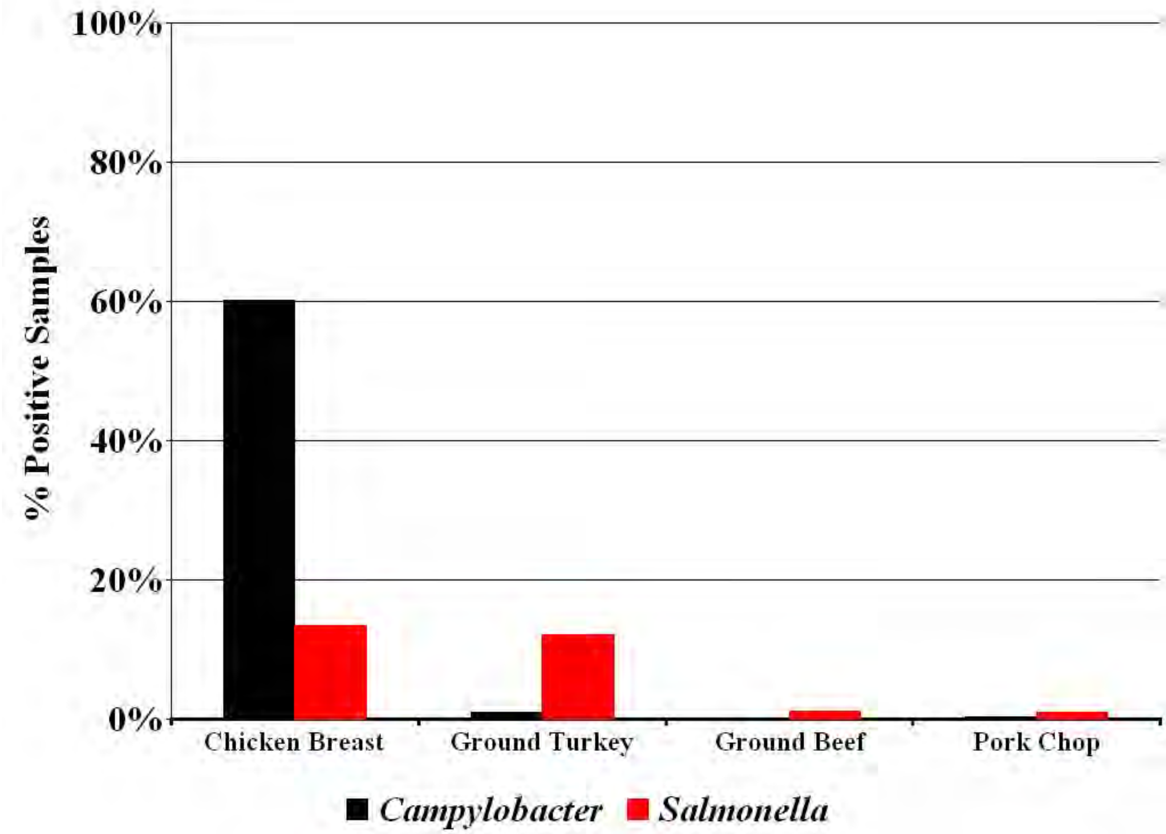


Figure 2b. Percent Positive Samples for *Enterococcus* & *E. coli* by Meat Type for All Sites, 2004

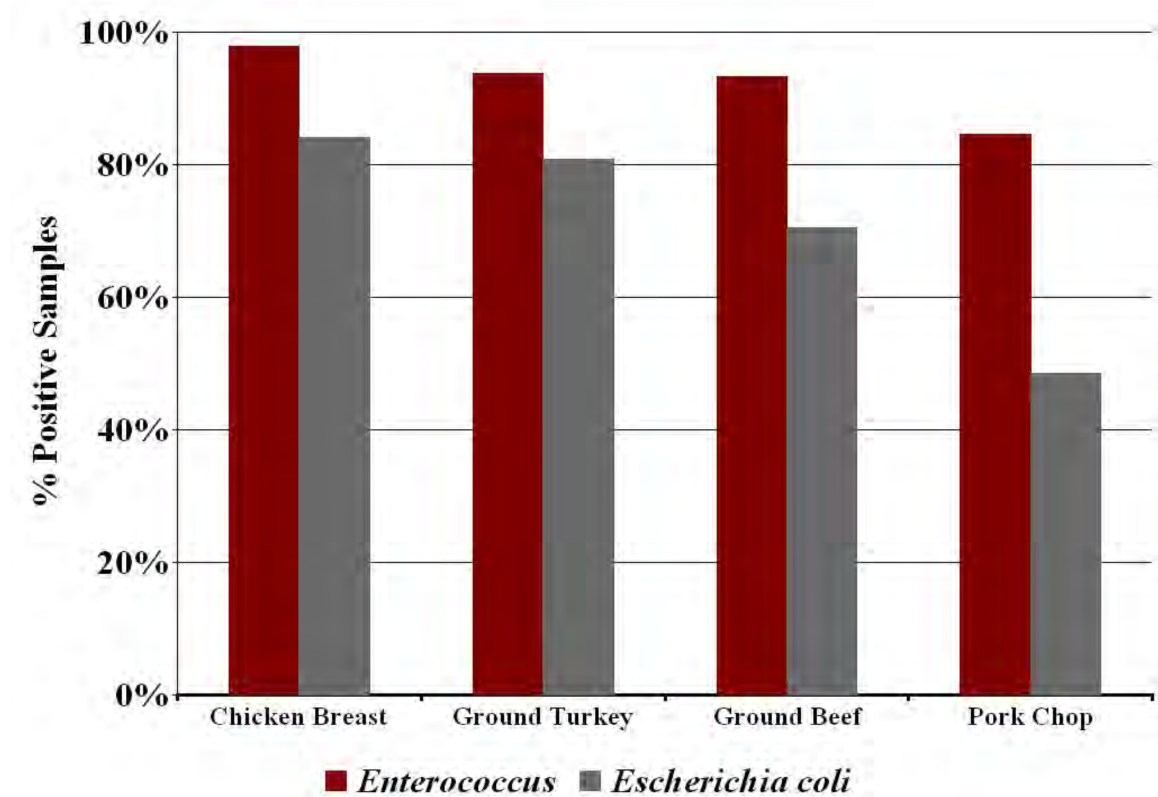


Figure 3a. Percent Positive Samples for *Campylobacter* & *Salmonella* and *Enterococcus* & *E. coli* by Month and Meat Type for All Sites, 2004

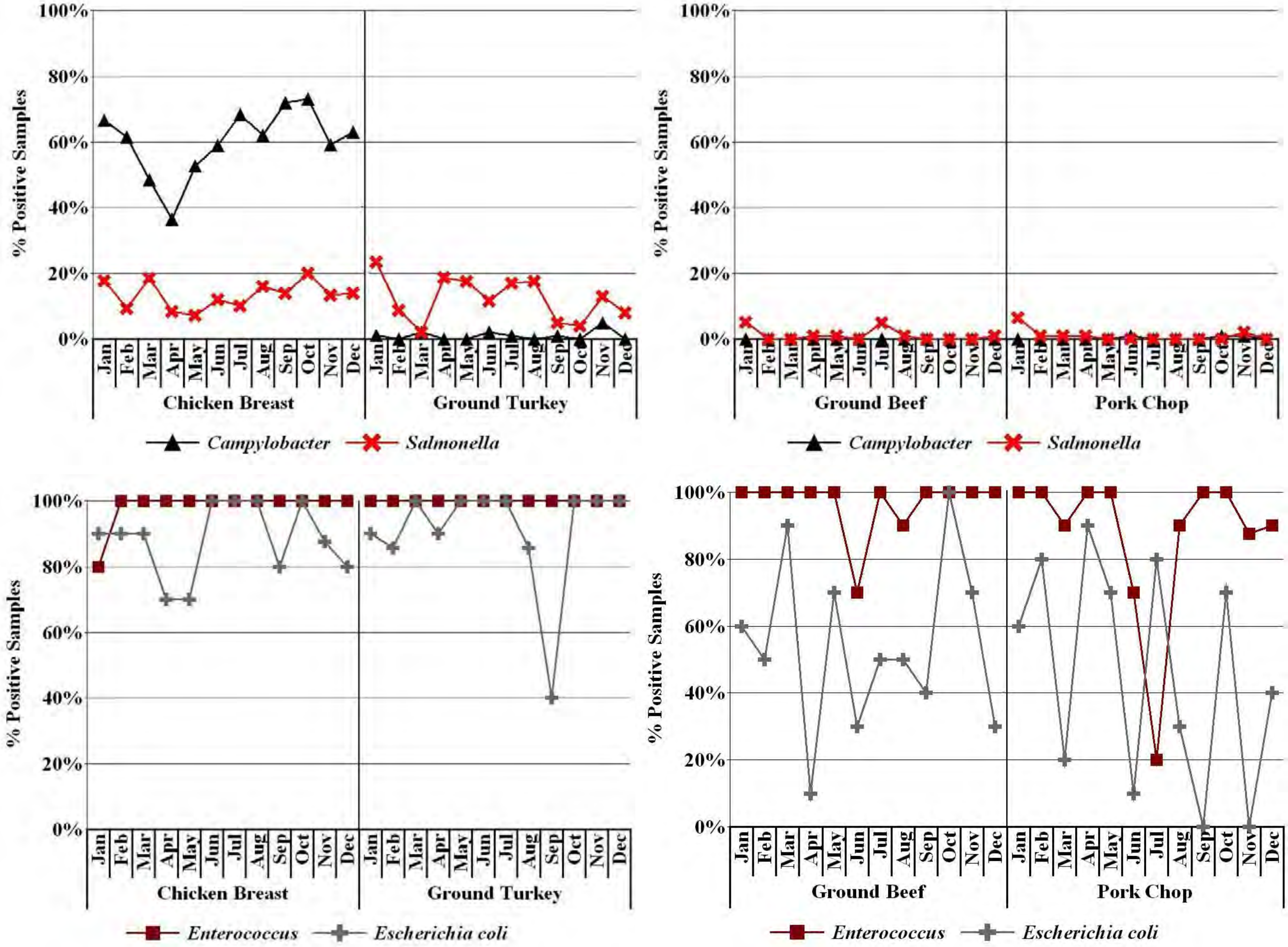


Figure 3b. Percent Positive Samples for *Campylobacter* & *Salmonella* by Month and Meat Type in California, 2004

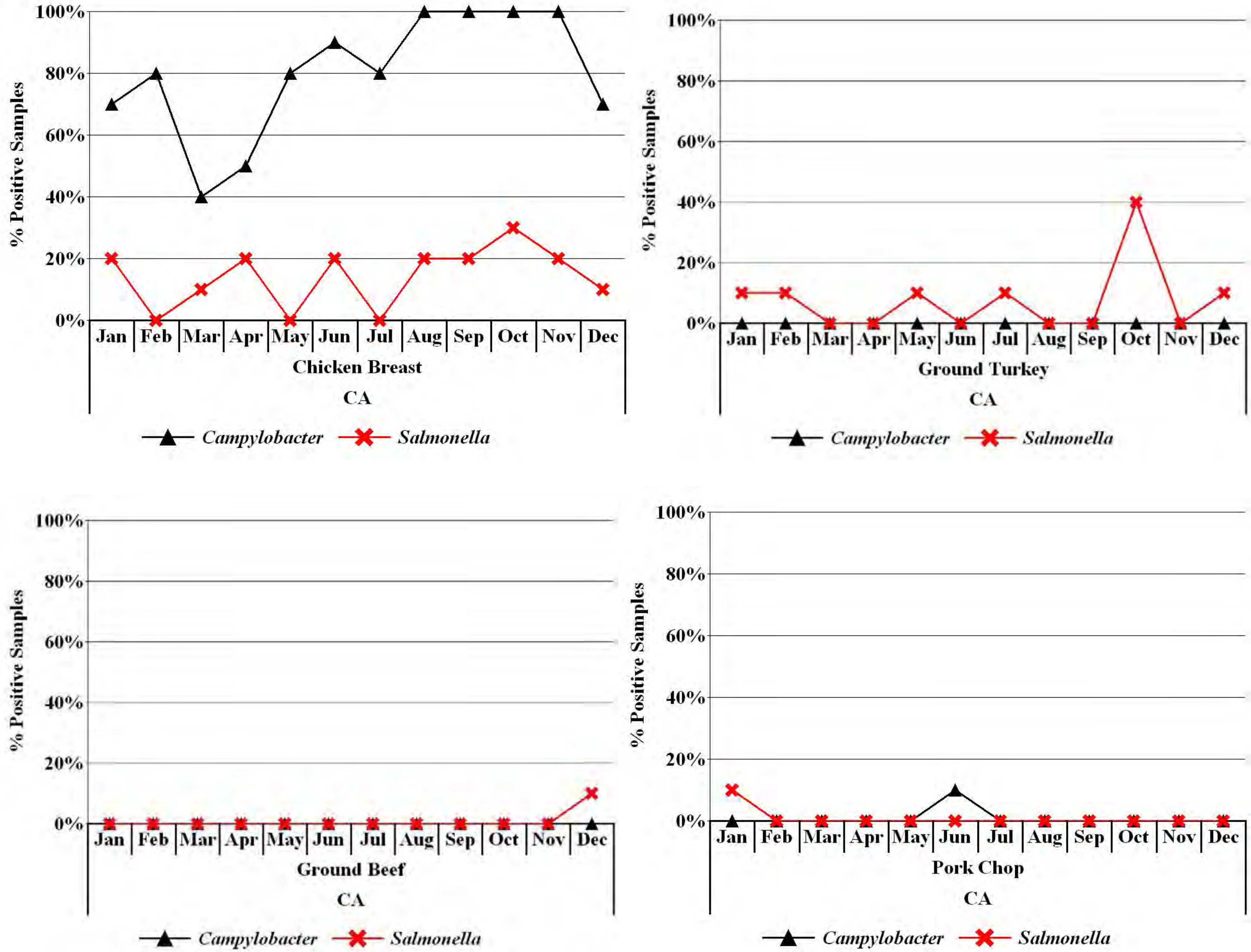
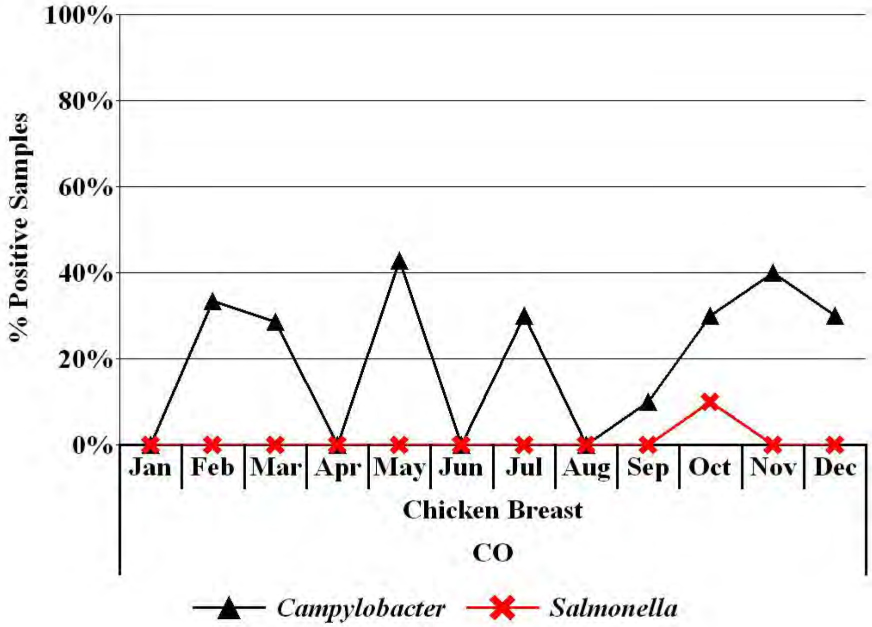
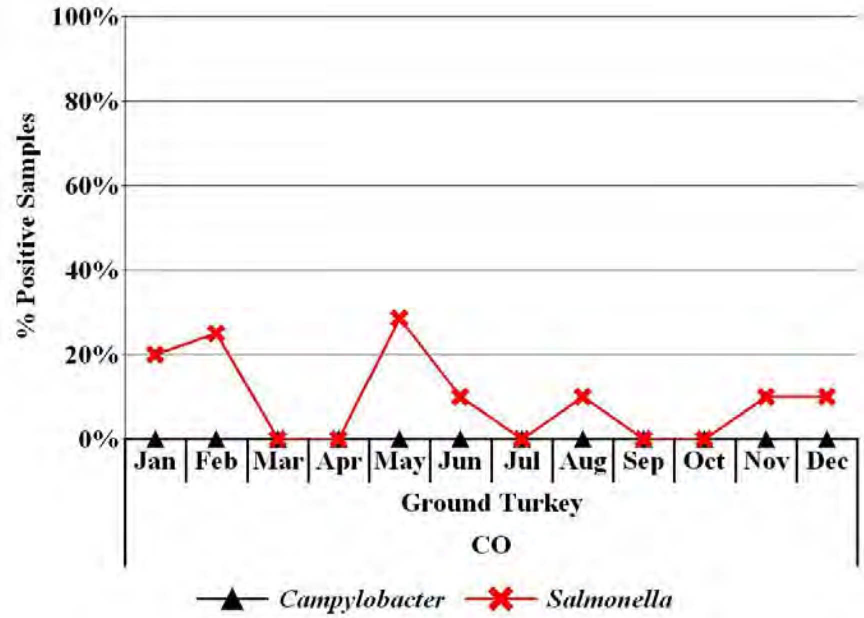
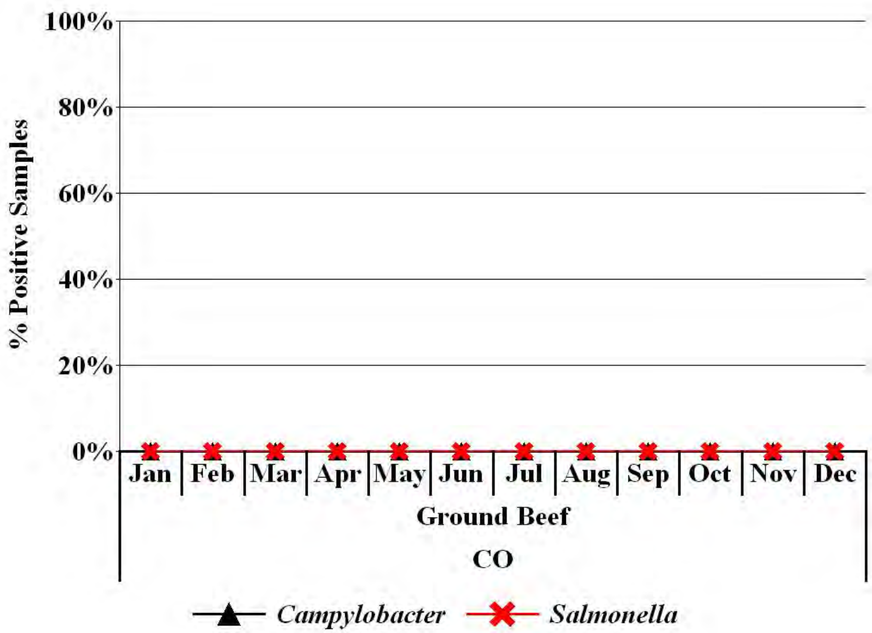


Figure 3c. Percent Positive Samples for *Campylobacter* & *Salmonella* by Month and Meat Type in Colorado, 2004







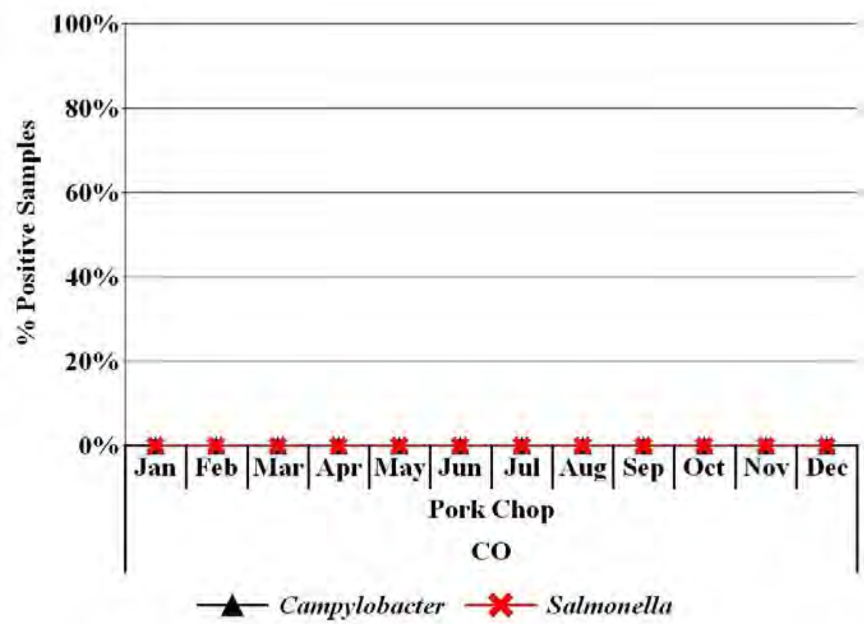


Figure 3d. Percent Positive Samples for *Campylobacter* & *Salmonella* by Month and Meat Type in Connecticut, 2004

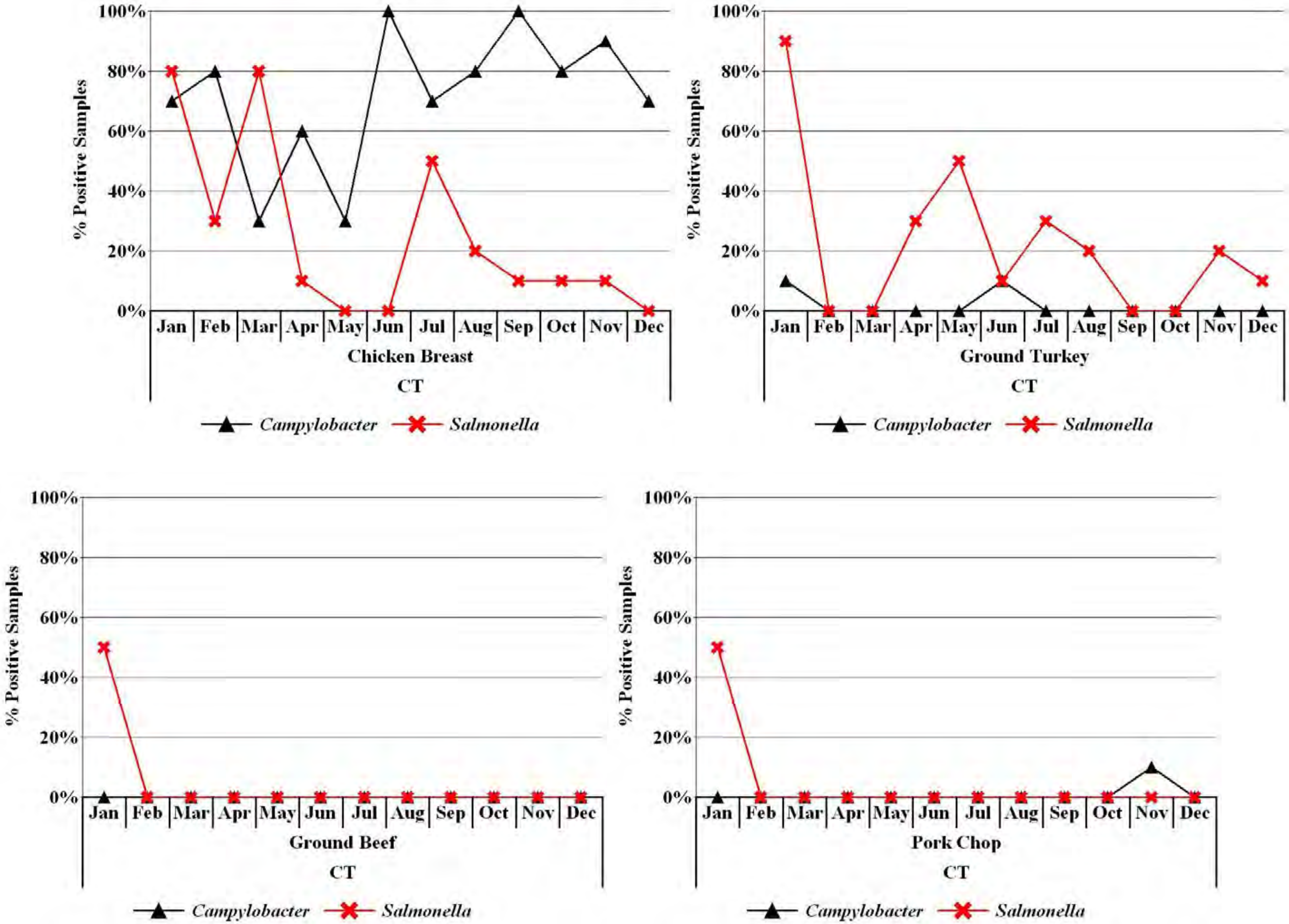


Figure 3e. Percent Positive Samples for *Campylobacter* & *Salmonella* by Month and Meat Type in Georgia, 2004

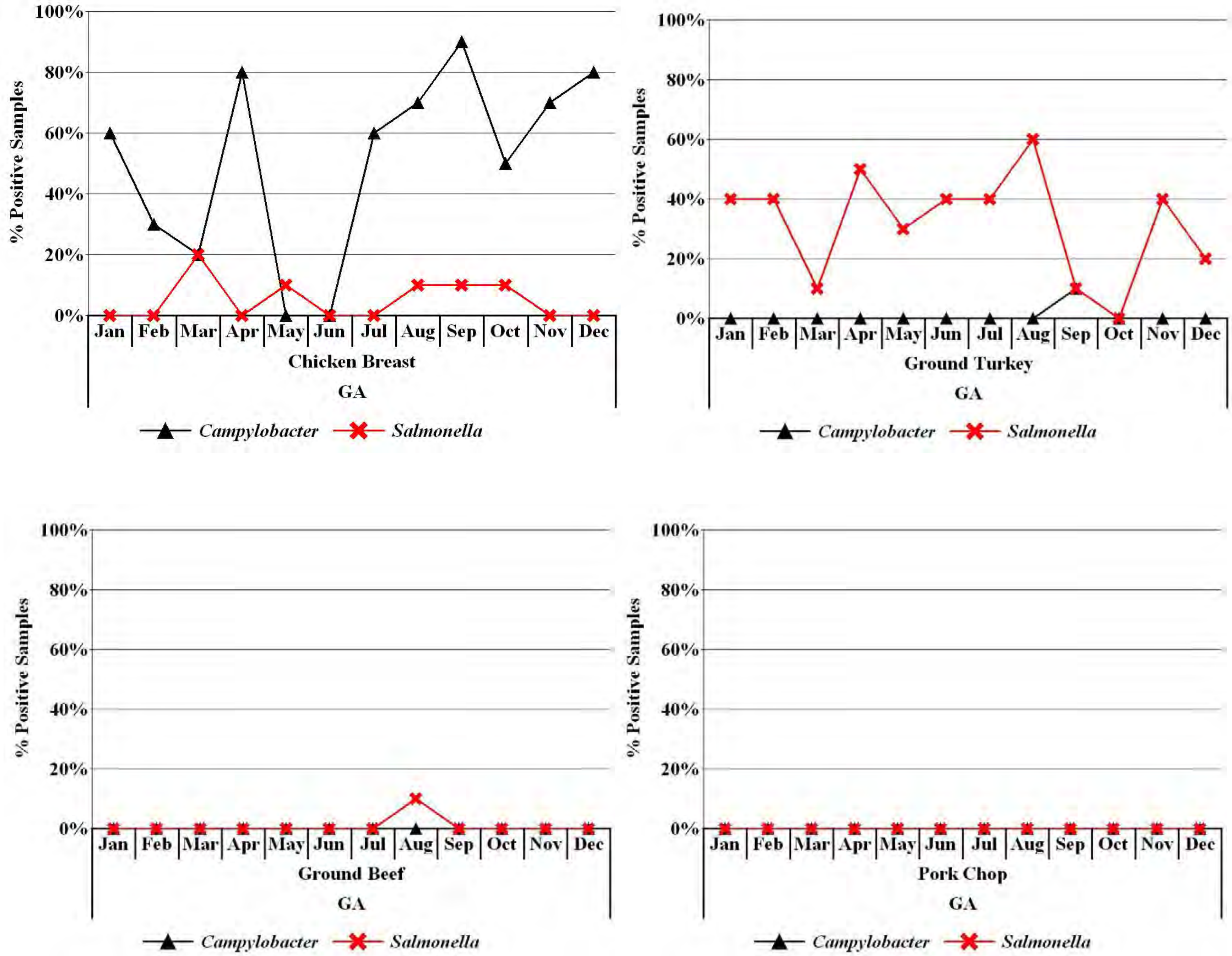


Figure 3f. Percent Positive Samples for *Enterococcus* & *E. coli* by Month and Meat Type in Georgia, 2004

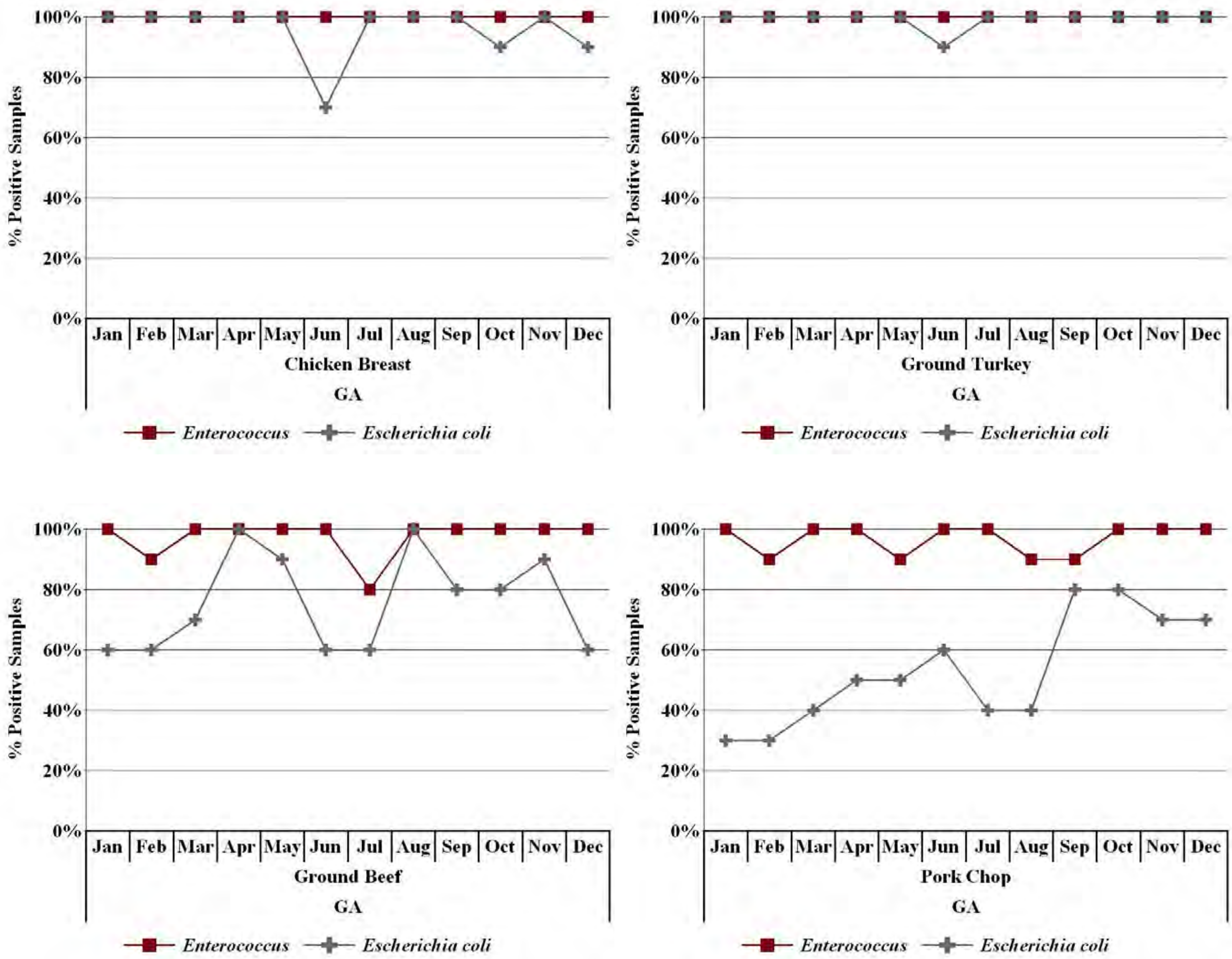


Figure 3g. Percent Positive Samples for *Campylobacter* & *Salmonella* by Month and Meat Type in Maryland, 2004

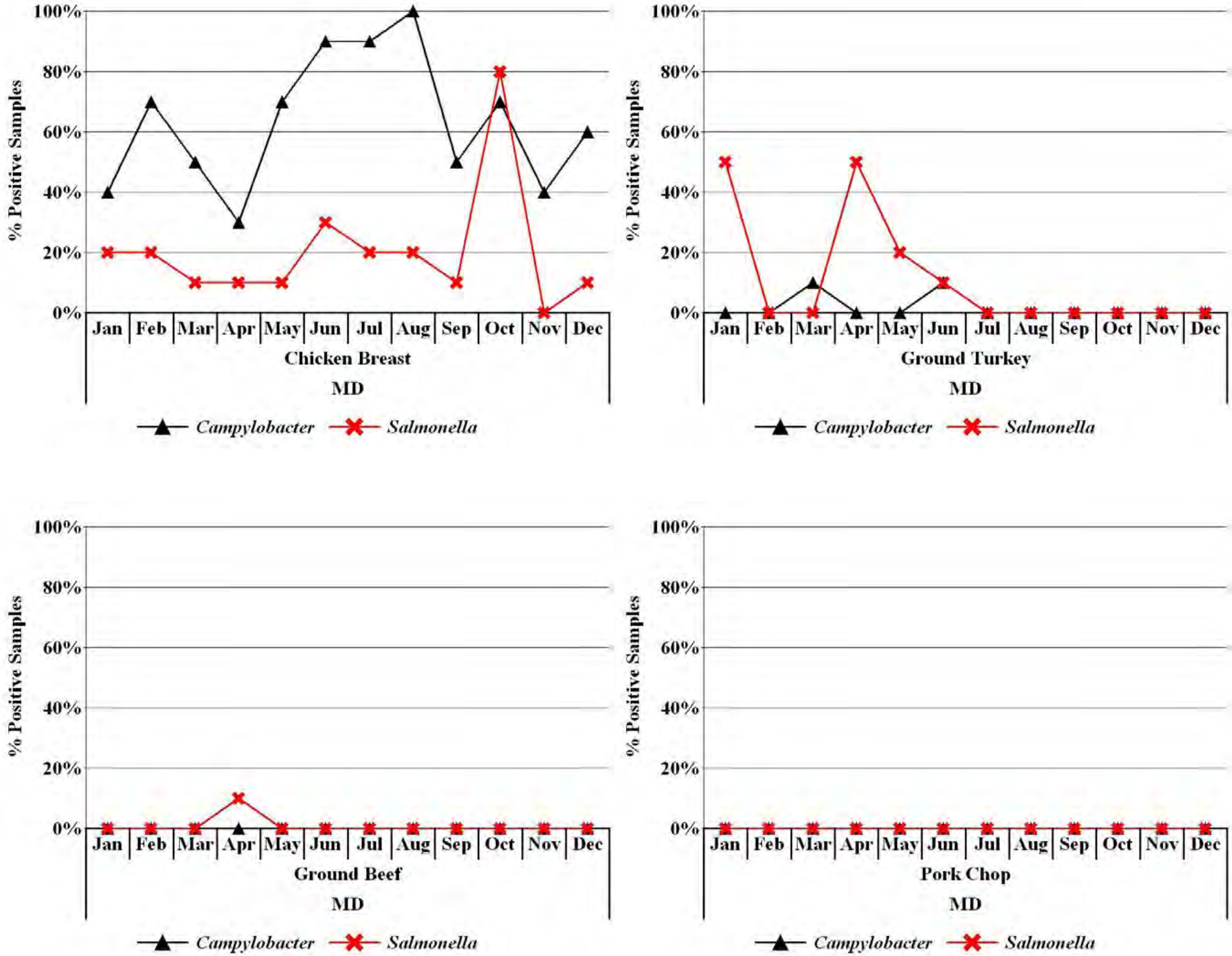


Figure 3h. Percent Positive Samples for *Enterococcus* & *E. coli* by Month and Meat Type in Maryland, 2004

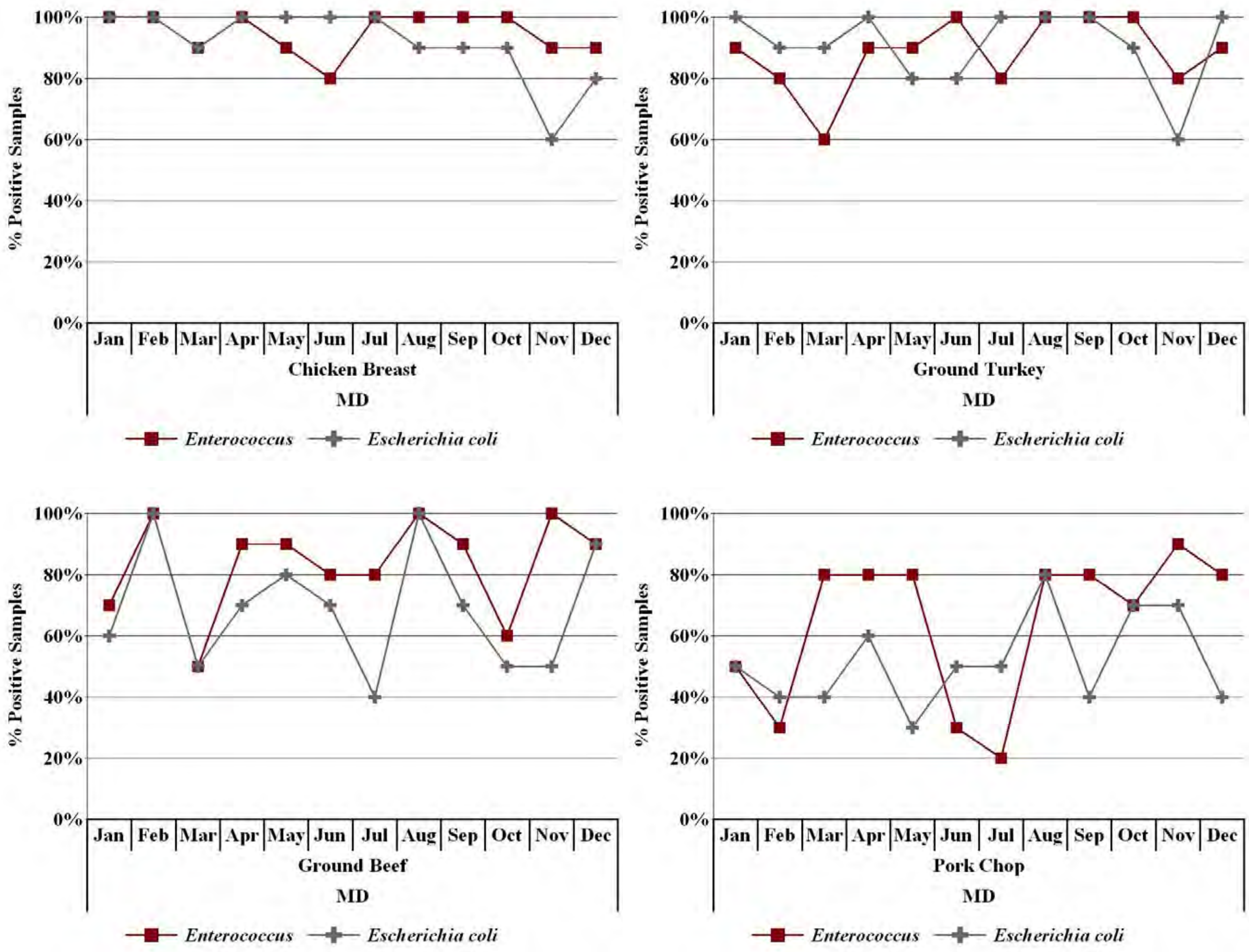


Figure 3i. Percent Positive Samples for *Campylobacter* & *Salmonella* by Month and Meat Type in Minnesota, 2004

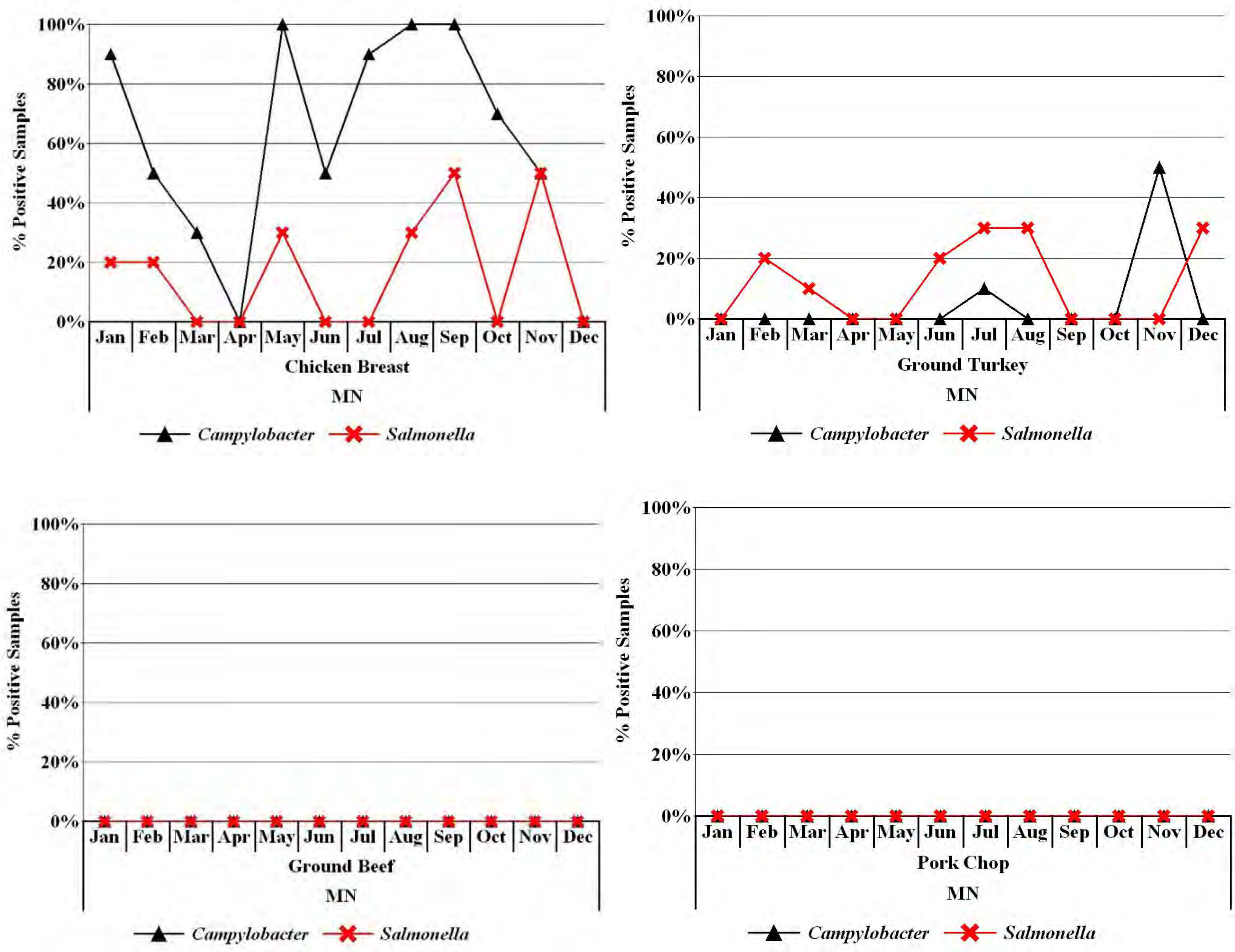


Figure 3j. Percent Positive Samples for *Campylobacter* & *Salmonella* by Month and Meat Type in New Mexico, 2004

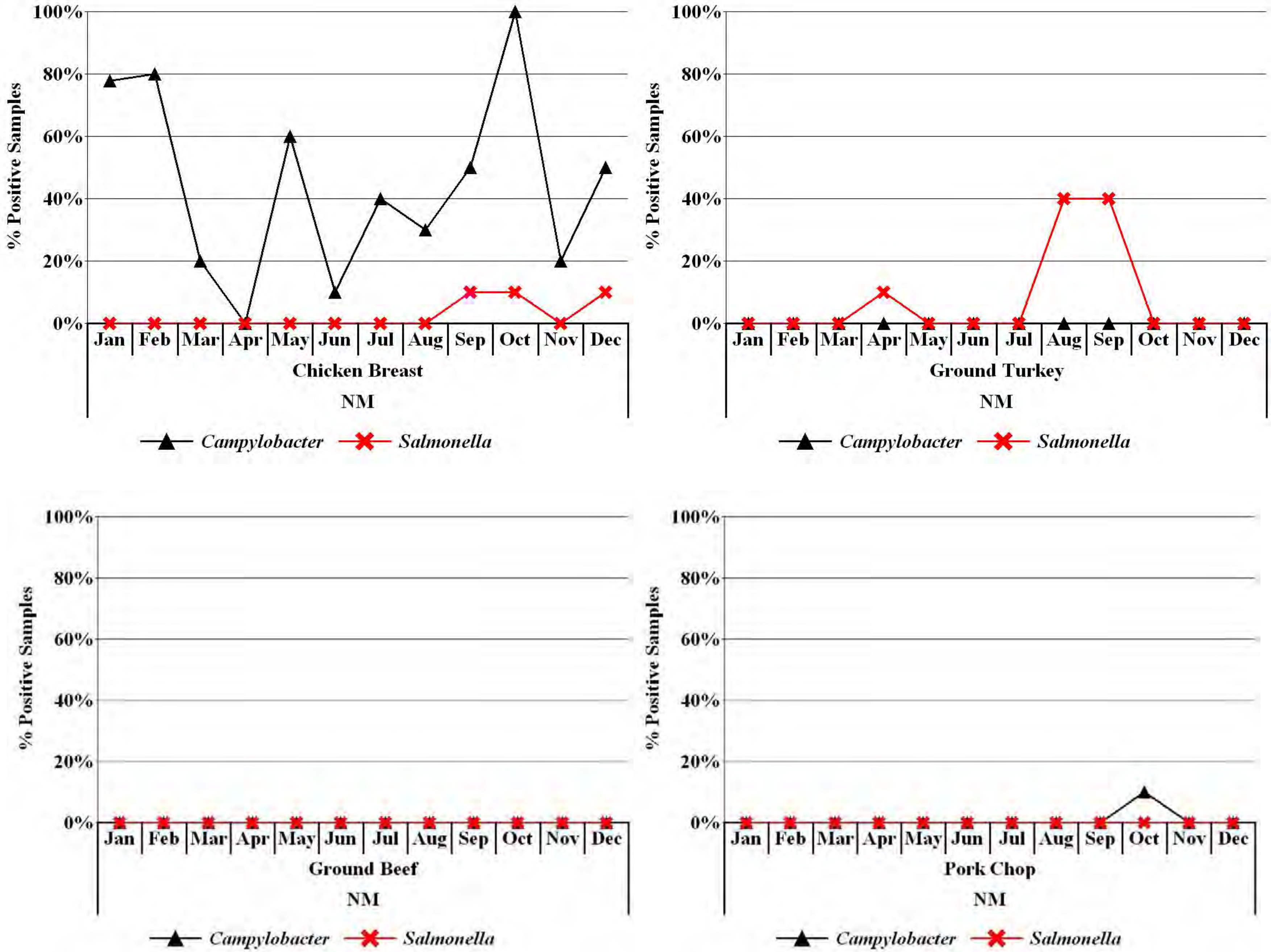


Figure 3k. Percent Positive Samples for *Campylobacter* & *Salmonella* by Month and Meat Type in New York, 2004

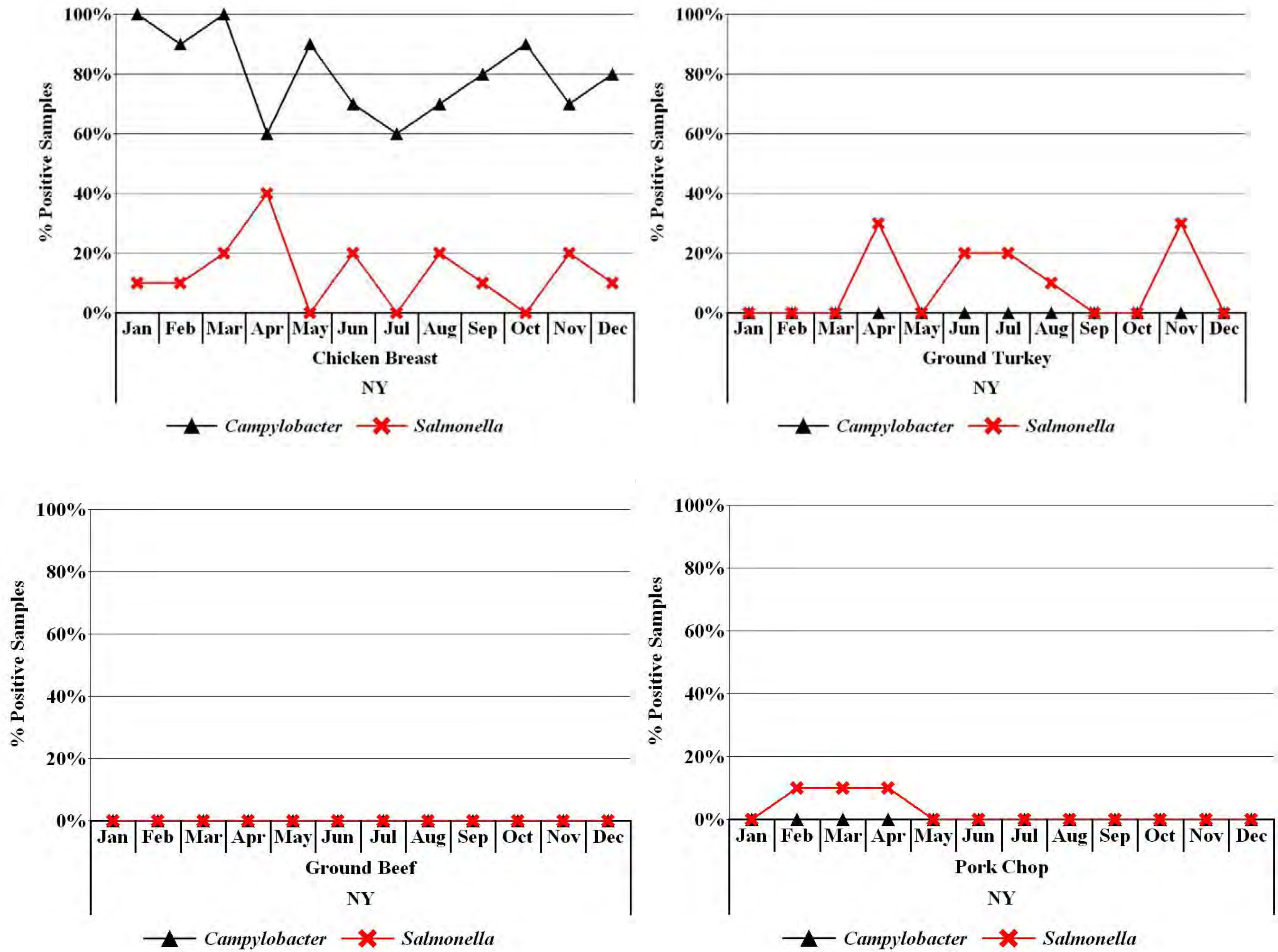


Figure 3l. Percent Positive Samples for *Campylobacter* & *Salmonella* by Month and Meat Type in Oregon, 2004

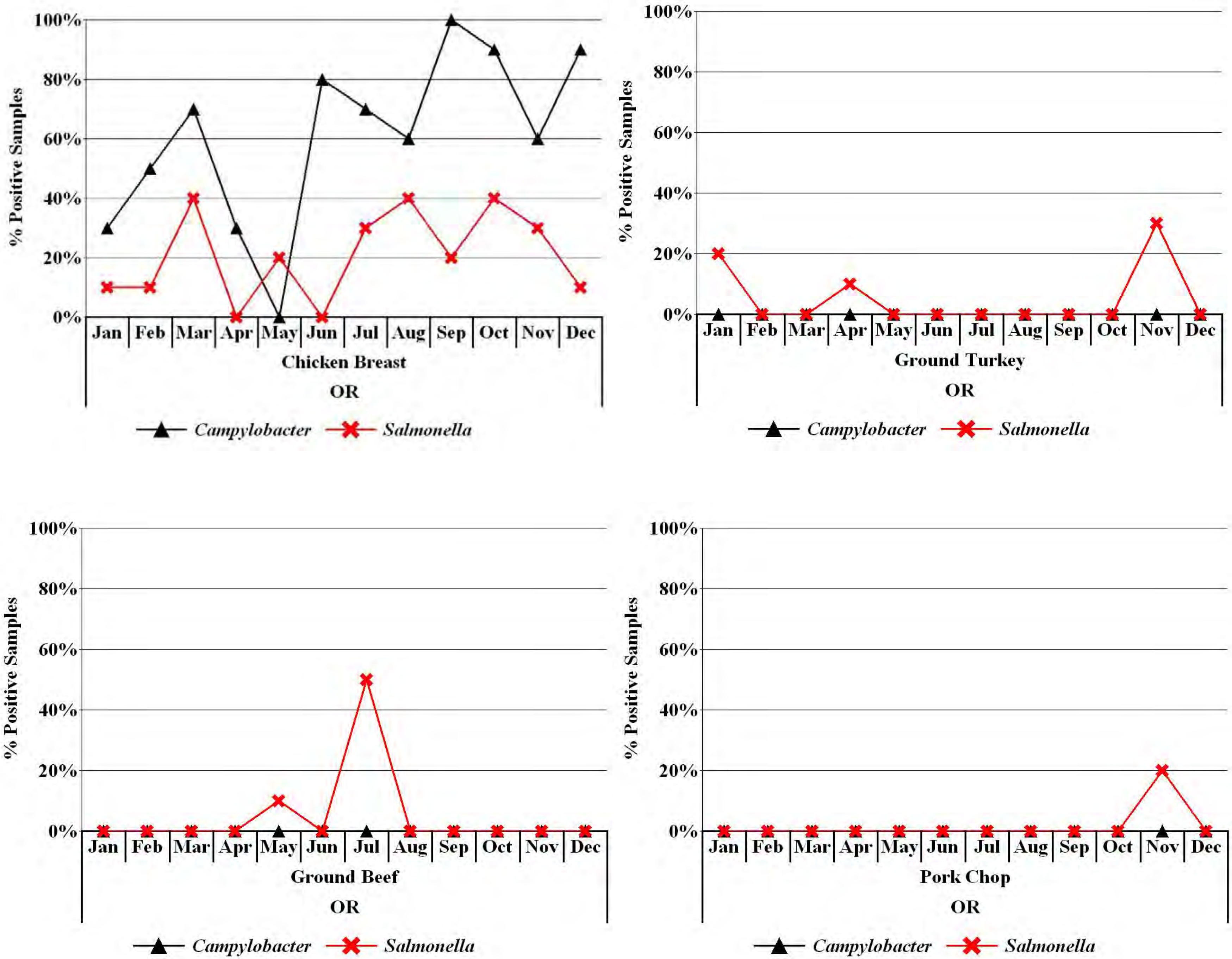


Figure 3m. Percent Positive Samples for *Enterococcus* & *E. coli* by Month and Meat Type in Oregon, 2004

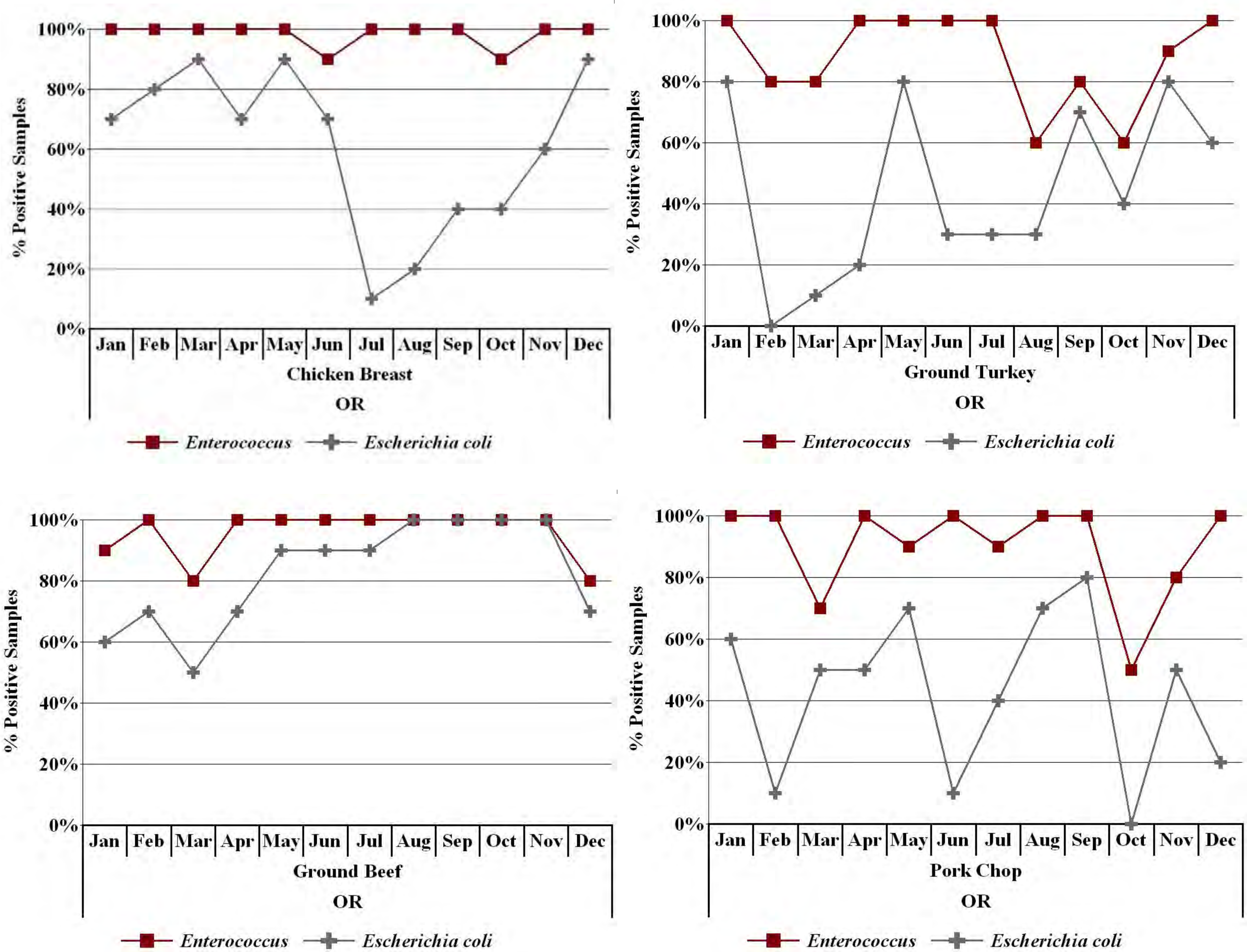


Figure 3n. Percent Positive Samples for *Campylobacter* & *Salmonella* by Month and Meat Type in Tennessee, 2004

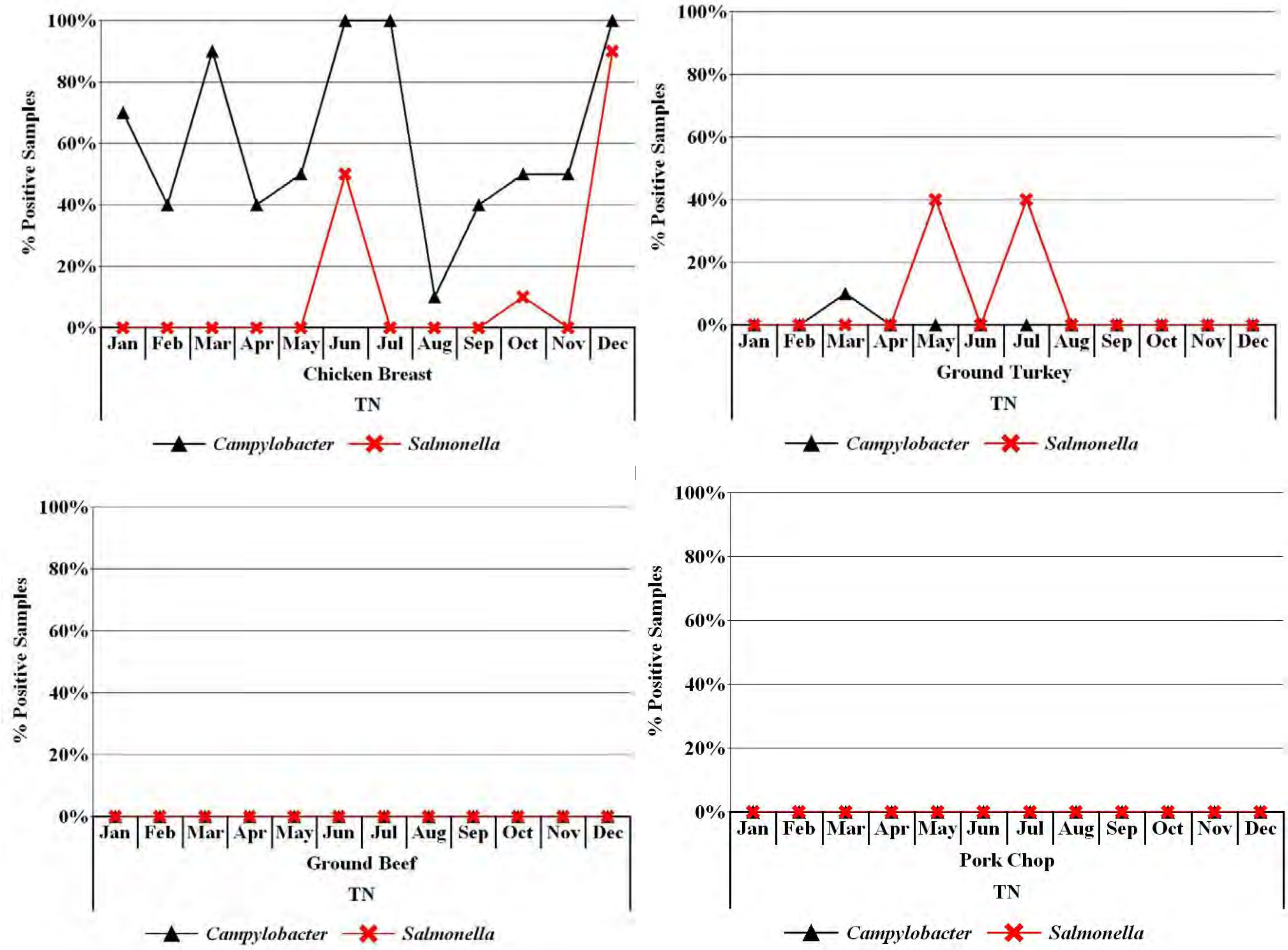


Figure 3o. Percent Positive Samples for *Enterococcus* & *E. coli* by Month and Meat Type in Tennessee, 2004

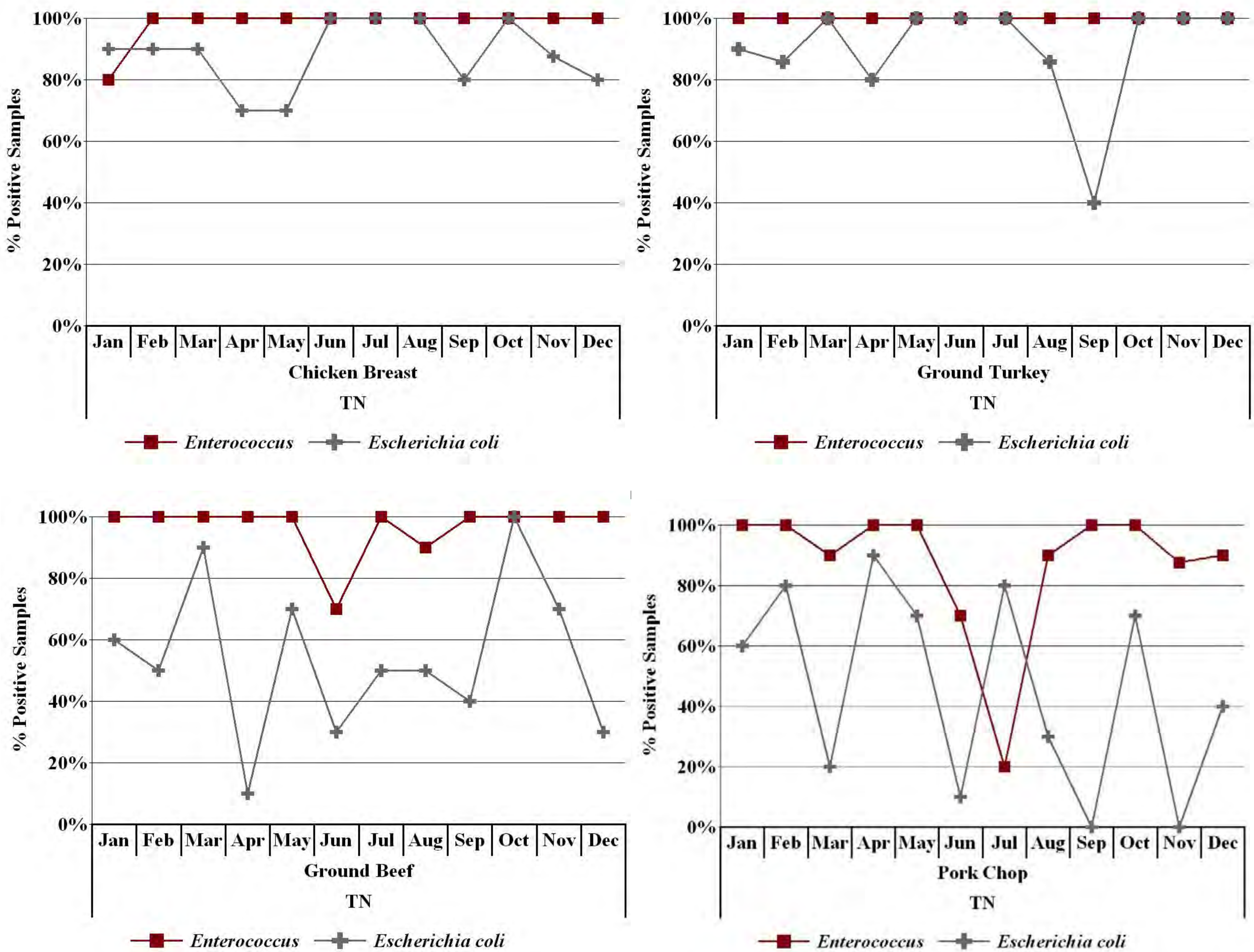


Table 5. Overall *Salmonella* Serotypes Identified, 2004

Serotype	n
1. *S.* Heidelberg	71
2. *S.* Typhimurium	53
3. *S.* Kentucky	43
4. *S.* Saintpaul	24
5. *S.* Schwarzengrund	21
6. *S.* Hadar	19
7. *S.* Reading	16
8. *S.* Braenderup	11
9. *S.* Muenster	10
10. *S.* Agona	9
11. *S.* III 18a: z4, z32:-	6
12. *S.* Berta	5
13. *S.* Montevideo	5
14. *S.* Mbandaka	4
15. *S.* Newport	4
16. *S.* I 4, 12 : I :-	4
17. *S.* Derby	3
18. *S.* Enteritidis	3
19. *S.* IIIa 18: z4, z23: -	2
20. *S.* I 4, 12 : r :-	2
21. *S.* Senftenberg	2
22. *S.* Bredeney	1
23. *S.* Dublin	1
24. *S.* Livingstone	1
25. *S.* Minnesota	1
26. *S.* Muenchen	1
27. S. I 4, 12 : d :-	1
28. *S.* Urbana	1
Total	**324**

Table 6. *Salmonella* by Serotype and Meat Type, 2004

Serotype	Chicken Breast		Ground Turkey		Ground Beef		Pork Chop	
	n	%[*]	n	%	n	%	n	%
S. Heidelberg (n=71)	31	43.7%	37	52.1%	0	-[†]	3	4.2%
S. Typhimurium[‡] (n=53)	49	92.5%	2	3.8%	0	-	2	3.8%
S. Kentucky (n=43)	42	97.7%	1	2.3%	0	-	0	-
S. Saintpaul (n=24)	0	-	24	100.0%	0	-	0	-
S. Schwarzengrund (n=21)	5	23.8%	16	76.2%	0	-	0	-
S. Hadar (n=19)	8	42.1%	11	57.9%	0	-	0	-
S. Reading (n=16)	0	-	16	100.0%	0	-	0	-
S. Braenderup (n=11)	1	9.1%	0	-	5	45.5%	5	45.5%
S. Muenster (n=10)	1	10.0%	4	40.0%	5	50.0%	0	-
S. Agona (n=9)	2	22.2%	6	66.7%	0	-	1	11.1%
S. III 18a: z4, z32: - (n=6)	0	-	6	100.0%	0	-	0	-
S. Berta (n=5)	2	40.0%	2	40.0%	1	20.0%	0	-
S. Montevideo (n=5)	3	60.0%	2	40.0%	0	-	0	-
S. Mbandaka (n=4)	4	100.0%	0	-	0	-	0	
S. Newport (n=4)	0	-	2	50.0%	2	50.0%	0	
S. I 4, 12 : i : - (n=4)	4	100.0%	0	-	0	-	0	-
S. Derby (n=3)	0	-	3	100.0%	0	-	0	-
S. Enteritidis (n=3)	3	100.0%	0	-	0	-	0	-
S. III 18a: z4, z23: - (n=2)	0	-	2	100.0%	0	-	0	-
S. I 4, 12 : r : - (n=2)	0	-	2	100.0%	0	-	0	-
S. Senftenberg (n=2)	0	-	2	100.0%	0	-	0	-
S. Bredeney (n=1)	0	-	1	100.0%	0	-	0	-
S. Dublin (n=1)	0	-	0	-	1	100.0%	0	-
S. Livingstone (n=1)	1	100.0%	0	-	0	-	0	-
S. Minnesota (n=1)	0	-	1	100.0%	0	-	0	-
S. Muenchen (n=1)	1	100.0%	0	-	0	-	0	-
S. I 4, 12 : d :- (n=1)	0	-	1	100.0%	0	-	0	-
S. Urbana (n=1)	0	-	1	100.0%	0	-	0	-
Total 324	**157**	**48.5%**	**142**	**43.8%**	**14**	**4.3%**	**11**	**3.4%**

[*] Where % = (# isolates per serotype per meat) / (total # isolates per serotype).
[†] Dashes indicate that no isolates from serotype were isolated from meat type.
[‡] Includes Typhimurium var. 5-.

Table 7. *Salmonella* Serotype by Site and Meat Type, 2004

Site	Serotype	Chicken Breast		Ground Turkey		Ground Beef		Pork Chop	
		n	%*	n	%	n	%	n	%
CA	*S*. Heidelberg (n=8)	4	50.0%	4	50.0%	0	-†	0	-
	S. Kentucky (n=5)	5	100.0%	0	-	0	-	0	-
	S. Typhimurium‡ (n=3)	1	33.3%	1	33.3%	0	-	1	33.3%
	S. III 18a: z4, z32: - (n=2)	0	-	2	100.0%	0	-	0	-
	S. Montevideo (n=2)	2	100.0%	0	-	0	-	0	-
	S. Hadar (n=2)	2	100.0%	0	-	0	-	0	-
	S. Agona (n=1)	1	100.0%	0	-	0	-	0	-
	S. Braenderup (n=1)	1	100.0%	0	-	0	-	0	-
	S. Saintpaul (n=1)	0	-	1	100.0%	0	-	0	-
	S. Reading (n=1)	0	-	1	100.0%	0	-	0	-
	S. Dublin (n=1)	0	-	0	-	1	100.0%	0	-
	S. Livingstone (n=1)	1	100.0%	0	-	0	-	0	-
	Total (n=28)	**17**	**60.7%**	**9**	**32.1%**	**1**	**3.6%**	**1**	**3.6%**
CO	*S*. Heidelberg (n=4)	0	-	4	100.0%	0	-	0	-
	S. Saintpaul (n=2)	0	-	2	100.0%	0	-	0	-
	S. Reading (n=1)	0	-	1	100.0%	0	-	0	-
	S. Agona (n=1)	1	100.0%	0	-	0	-	0	-
	S. Minnesota (n=1)	0	-	1	100.0%	0	-	0	-
	Total (n=9)	**1**	**11.1%**	**8**	**88.9%**	**0**	**-**	**0**	**-**
CT	*S*. Typhimurium (n=20)	19	95.0%	1	5.0%	0	-	0	-
	S. Heidelberg (n=10)	2	20.0%	8	80.0%	0	-	0	-
	S. Braenderup (n=10)	0	-	0	-	5	50.0%	5	50.0%
	S. Schwarzengrund (n=9)	0	-	9	100.0%	0	-	0	-
	S. Kentucky (n=8)	8	100.0%	0	-	0	-	0	-
	S. Saintpaul (n=3)	0	-	3	100.0%	0	-	0	-
	S. III 18a: z4, z32: - (n=2)	0	-	2	100.0%	0	-	0	-
	S. I 4, 12 : r : - (n=2)	0	-	2	100.0%	0	-	0	-
	S. Enteritidis (n=1)	1	100.0%	0	-	0	-	0	-
	S. Bredeney (n=1)	0	-	1	100.0%	0	-	0	-
	Total (n=66)	**30**	**45.5%**	**26**	**39.4%**	**5**	**7.6%**	**5**	**7.6%**
GA	*S*. Heidelberg (n=12)	1	8.3%	11	91.7%	0	-	0	-
	S. Saintpaul (n=6)	0	-	6	100.0%	0	-	0	-
	S. Reading (n=5)	0	-	5	100.0%	0	-	0	-
	S. Agona (n=4)	0	-	4	100.0%	0	-	0	-
	S. III 18a: z4, z32: - (n=3)	0	-	3	100.0%	0	-	0	-
	S. Newport (n=3)	0	-	2	66.7%	1	33.3%	0	-
	S. Kentucky (n=2)	2	100.0%	0	-	0	-	0	-
	S. Schwarzengrund (n=2)	0	-	2	100.0%	0	-	0	-
	S. Montevideo (n=2)	0	-	2	100.0%	0	-	0	-
	S. Mbandaka (n=2)	2	100.0%	0	-	0	-	0	-
	S. Hadar (n=1)	0	-	1	100.0%	0	-	0	-
	S. Derby (n=1)	0	-	1	100.0%	0	-	0	-
	S. Enteritidis (n=1)	1	100.0%	0	-	0	-	0	-
	S. Senftenberg (n=1)	0	-	1	100.0%	0	-	0	-
	Total (n=45)	**6**	**13.3%**	**38**	**84.4%**	**1**	**2.2%**	**0**	**-**

* Where % = (# isolates per serotype per meat type per site)/(total # isolates per serotype per site).
† Dashes indicate that no isolates from serotype were isolated from meat type.
‡ Includes Typhimurium var. 5-.

Table 7(cont'd). *Salmonella* Serotype by Site and Meat Type, 2004

Site	Serotype	Chicken Breast		Ground Turkey		Ground Beef		Pork Chop	
		n	%	n	%	n	%	n	%
MD	*S.* Typhimurium (n=14)	14	100.0%	0	-	0	-	0	-
	S. Muenster (n=5)	1	20.0%	4	80.0%	0	-	0	-
	S. Schwarzengrund (n=4)	2	50.0%	2	50.0%	0	-	0	-
	S. Berta (n=3)	0	-	2	66.7%	1	33.3%	0	-
	S. Kentucky (n=3)	3	100.0%	0	-	0	-	0	-
	S. Derby (n=2)	0	-	2	100.0%	0	-	0	-
	S. Enteritidis (n=1)	1	100.0%	0	-	0	-	0	-
	S. Heidelberg (n=1)	1	100.0%	0	-	0	-	0	-
	S. Hadar (n=1)	1	100.0%	0	-	0	-	0	-
	S. Montevideo (n=1)	1	100.0%	0	-	0	-	0	-
	S. Senftenberg (n=1)	0	-	1	100.0%	0	-	0	-
	S. I 4, 12 : d :- (n=1)	0	-	1	100.0%	0	-	0	-
	S. Urbana (n=1)	0	-	1	100.0%	0	-	0	-
	Total (n=38)	**24**	**63.2%**	**13**	**34.2%**	**1**	**2.6%**	**0**	**-**
MN	*S.* Heidelberg (n=10)	7	70.0%	3	30.0%	0	-	0	-
	S. Kentucky (n=10)	9	90.0%	1	10.0%	0	-	0	-
	S. Hadar (n=5)	0	-	5	100.0%	0	-	0	-
	S. Reading (n=4)	0	-	4	100.0%	0	-	0	-
	S. Mbandaka (n=2)	2	100.0%	0	-	0	-	0	-
	S. Berta (n=2)	2	100.0%	0	-	0	-	0	-
	S. Saintpaul (n=1)	0	-	1	100.0%	0	-	0	-
	Total (n=34)	**20**	**58.8%**	**14**	**41.2%**	**0**	**-**	**0**	**-**
NM	*S.* Reading (n=5)	0	-	5	100.0%	0	-	0	-
	S. Heidelberg (n=3)	1	33.3%	2	66.7%	0	-	0	-
	S. Saintpaul (n=2)	0	-	2	100.0%	0	-	0	-
	S. Schwarzengrund (n=1)	1	100.0%	0	-	0	-	0	-
	S. Kentucky (n=1)	1	100.0%	0	-	0	-	0	-
	Total (n=12)	**3**	**25.0%**	**9**	**75.0%**	**0**	**-**	**0**	**-**
NY	*S.* Kentucky (n=10)	10	100.0%	0	-	0	-	0	-
	S. Typhimurium (n=7)	6	85.7%	0	-	0	-	1	14.3%
	S. Saintpaul (n=3)	0	-	3	100.0%	0	-	0	-
	S. Schwarzengrund (n=3)	0	-	3	100.0%	0	-	0	-
	S. Agona (n=3)	0	-	2	66.7%	0	-	1	33.3%
	S. Heidelberg (n=2)	0	-	1	50.0%	0	-	1	50.0%
	S. Hadar (n=1)	0	-	1	100.0%	0	-	0	-
	S. III 18a: z4, z32: - (n=1)	0	-	1	100.0%	0	-	0	-
	Total (n=30)	**16**	**53.3%**	**11**	**36.7%**	**0**	**-**	**3**	**10.0%**
OR	*S.* Heidelberg (n=21)	15	71.4%	4	19.0%	0	-	2	9.5%
	S. Hadar (n=5)	5	100.0%	0	-	0	-	0	-
	S. Muenster (n=5)	0	-	0	-	5	100.0%	0	-
	S. Kentucky (n=3)	3	100.0%	0	-	0	-	0	-
	S. Saintpaul (n=2)	0	-	2	100.0%	0	-	0	-
	S. Schwarzengrund (n=2)	2	100.0%	0	-	0	-	0	-
	S. Newport (n=1)	0	-	0	-	1	100.0%	0	-
	Total (n=39)	**25**	**64.1%**	**6**	**15.4%**	**6**	**15.4%**	**2**	**5.1%**

Table 7(cont'd). *Salmonella* Serotype by Site and Meat Type, 2004

Site	Serotype	Chicken Breast		Ground Turkey		Ground Beef		Pork Chop	
		n	**%**	**n**	**%**	**n**	**%**	**n**	**%**
TN	*S*. Typhimurium (n=9)	9	100.0%	0	-	0	-	0	-
	S. Hadar (n=4)	0	-	4	100.0%	0	-	0	-
	S. Saintpaul (n=4)	0	-	4	100.0%	0	-	0	-
	S. I 4, 12 : i : - (n=4)	4	100.0%	0	-	0	-	0	-
	S. Kentucky (n=1)	1	100.0%	0	-	0	-	0	-
	S. Muenchen (n=1)	1	100.0%	0	-	0	-	0	-
	Total (n=23)	**15**	**65.2%**	**8**	**34.8%**	**0**	**-**	**0**	**-**
Grand Total (N=324)		**157**	**48.5%**	**142**	**43.8%**	**14**	**4.3%**	**11**	**3.4%**

Table 8. *Salmonella* Isolates by Month for All Sites, 2004

Month	n	%*
January	49	15.1%
February	18	5.6%
March	21	6.5%
April	28	8.6%
May	25	7.7%
June	23	7.1%
July	32	9.9%
August	34	10.5%
September	19	5.9%
October	24	7.4%
November	28	8.6%
December	23	7.1%
Total (N)	**324**	**100.0%**

* Where % = (n/N).

Table 9. Antimicrobial Resistance among *Salmonella* Isolates (N=324), 2004

Antimicrobial Agent	n	%R*
Tetracycline	161	49.7%
Streptomycin	98	30.2%
Sulfisoxazole	89	27.5%
Ampicillin	81	25.0%
Amoxicillin/Clavulanic Acid	52	16.0%
Cefoxitin	48	14.8%
Ceftiofur	48	14.8%
Kanamycin	45	13.9%
Gentamicin	35	10.8%
Chloramphenicol	11	3.4%
Ceftriaxone	1	0.3%
Trimethoprim/Sulfamethoxazole	1	0.3%
Amikacin	0	0.0%
Ciprofloxacin	0	0.0%
Nalidixic Acid	0	0.0%

* Where %R = (n/N).

Figure 4. Antimicrobial Resistance among *Salmonella* isolates (n =324), 2004

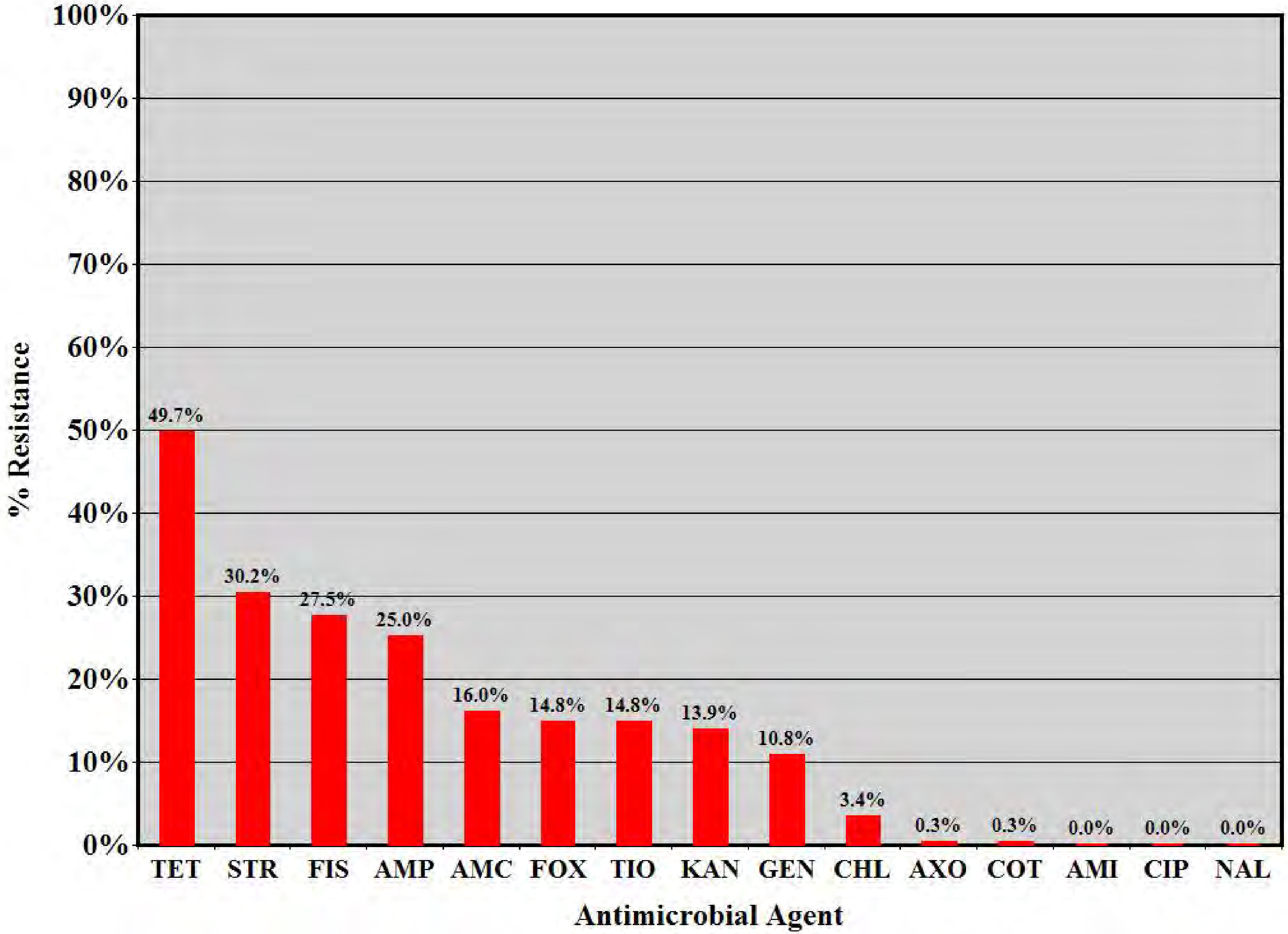


Figure 5. MIC Distribution among all Antimicrobial Agents, 2004

Salmonella from All Meats (N=324)		Distribution (%) of MICs (in µg/ml)															
Antimicrobial Agent	**%R[†]**	**0.015**	**0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**>256**
Ampicillin	**25.0%**							63.6	10.5	0.9				**25.0**			
Amoxicillin/Clavulanic Acid	**16.0%**							67.0	8.0		4.0	4.9	**1.2**	**14.8**			
Cefoxitin	**14.8%**							1.9	59.0	20.7	3.1	0.6	**3.1**	**11.7**			
Ceftiofur	**14.8%**					0.3	46.3	36.7	1.9			**14.8**					
Ceftriaxone	**0.3%**					84.9					0.9	9.9	4.0	**0.3**			
Nalidixic Acid	**0.0%**								8.0	84.9	6.8	0.3					
Ciprofloxacin	**0.0%**	95.4	4.0	0.6													
Sulfisoxazole	**27.5%**											8.3	15.4	48.1	0.6		**27.5**
Trimethoprim/Sulfamethoxazole	**0.3%**				93.5	4.3	1.9				**0.3**						
Amikacin	**0.0%**						4.6	49.4	41.0	4.9							
Gentamicin	**10.8%**					42.0	41.4	4.0	0.3		1.5	**4.9**	**5.9**				
Kanamycin	**13.9%**										82.7	2.5	0.9	**3.1**	**10.8**		
Streptomycin*	**30.2%**												69.8	**17.3**	**13.0**		
Chloramphenicol	**3.4%**								1.2	13.0	80.2	2.2		**3.4**			
Tetracycline	**49.7%**									46.6	3.7	**1.9**	**0.9**	**46.9**			

*Currently no CLSI breakpoints have been established for this organism/antimicrobial combination. Indicated breakpoints were established by NARMS.

[†]Discrepancies between %R and sums of distribution %s are due to rounding.

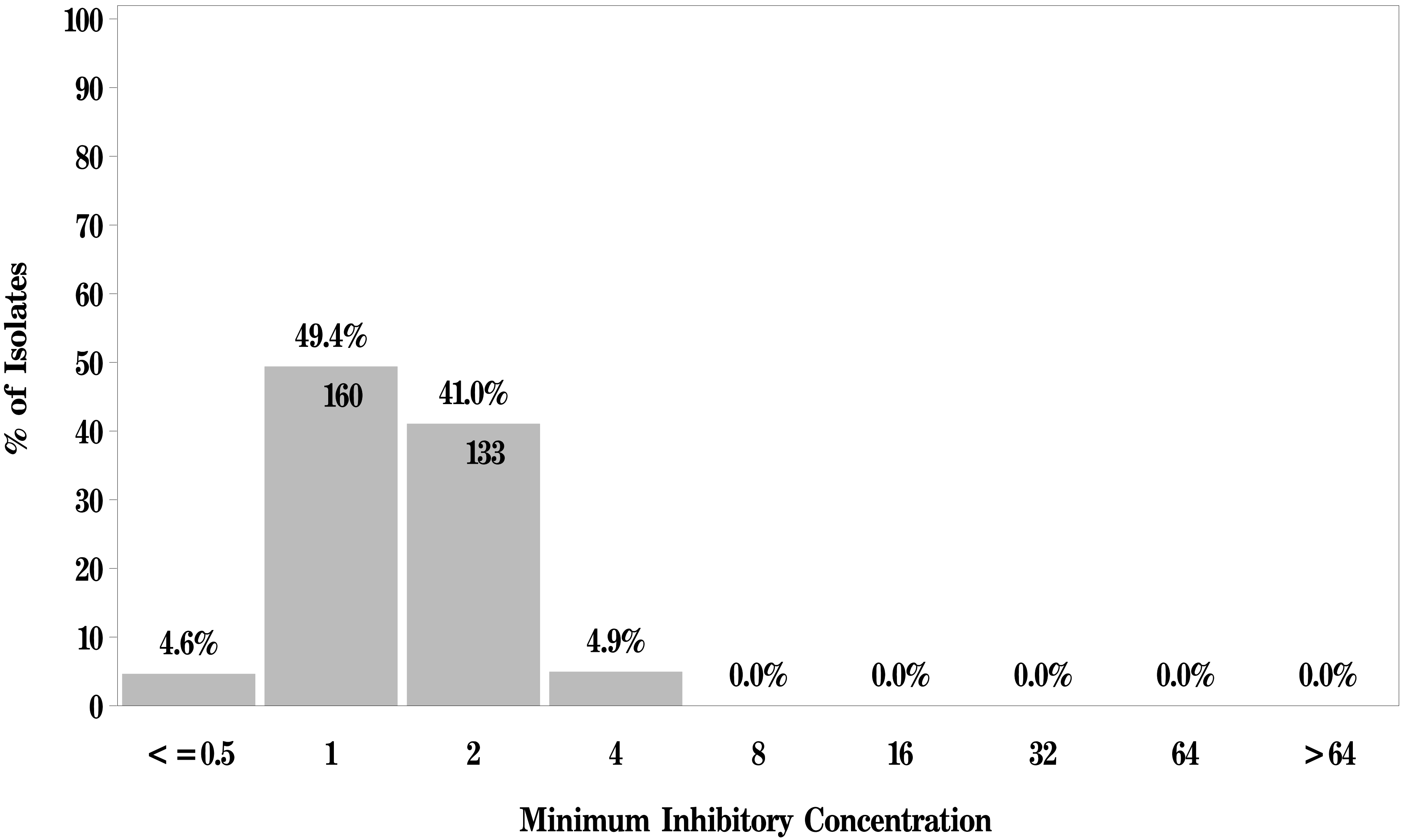
Vertical bars show the CLSI Susceptible/Resistant breakpoints for each drug.

Unshaded areas indicate the dilution ranges of the Sensititre plate used to test the 2004 isolates.

NARMS

Figure 5a: Minimum Inhibitory Concentration of Amikacin for *Salmonella* (N=324 Isolates)

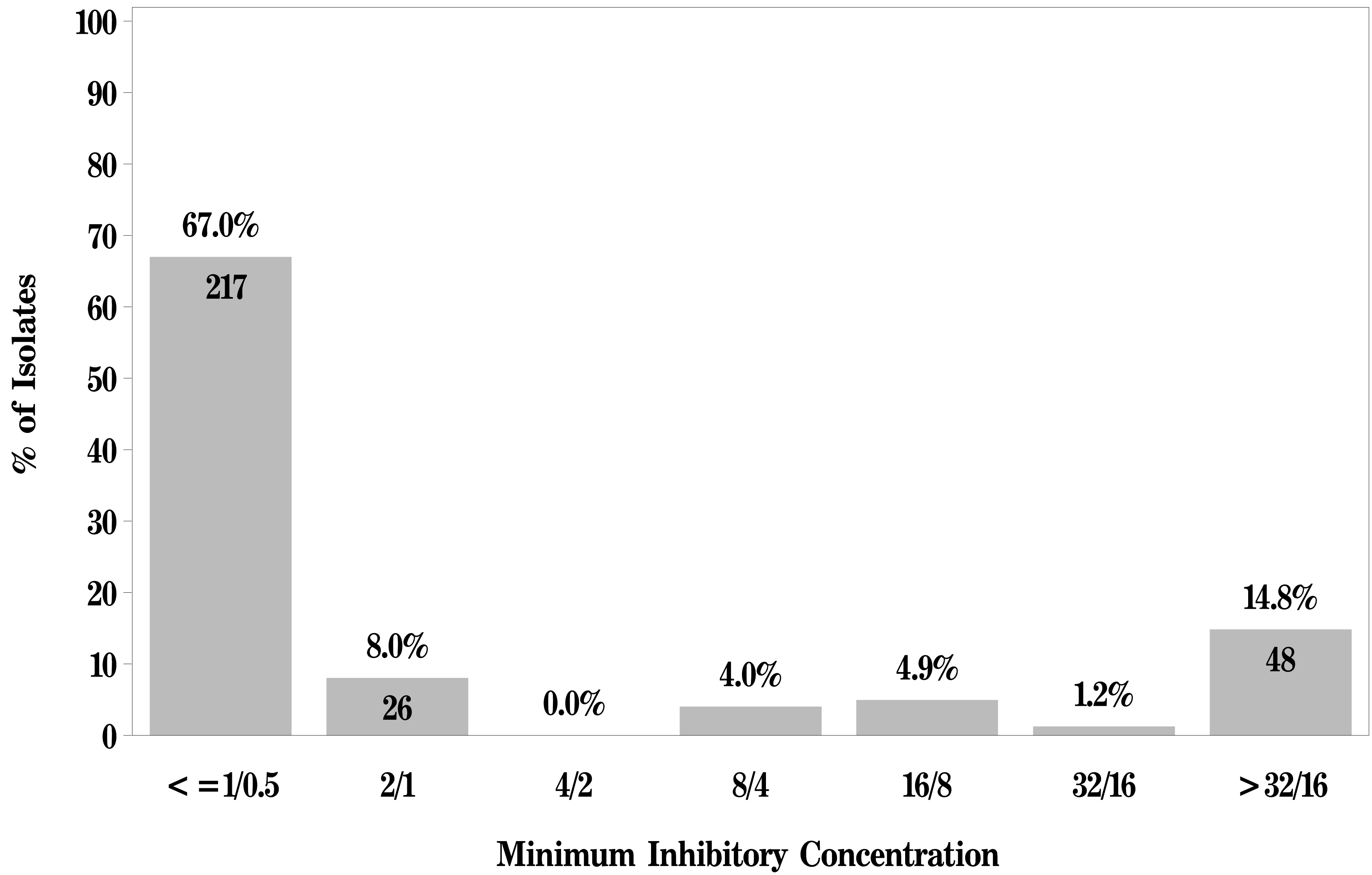
Breakpoints: Susceptible <=16 µg/mL Resistant >=64 µg/mL



NARMS

Figure 5b: Minimum Inhibitory Concentration of Amoxicillin/Clavulanic acid for *Salmonella* (N=324 Isolates)

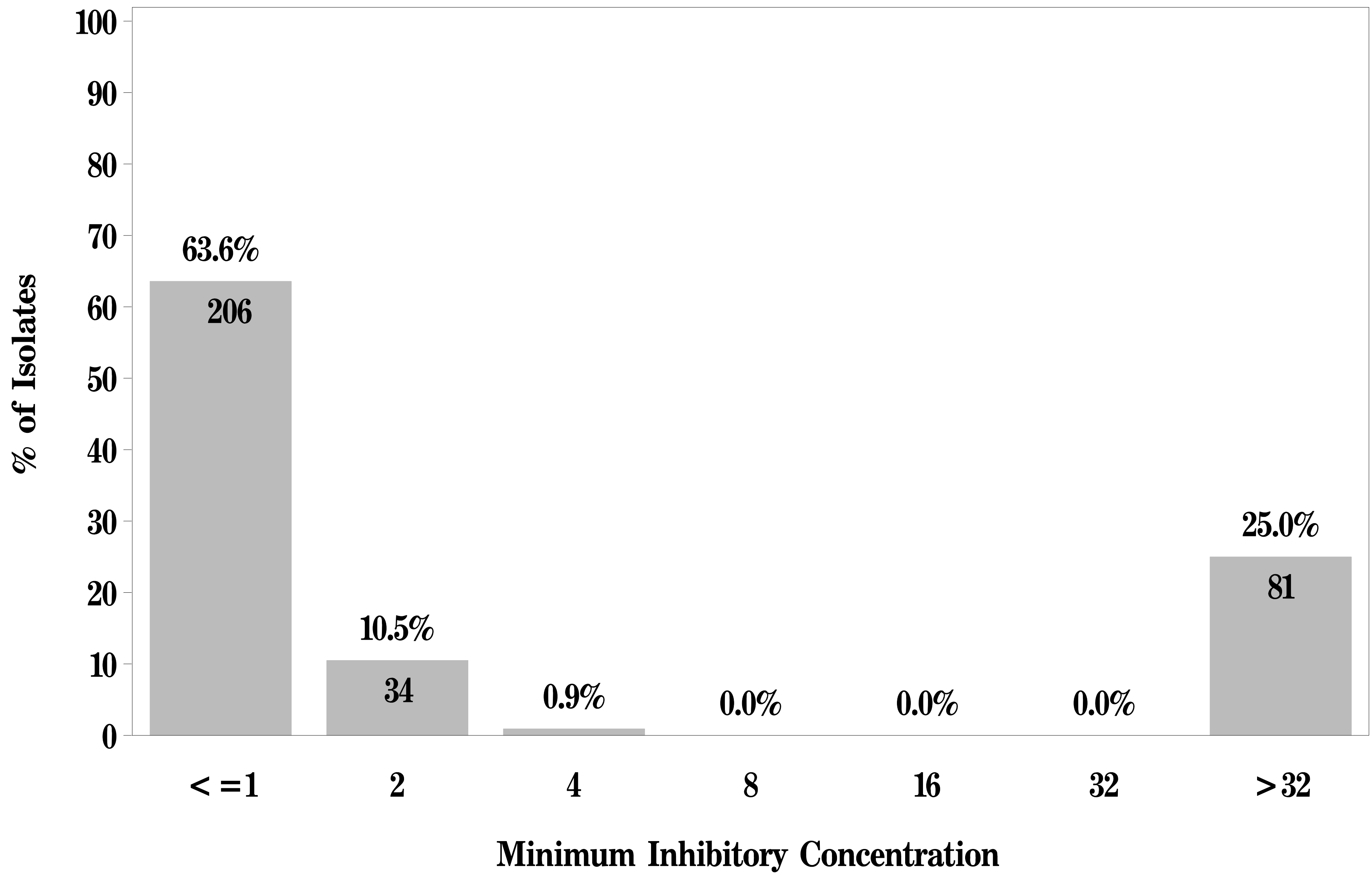
Breakpoints: Susceptible<=8 μg/mL Resistant>=32 μg/mL



NARMS

Figure 5c: Minimum Inhibitory Concentration of Ampicillin for *Salmonella* (N=324 Isolates)

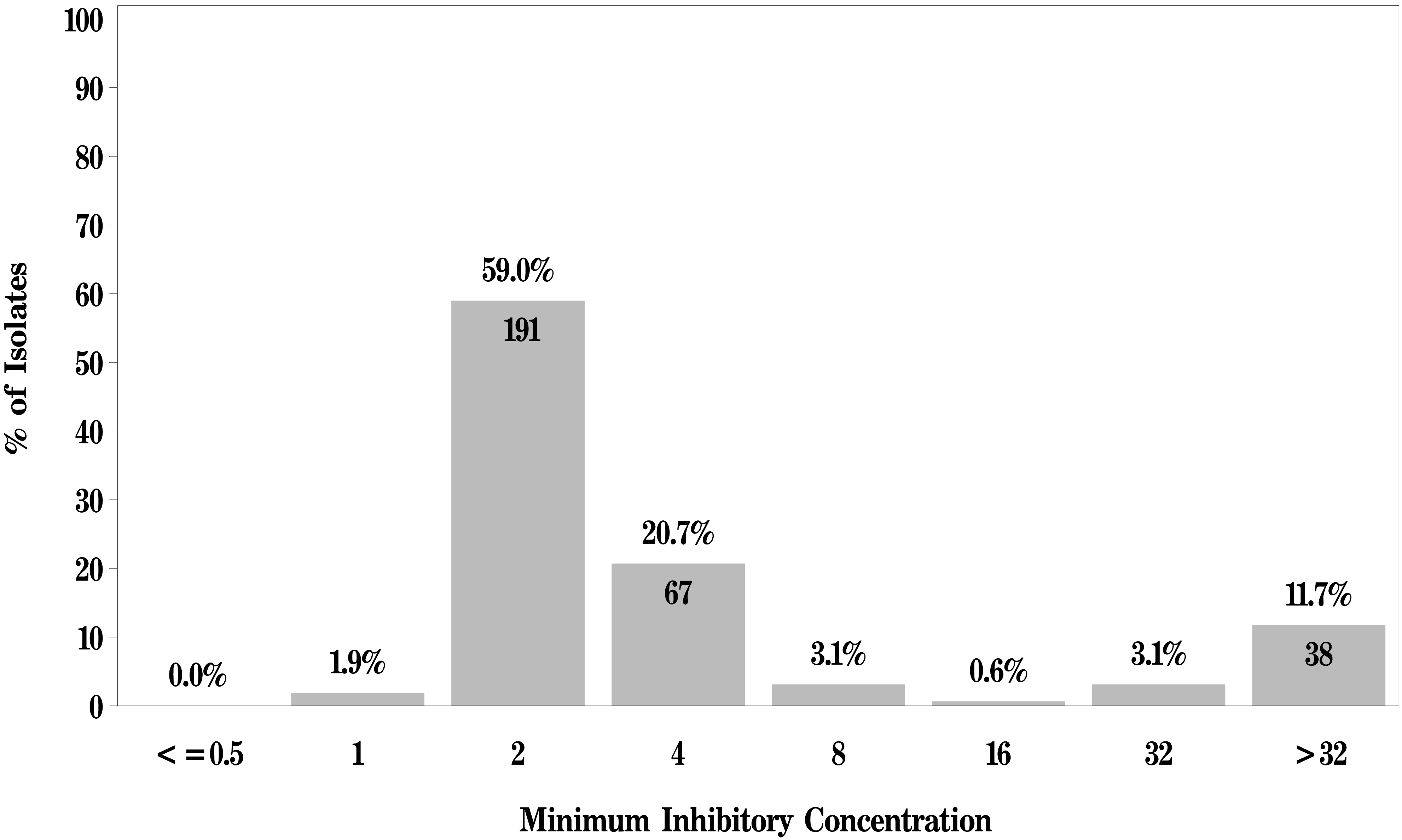
Breakpoints: Susceptible <=8 µg/mL Resistant >=32 µg/mL



NARMS

Figure 5d: Minimum Inhibitory Concentration of Cefoxitin for *Salmonella* (N=324 Isolates)

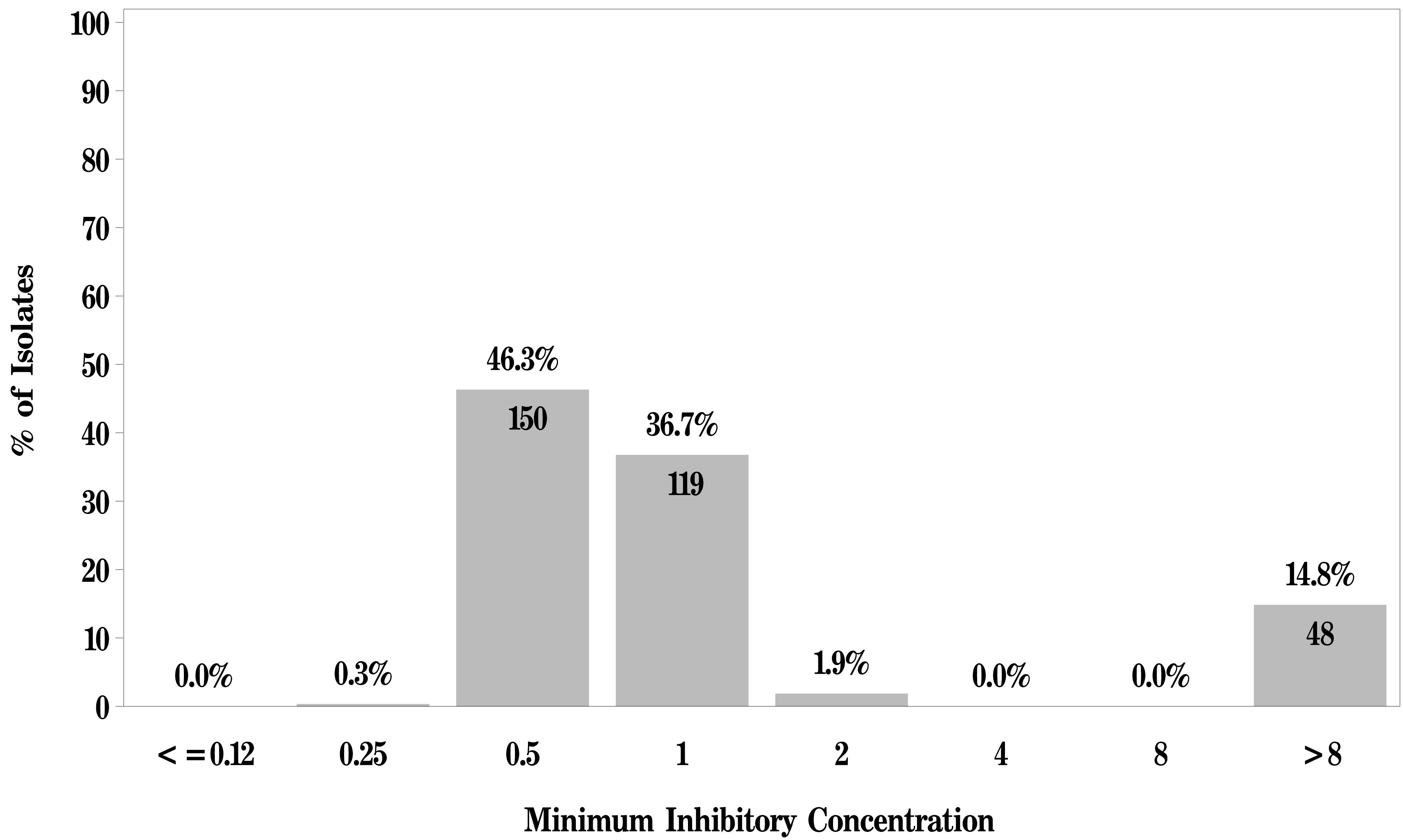
Breakpoints: Susceptible <=8 μg/mL Resistant >=32 μg/mL



NARMS

Figure 5e: Minimum Inhibitory Concentration of Ceftiofur for *Salmonella* (N=324 Isolates)

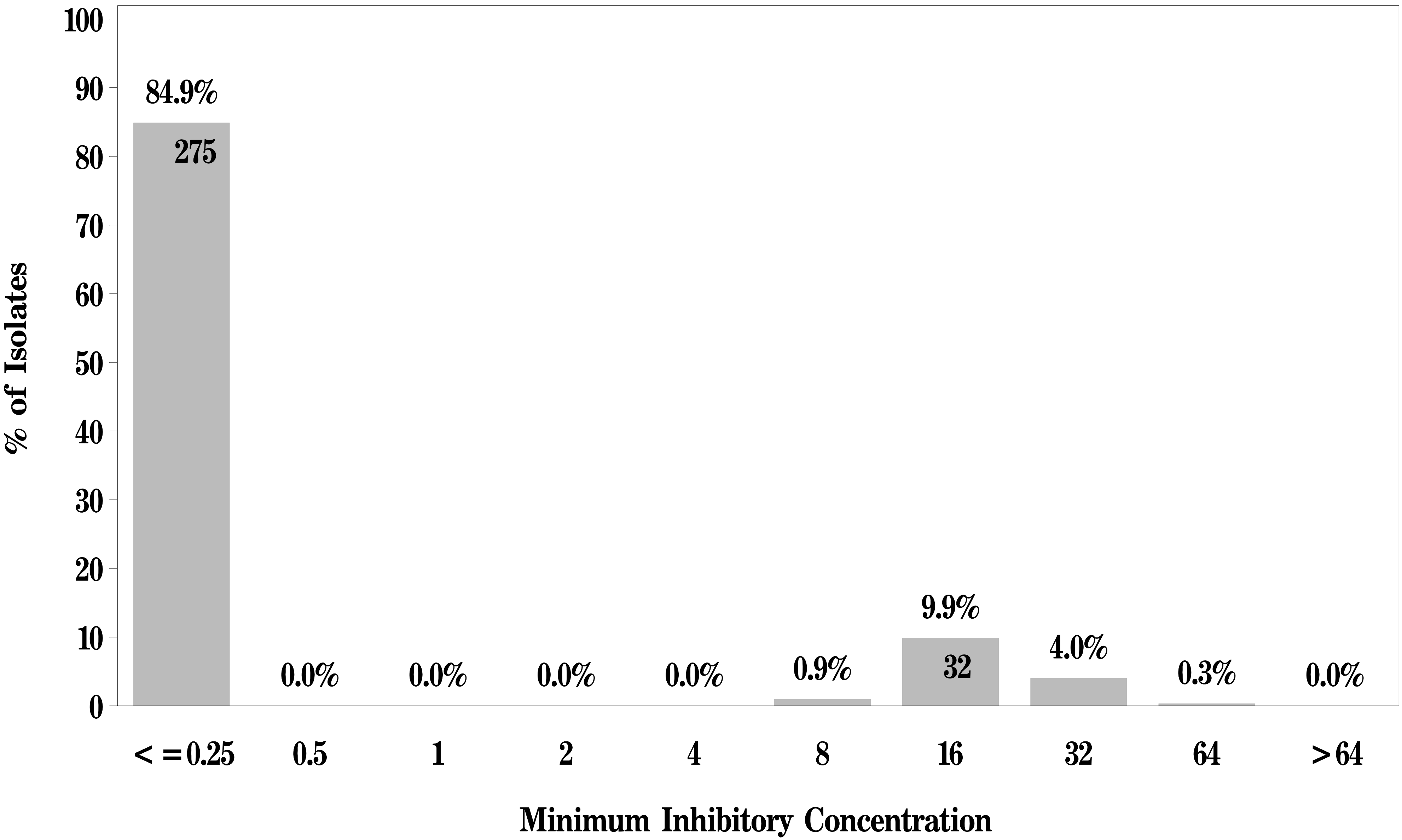
Breakpoints: Susceptible <=2 μg/mL Resistant >=8 μg/mL



NARMS

Figure 5f: Minimum Inhibitory Concentration of Ceftriaxone for *Salmonella* (N=324 Isolates)

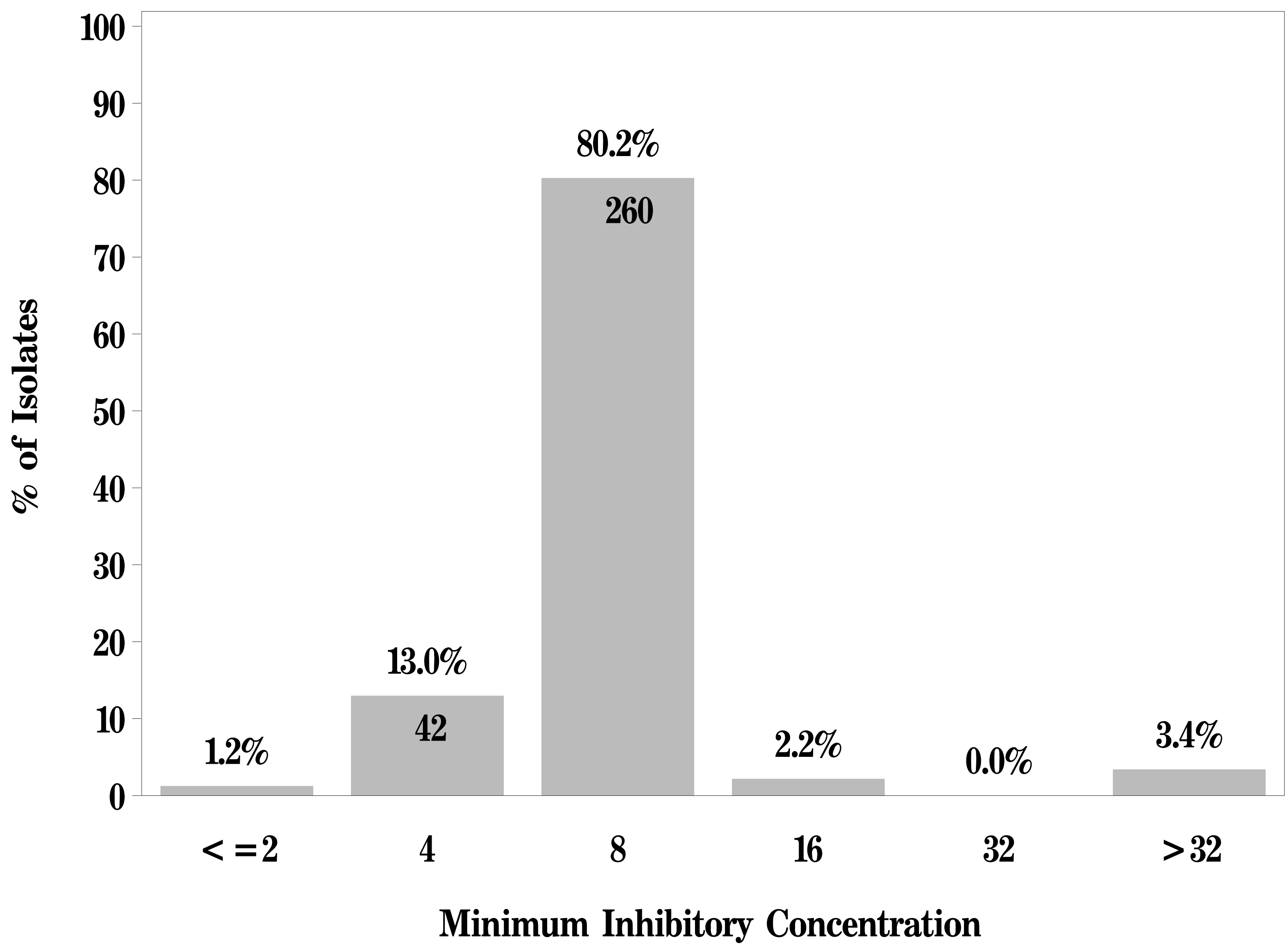
Breakpoints: Susceptible <=8 µg/mL Resistant >=64 µg/mL



NARMS

Figure 5g: Minimum Inhibitory Concentration of Chloramphenicol for *Salmonella* (N=324 Isolates)

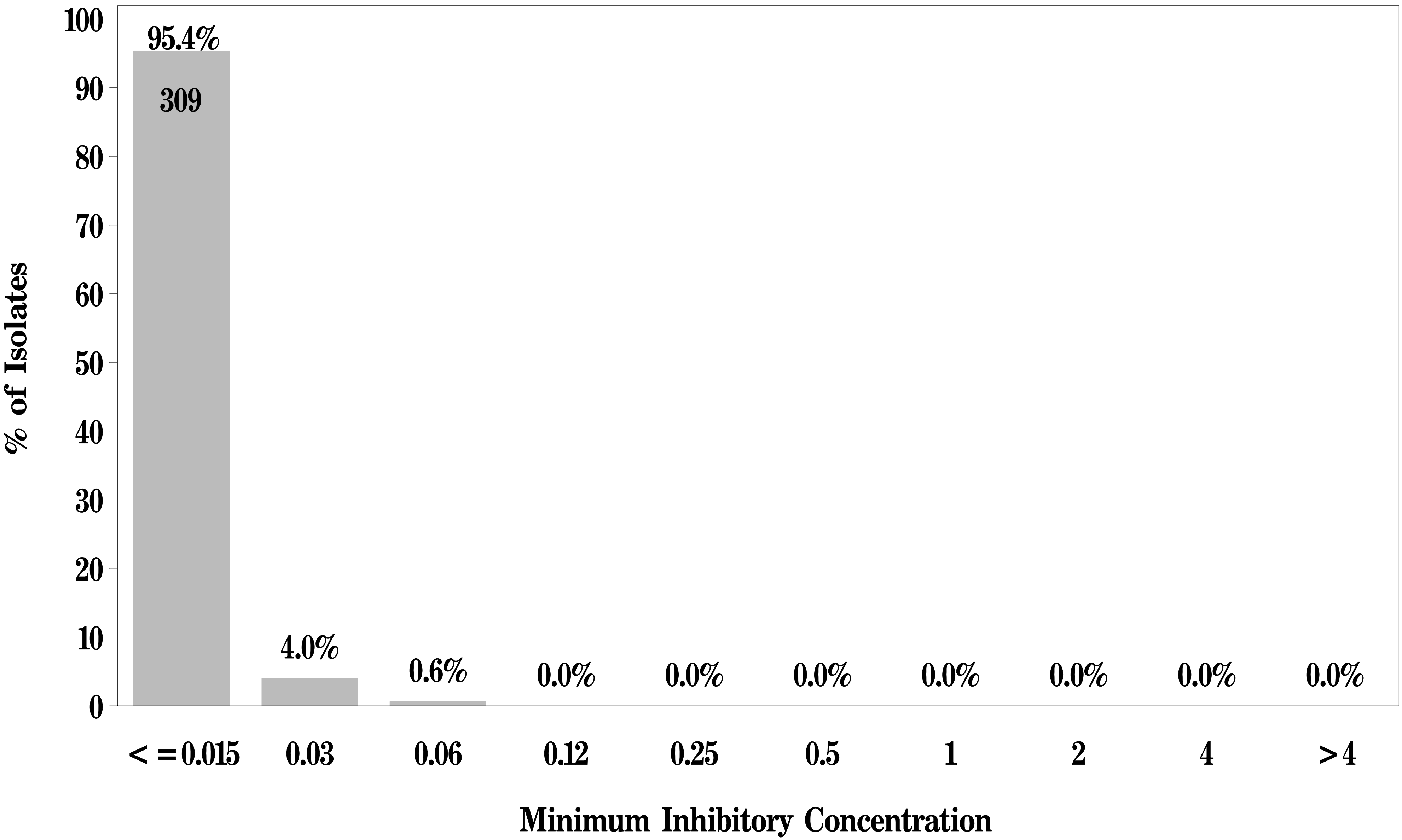
Breakpoints: Susceptible<=8 µg/mL Resistant>=32 µg/mL



NARMS

Figure 5h: Minimum Inhibitory Concentration of Ciprofloxacin for *Salmonella* (N=324 Isolates)

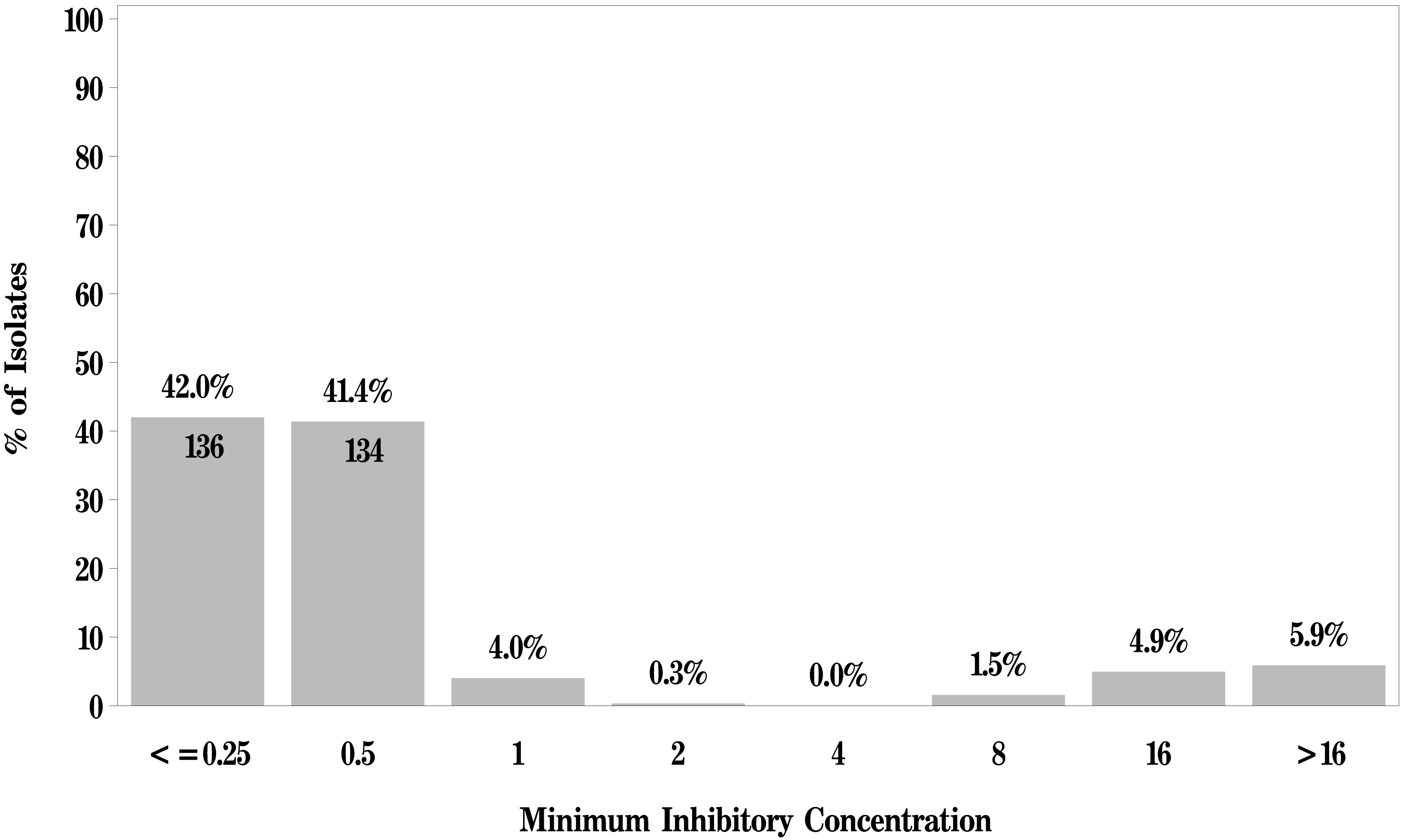
Breakpoints: Susceptible <=1 µg/mL Resistant >=4 µg/mL



NARMS

Figure 5i: Minimum Inhibitory Concentration of Gentamicin for *Salmonella* (N=324 Isolates)

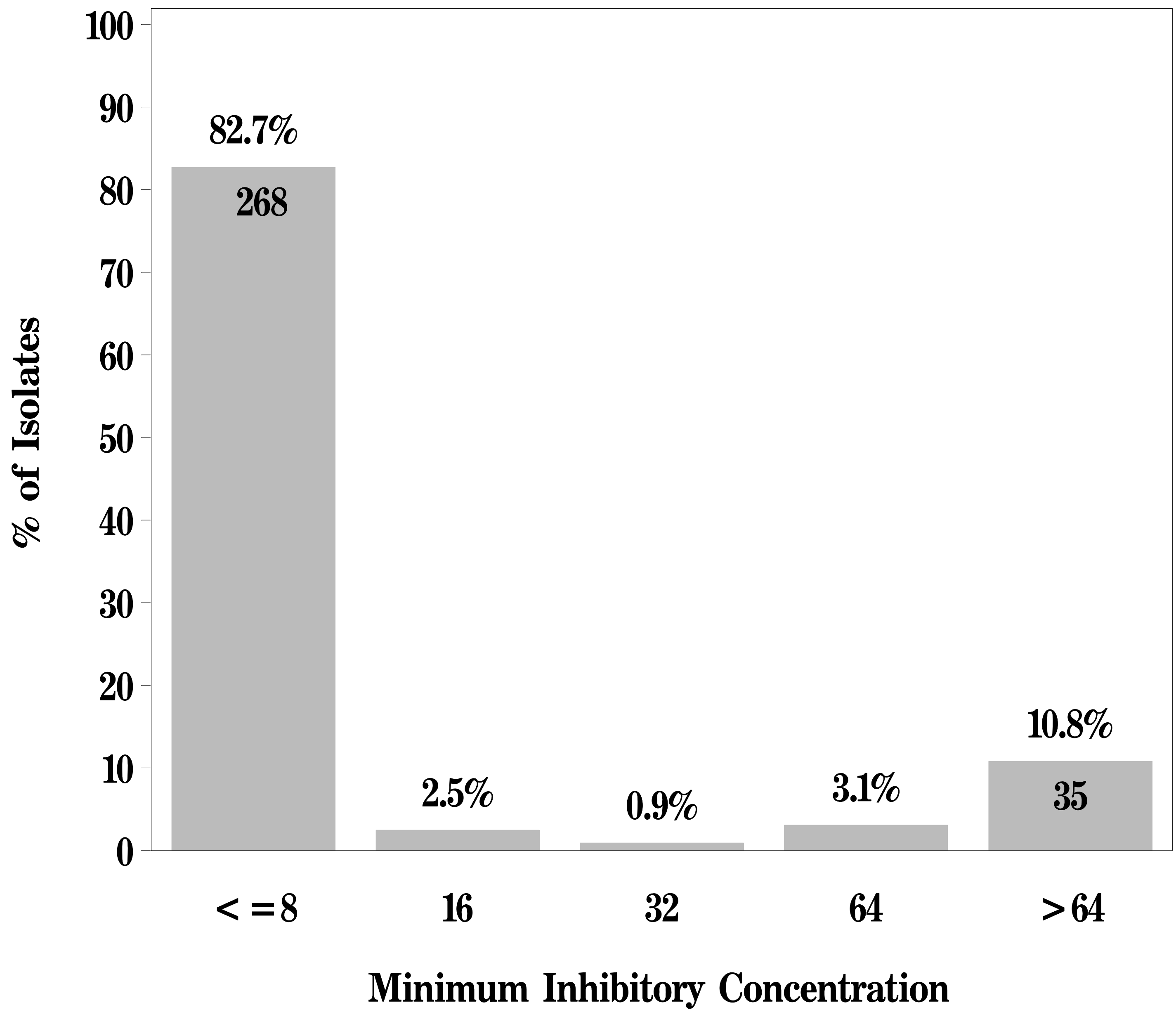
Breakpoints: Susceptible <=4 µg/mL Resistant >=16 µg/mL



NARMS

Figure 5j: Minimum Inhibitory Concentration of Kanamycin for *Salmonella* (N=324 Isolates)

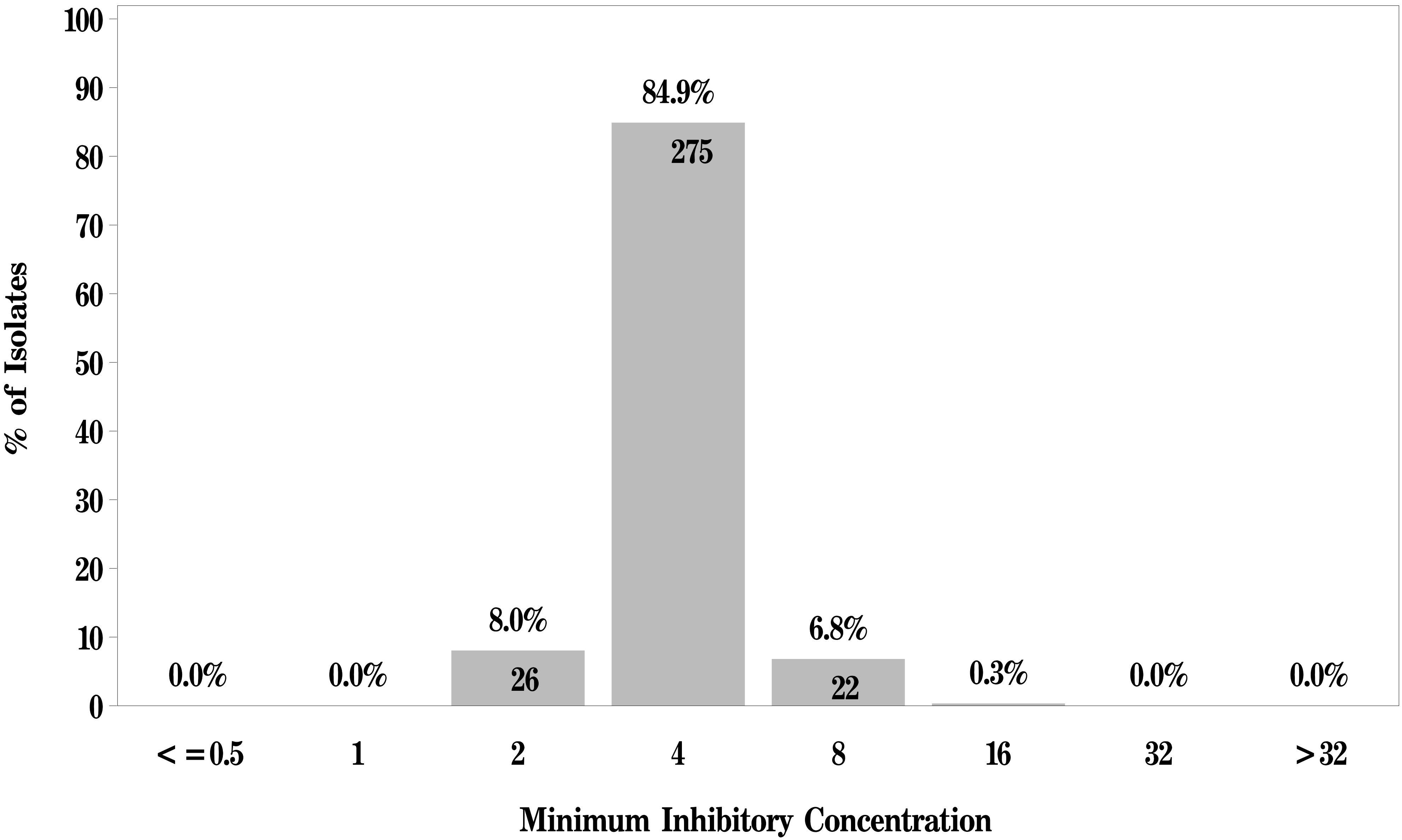
Breakpoints: Susceptible<=16 μg/mL Resistant>=64 μg/mL



NARMS

Figure 5k: Minimum Inhibitory Concentration of Nalidixic acid for *Salmonella* (N=324 Isolates)

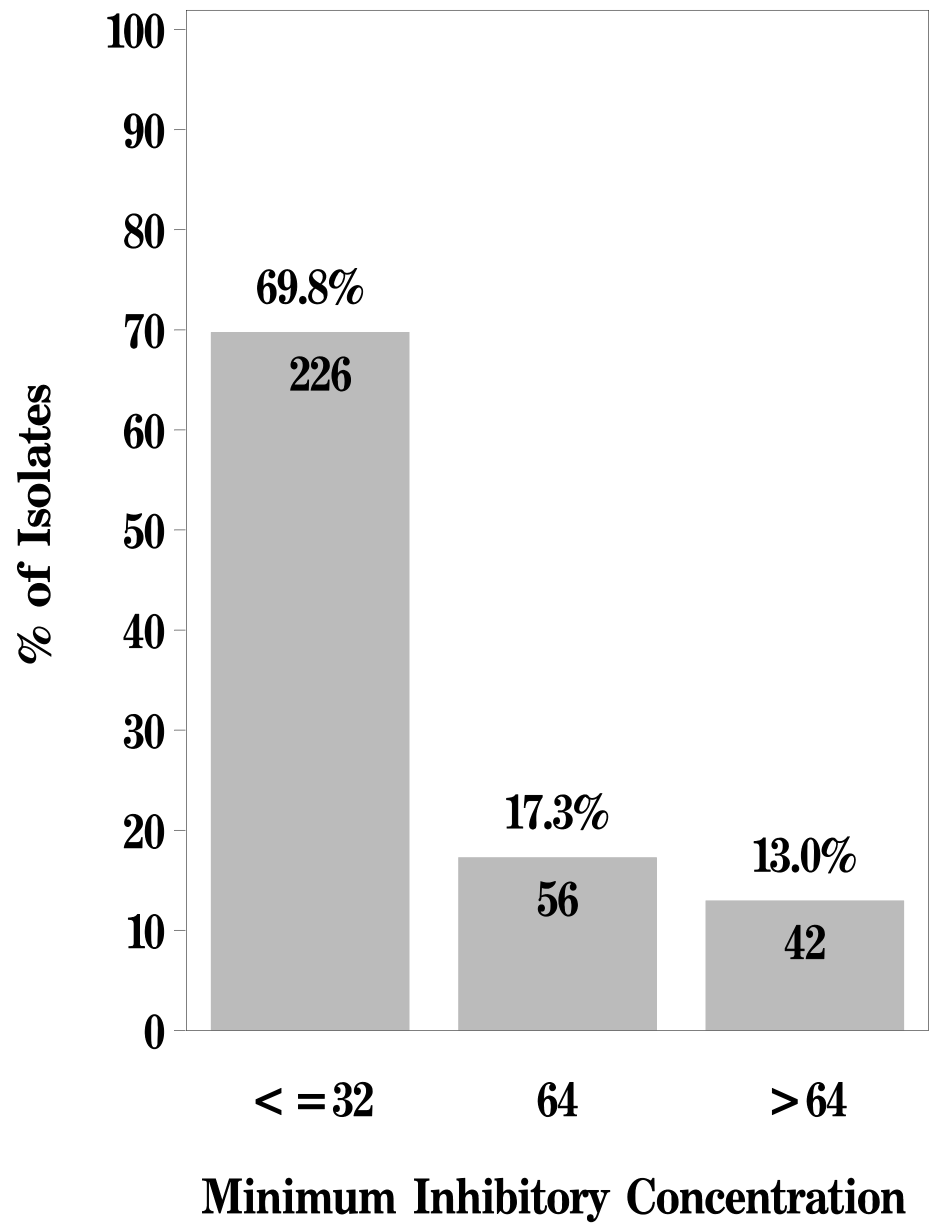
Breakpoints: Susceptible <=16 μg/mL Resistant >=32 μg/mL



NARMS

Figure 5l: Minimum Inhibitory Concentration of Streptomycin for *Salmonella* (N=324 Isolates)

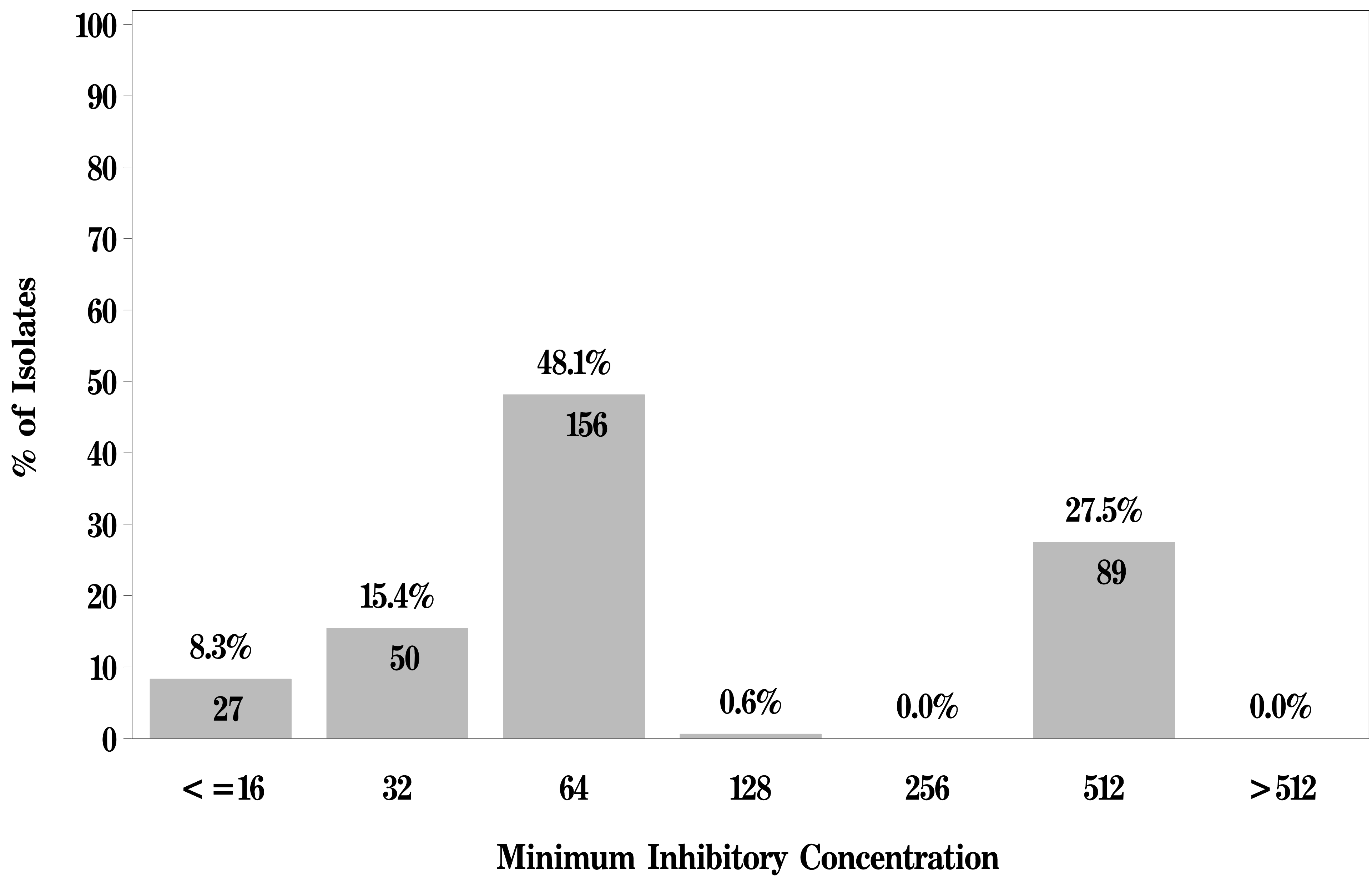
Breakpoints: Susceptible<=32 µg/mL Resistant>=64 µg/mL



NARMS

Figure 5m: Minimum Inhibitory Concentration of Sulfisoxazole for *Salmonella* (N=324 Isolates)

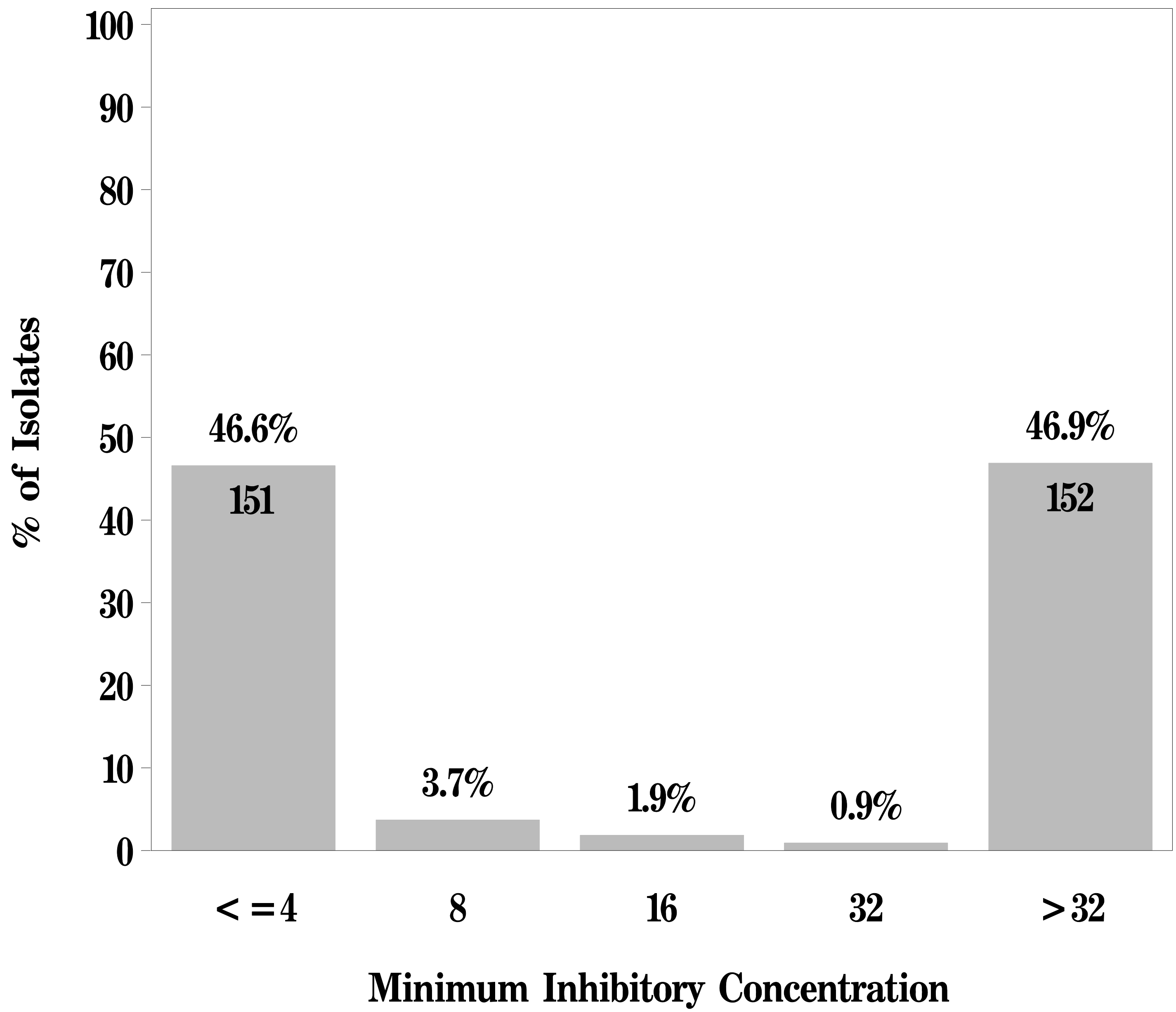
Breakpoints: Susceptible <=256 µg/mL Resistant >=512 µg/mL



NARMS

Figure 5n: Minimum Inhibitory Concentration of Tetracycline for *Salmonella* (N=324 Isolates)

Breakpoints: Susceptible <=4 μg/mL Resistant >=16 μg/mL



NARMS

Figure 5o: Minimum Inhibitory Concentration of Trimethoprim/sulfamethoxazole for *Salmonella* (N=324 Isolates)

Breakpoints: Susceptible <=2 µg/mL Resistant >=4 µg/mL

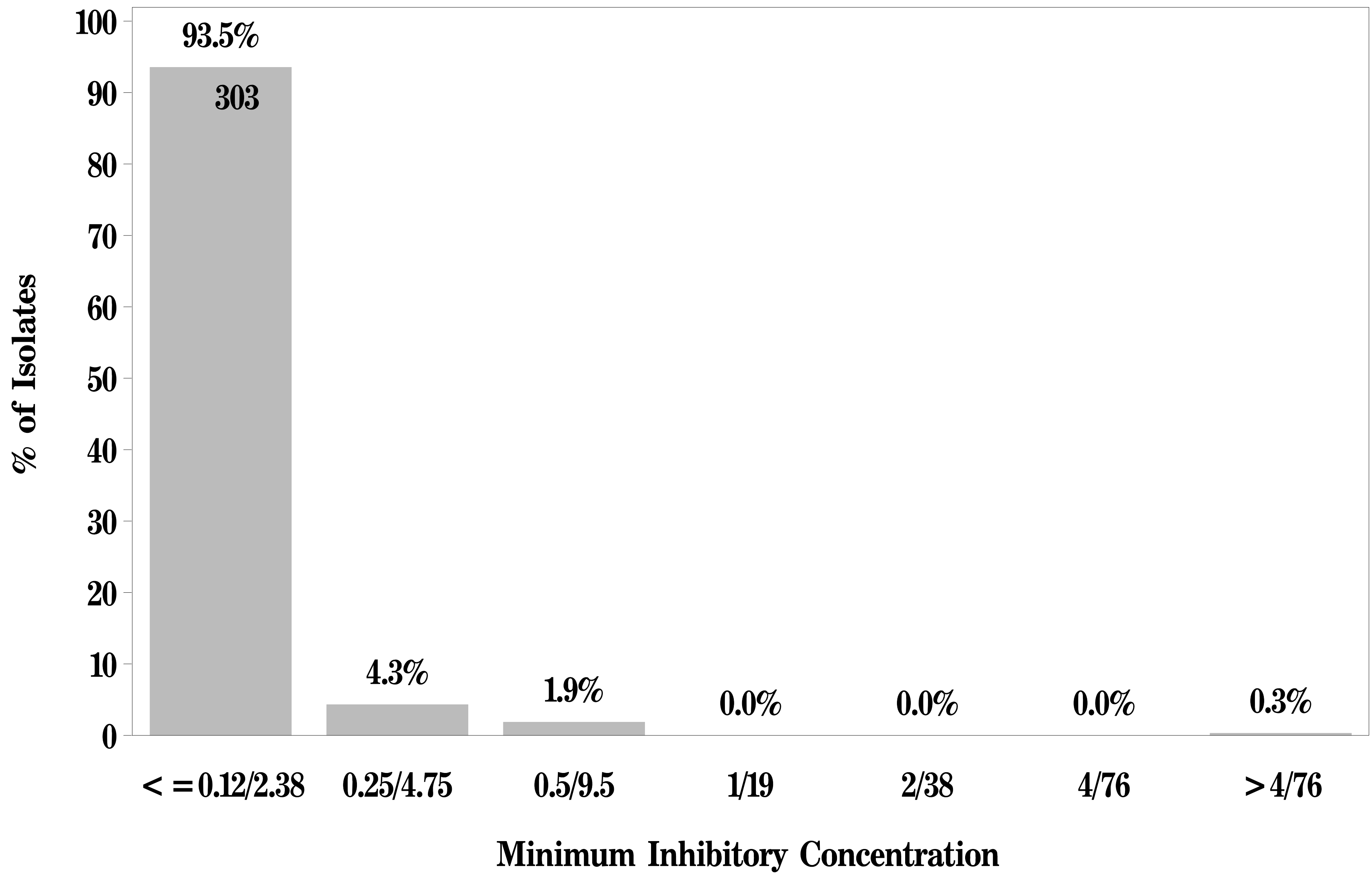


Table 10. Antimicrobial Resistance among *Salmonella* Isolates by Meat Type, 2004

Antimicrobial Agent	Chicken Breast (n=157)	Ground Turkey (n=142)	Ground Beef (n=14)	Pork Chop (n=11)
Tetracycline	46.5%*	56.3%	14.3%	54.5%
Streptomycin	28.0%	33.8%	14.3%	27.3%
Sulfisoxazole	28.7%	28.2%	14.3%	18.2%
Ampicillin	30.6%	20.4%	21.4%	9.1%
Amoxicillin/Clavulanic Acid	24.8%	7.7%	14.3%	-†
Cefoxitin	24.8%	4.9%	14.3%	-
Ceftiofur	24.8%	4.9%	14.3%	-
Kanamycin	11.5%	18.3%	-	9.1%
Gentamicin	3.8%	20.4%	-	-
Chloramphenicol	1.9%	2.8%	14.3%	18.2%
Ceftriaxone	-	-	7.1%	-
Trimethoprim/Sulfamethoxazole	-	-	7.1%	-
Amikacin	-	-	-	-
Ciprofloxacin	-	-	-	-
Nalidixic Acid	-	-	-	-

* Where % Resistance = (# isolates per meat type resistant to antimicrobial) / (total # isolates per meat type).

† Dashes indicate 0.0% resistance to antimicrobial.

Figure 6a. MIC Distribution among *Salmonella* from Chicken Breast, 2004

Salmonella from Chicken Breast (N=157)		Distribution (%) of MICs (in µg/ml)															
Antimicrobial Agent	**%R[†]**	**0.015**	**0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**>256**
Ampicillin	**30.6%**							60.5	8.9					**30.6**			
Amoxicillin/Clavulanic Acid	**24.8%**							61.8	7.6		4.5	1.3		**24.8**			
Cefoxitin	**24.8%**							2.5	56.7	14.6	1.3		**5.7**	**19.1**			
Ceftiofur	**24.8%**					0.6	47.1	27.4				**24.8**					
Ceftriaxone	**0.0%**					75.2					1.9	18.5	4.5				
Nalidixic Acid	**0.0%**								12.1	82.8	5.1						
Ciprofloxacin	**0.0%**	96.2	3.8														
Sulfisoxazole	**28.7%**											12.1	14.6	43.3	1.3		**28.7**
Trimethoprim/Sulfamethoxazole	**0.0%**				96.8	3.2											
Amikacin	**0.0%**						7.6	46.5	40.1	5.7							
Gentamicin	**3.8%**					46.5	45.2	3.8			0.6	**1.9**	**1.9**				
Kanamycin	**11.5%**										84.7	3.2	0.6		**11.5**		
Streptomycin*	**28.0%**												72.0	**16.6**	**11.5**		
Chloramphenicol	**1.9%**								2.5	14.6	80.3	0.6		**1.9**			
Tetracycline	**46.5%**									52.9	0.6			**46.5**			

*Currently no CLSI breakpoints have been established for this organism/antimicrobial combination. Indicated breakpoints were established by NARMS.

[†]Discrepancies between %R and sums of distribution %s are due to rounding.

Vertical bars show the CLSI Susceptible/Resistant breakpoints for each drug.

Unshaded areas indicate the dilution ranges of the Sensititre plate used to test the 2004 isolates.

Figure 6b. MIC Distribution among *Salmonella* from Ground Turkey, 2004

Salmonella from Ground Turkey (N=142)		Distribution (%) of MICs (in µg/ml)															
Antimicrobial Agent	**%R[†]**	**0.015**	**0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**>256**
Ampicillin	**20.4%**							64.1	14.1	1.4				**20.4**			
Amoxicillin/Clavulanic Acid	**7.7%**							71.8	8.5		3.5	8.5	**2.8**	**4.9**			
Cefoxitin	**4.9%**							1.4	60.6	28.2	3.5	1.4	**0.7**	**4.2**			
Ceftiofur	**4.9%**						43.0	47.9	4.2			**4.9**					
Ceftriaxone	**0.0%**					94.4						2.1	3.5				
Nalidixic Acid	**0.0%**								4.2	85.2	9.9	0.7					
Ciprofloxacin	**0.0%**	93.7	4.9	1.4													
Sulfisoxazole	**28.2%**											4.9	17.6	49.3			**28.2**
Trimethoprim/Sulfamethoxazole	**0.0%**				89.4	6.3	4.2										
Amikacin	**0.0%**						2.1	50.0	44.4	3.5							
Gentamicin	**20.4%**					33.8	37.3	4.9	0.7		2.8	**9.2**	**11.3**				
Kanamycin	**18.3%**										78.9	1.4	1.4	**7.0**	**11.3**		
Streptomycin*	**33.8%**												65.5	**21.1**	**13.4**		
Chloramphenicol	**2.8%**									12.7	80.3	4.2		**2.8**			
Tetracycline	**56.3%**									35.9	7.7	**4.2**	**0.7**	**51.4**			

*Currently no CLSI breakpoints have been established for this organism/antimicrobial combination. Indicated breakpoints were established by NARMS.

[†]Discrepancies between %R and sums of distribution %s are due to rounding.

Vertical bars show the CLSI Susceptible/Resistant breakpoints for each drug.

Unshaded areas indicate the dilution ranges of the Sensititre plate used to test the 2004 isolates.

Figure 6c. MIC Distribution among *Salmonella* from Ground Beef, 2004

***Salmonella* from Ground Beef (N=14)**		**Distribution (%) of MICs (in µg/ml)**															
Antimicrobial Agent	**%R†**	**0.015**	**0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**>256**
Ampicillin	**21.4%**							78.6						**21.4**			
Amoxicillin/Clavulanic Acid	**14.3%**							71.4	7.1		7.1			**14.3**			
Cefoxitin	**14.3%**								50.0	14.3	21.4			**14.3**			
Ceftiofur	**14.3%**						50.0	35.7				**14.3**					
Ceftriaxone	**7.1%**					85.7							7.1	**7.1**			
Nalidixic Acid	**0.0%**								7.1	92.9							
Ciprofloxacin	**0.0%**	100.0															
Sulfisoxazole	**14.3%**											7.1	7.1	71.4			**14.3**
Trimethoprim/Sulfamethoxazole	**7.1%**				92.9						**7.1**						
Amikacin	**0.0%**							64.3	28.6	7.1							
Gentamicin	**0.0%**					57.1	42.9										
Kanamycin	**0.0%**										100.0						
Streptomycin*	**14.3%**												85.7		**14.3**		
Chloramphenicol	**14.3%**									7.1	78.6			**14.3**			
Tetracycline	**14.3%**									85.7				**14.3**			

*Currently no CLSI breakpoints have been established for this organism/antimicrobial combination. Indicated breakpoints were established by NARMS.

†Discrepancies between %R and sums of distribution %s are due to rounding.

Vertical bars show the CLSI Susceptible/Resistant breakpoints for each drug. Indicated breakpoints were established by NARMS.

Unshaded areas indicate the dilution ranges of the Sensititre plate used to test the 2004 isolates.

Figure 6d. MIC Distribution among *Salmonella* from Pork Chops, 2004

***Salmonella* from Pork Chops (N=11)**		**Distribution (%) of MICs (in µg/ml)**															
Antimicrobial Agent	**%R[†]**	**0.015**	**0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**>256**
Ampicillin	**9.1%**							81.8		9.1				**9.1**			
Amoxicillin/Clavulanic Acid	**0.0%**							72.7	9.1			18.2					
Cefoxitin	**0.0%**								81.8	18.2							
Ceftiofur	**0.0%**						72.7	27.3									
Ceftriaxone	**0.0%**					100.0											
Nalidixic Acid	**0.0%**									100.0							
Ciprofloxacin	**0.0%**	100.0															
Sulfisoxazole	**18.2%**												9.1	72.7			**18.2**
Trimethoprim/Sulfamethoxazole	**0.0%**				100.0												
Amikacin	**0.0%**							63.6	27.3	9.1							
Gentamicin	**0.0%**					63.6	36.4										
Kanamycin	**9.1%**										81.8	9.1			**9.1**		
Streptomycin*	**27.3%**												72.7		**27.3**		
Chloramphenicol	**18.2%**										81.8			**18.2**			
Tetracycline	**54.5%**									45.5			**18.2**	**36.4**			

*Currently no CLSI breakpoints have been established for this organism/antimicrobial combination. Indicated breakpoints were established by NARMS.

[†]Discrepancies between %R and sums of distribution %s are due to rounding.

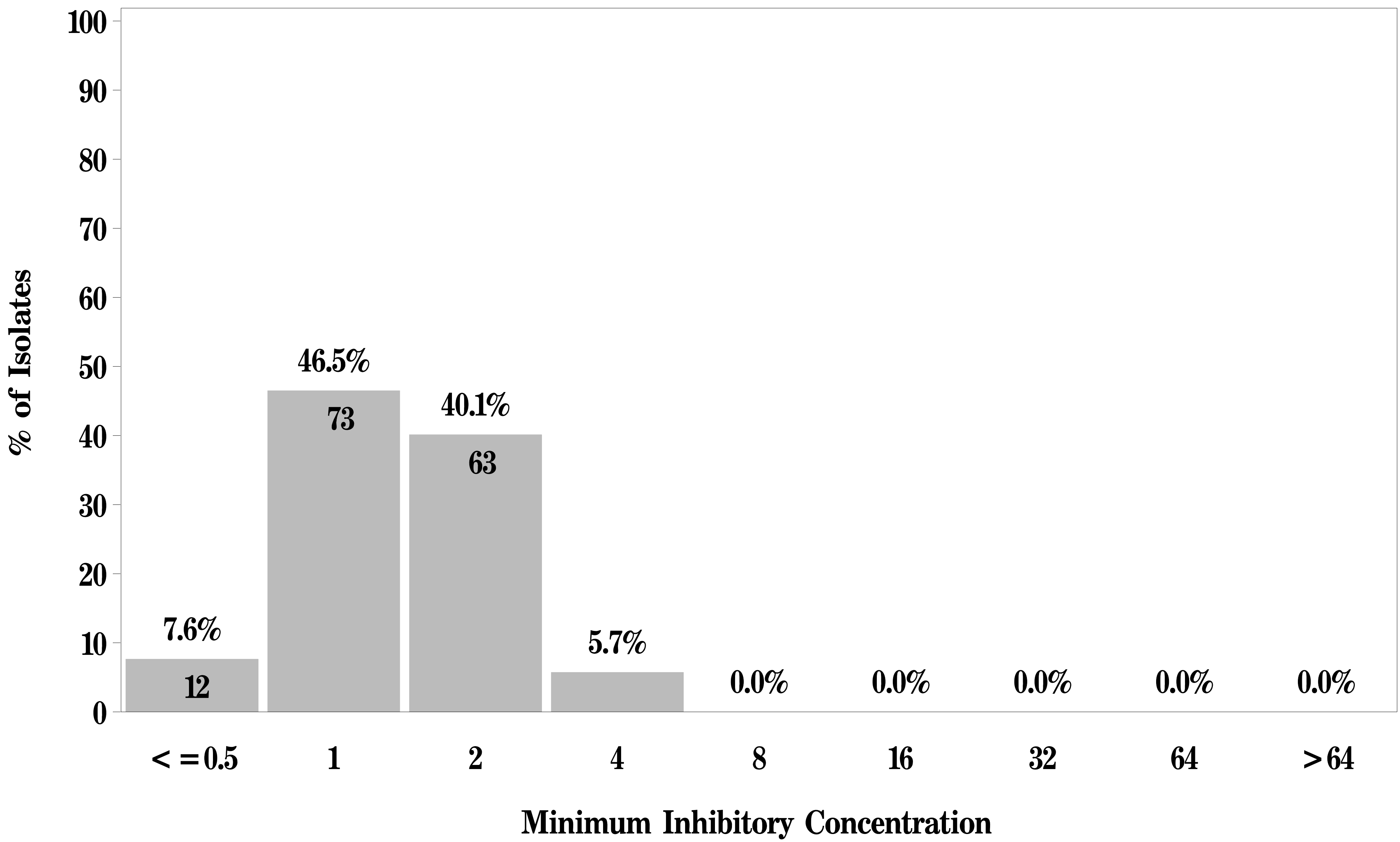
Vertical bars show the CLSI Susceptible/Resistant breakpoints for each drug.

Unshaded areas indicate the dilution ranges of the Sensititre plate used to test the 2004 isolates.

NARMS

Figure 7a: Minimum Inhibitory Concentration of Amikacin for *Salmonella* in Chicken Breast (N=157 Isolates)

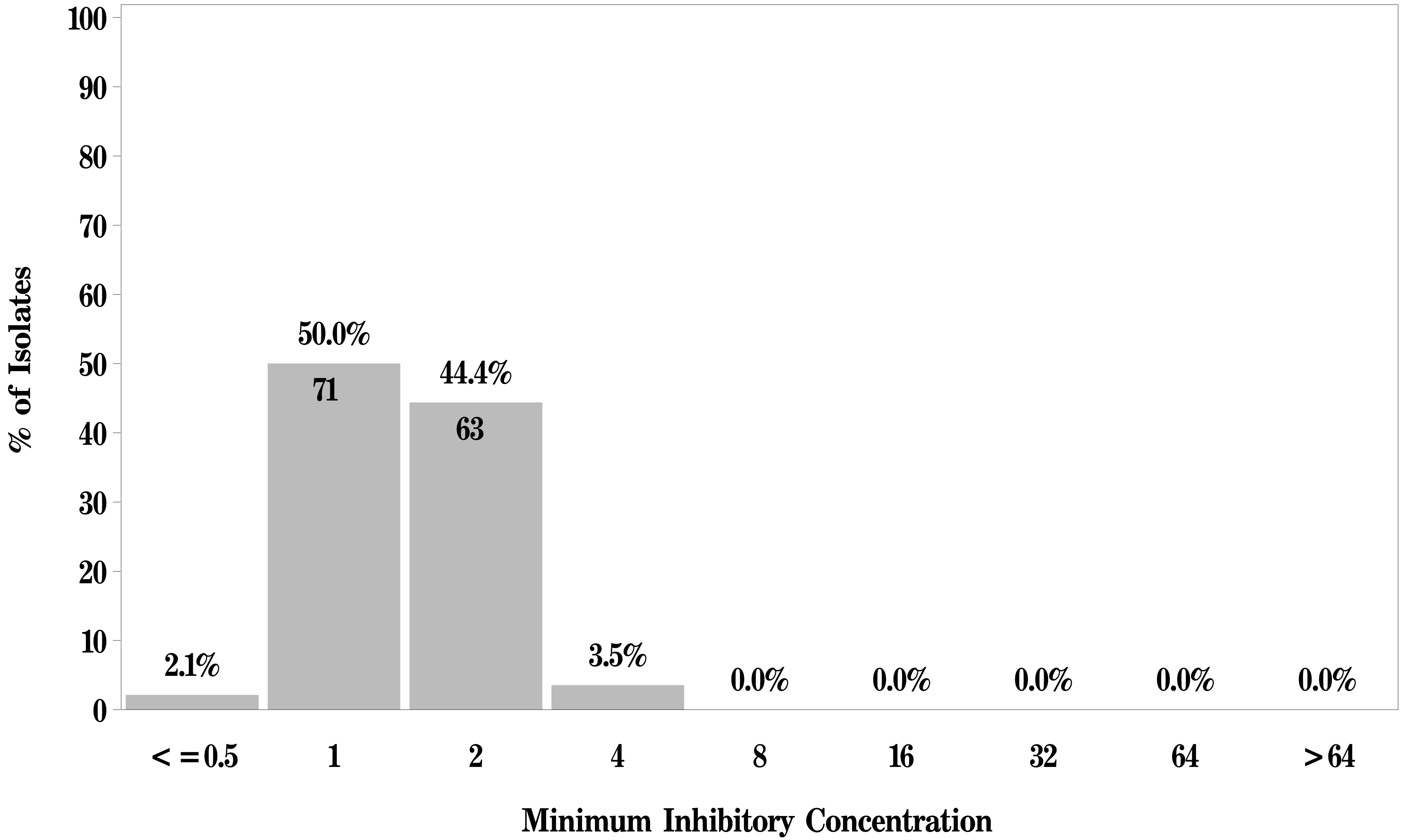
Breakpoints: Susceptible <=16 μg/mL Resistant >=64 μg/mL



NARMS

Figure 7a: Minimum Inhibitory Concentration of Amikacin for *Salmonella* in Ground Turkey (N=142 Isolates)

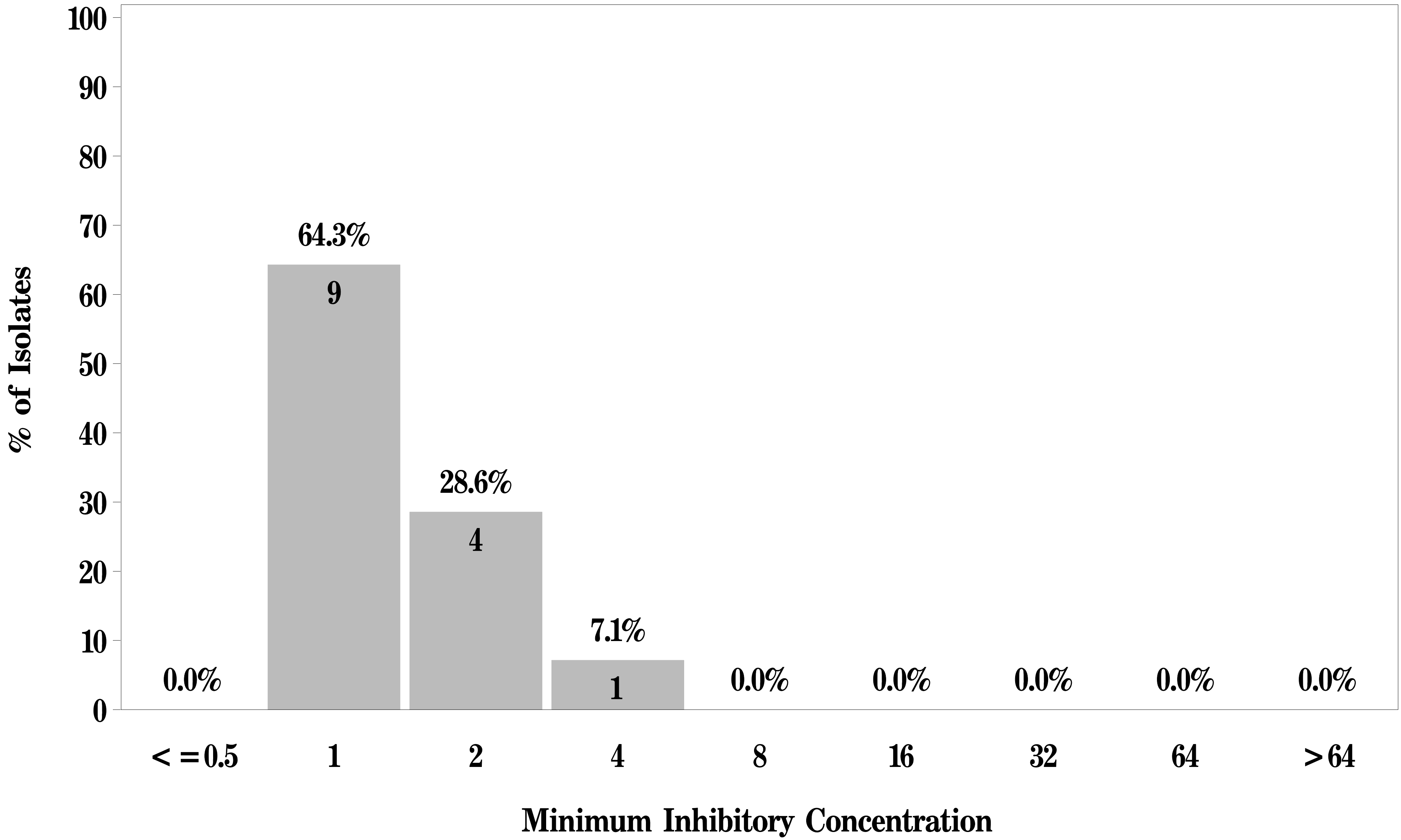
Breakpoints: Susceptible <=16 μg/mL Resistant >=64 μg/mL



NARMS

Figure 7a: Minimum Inhibitory Concentration of Amikacin for *Salmonella* in Ground Beef (N=14 Isolates)

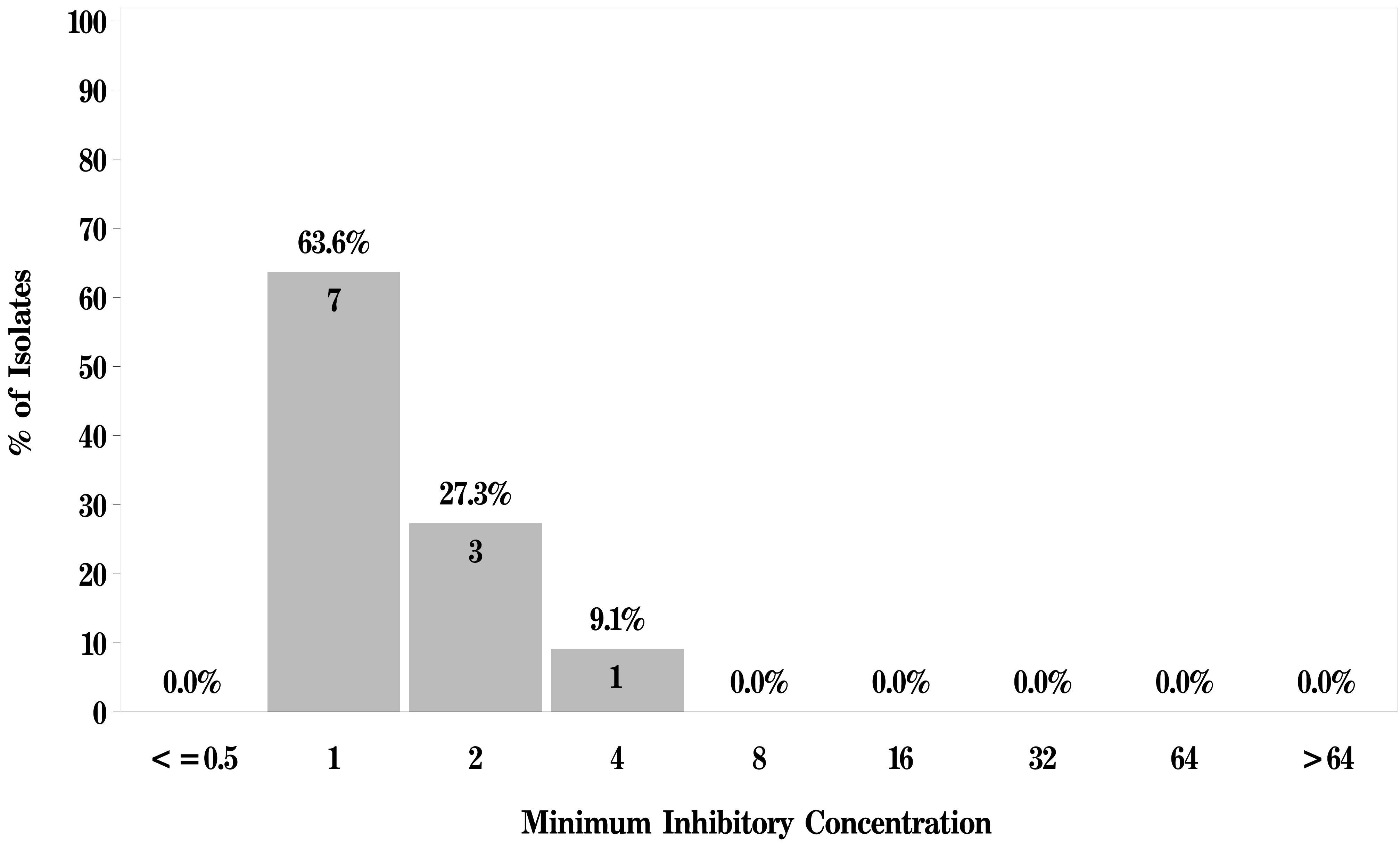
Breakpoints: Susceptible <=16 μg/mL Resistant >=64 μg/mL



NARMS

Figure 7a: Minimum Inhibitory Concentration of Amikacin for *Salmonella* in Pork Chop (N=11 Isolates)

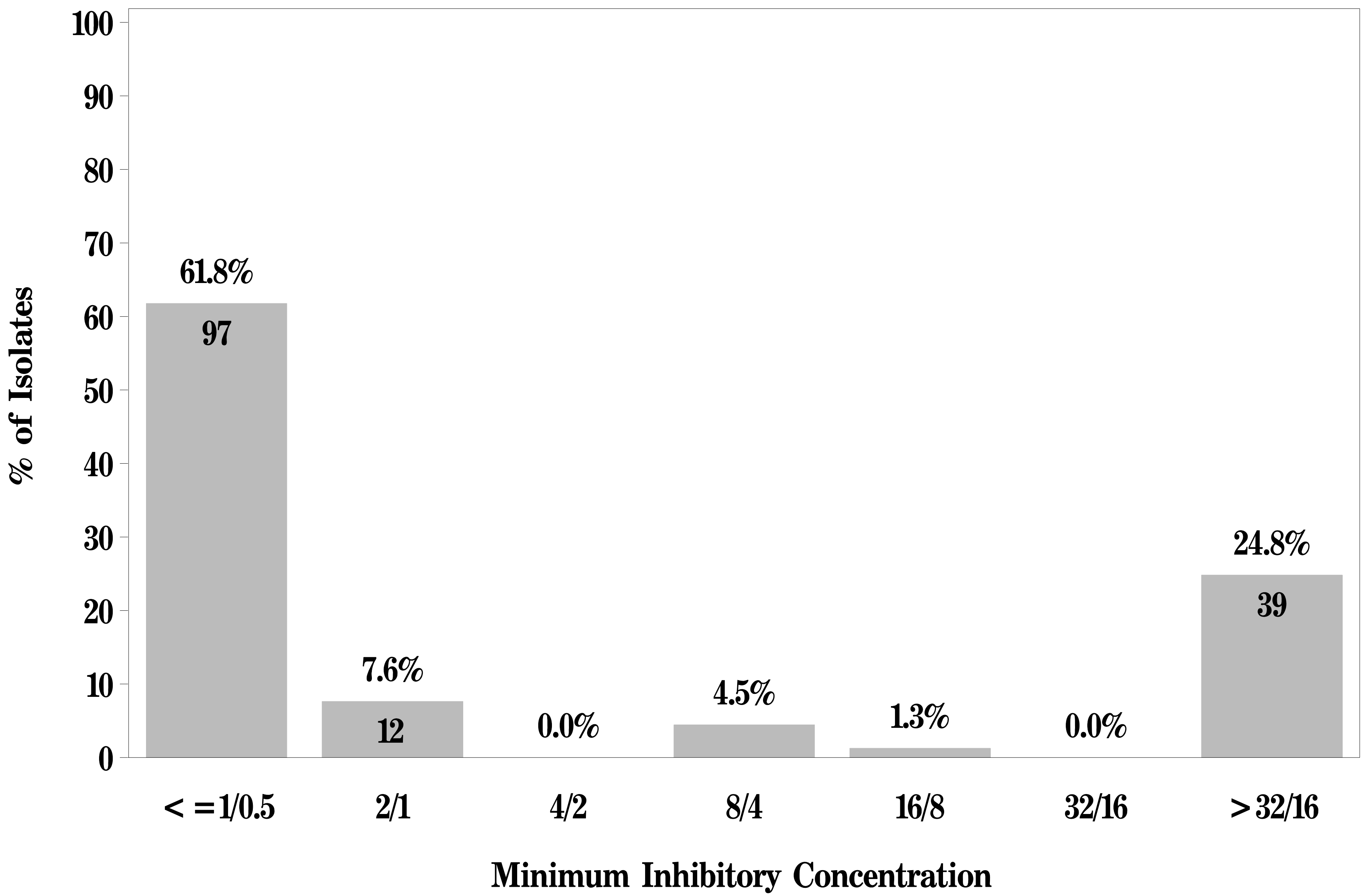
Breakpoints: Susceptible <=16 μg/mL Resistant >=64 μg/mL



NARMS

Figure 7b: Minimum Inhibitory Concentration of Amoxicillin/Clavulanic acid for *Salmonella* in Chicken Breast (N=157 Isolates)

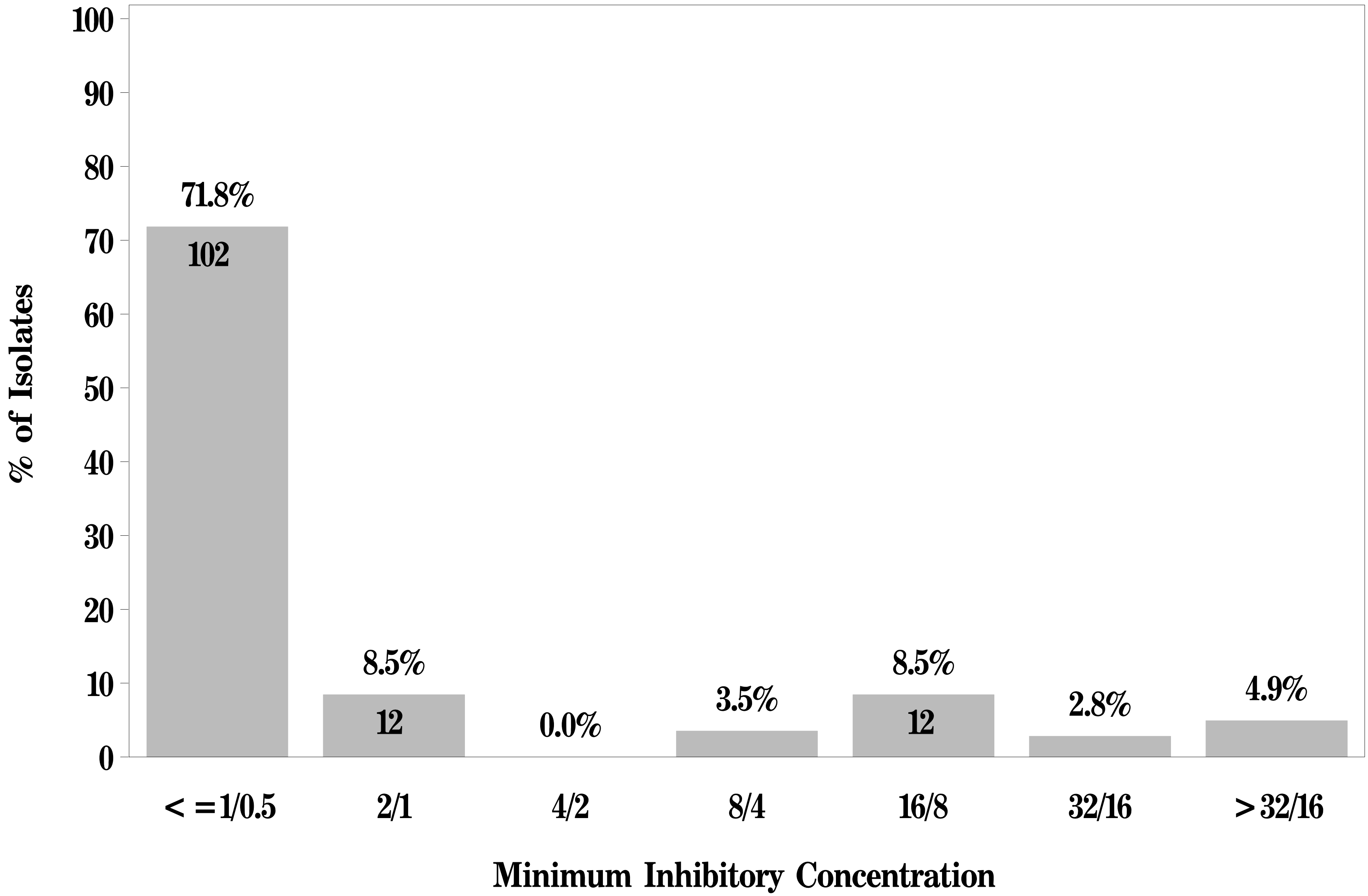
Breakpoints: Susceptible<=8 μg/mL Resistant>=32 μg/mL



NARMS

Figure 7b: Minimum Inhibitory Concentration of Amoxicillin/Clavulanic acid for *Salmonella* in Ground Turkey (N=142 Isolates)

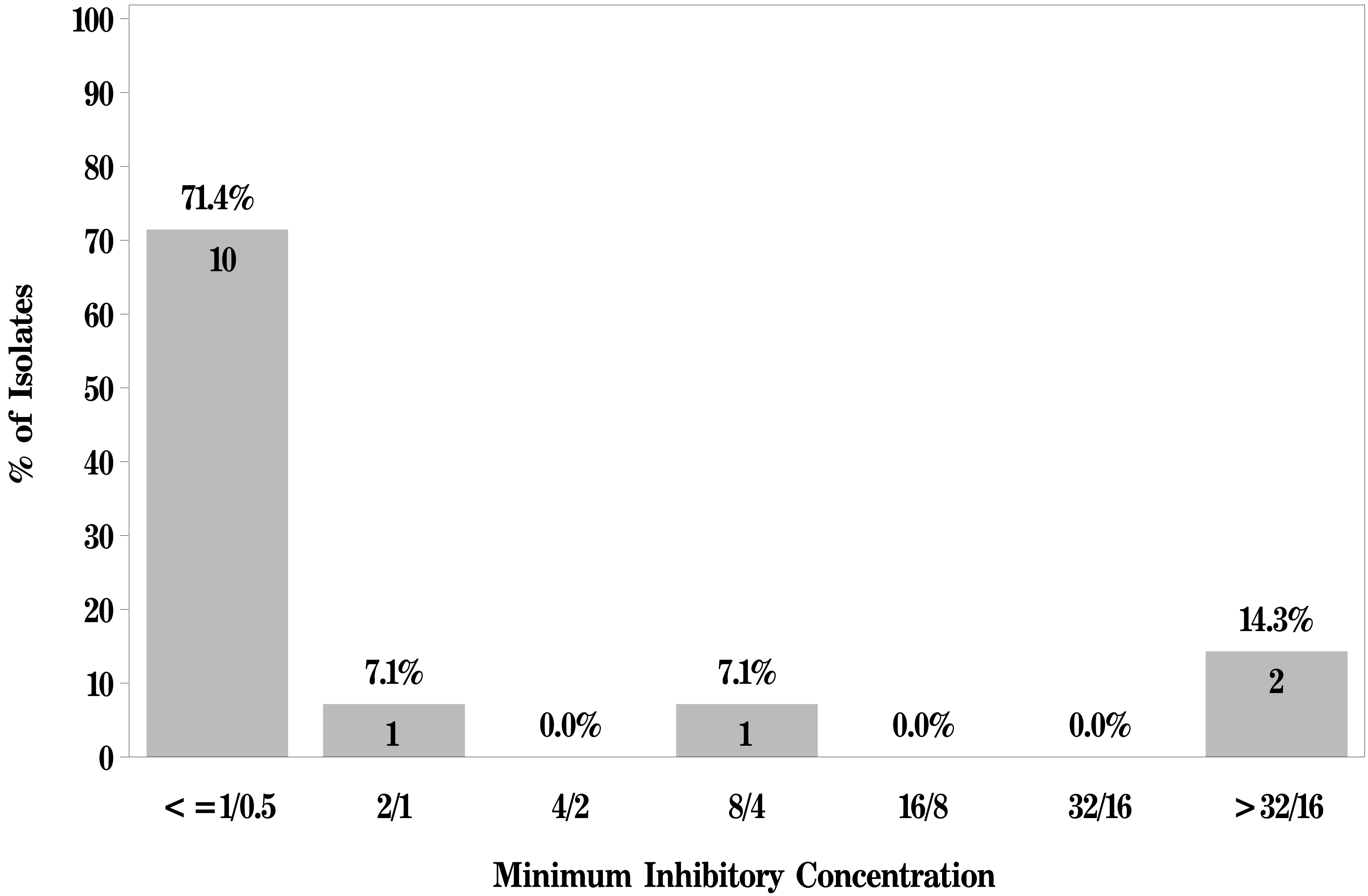
Breakpoints: Susceptible<=8 μg/mL Resistant>=32 μg/mL



NARMS

Figure 7b: Minimum Inhibitory Concentration of Amoxicillin/Clavulanic acid for *Salmonella* in Ground Beef (N=14 Isolates)

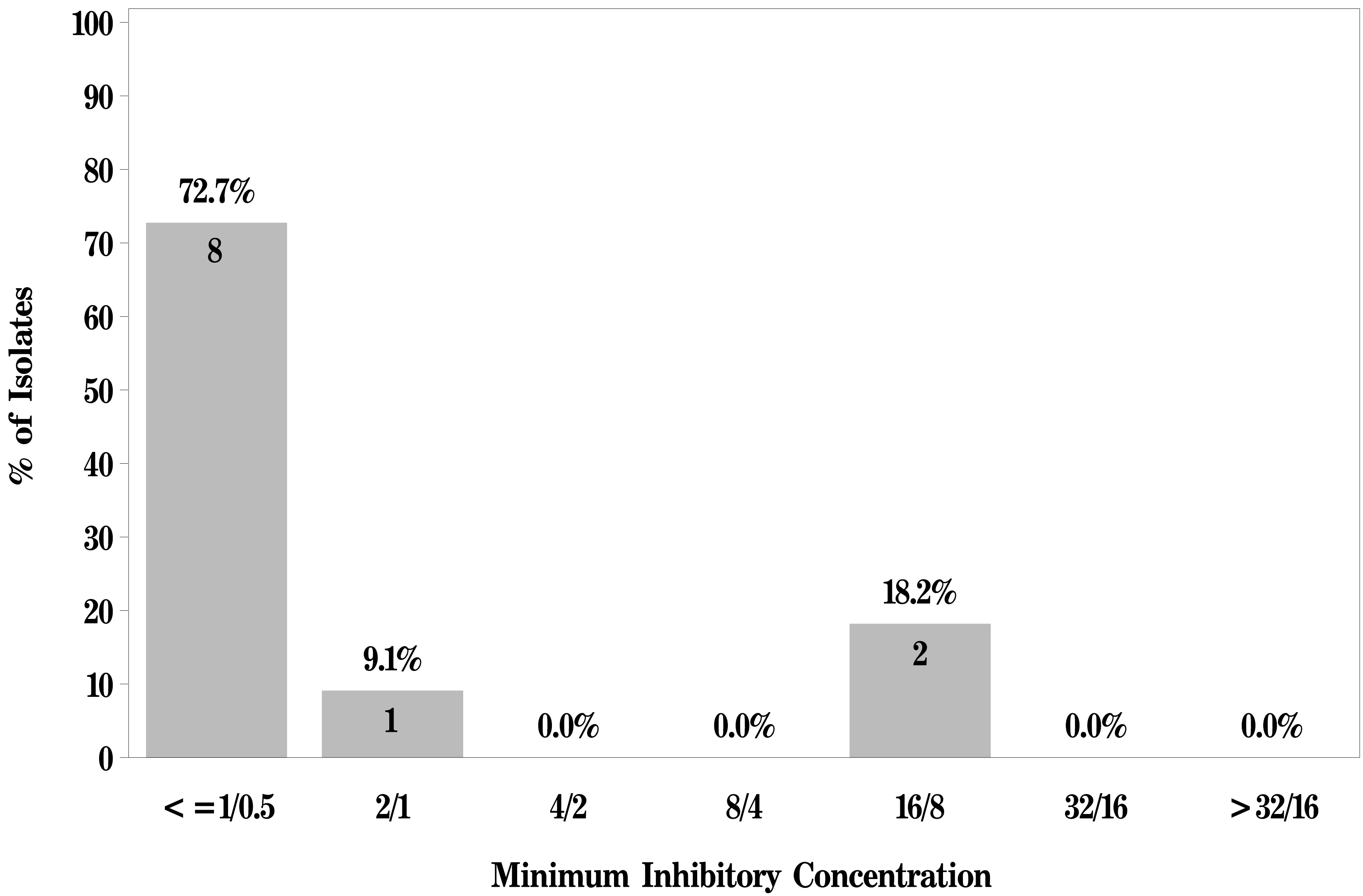
Breakpoints: Susceptible<=8 μg/mL Resistant>=32 μg/mL



NARMS

Figure 7b: Minimum Inhibitory Concentration of Amoxicillin/Clavulanic acid for *Salmonella* in Pork Chop (N=11 Isolates)

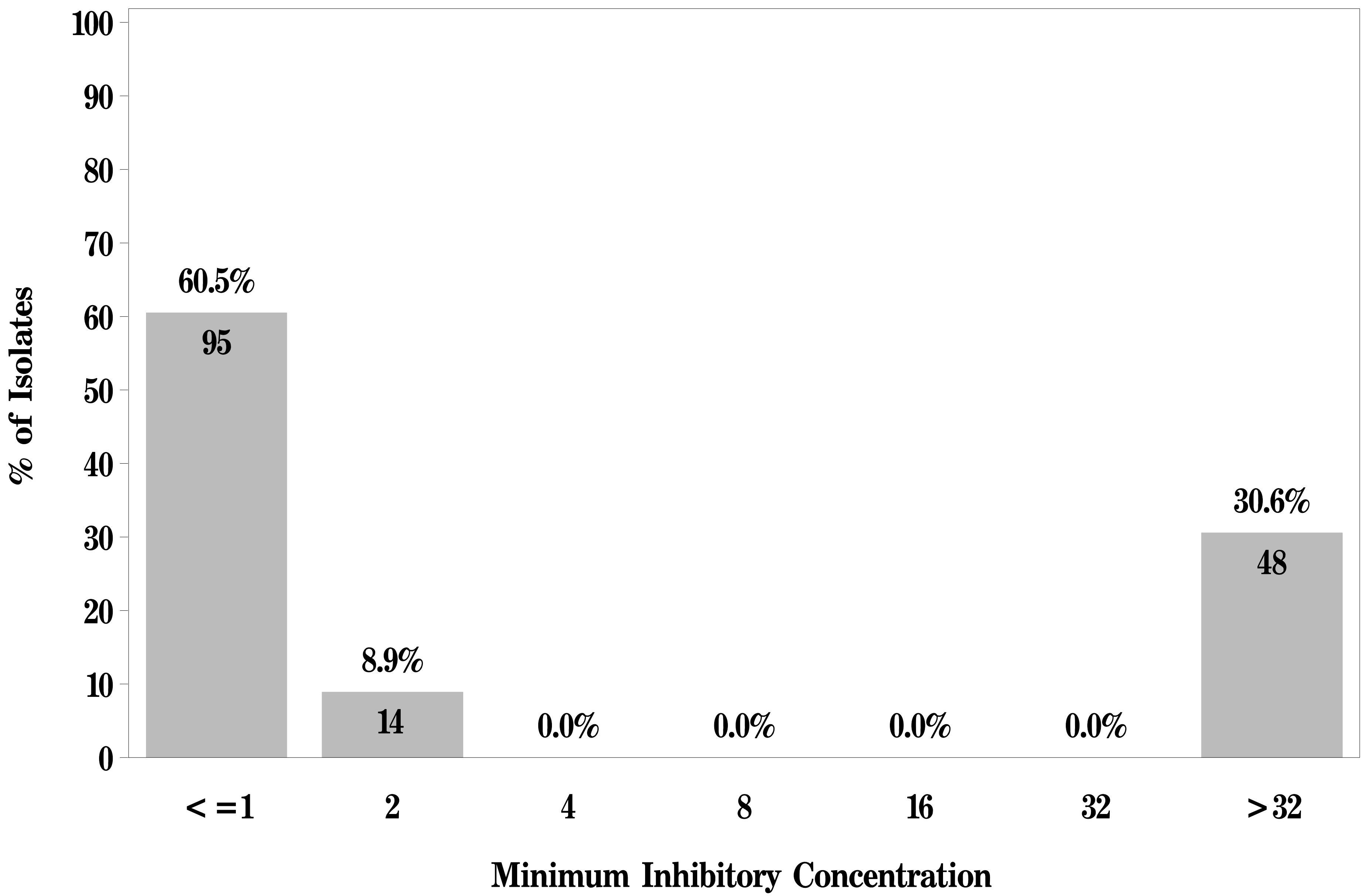
Breakpoints: Susceptible <=8 µg/mL Resistant >=32 µg/mL



NARMS

Figure 7c: Minimum Inhibitory Concentration of Ampicillin for *Salmonella* in Chicken Breast (N=157 Isolates)

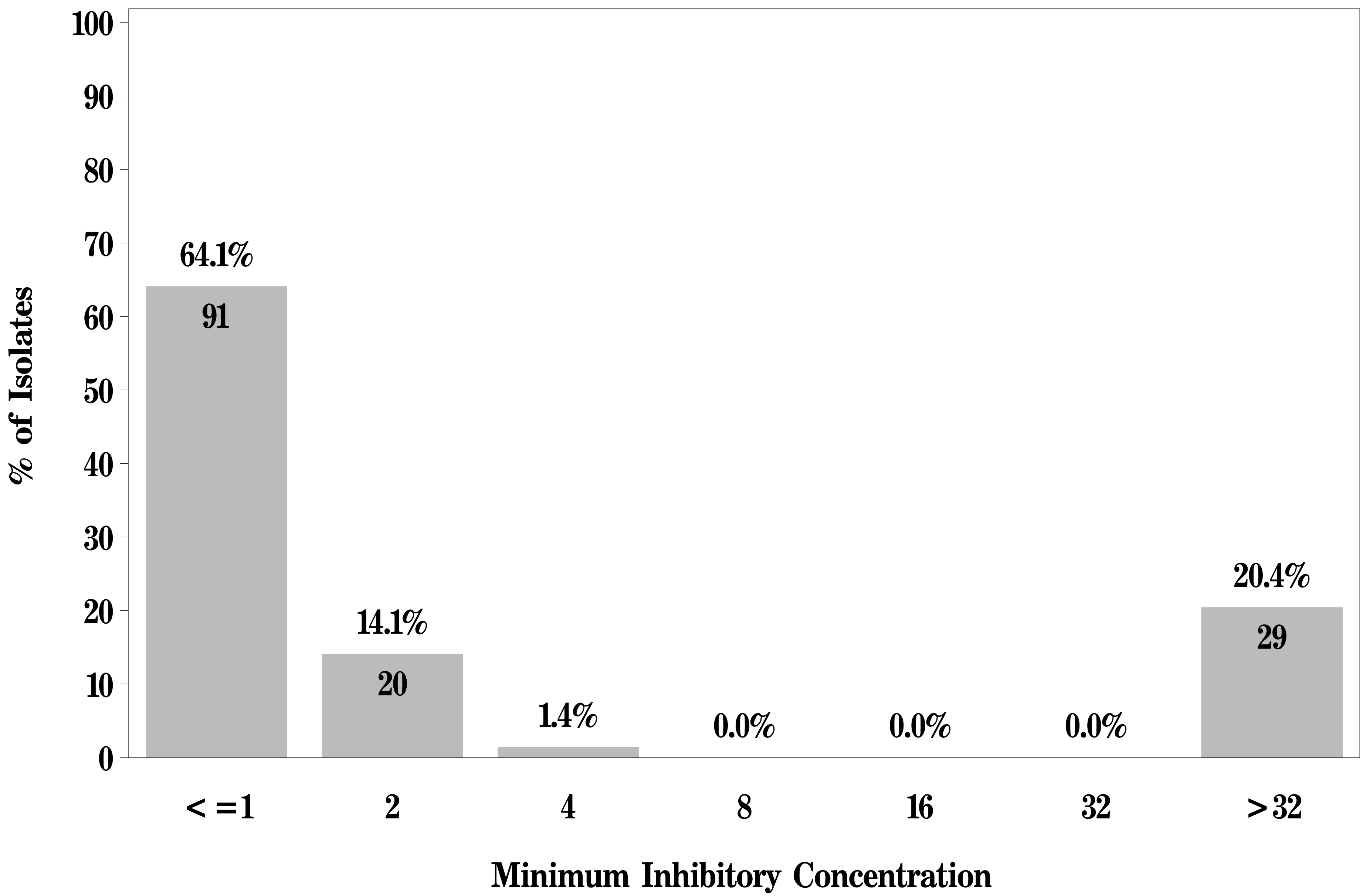
Breakpoints: Susceptible <=8 μg/mL Resistant >=32 μg/mL



NARMS

Figure 7c: Minimum Inhibitory Concentration of Ampicillin for *Salmonella* in Ground Turkey (N=142 Isolates)

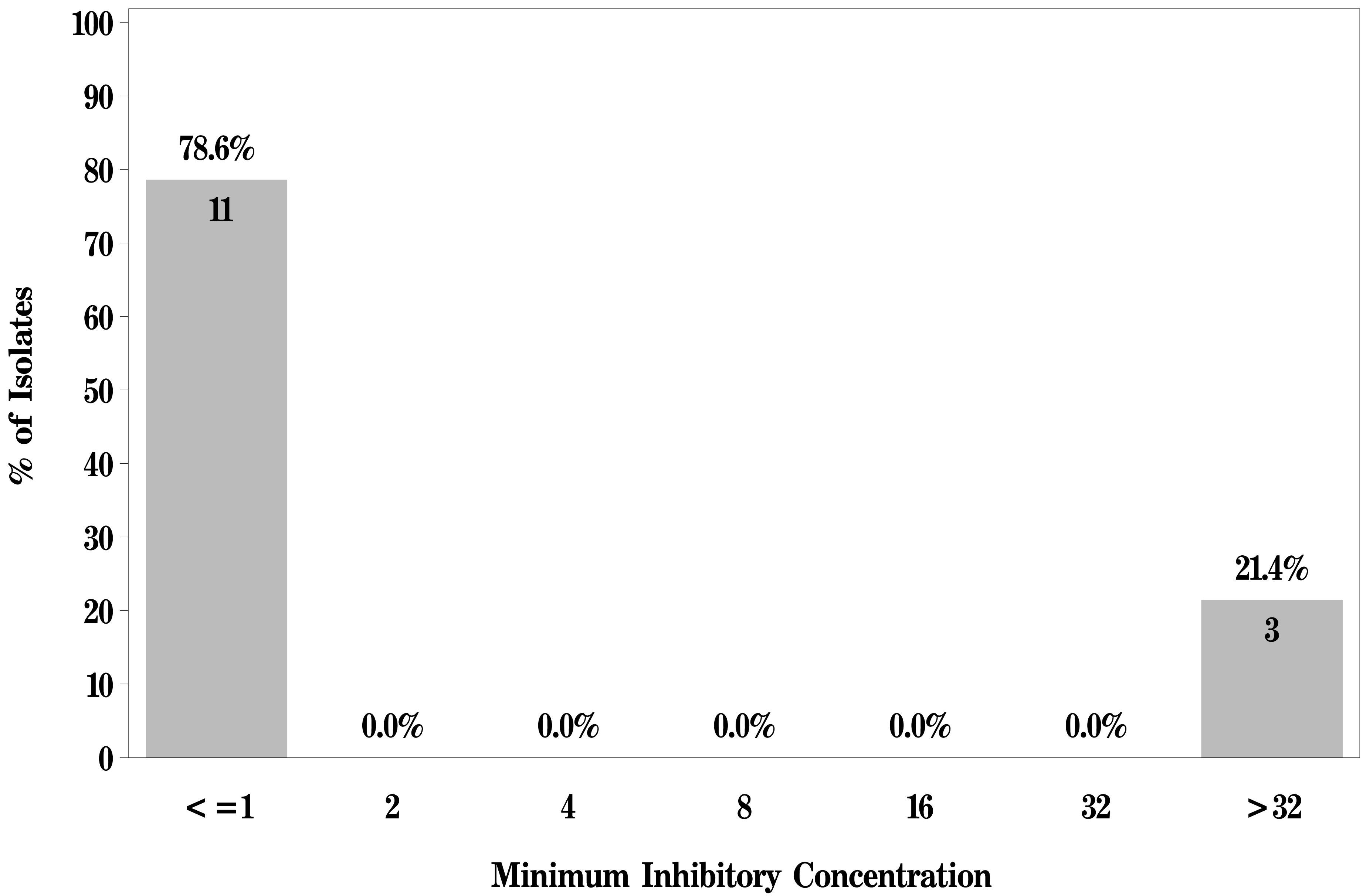
Breakpoints: Susceptible <=8 μg/mL Resistant >=32 μg/mL



NARMS

Figure 7c: Minimum Inhibitory Concentration of Ampicillin for *Salmonella* in Ground Beef (N=14 Isolates)

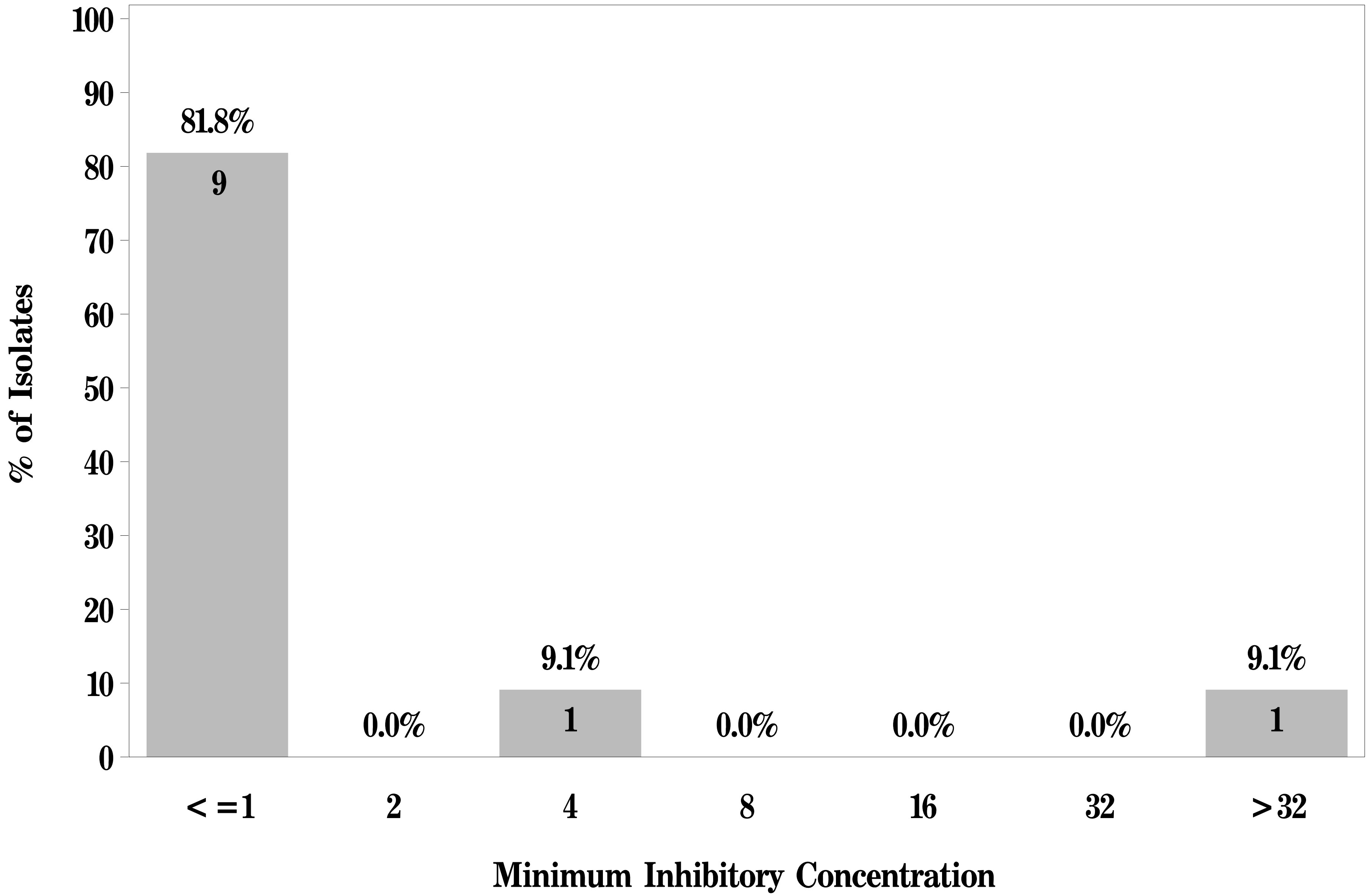
Breakpoints: Susceptible <=8 μg/mL Resistant >=32 μg/mL



NARMS

Figure 7c: Minimum Inhibitory Concentration of Ampicillin for *Salmonella* in Pork Chop (N=11 Isolates)

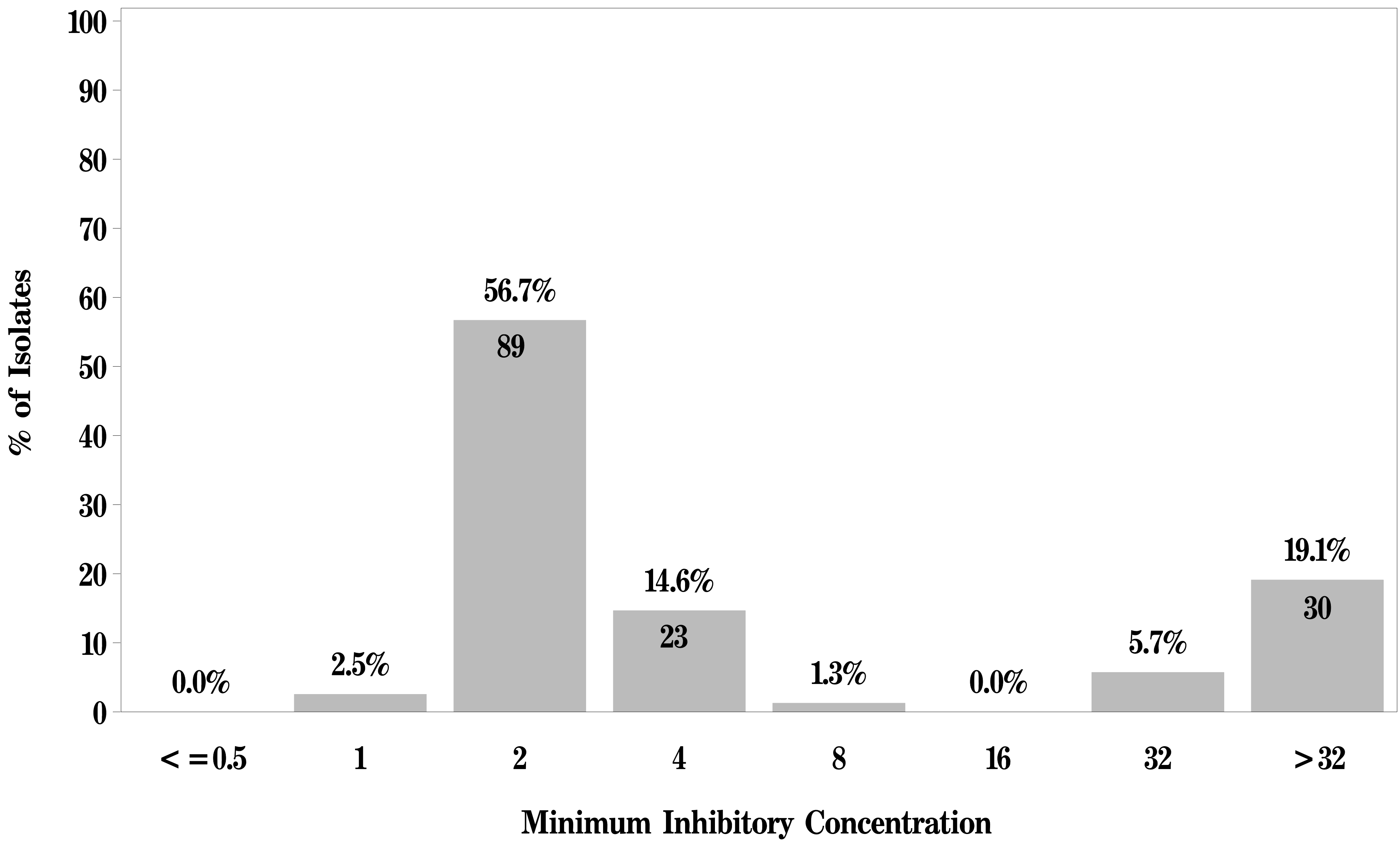
Breakpoints: Susceptible <=8 µg/mL Resistant >=32 µg/mL



NARMS

Figure 7d: Minimum Inhibitory Concentration of Cefoxitin for *Salmonella* in Chicken Breast (N=157 Isolates)

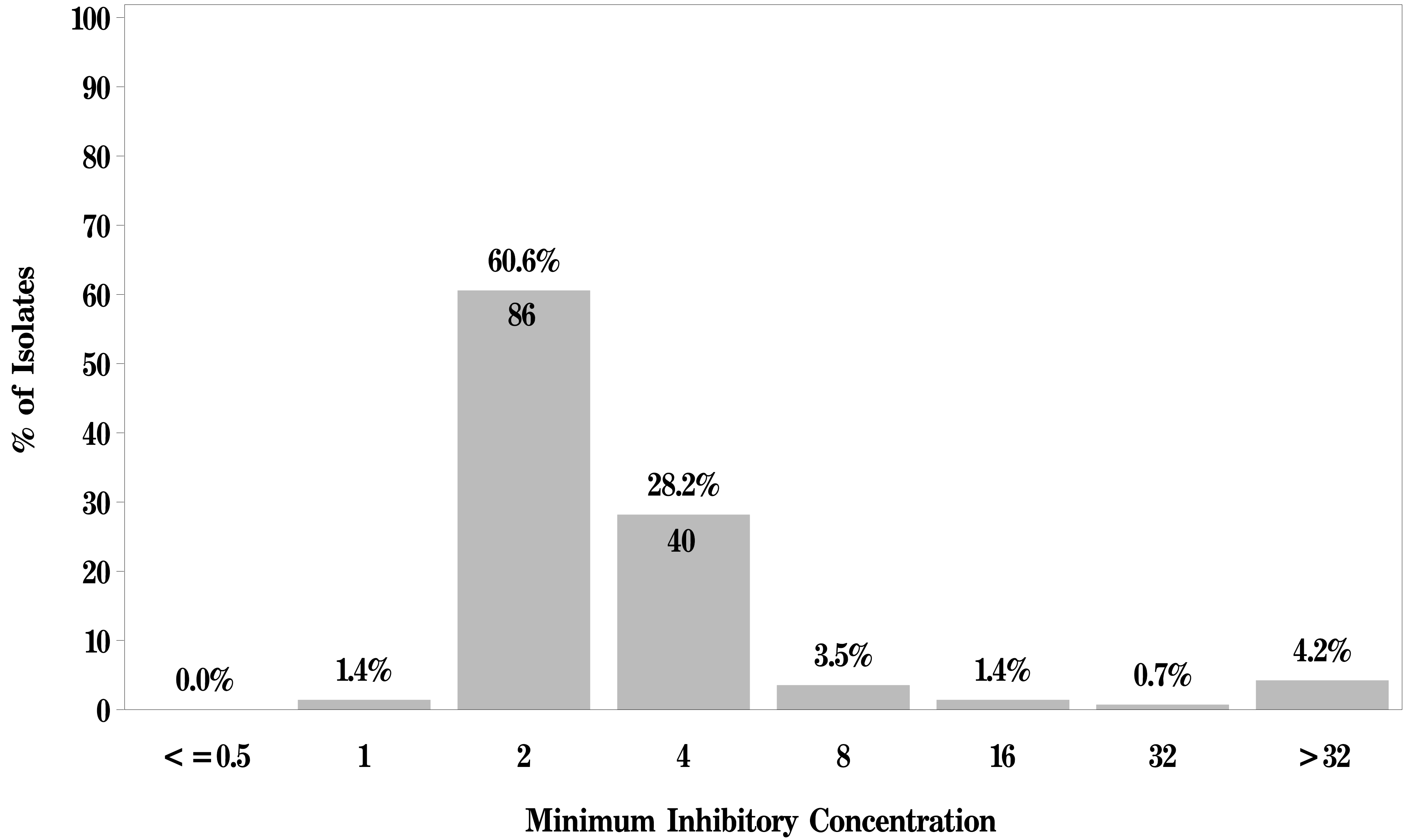
Breakpoints: Susceptible <=8 μg/mL Resistant >=32 μg/mL



NARMS

Figure 7d: Minimum Inhibitory Concentration of Cefoxitin for *Salmonella* in Ground Turkey (N=142 Isolates)

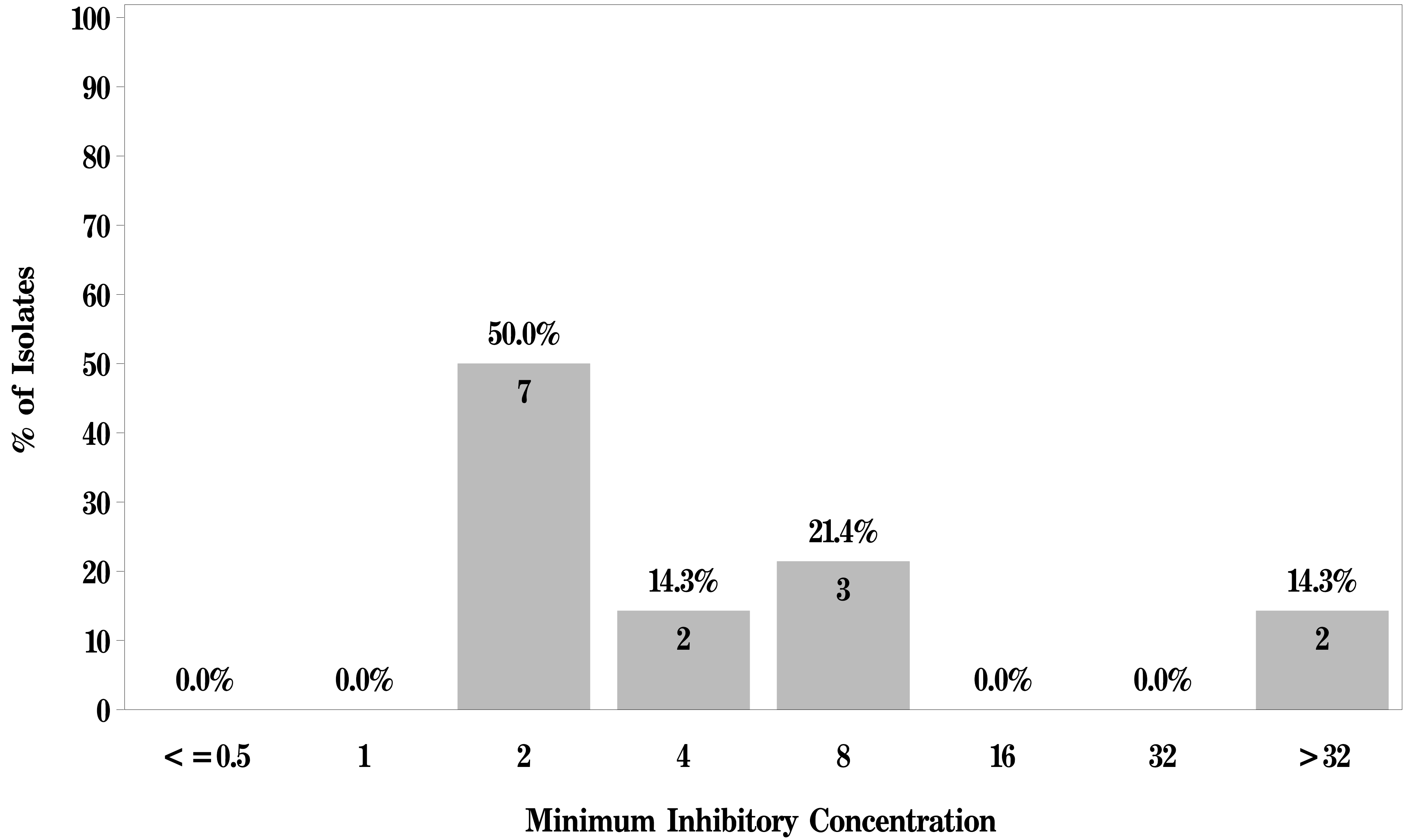
Breakpoints: Susceptible<=8 µg/mL Resistant>=32 µg/mL



NARMS

Figure 7d: Minimum Inhibitory Concentration of Cefoxitin for *Salmonella* in Ground Beef (N=14 Isolates)

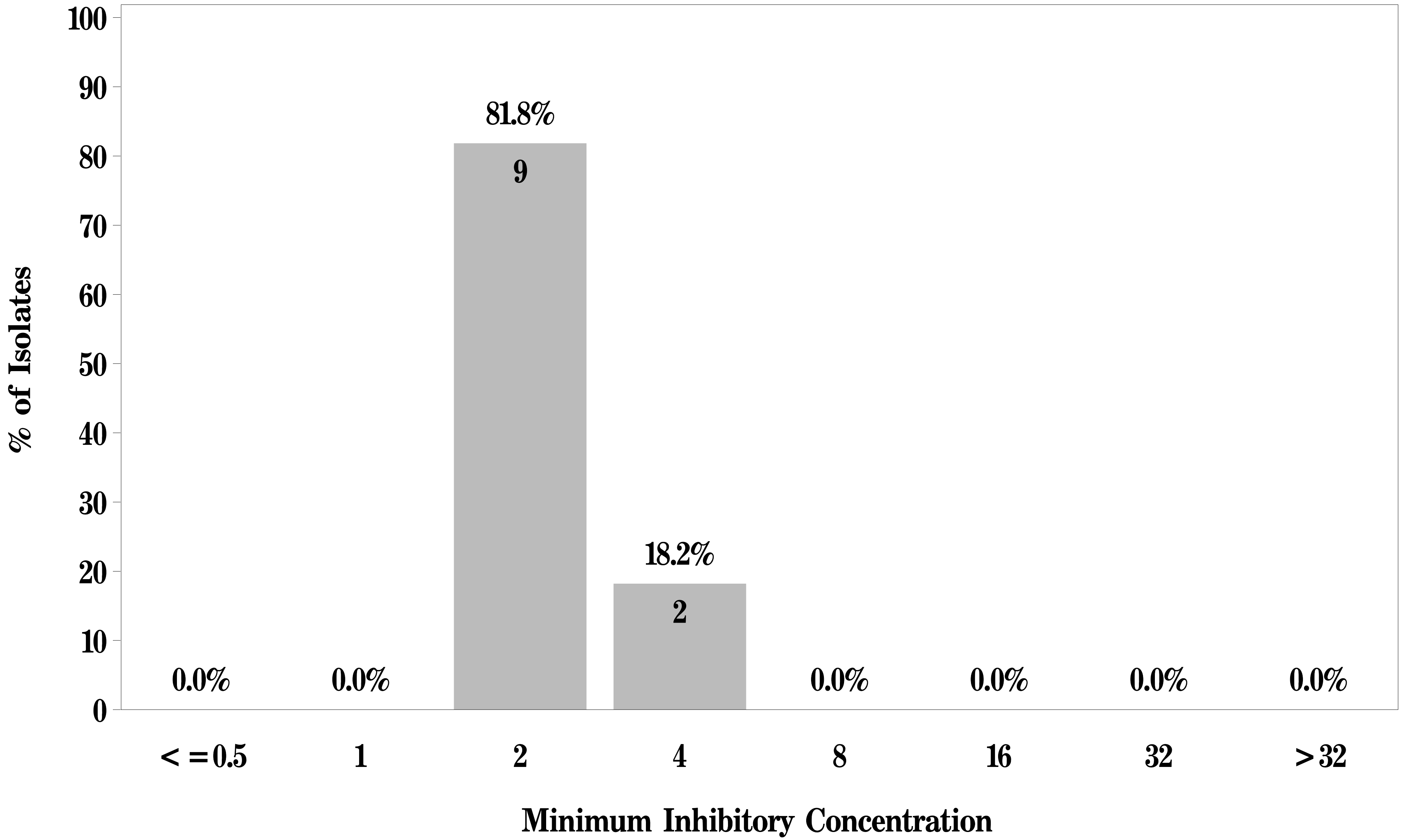
Breakpoints: Susceptible <=8 µg/mL Resistant >=32 µg/mL



NARMS

Figure 7d: Minimum Inhibitory Concentration of Cefoxitin for *Salmonella* in Pork Chop (N=11 Isolates)

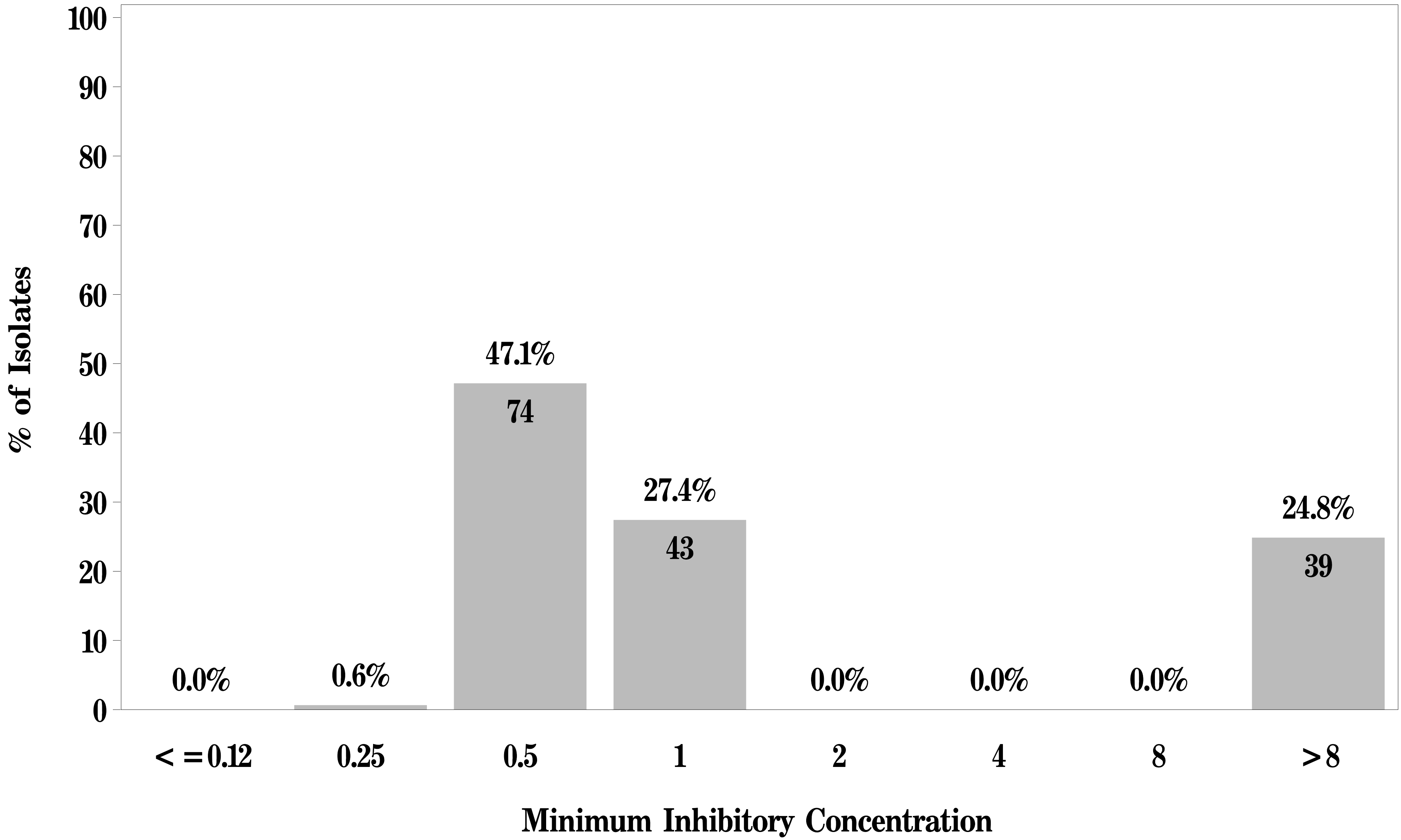
Breakpoints: Susceptible <=8 μg/mL Resistant >=32 μg/mL



NARMS

Figure 7e: Minimum Inhibitory Concentration of Ceftiofur for *Salmonella* in Chicken Breast (N=157 Isolates)

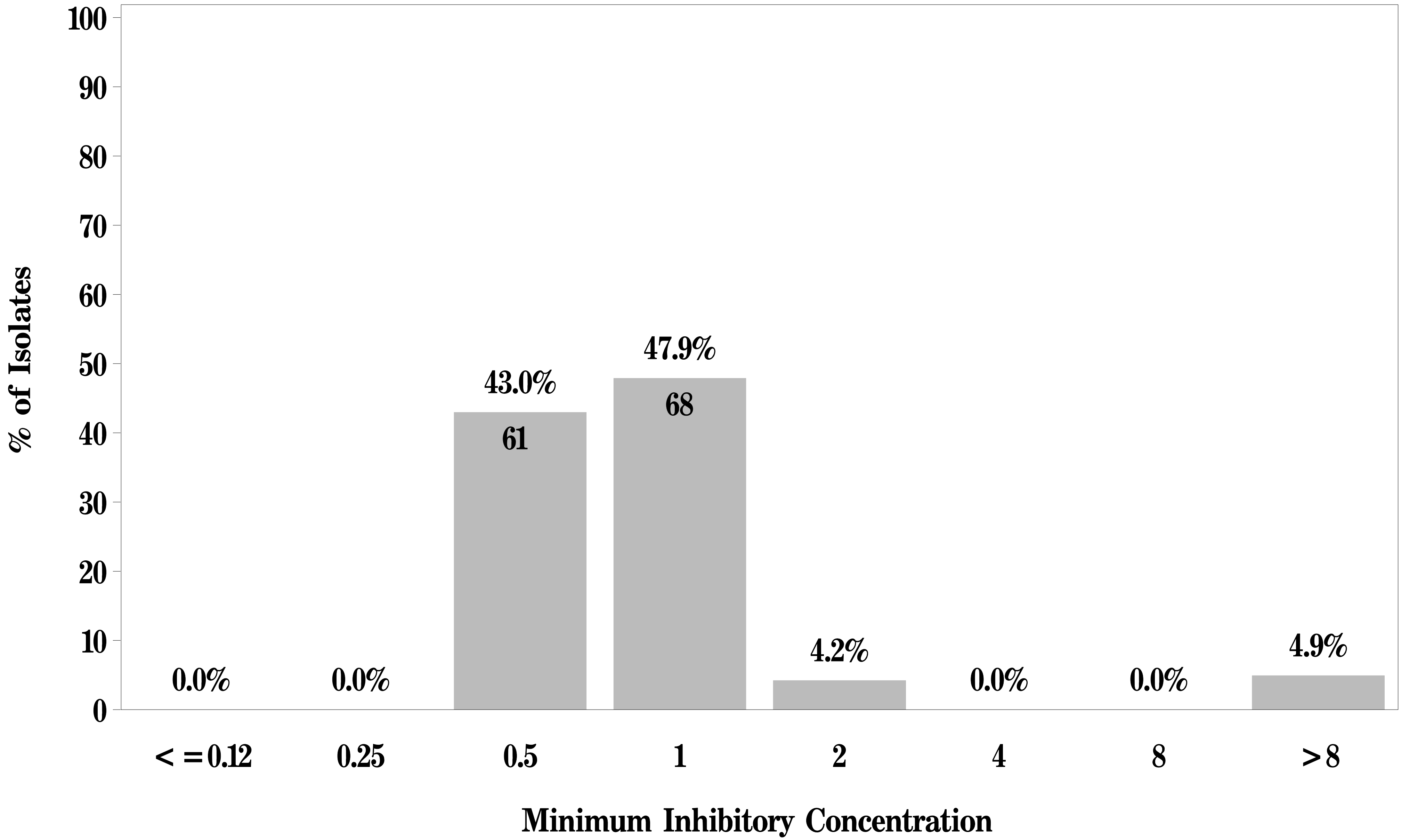
Breakpoints: Susceptible<=2 μg/mL Resistant>=8 μg/mL



NARMS

Figure 7e: Minimum Inhibitory Concentration of Ceftiofur for *Salmonella* in Ground Turkey (N=142 Isolates)

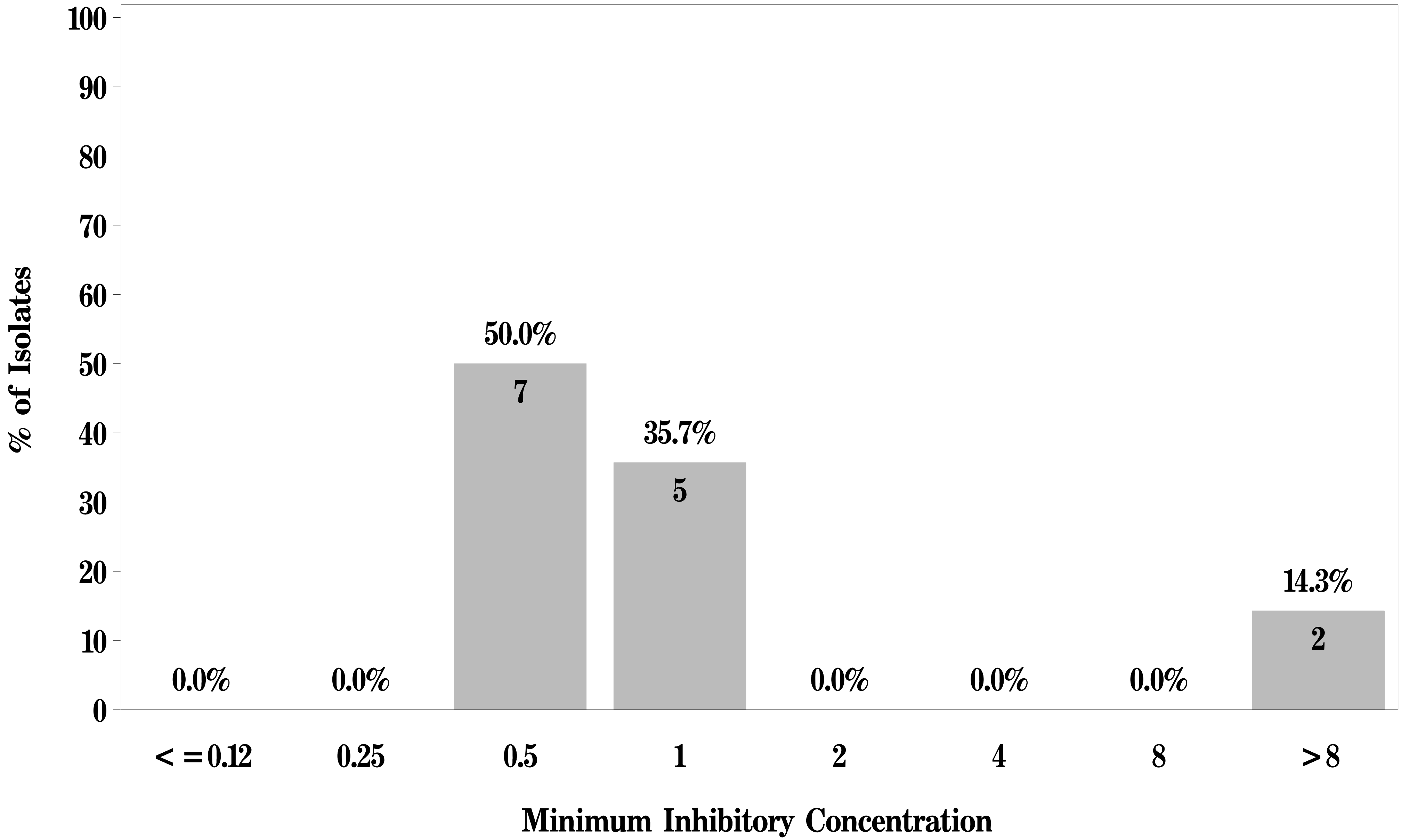
Breakpoints: Susceptible <=2 μg/mL Resistant >=8 μg/mL



NARMS

Figure 7e: Minimum Inhibitory Concentration of Ceftiofur for *Salmonella* in Ground Beef (N=14 Isolates)

Breakpoints: Susceptible<=2 µg/mL Resistant>=8 µg/mL



NARMS

Figure 7e: Minimum Inhibitory Concentration of Ceftiofur for *Salmonella* in Pork Chop (N=11 Isolates)

Breakpoints: Susceptible <=2 µg/mL Resistant >=8 µg/mL

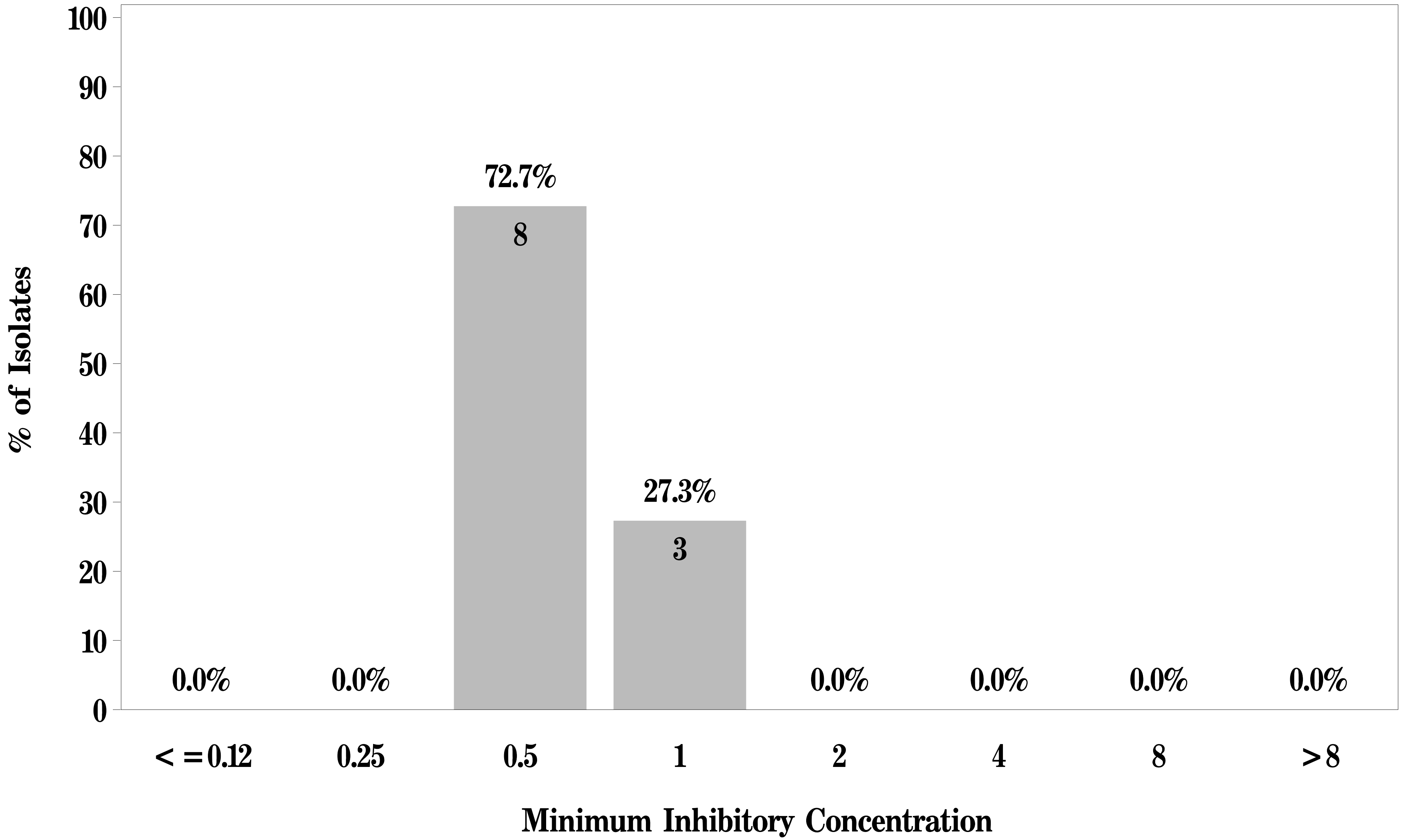


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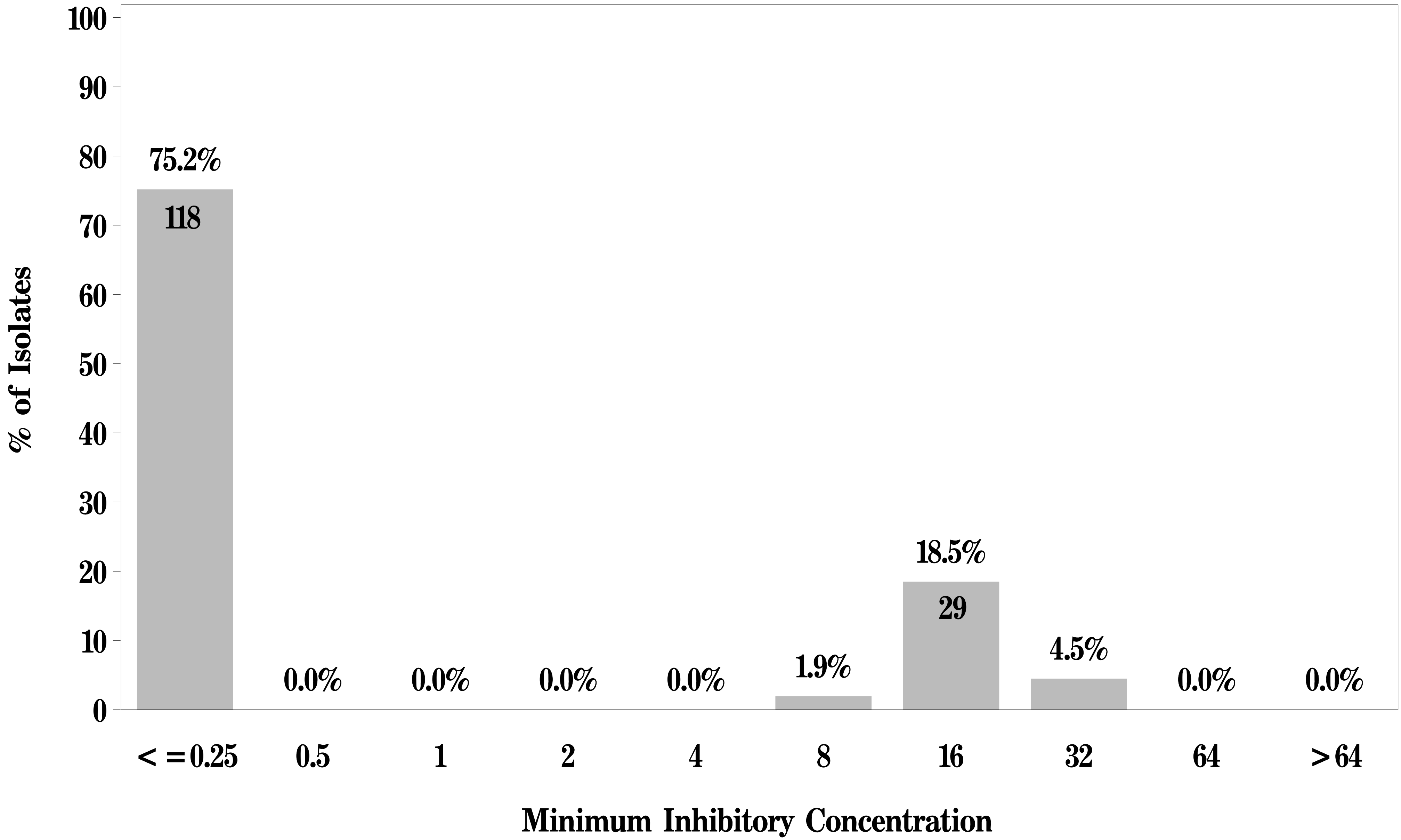
Figure 7f: Minimum Inhibitory Concentration of Ceftriaxone for *Salmonella* in Chicken Breast (N=157 Isolates)

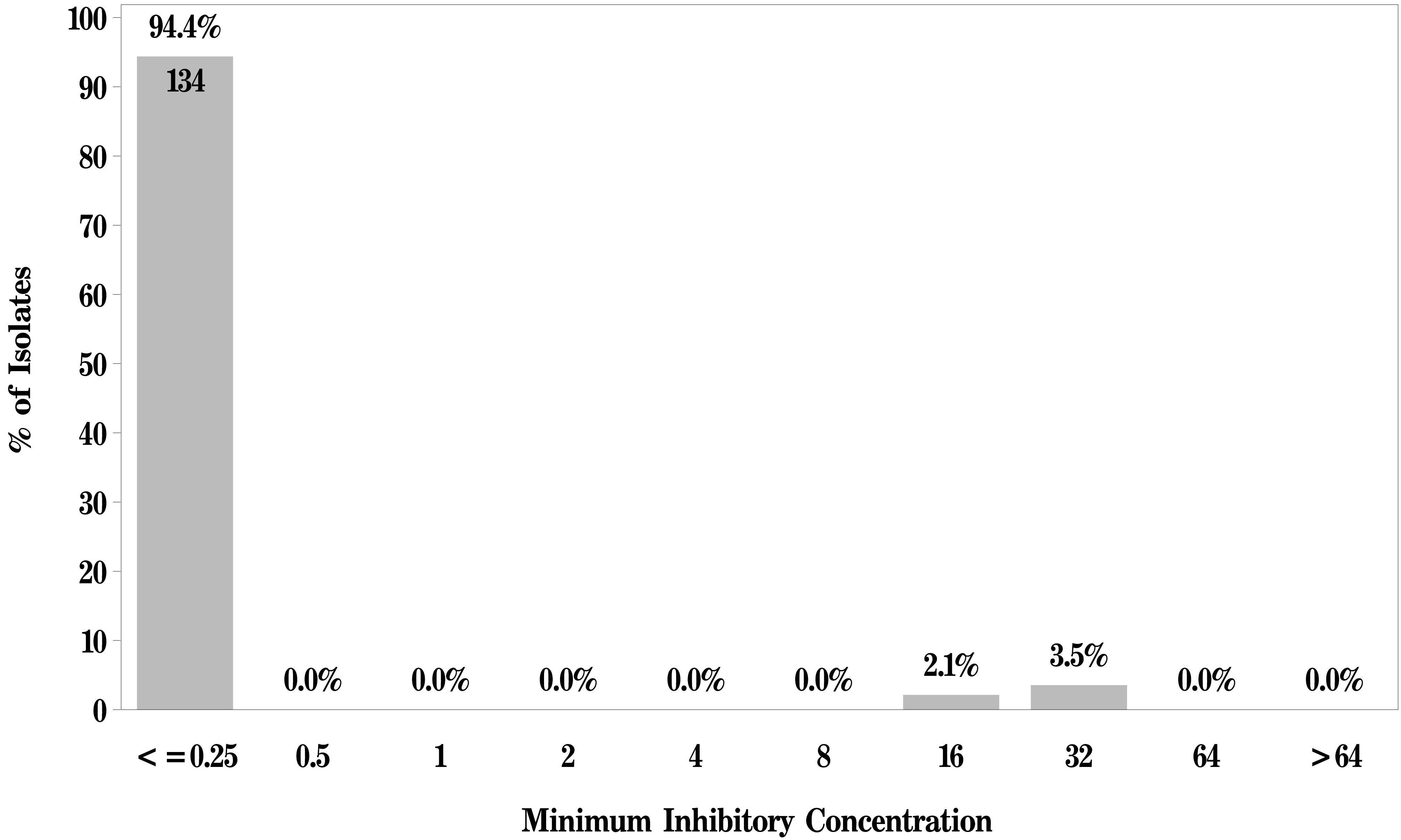
Breakpoints: Susceptible <=8 μg/mL Resistant >=64 μg/mL



NARMS

Figure 7f: Minimum Inhibitory Concentration of Ceftriaxone for *Salmonella* in Ground Turkey (N=142 Isolates)

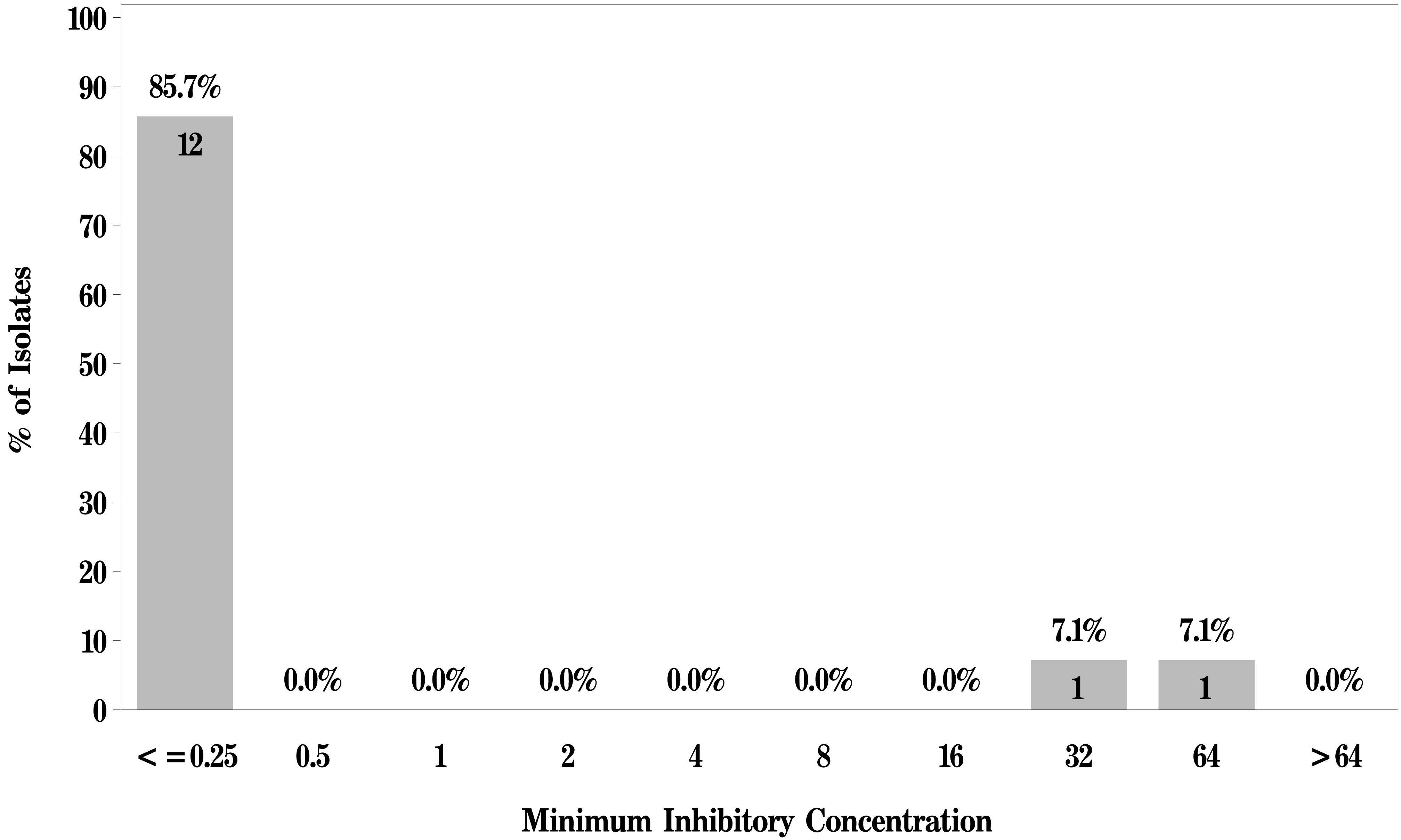
Breakpoints: Susceptible <=8 μg/mL Resistant >=64 μg/mL



NARMS

Figure 7f: Minimum Inhibitory Concentration of Ceftriaxone for *Salmonella* in Ground Beef (N=14 Isolates)

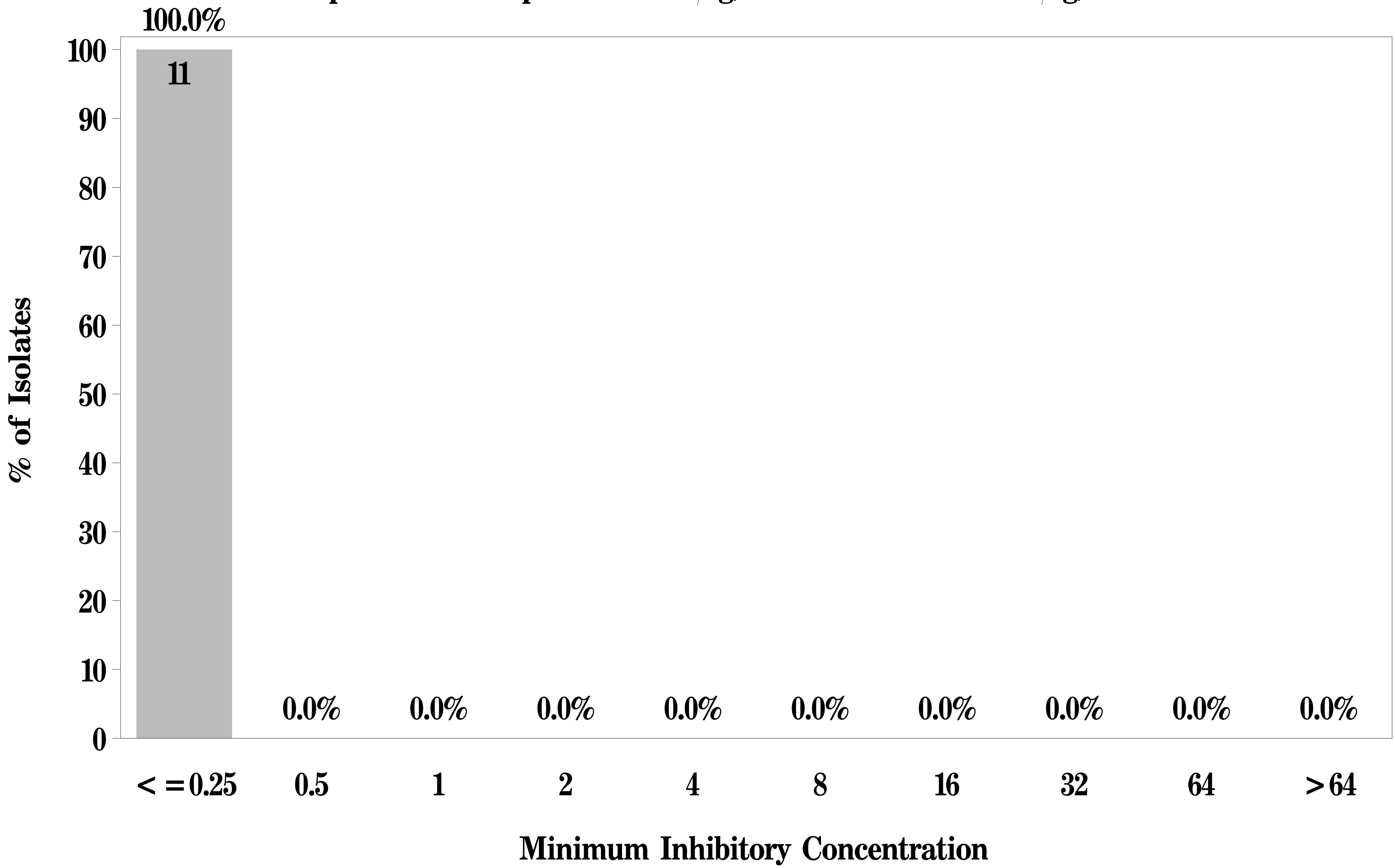
Breakpoints: Susceptible <=8 μg/mL Resistant >=64 μg/mL



NARMS

Figure 7f: Minimum Inhibitory Concentration of Ceftriaxone for *Salmonella* in Pork Chop (N=11 Isolates)

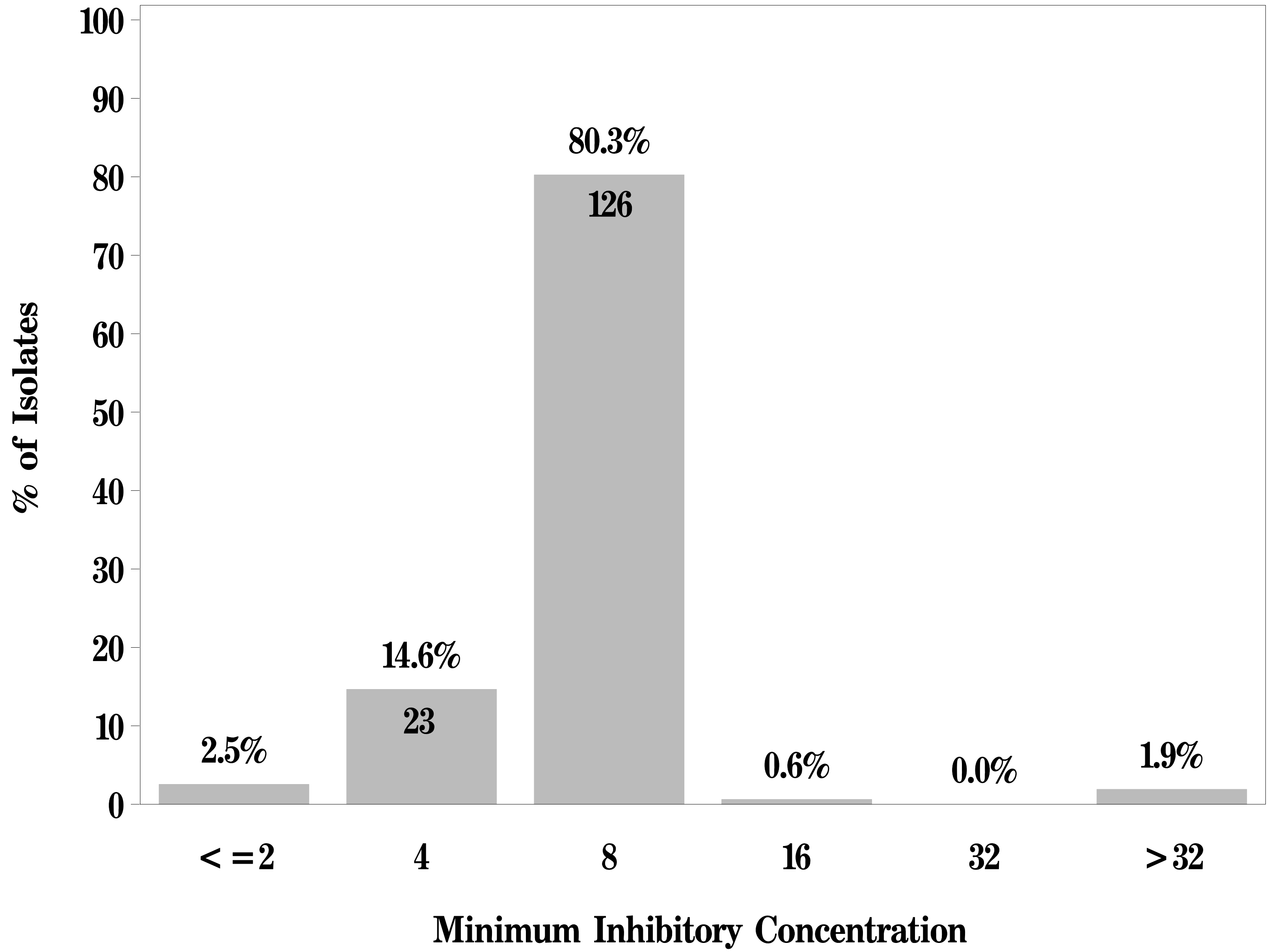
Breakpoints: Susceptible<=8 μg/mL Resistant>=64 μg/mL



NARMS

Figure 7g: Minimum Inhibitory Concentration of Chloramphenicol for *Salmonella* in Chicken Breast (N=157 Isolates)

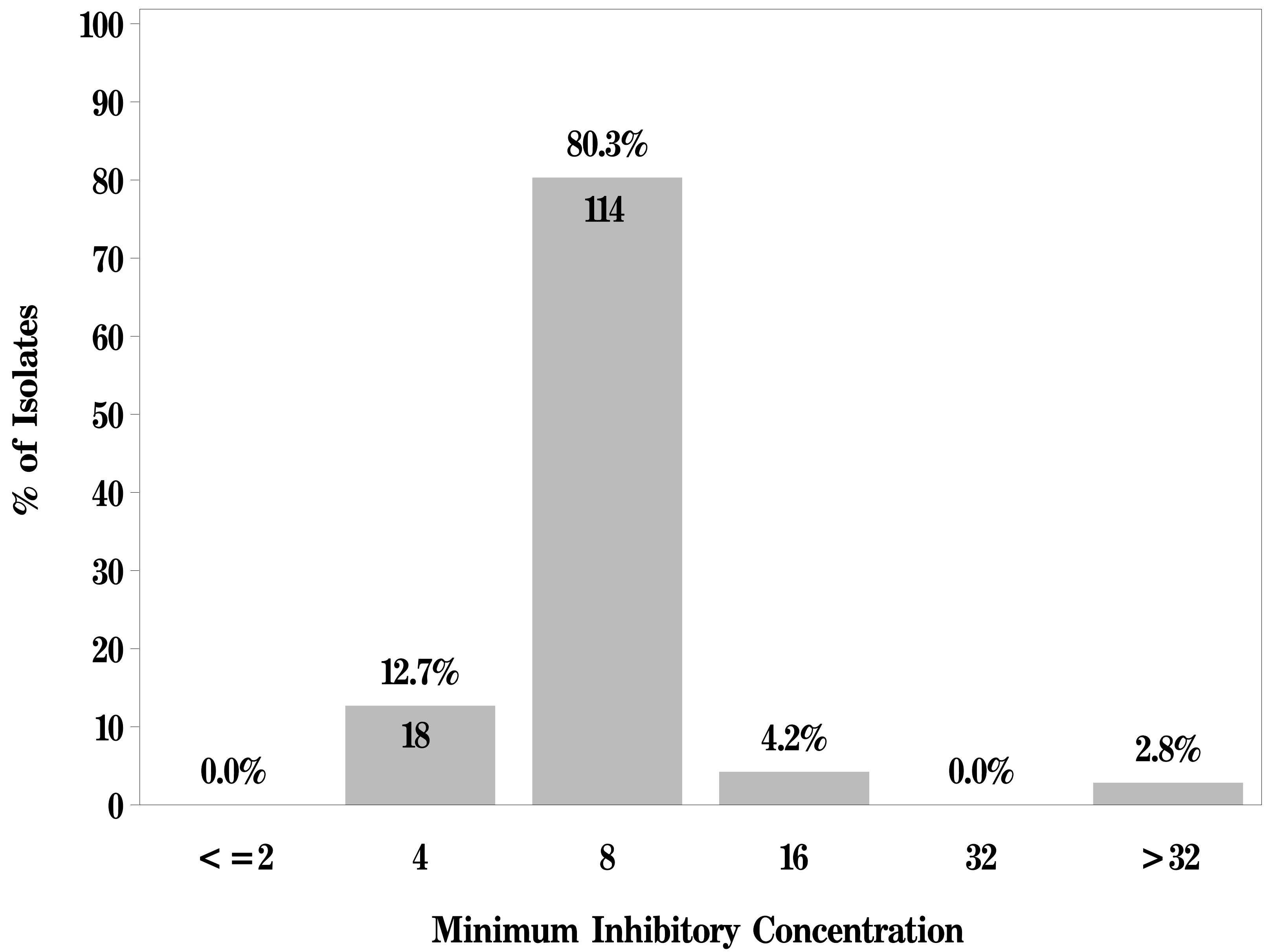
Breakpoints: Susceptible <=8 μg/mL Resistant >=32 μg/mL



NARMS

Figure 7g: Minimum Inhibitory Concentration of Chloramphenicol for *Salmonella* in Ground Turkey (N=142 Isolates)

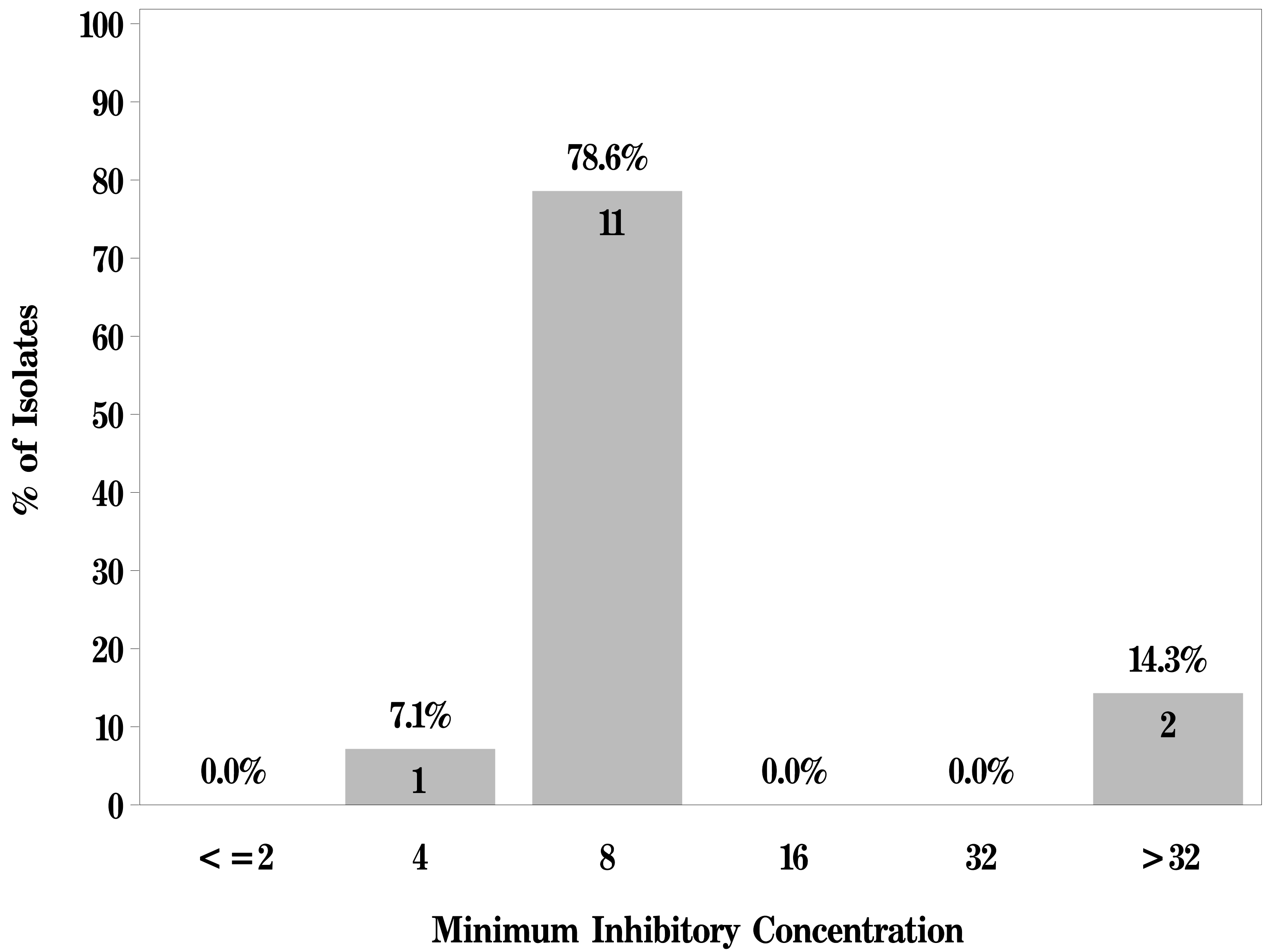
Breakpoints: Susceptible <=8 μg/mL Resistant >=32 μg/mL



NARMS

Figure 7g: Minimum Inhibitory Concentration of Chloramphenicol for *Salmonella* in Ground Beef (N=14 Isolates)

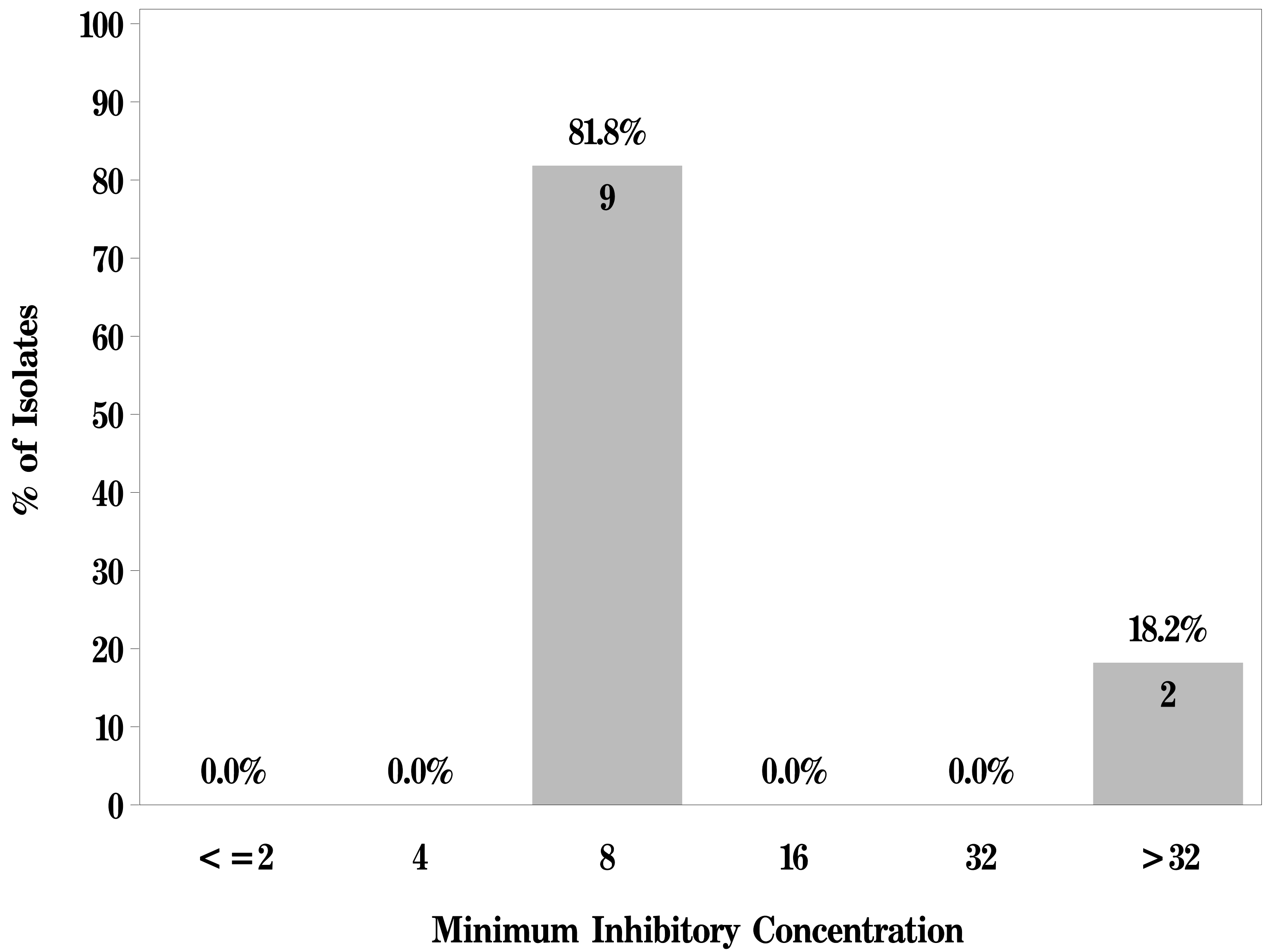
Breakpoints: Susceptible <=8 μg/mL Resistant >=32 μg/mL



NARMS

Figure 7g: Minimum Inhibitory Concentration of Chloramphenicol for *Salmonella* in Pork Chop (N=11 Isolates)

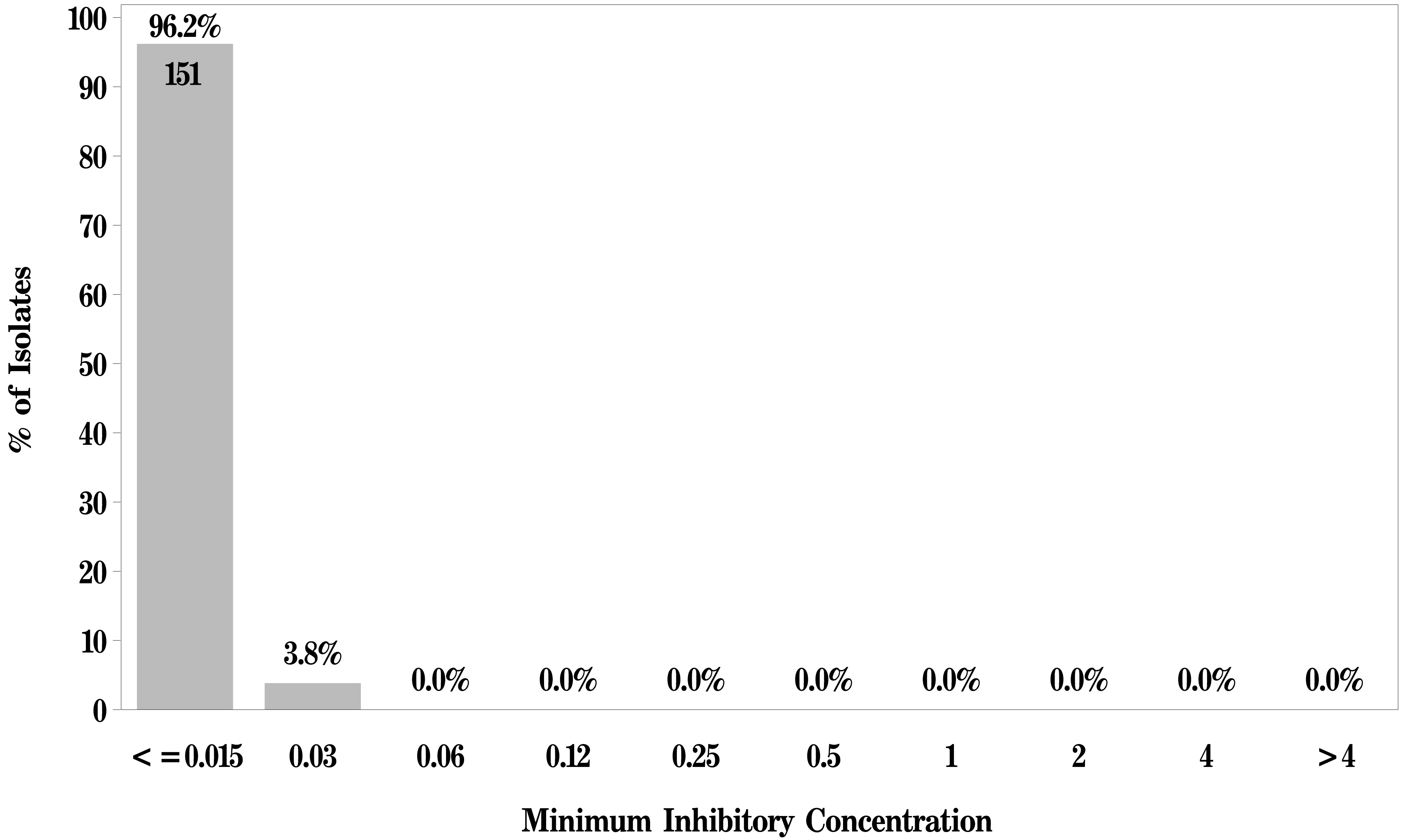
Breakpoints: Susceptible <=8 μg/mL Resistant >=32 μg/mL



NARMS

Figure 7h: Minimum Inhibitory Concentration of Ciprofloxacin for *Salmonella* in Chicken Breast (N=157 Isolates)

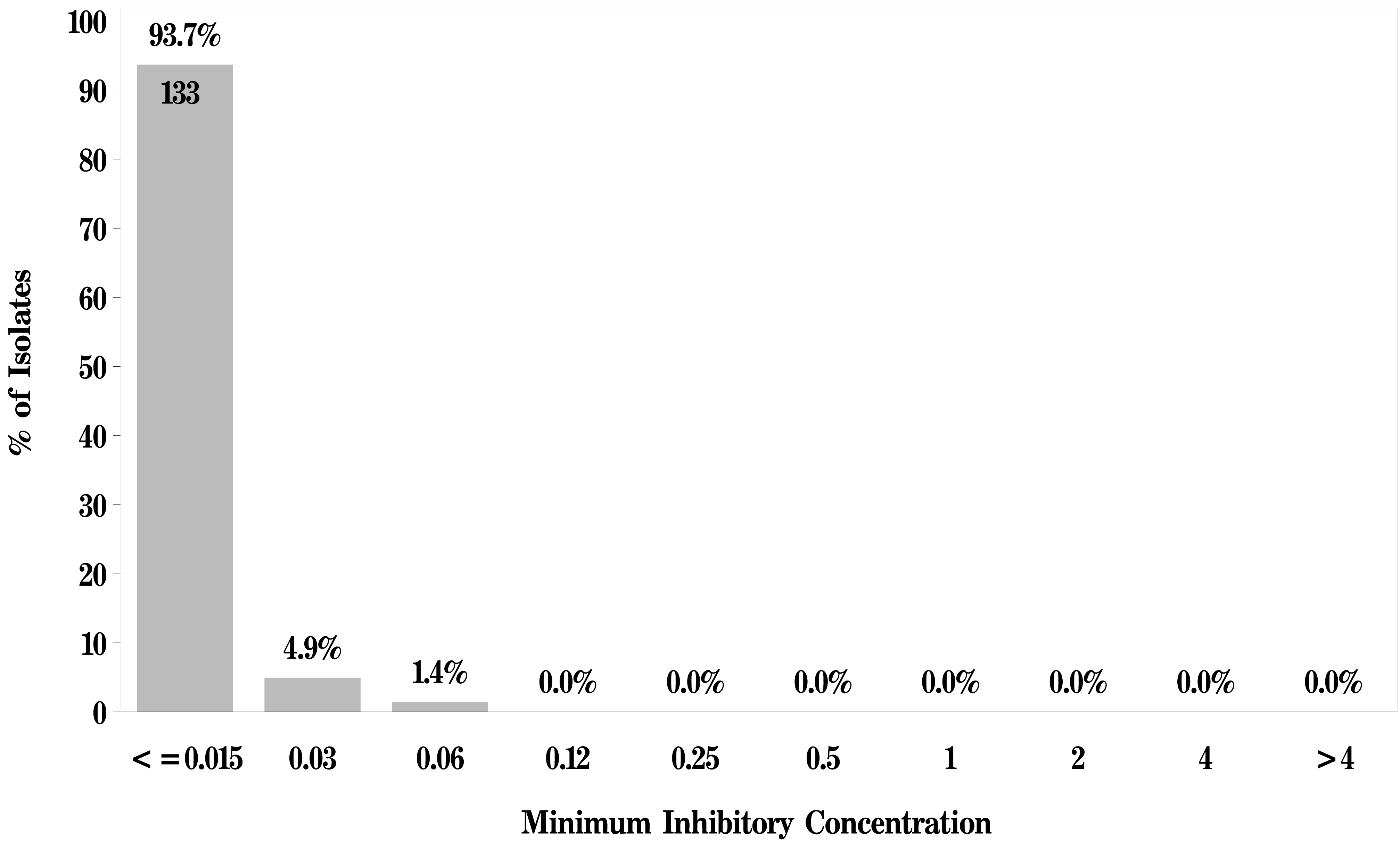
Breakpoints: Susceptible <=1 μg/mL Resistant >=4 μg/mL



NARMS

Figure 7h: Minimum Inhibitory Concentration of Ciprofloxacin for *Salmonella* in Ground Turkey (N=142 Isolates)

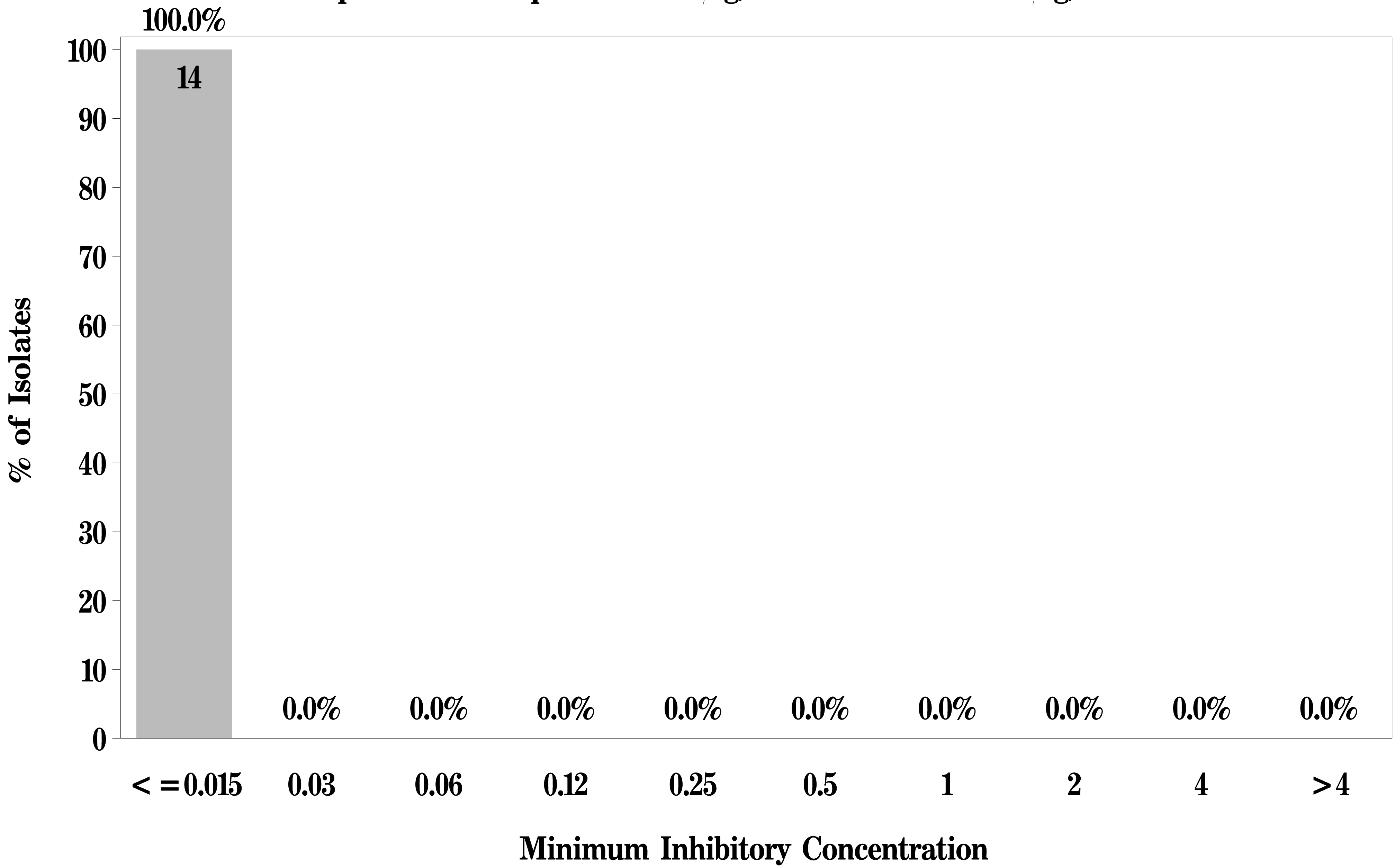
Breakpoints: Susceptible <=1 μg/mL Resistant >=4 μg/mL



NARMS

Figure 7h: Minimum Inhibitory Concentration of Ciprofloxacin for *Salmonella* in Ground Beef (N=14 Isolates)

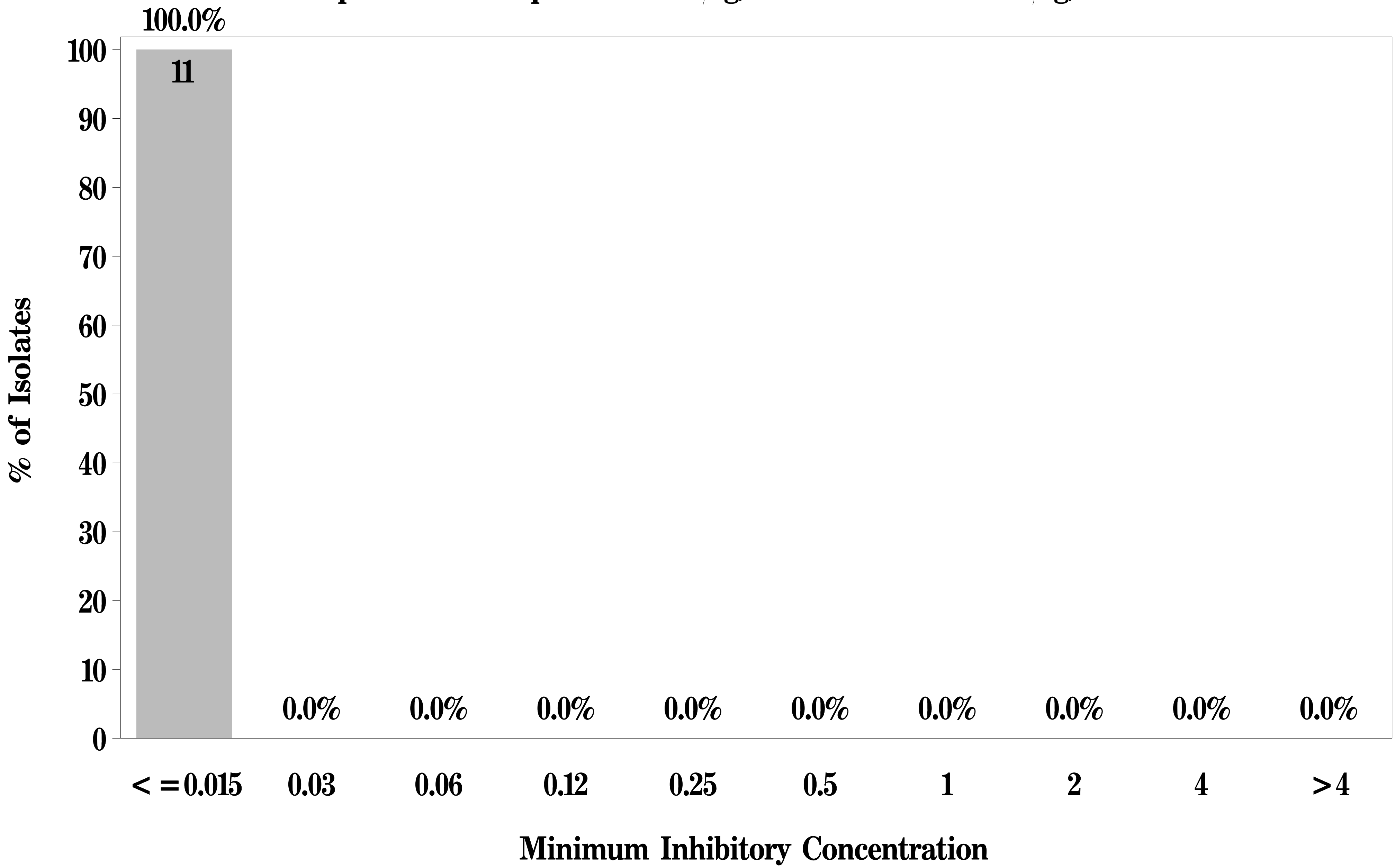
Breakpoints: Susceptible<=1 μg/mL Resistant>=4 μg/mL



NARMS

Figure 7h: Minimum Inhibitory Concentration of Ciprofloxacin for *Salmonella* in Pork Chop (N=11 Isolates)

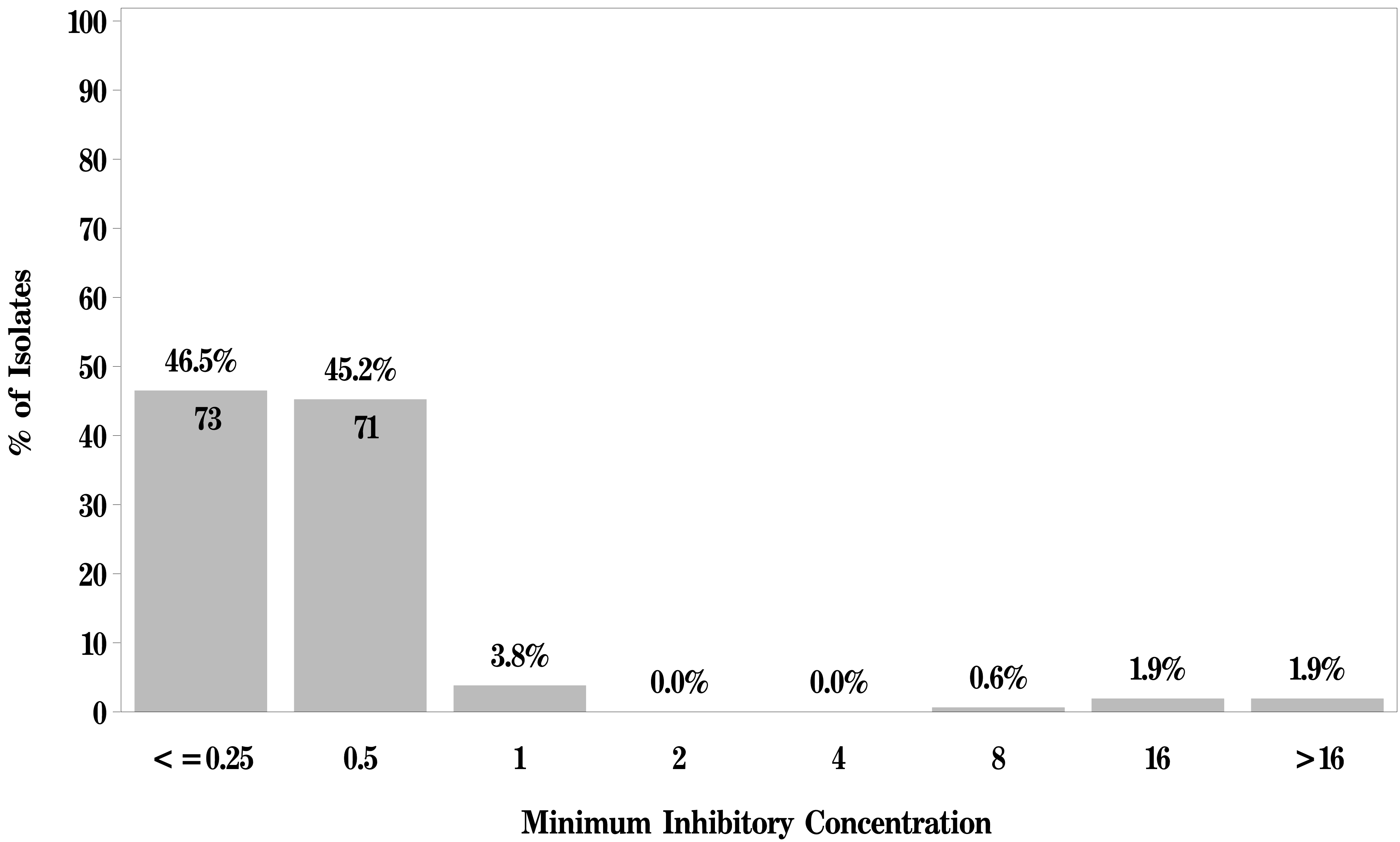
Breakpoints: Susceptible<=1 μg/mL Resistant>=4 μg/mL



NARMS

Figure 7i: Minimum Inhibitory Concentration of Gentamicin for *Salmonella* in Chicken Breast (N=157 Isolates)

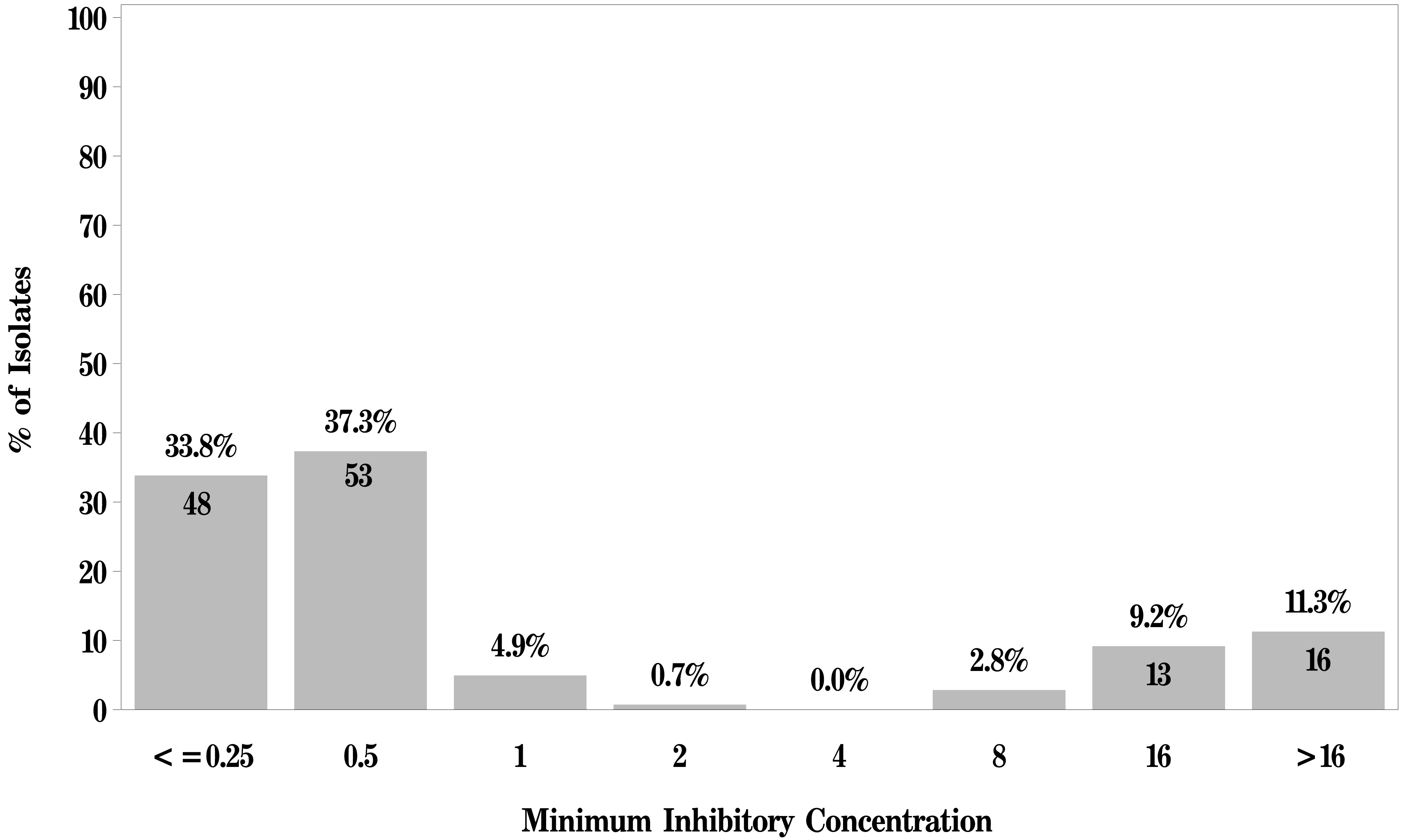
Breakpoints: Susceptible <=4 µg/mL Resistant >=16 µg/mL



NARMS

Figure 7i: Minimum Inhibitory Concentration of Gentamicin for *Salmonella* in Ground Turkey (N=142 Isolates)

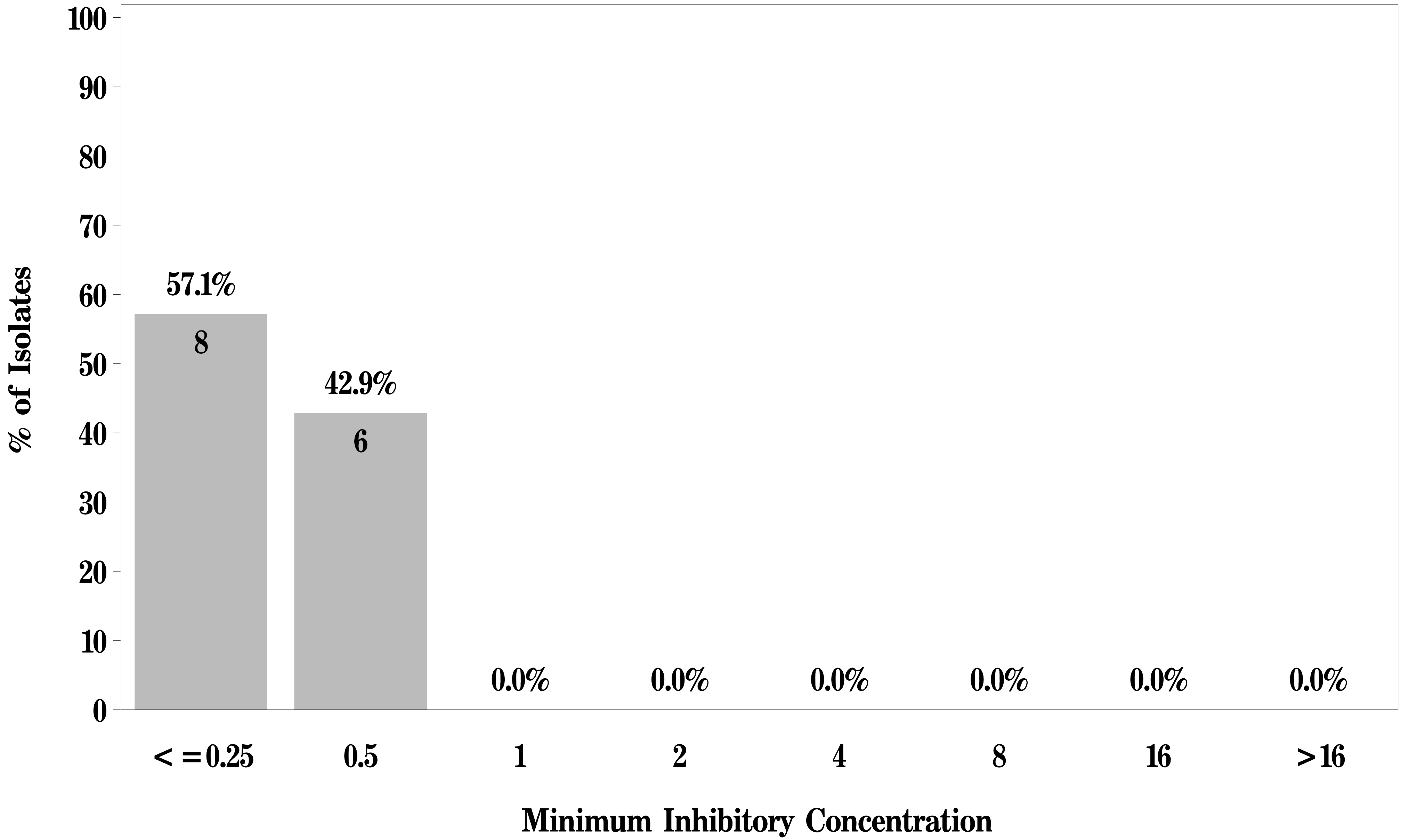
Breakpoints: Susceptible <=4 µg/mL Resistant >=16 µg/mL



NARMS

Figure 7i: Minimum Inhibitory Concentration of Gentamicin for *Salmonella* in Ground Beef (N=14 Isolates)

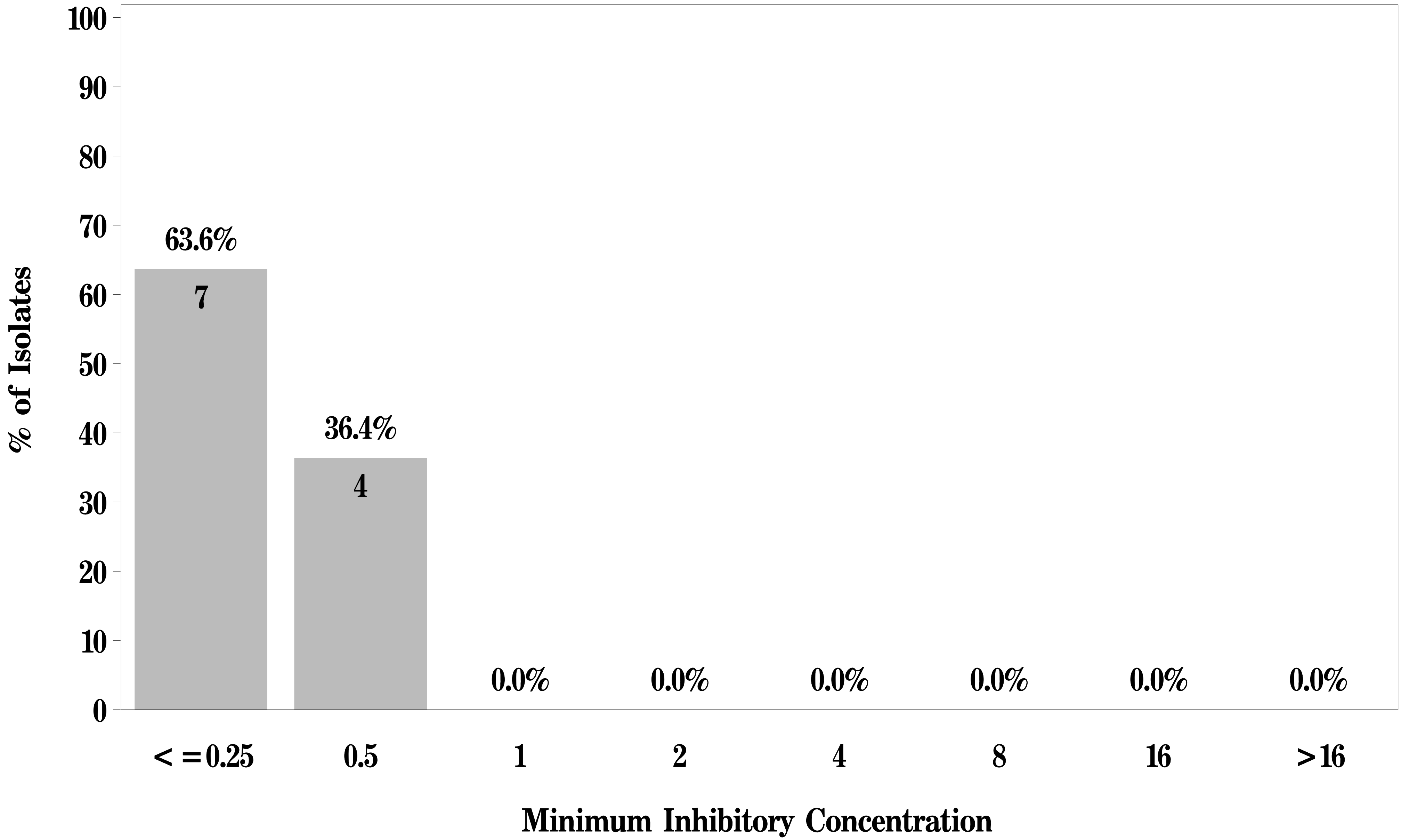
Breakpoints: Susceptible <=4 µg/mL Resistant >=16 µg/mL



NARMS

Figure 7i: Minimum Inhibitory Concentration of Gentamicin for *Salmonella* in Pork Chop (N=11 Isolates)

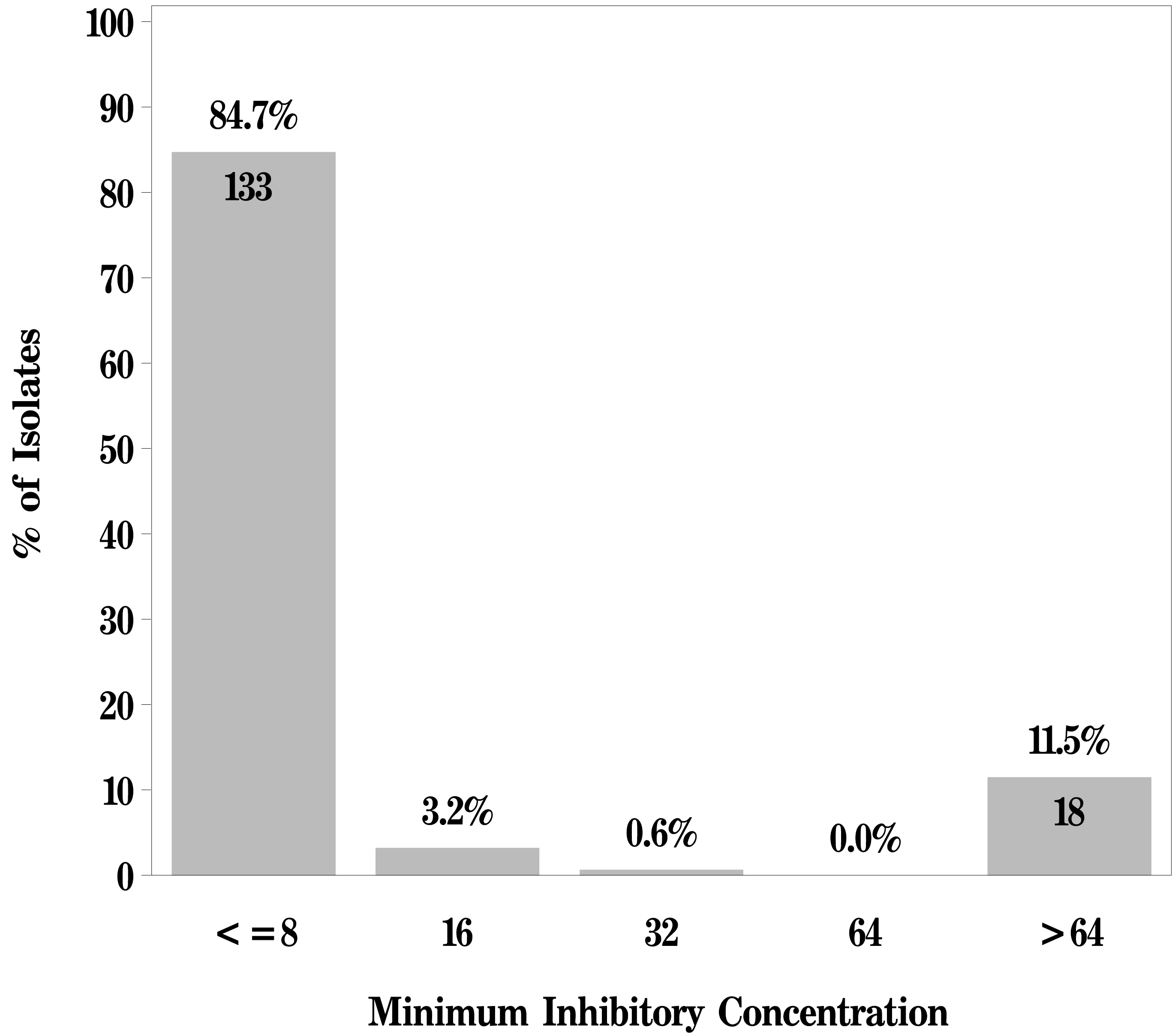
Breakpoints: Susceptible<=4 μg/mL Resistant>=16 μg/mL



NARMS

Figure 7j: Minimum Inhibitory Concentration of Kanamycin for *Salmonella* in Chicken Breast (N=157 Isolates)

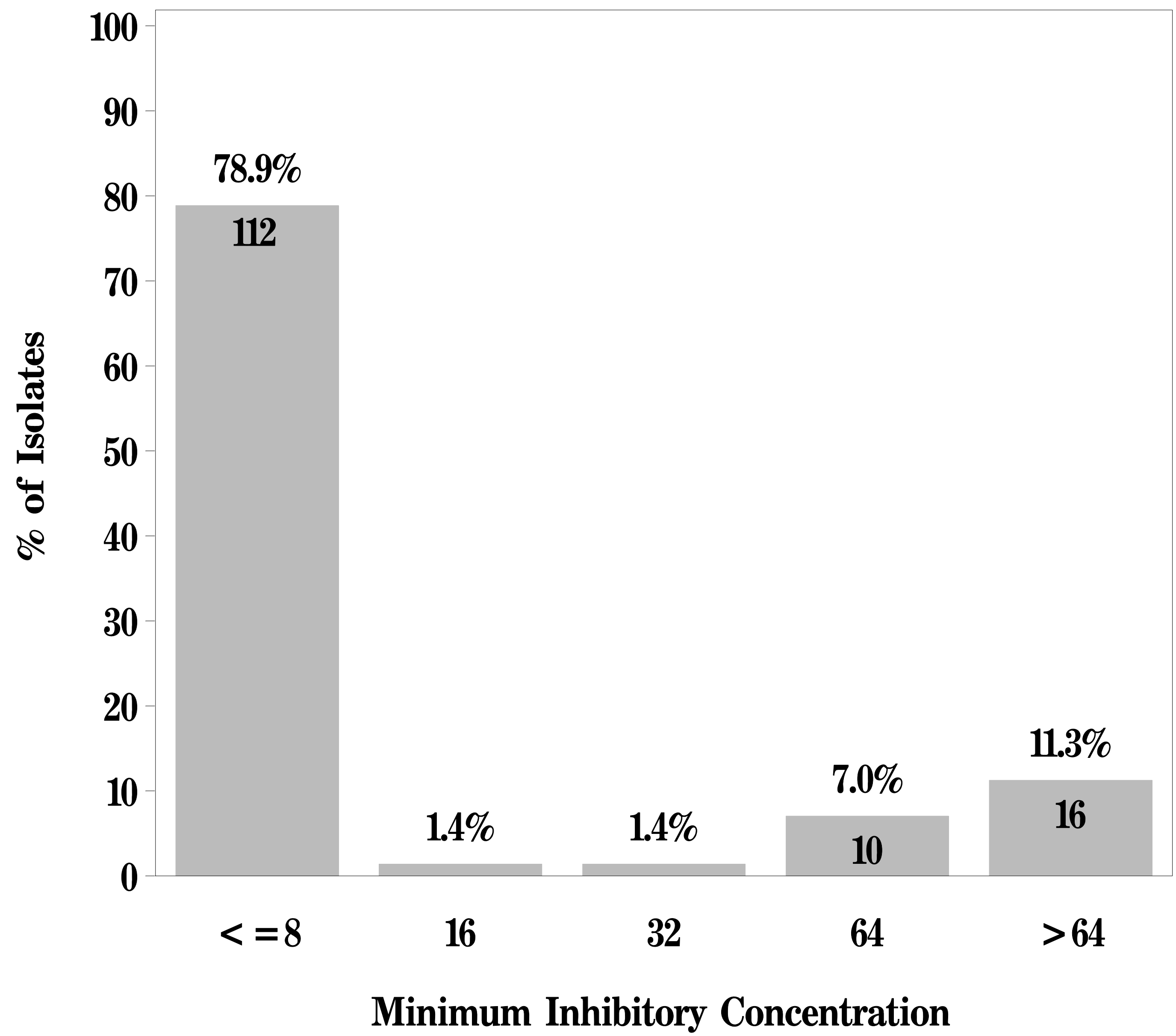
Breakpoints: Susceptible <=16 µg/mL Resistant >=64 µg/mL



NARMS

Figure 7j: Minimum Inhibitory Concentration of Kanamycin for *Salmonella* in Ground Turkey (N=142 Isolates)

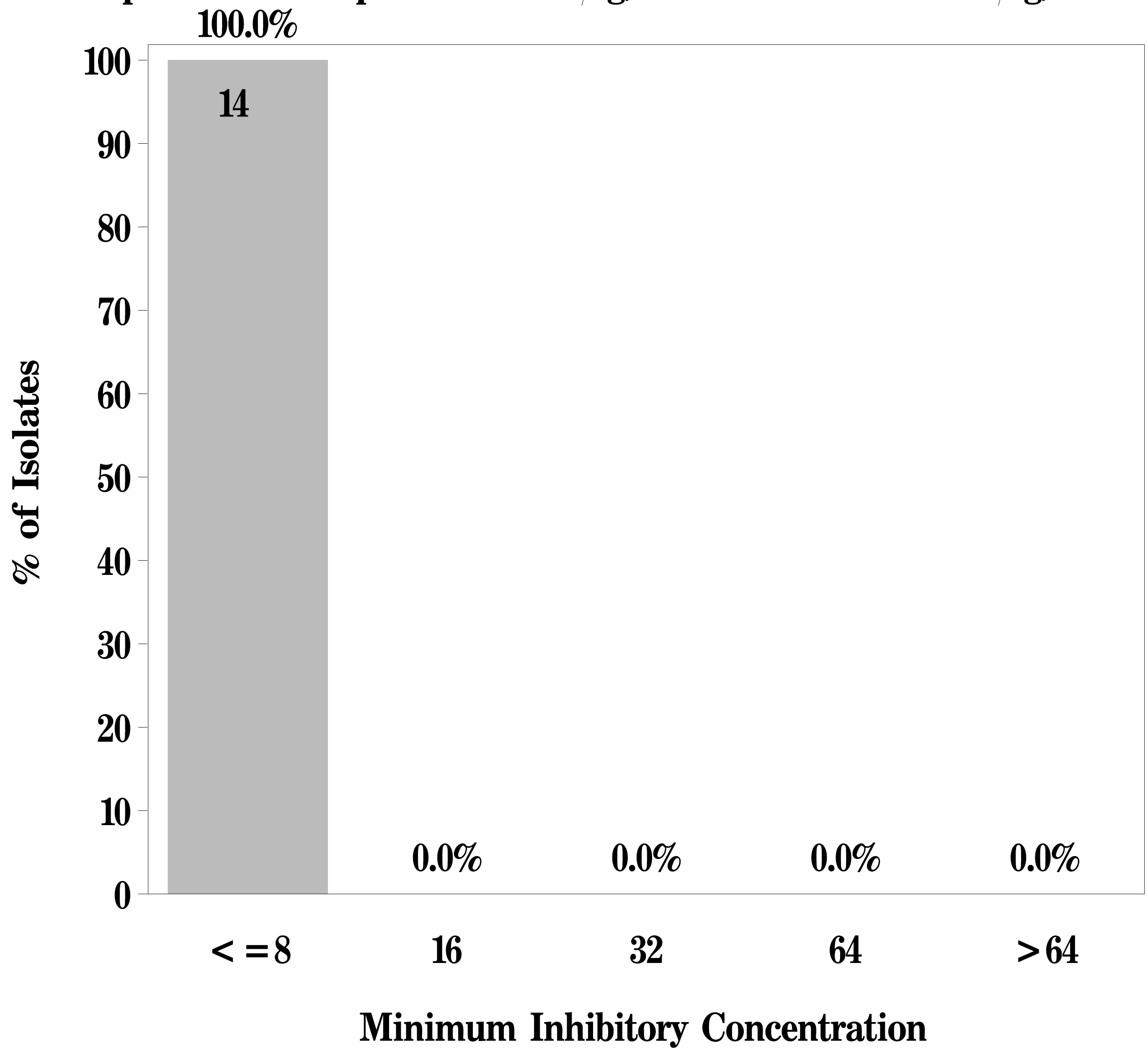
Breakpoints: Susceptible <=16 μg/mL Resistant >=64 μg/mL



NARMS

Figure 7j: Minimum Inhibitory Concentration of Kanamycin for *Salmonella* in Ground Beef (N=14 Isolates)

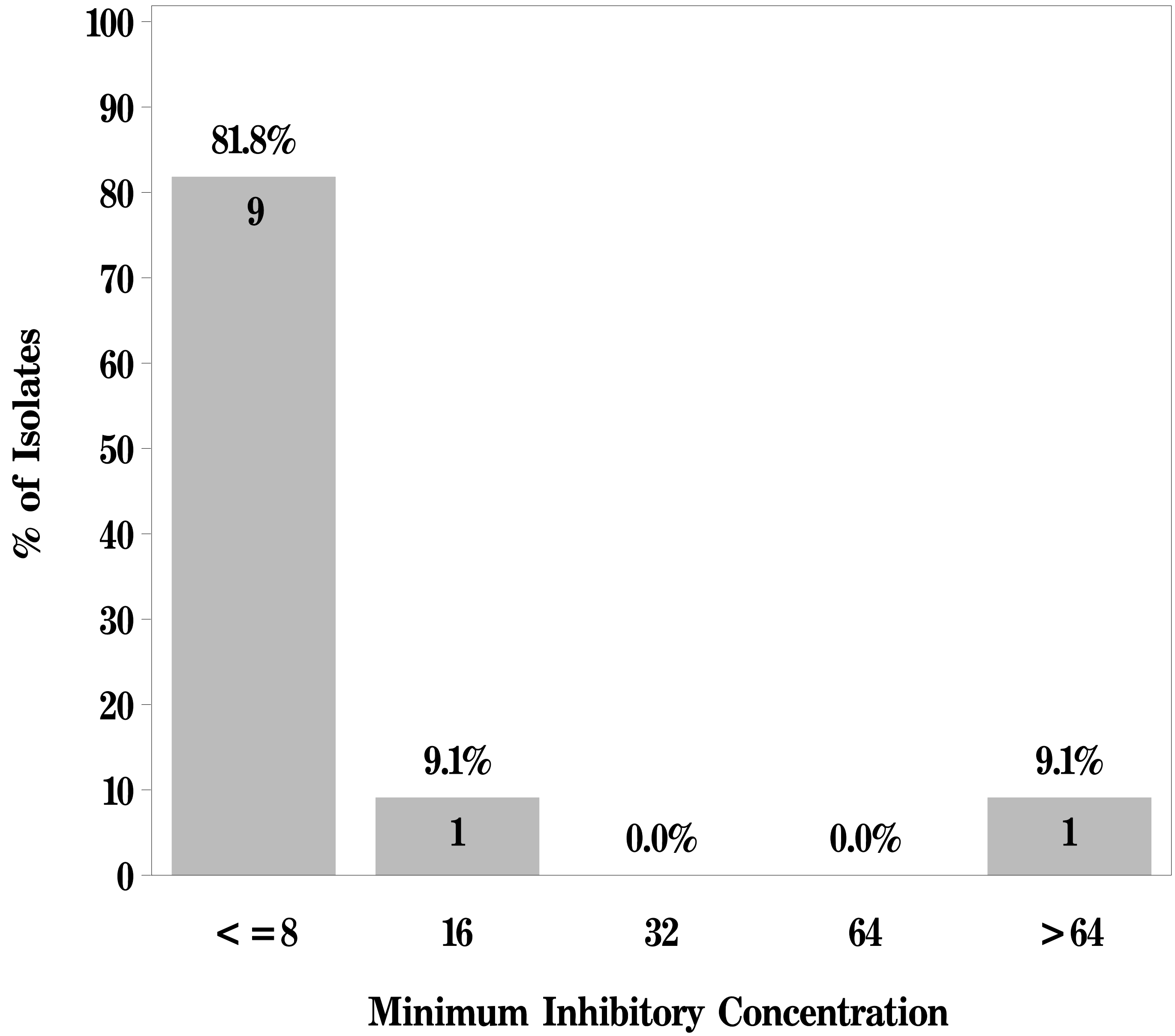
Breakpoints: Susceptible <=16 µg/mL Resistant >=64 µg/mL



NARMS

Figure 7j: Minimum Inhibitory Concentration of Kanamycin for *Salmonella* in Pork Chop (N=11 Isolates)

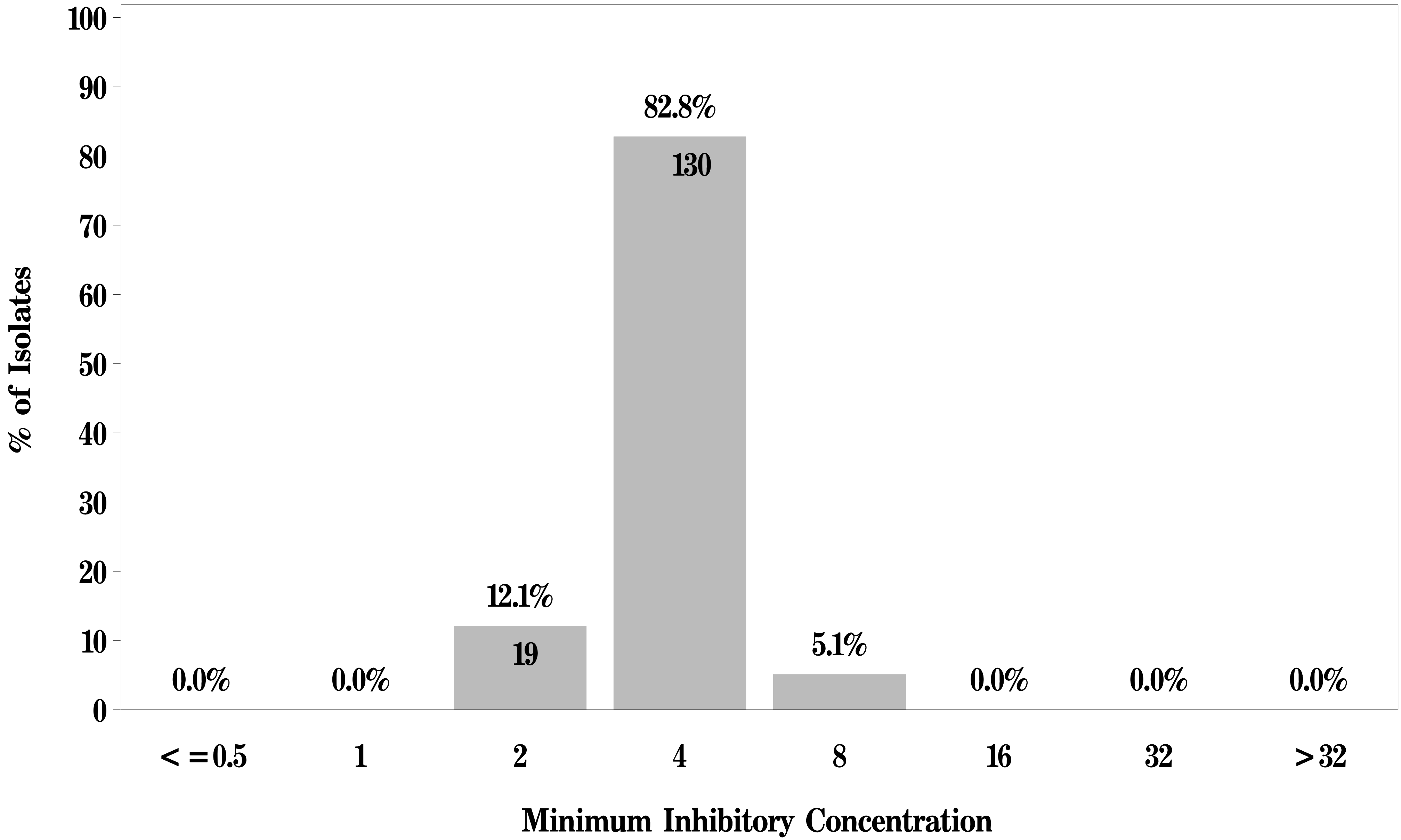
Breakpoints: Susceptible <=16 μg/mL Resistant >=64 μg/mL



NARMS

Figure 7k: Minimum Inhibitory Concentration of Nalidixic acid for *Salmonella* in Chicken Breast (N=157 Isolates)

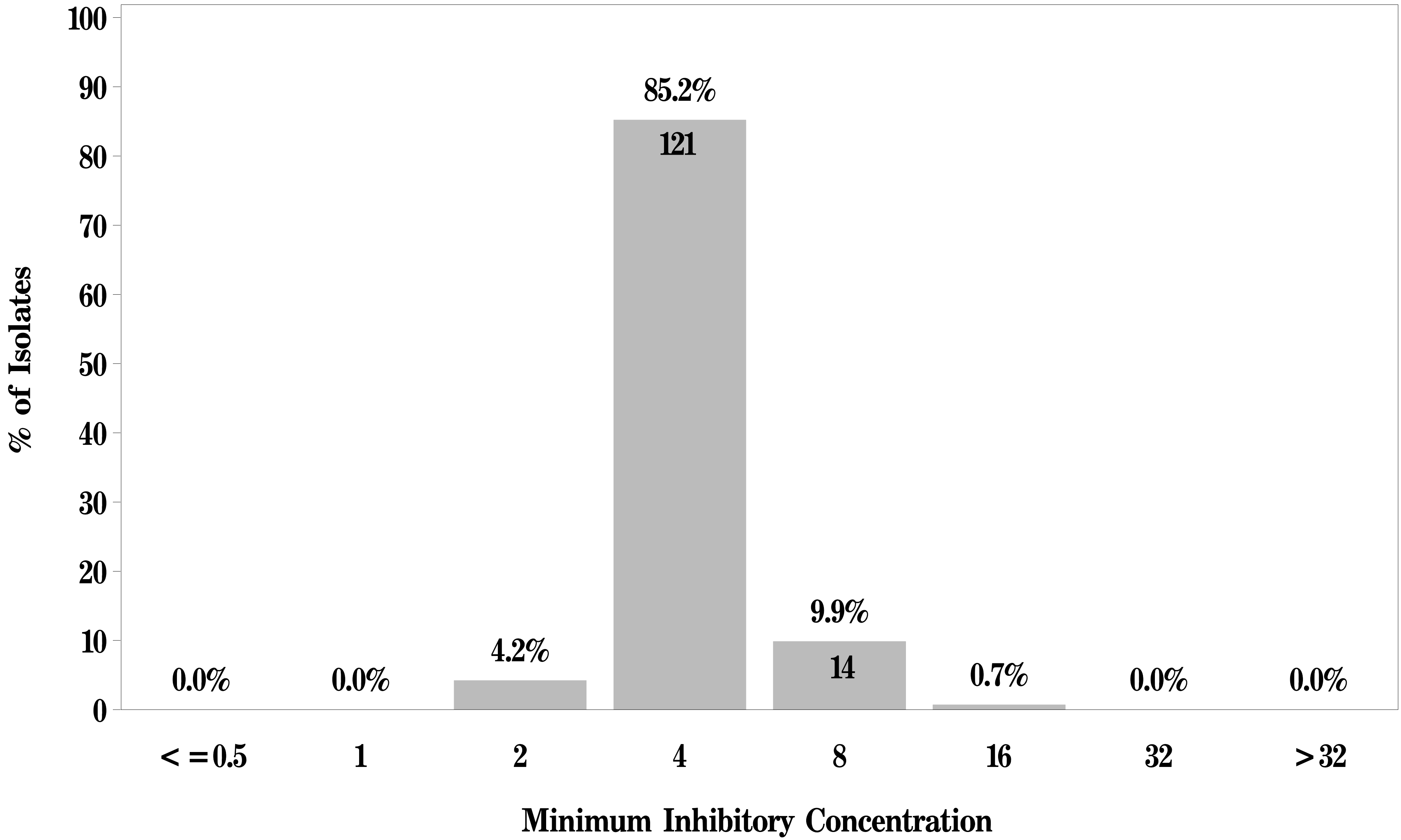
Breakpoints: Susceptible <=16 μg/mL Resistant >=32 μg/mL



NARMS

Figure 7k: Minimum Inhibitory Concentration of Nalidixic acid for *Salmonella* in Ground Turkey (N=142 Isolates)

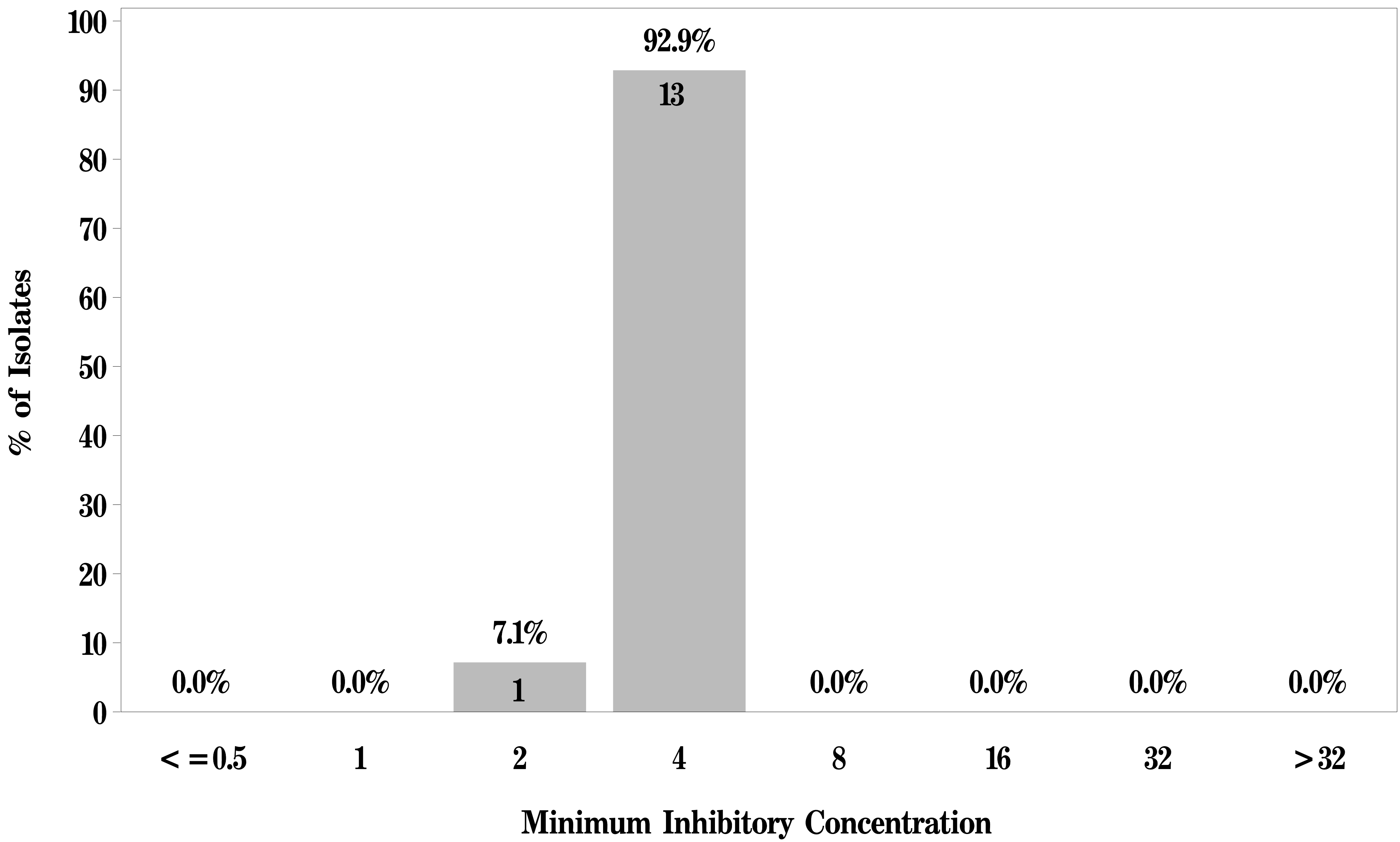
Breakpoints: Susceptible <=16 μg/mL Resistant >=32 μg/mL



NARMS

Figure 7k: Minimum Inhibitory Concentration of Nalidixic acid for *Salmonella* in Ground Beef (N=14 Isolates)

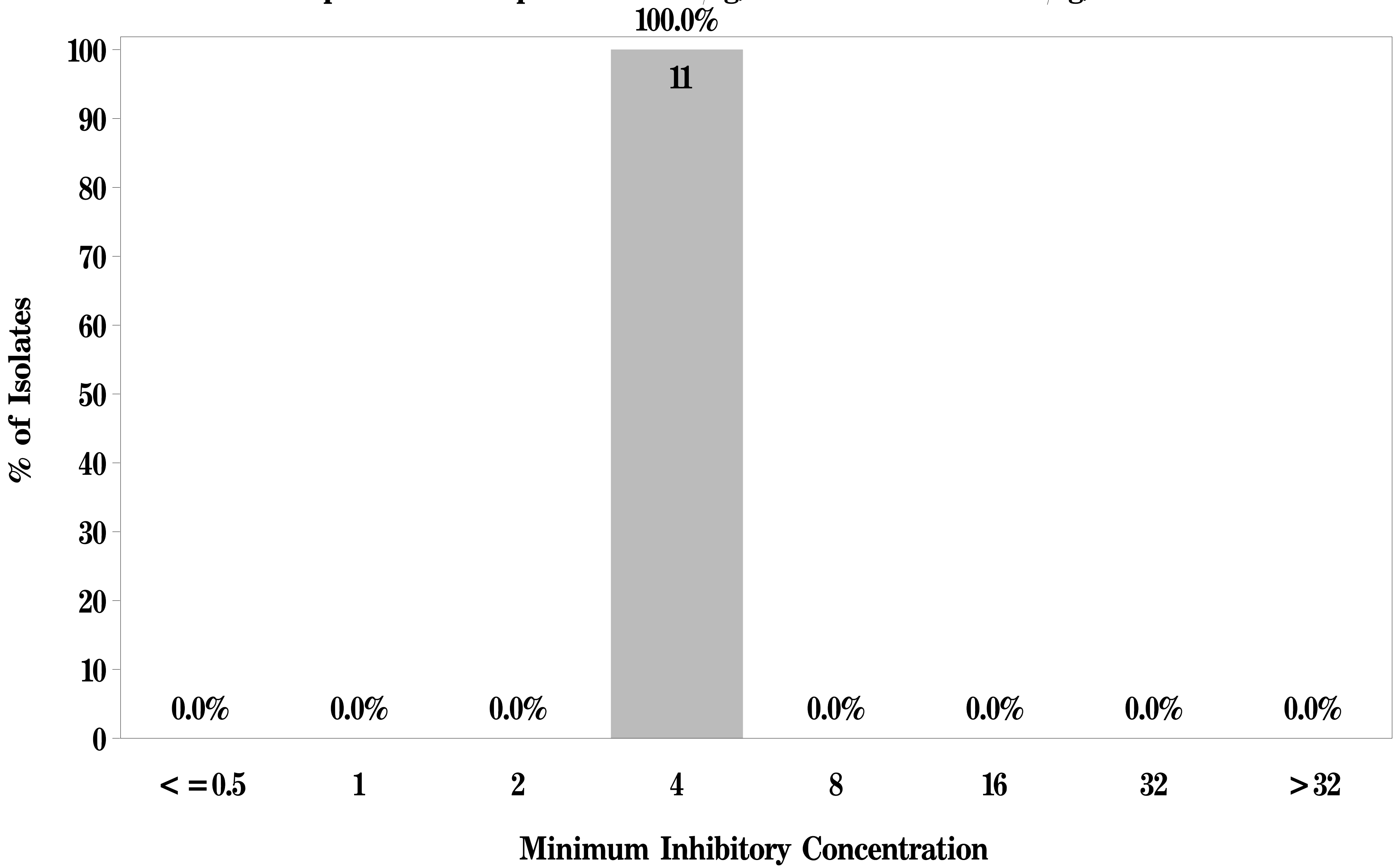
Breakpoints: Susceptible <=16 µg/mL Resistant >=32 µg/mL



NARMS

Figure 7k: Minimum Inhibitory Concentration of Nalidixic acid for *Salmonella* in Pork Chop (N=11 Isolates)

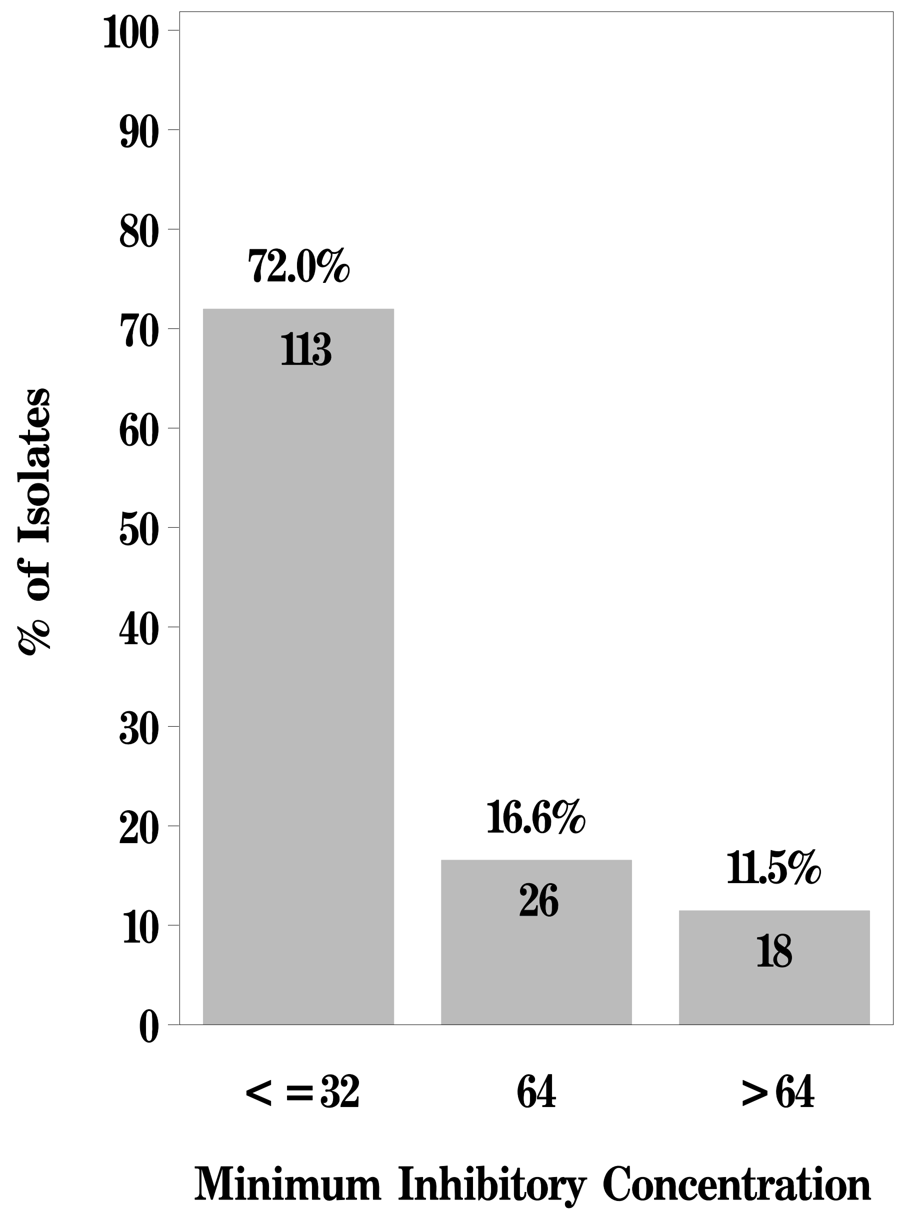
Breakpoints: Susceptible <=16 μg/mL Resistant >=32 μg/mL



NARMS

Figure 7l: Minimum Inhibitory Concentration of Streptomycin for *Salmonella* in Chicken Breast (N=157 Isolates)

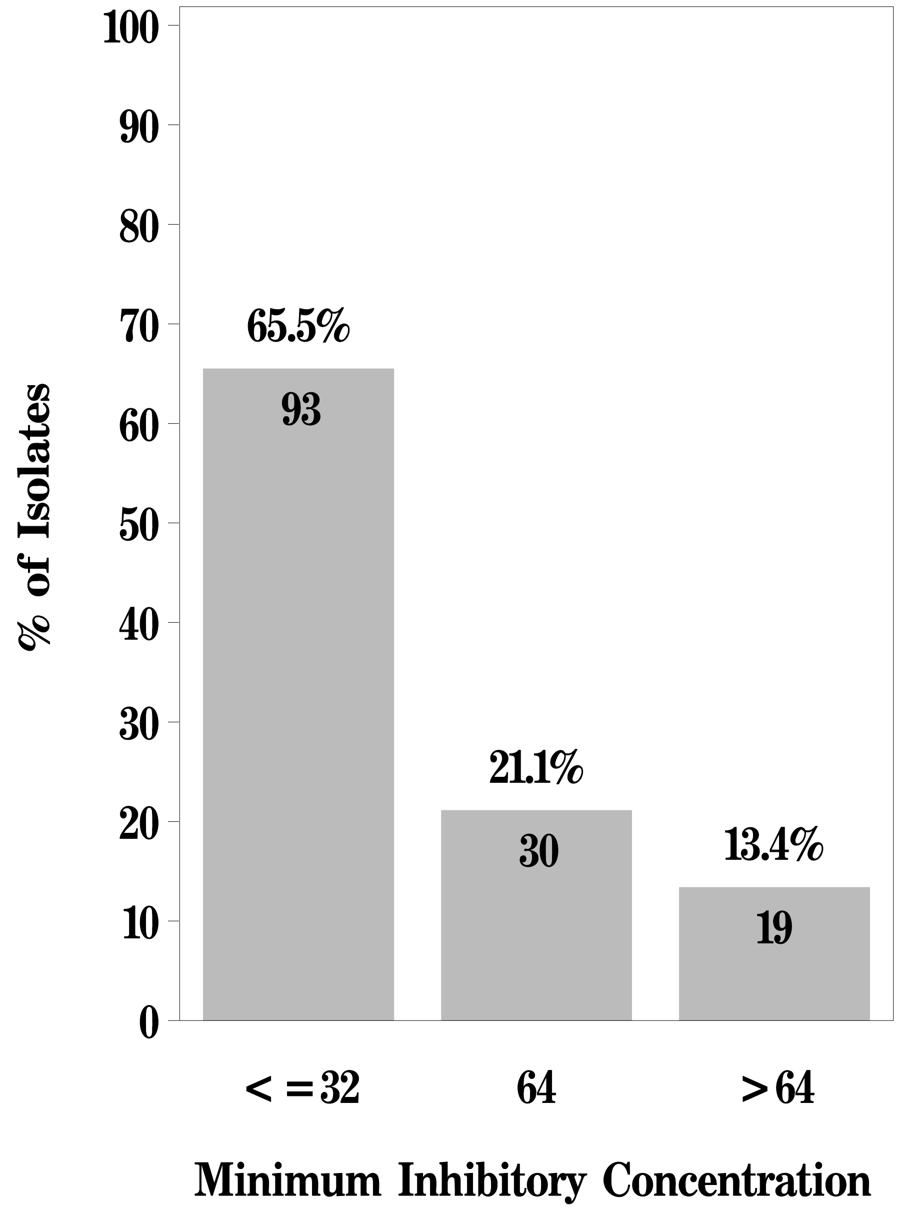
Breakpoints: Susceptible <=32 µg/mL Resistant >=64 µg/mL



NARMS

Figure 7l: Minimum Inhibitory Concentration of Streptomycin for *Salmonella* in Ground Turkey (N=142 Isolates)

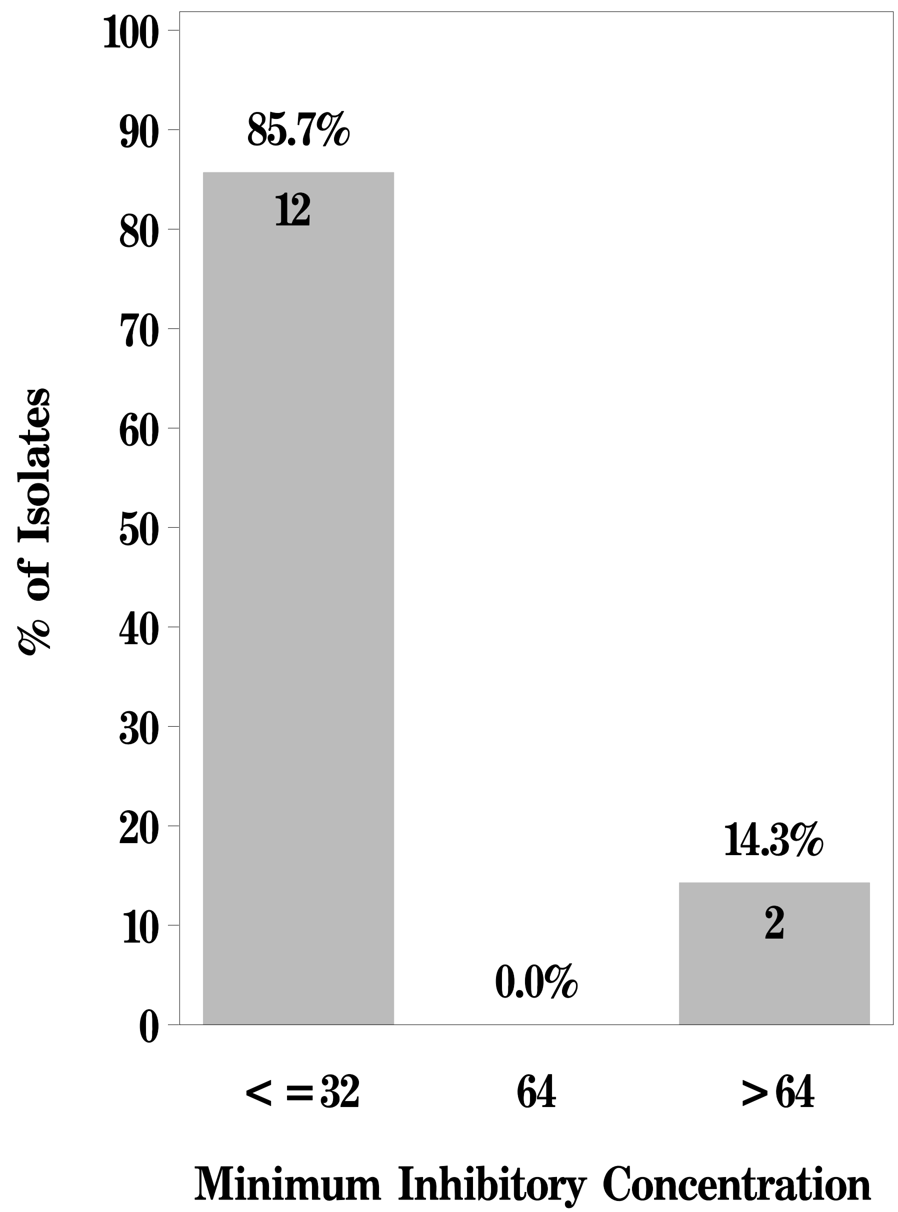
Breakpoints: Susceptible <=32 µg/mL Resistant >=64 µg/mL



NARMS

Figure 7l: Minimum Inhibitory Concentration of Streptomycin for *Salmonella* in Ground Beef (N=14 Isolates)

Breakpoints: Susceptible<=32 μg/mL Resistant>=64 μg/mL



NARMS

Figure 7l: Minimum Inhibitory Concentration of Streptomycin for *Salmonella* in Pork Chop (N=11 Isolates)

Breakpoints: Susceptible <=32 μg/mL Resistant >=64 μg/mL

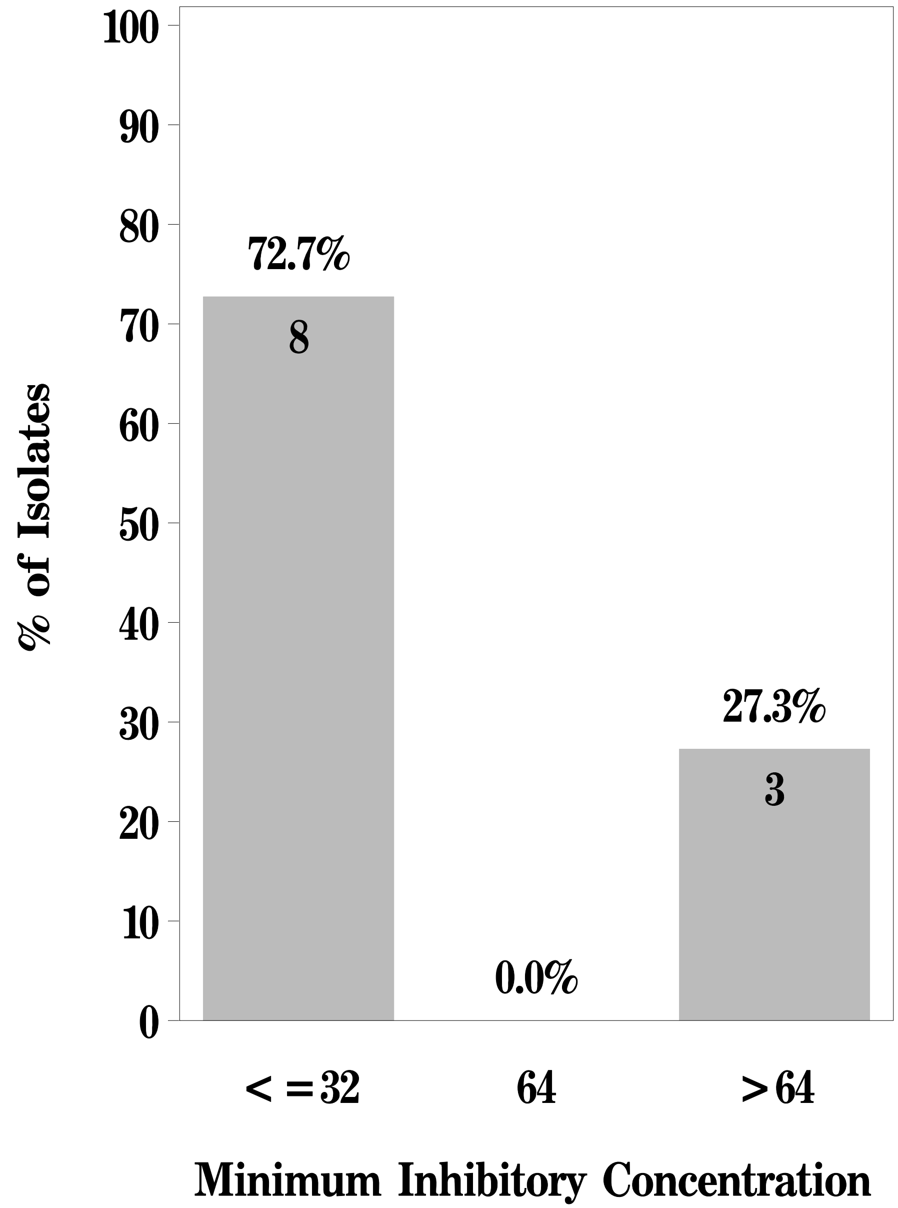


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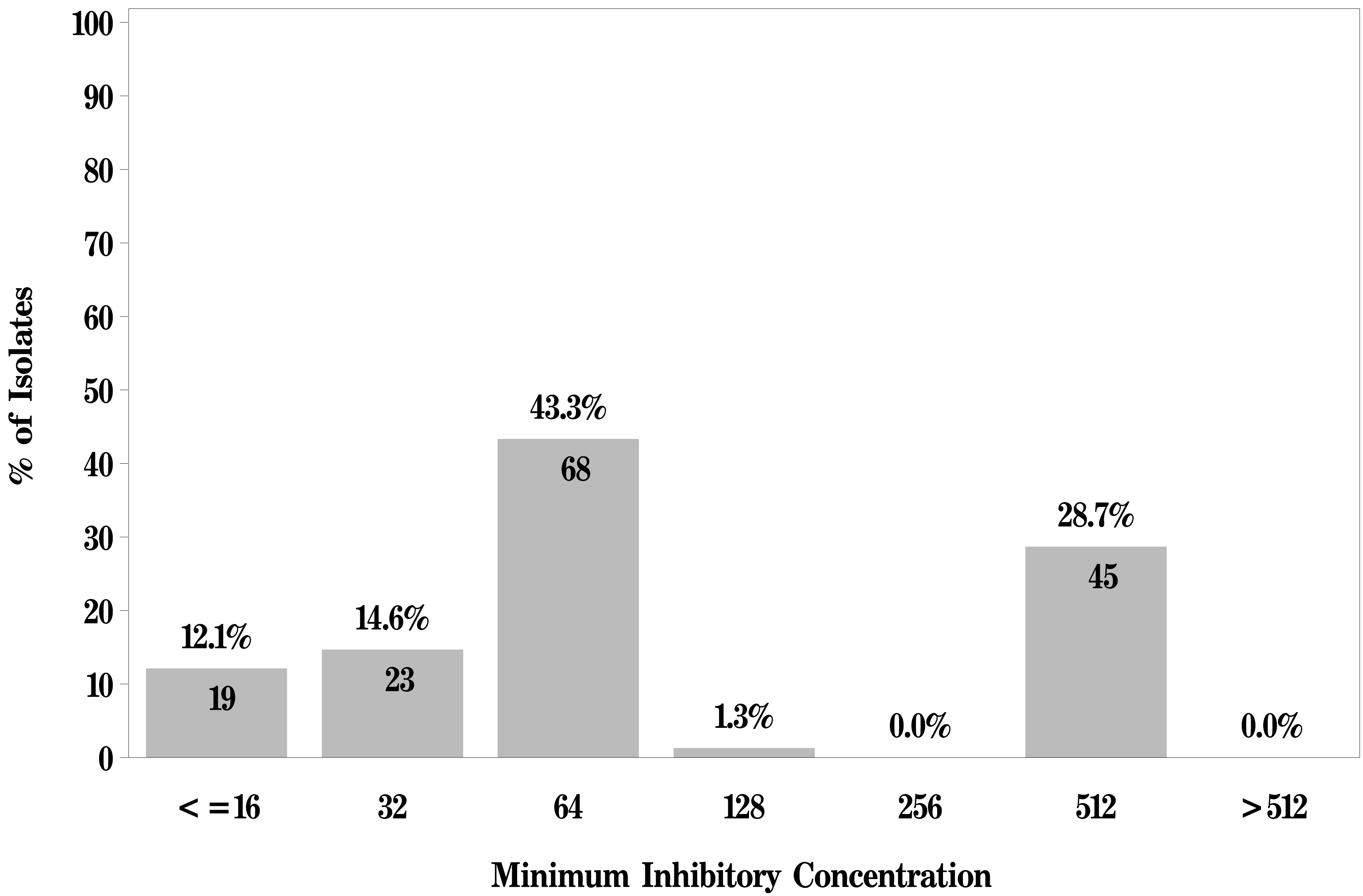
Figure 7m: Minimum Inhibitory Concentration of Sulfisoxazole for *Salmonella* in Chicken Breast (N=157 Isolates)

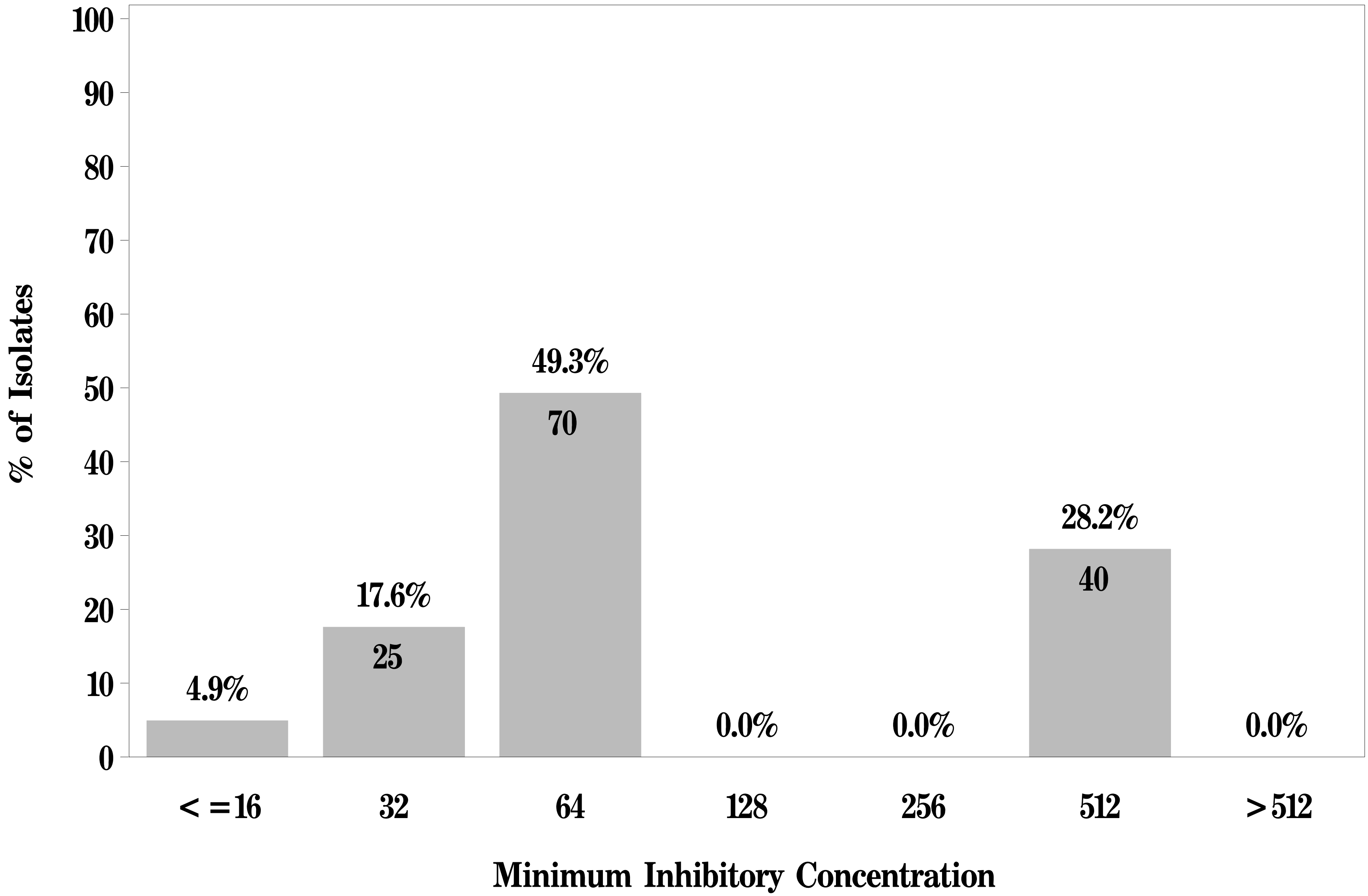
Breakpoints: Susceptible <=256 µg/mL Resistant >=512 µg/mL



NARMS

Figure 7m: Minimum Inhibitory Concentration of Sulfisoxazole for *Salmonella* in Ground Turkey (N=142 Isolates)

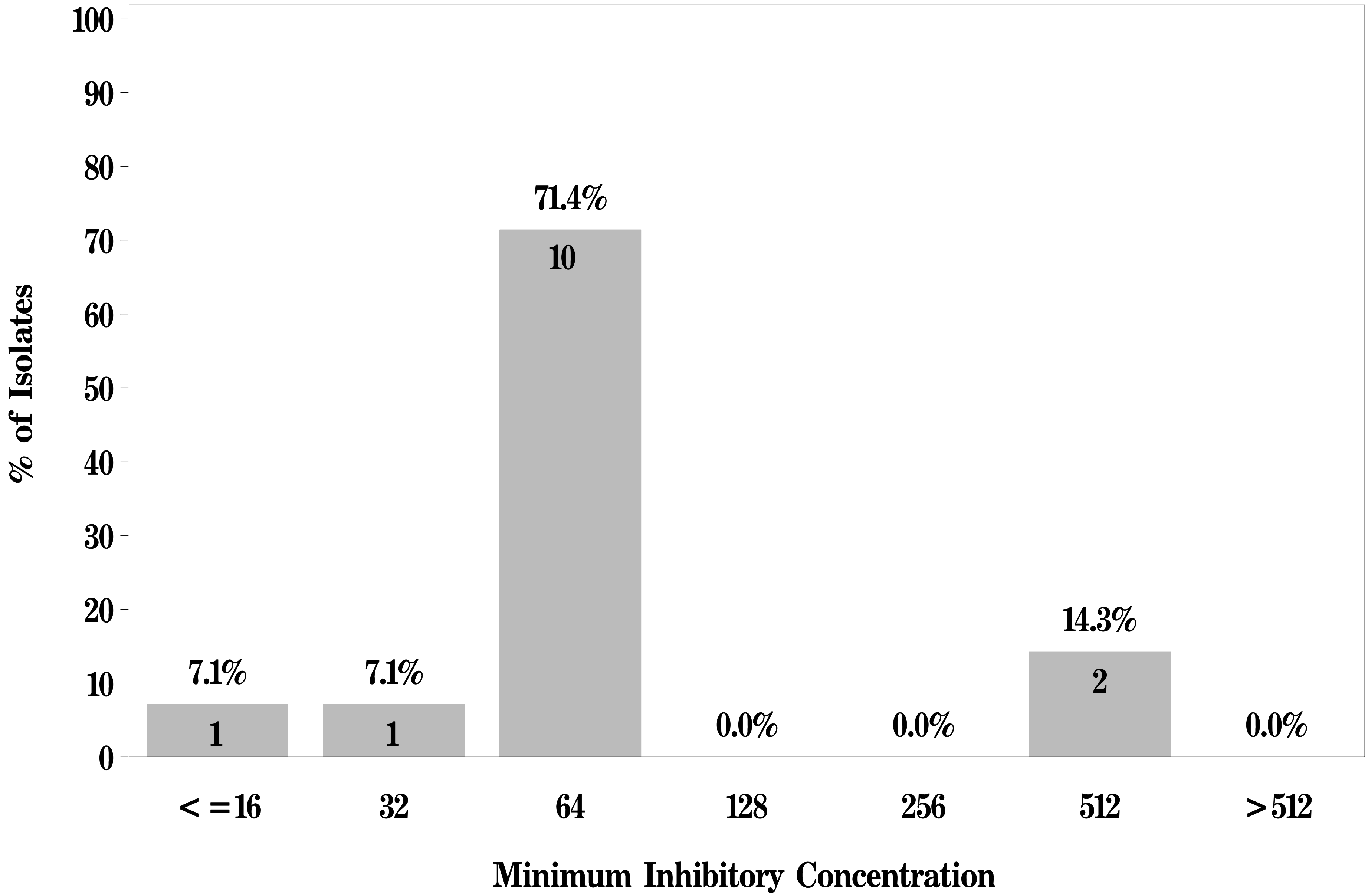
Breakpoints: Susceptible<=256 µg/mL Resistant>=512 µg/mL



NARMS

Figure 7m: Minimum Inhibitory Concentration of Sulfisoxazole for *Salmonella* in Ground Beef (N=14 Isolates)

Breakpoints: Susceptible <=256 μg/mL Resistant >=512 μg/mL



NARMS

Figure 7m: Minimum Inhibitory Concentration of Sulfisoxazole for *Salmonella* in Pork Chop (N=11 Isolates)

Breakpoints: Susceptible <=256 µg/mL Resistant >=512 µg/mL

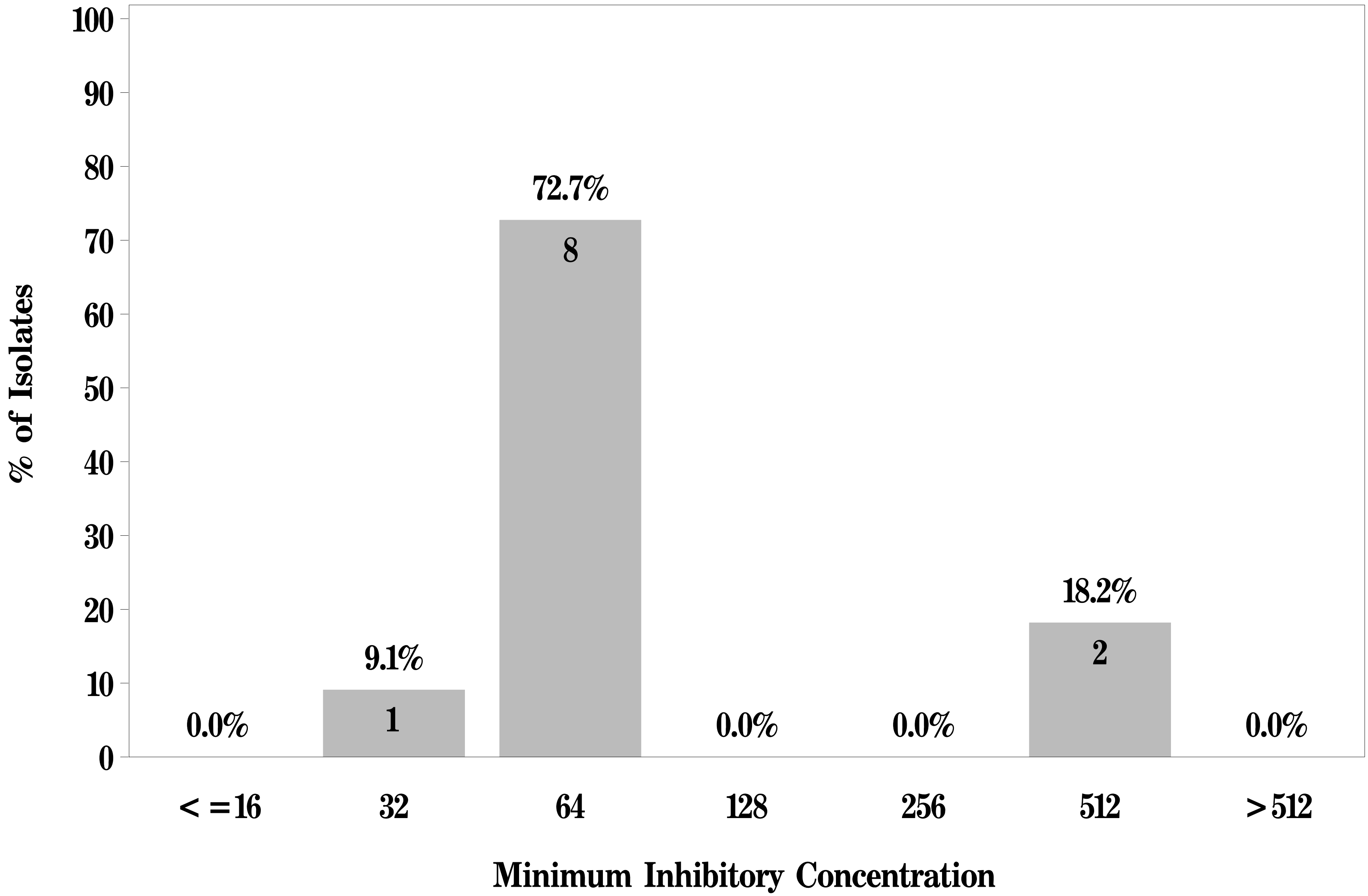


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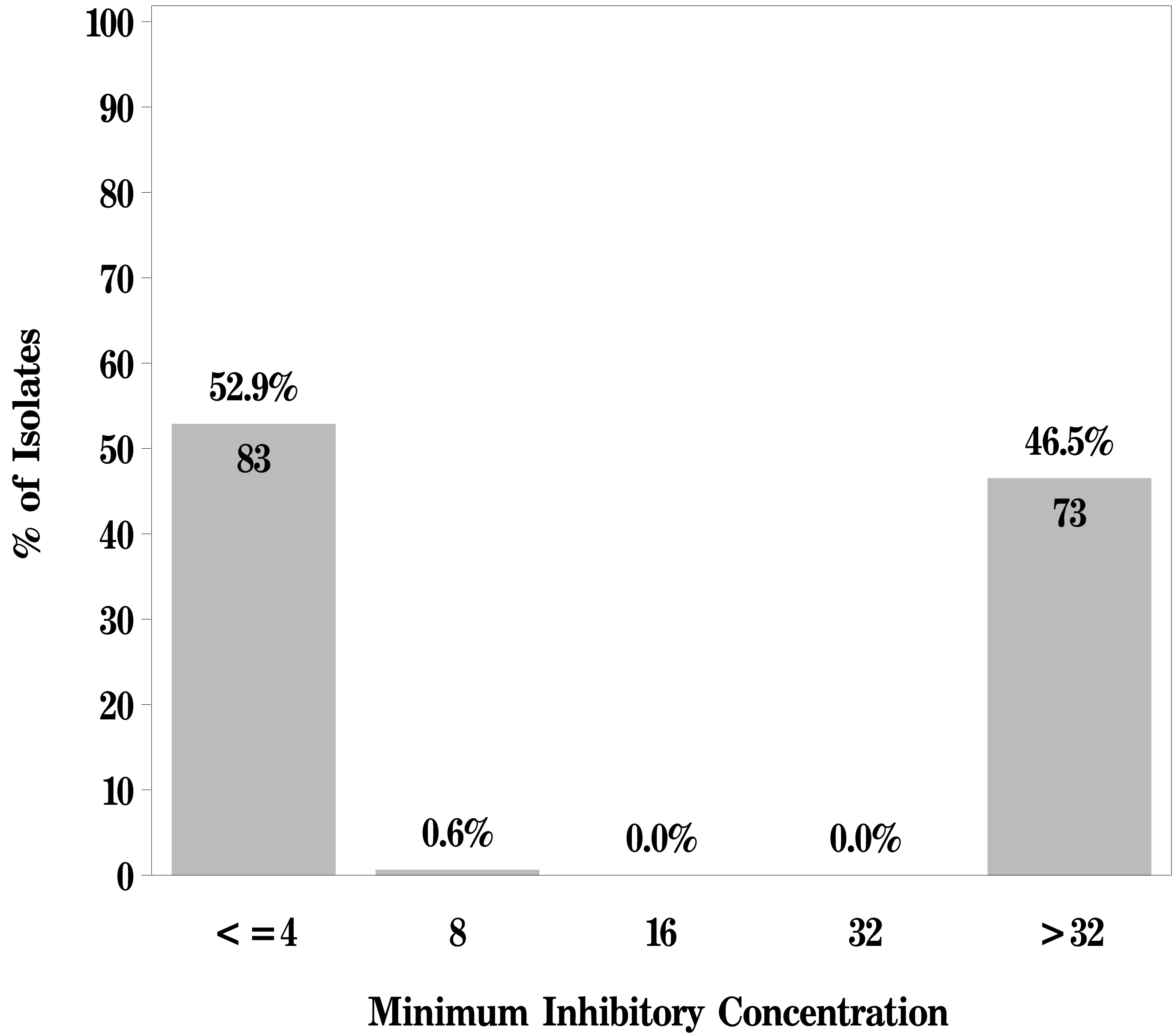
Figure 7n: Minimum Inhibitory Concentration of Tetracycline for *Salmonella* in Chicken Breast (N=157 Isolates)

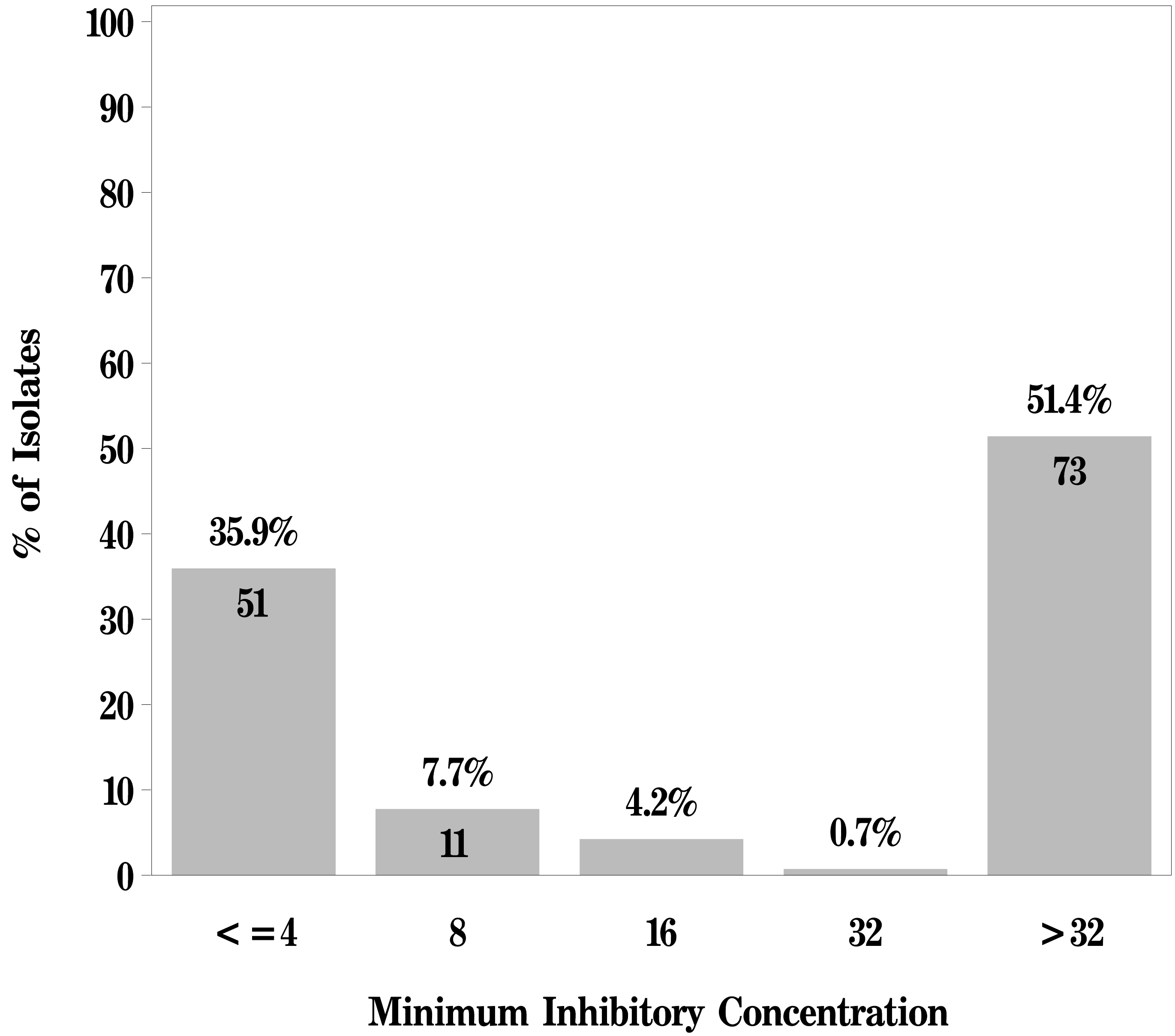
Breakpoints: Susceptible <=4 μg/mL Resistant >=16 μg/mL



NARMS

Figure 7n: Minimum Inhibitory Concentration of Tetracycline for *Salmonella* in Ground Turkey (N=142 Isolates)

Breakpoints: Susceptible <=4 µg/mL Resistant >=16 µg/mL



NARMS

Figure 7n: Minimum Inhibitory Concentration of Tetracycline for *Salmonella* in Ground Beef (N=14 Isolates)

Breakpoints: Susceptible <=4 μg/mL Resistant >=16 μg/mL

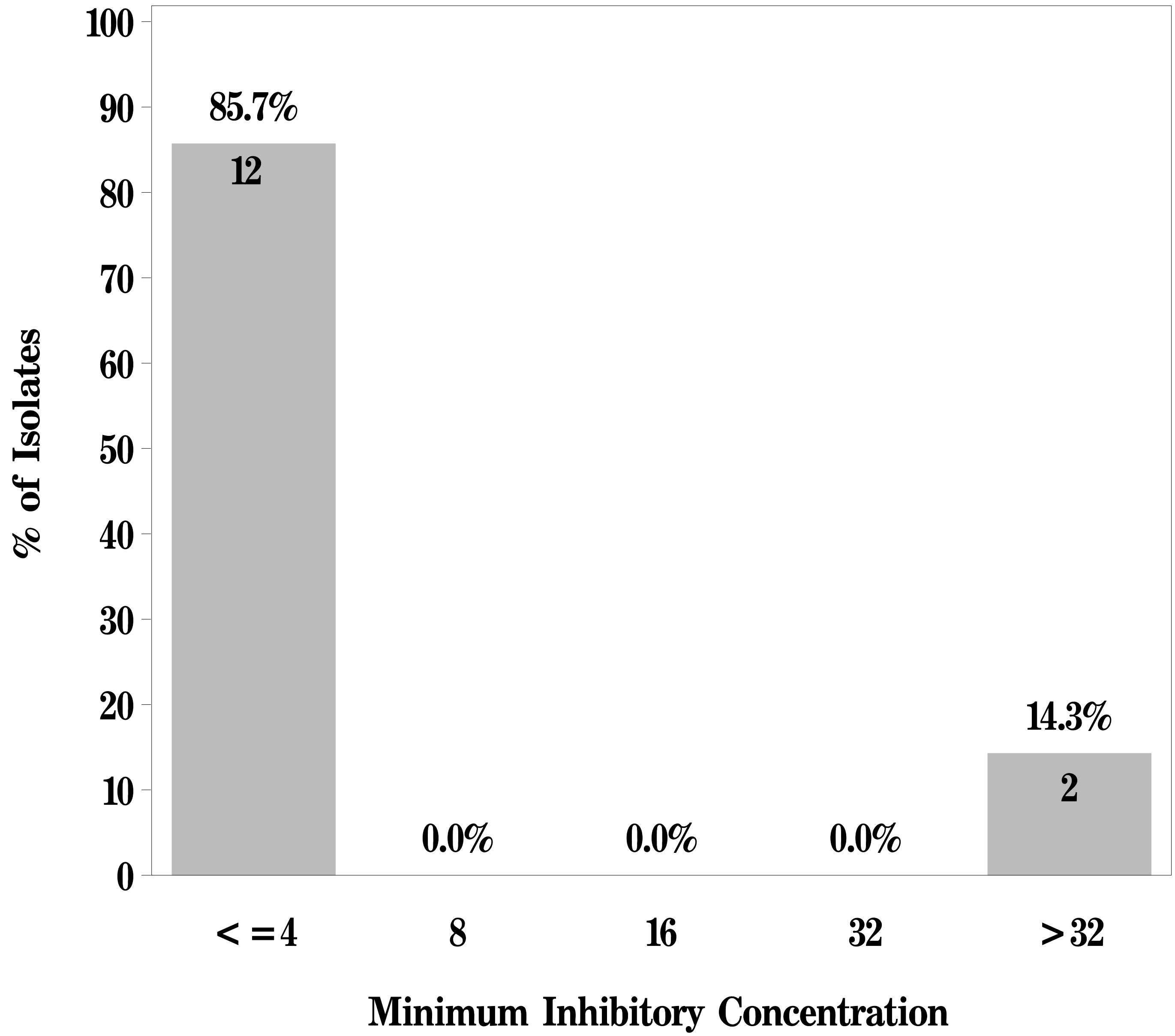


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Figure 7n: Minimum Inhibitory Concentration of Tetracycline for *Salmonella* in Pork Chop (N=11 Isolates)

Breakpoints: Susceptible <=4 μg/mL Resistant >=16 μg/mL

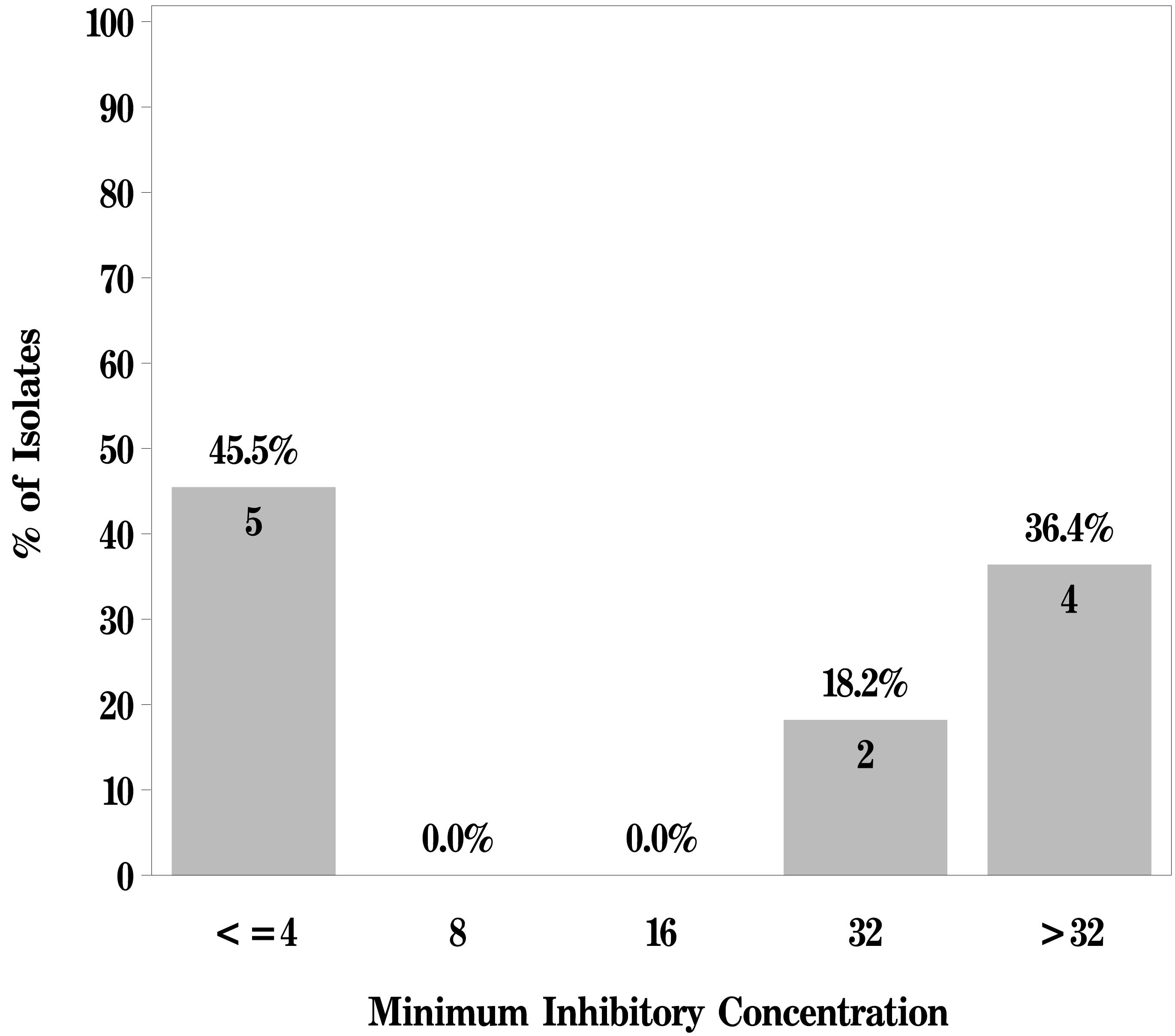

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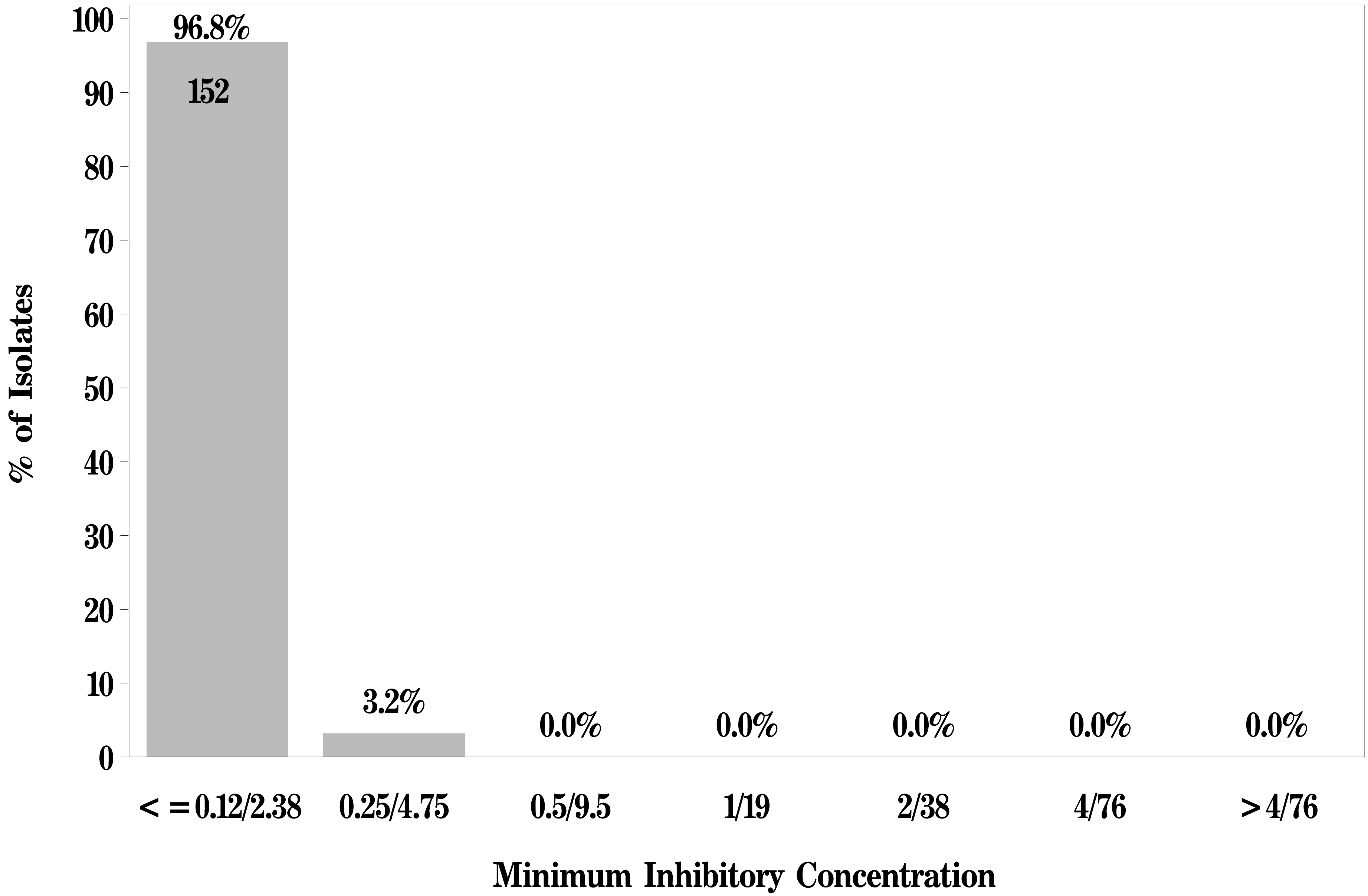
Figure 7o: Minimum Inhibitory Concentration of Trimethoprim/sulfamethoxazole for *Salmonella* in Chicken Breast (N=157 Isolates)

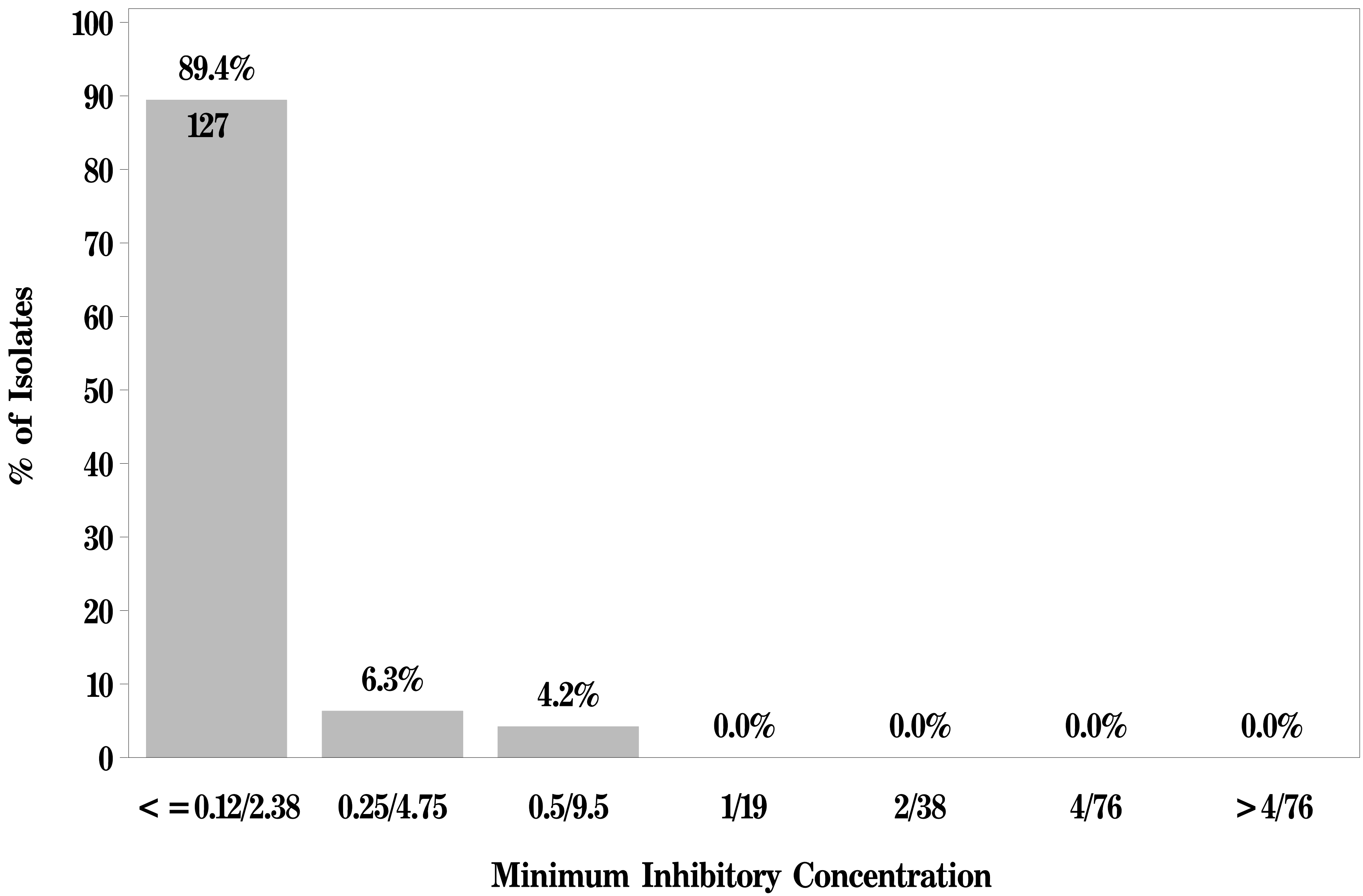
Breakpoints: Susceptible<=2 μg/mL Resistant>=4 μg/mL



NARMS

Figure 7o: Minimum Inhibitory Concentration of Trimethoprim/sulfamethoxazole for *Salmonella* in Ground Turkey (N=142 Isolates)

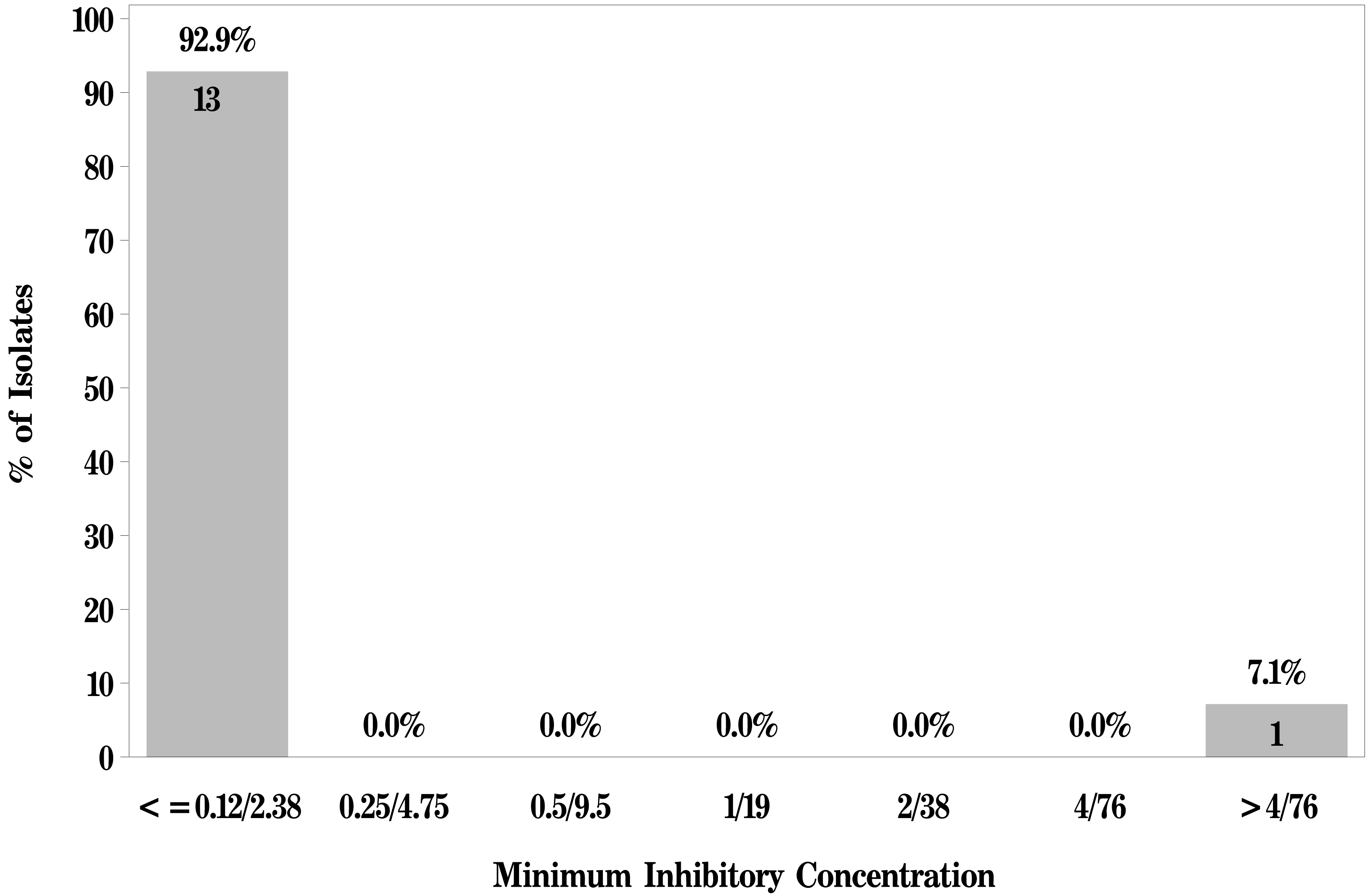
Breakpoints: Susceptible <=2 μg/mL Resistant >=4 μg/mL



NARMS

Figure 7o: Minimum Inhibitory Concentration of Trimethoprim/sulfamethoxazole for *Salmonella* in Ground Beef (N=14 Isolates)

Breakpoints: Susceptible<=2 μg/mL Resistant>=4 μg/mL



NARMS

Figure 7o: Minimum Inhibitory Concentration of Trimethoprim/sulfamethoxazole for *Salmonella* in Pork Chop (N=11 Isolates)

Breakpoints: Susceptible<=2 μg/mL Resistant>=4 μg/mL

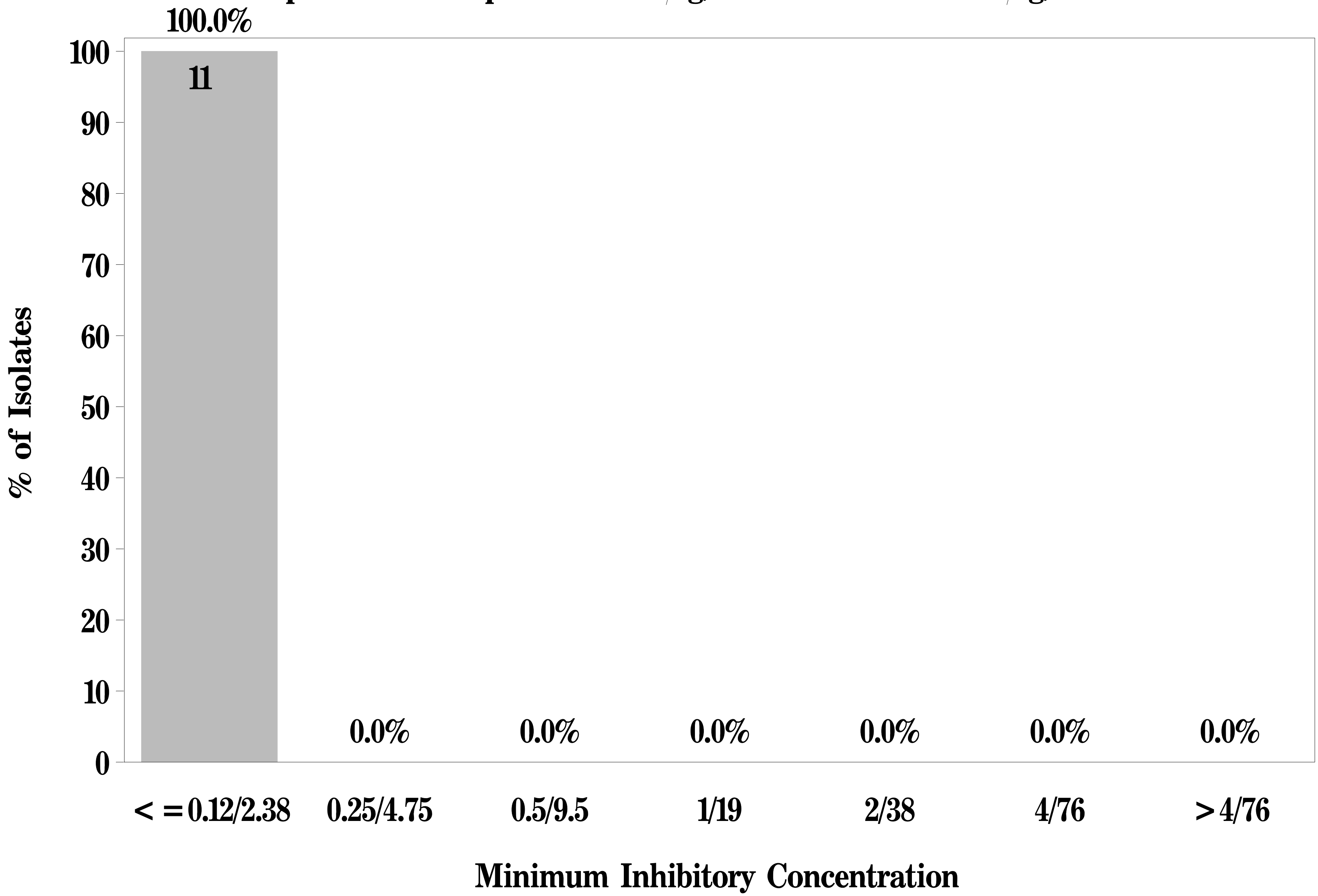


Table 11. Antimicrobial Resistance among *Salmonella* Isolates by Serotype, 2004

Serotype	Antimicrobial Agent														
	TET	STR	FIS	AMP	AMC	FOX	TIO	KAN	GEN	CHL	AXO	COT	AMI	CIP	NAL
S. Heidelberg (n=71)	43.7%*	33.8%	25.4%	18.3%	7.0%	7.0%	7.0%	15.5%	22.5%	4.2%	-	-	-	-	-
S. Typhimurium† (n=53)	73.6%	18.9%	75.5%	52.8%	45.3%	45.3%	45.3%	34.0%	1.9%	9.4%	-	-	-	-	-
S. Kentucky (n=43)	53.5%	51.2%	4.7%	27.9%	25.6%	25.6%	25.6%	2.3%	2.3%	-	-	-	-	-	-
S. Saintpaul (n=24)	58.3%	54.2%	54.2%	50.0%	16.7%	4.2%	4.2%	45.8%	37.5%	4.2%	-	-	-	-	-
S. Schwarzengrund (n=21)	28.6%	-‡	14.3%	4.8%	-	-	-	-	4.8%	-	-	-	-	-	-
S. Hadar (n=19)	94.7%	89.5%	-	5.3%	-	-	-	-	-	-	-	-	-	-	-
S. Reading (n=16)	6.3%	6.3%	6.3%	-	-	-	-	-	6.3%	-	-	-	-	-	-
S. Braenderup (n=11)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S. Muenster (n=10)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S. Agona (n=9)	88.9%	44.4%	55.6%	44.4%	22.2%	11.1%	11.1%	22.2%	11.1%	-	-	-	-	-	-
S. III 18a: z4, z32: - (n=6)	83.3%	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S. Berta (n=5)	-	-	-	60.0%	-	-	-	-	-	-	-	-	-	-	-
S. Montevideo (n=5)	-	40.0%	-	-	-	-	-	20.0%	60.0%	-	-	-	-	-	-
S. Mbandaka (n=4)	100.0%	-	25.0%	25.0%	-	-	-	-	-	-	-	-	-	-	-
S. Newport (n=4)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	-	-	50.0%	25.0%	25.0%	-	-	-
S. I 4, 12 : i : - (n=4)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S. Derby (n=3)	100.0%	-	-	66.7%	66.7%	66.7%	66.7%	-	-	-	-	-	-	-	-
S. Enteritidis (n=3)	33.3%	-	33.3%	33.3%	33.3%	33.3%	33.3%	-	-	-	-	-	-	-	-
S. III 18a: z4, z23: - (n=2)	-	50.0%	50.0%	-	-	-	-	-	50.0%	-	-	-	-	-	-
S. I 4, 12 : r : - (n=2)	100.0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S. Senftenberg (n=2)	50.0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S. Bredeney (n=1)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	-	100.0%	-	-	-	-	-	-
S. Dublin (n=1)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S. Livingstone (n=1)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S. Minnesota (n=1)	100.0%	100.0%	100.0%	-	-	-	-	100.0%	-	-	-	-	-	-	-
S. Muenchen (n=1)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S. I 4, 12 : d :- (n=1)	100.0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S. Urbana (n=1)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
• **Total (N=324)**	**49.7%**	**30.2%**	**27.5%**	**25.0%**	**16.0%**	**14.8%**	**14.8%**	**13.9%**	**10.8%**	**3.4%**	**0.3%**	**0.3%**	**0.0%**	**0.0%**	**0.0%**

* Where % Resistance = (# isolates per serotype resistant to antimicrobial) / (total # isolates per serotype).
† Includes Typhimurium var. 5-.
‡ Where dashes indicate 0.0% resistance to antimicrobial.

Table 12. Antimicrobial Resistance among *Salmonella* by Meat Type in Overall Top 6 Serotypes, 2004

Meat Type	Serotype	Antimicrobial Agent														
		TET	STR	FIS	AMP	AMC	FOX	TIO	KAN	GEN	CHL	AXO	COT	AMI	CIP	NAL
Chicken Breast	*S.* Heidelberg (n=31)	6.5%[*]	22.6%	12.9%	25.8%	9.7%	9.7%	9.7%	-	9.7%	3.2%	-	-	-	-	-
	S. Typhimurium[†] (n=49)	71.4%	14.3%	73.5%	53.1%	49.0%	49.0%	49.0%	34.7%	2.0%	4.1%	-	-	-	-	-
	S. Kentucky (n=42)	54.8%	52.4%	4.8%	28.6%	26.2%	26.2%	26.2%	2.4%	2.4%	-	-	-	-	-	-
	S. Saintpaul (n=0)	[‡]														
	S. Schwarzengrund (n=5)	-	-	20.0%	-	-	-	-	-	-	-	-	-	-	-	-
	S. Hadar (n=8)	87.5%	87.5%	-	-	-	-	-	-	-	-	-	-	-	-	-
Ground Turkey	*S.* Heidelberg (n=37)	70.3%	43.2%	37.8%	13.5%	5.4%	5.4%	5.4%	27.0%	35.1%	5.4%	-	-	-	-	-
	S. Typhimurium (n=2)	100.0%	50.0%	100.0%	50.0%	-	-	-	50.0%	-	50.0%	-	-	-	-	-
	S. Kentucky (n=1)	-[§]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S. Saintpaul (n=24)	58.3%	54.2%	54.2%	50.0%	16.7%	4.2%	4.2%	45.8%	37.5%	4.2%	-	-	-	-	-
	S. Schwarzengrund (n=16)	37.5%	-	12.5%	6.3%	-	-	-	-	6.3%	-	-	-	-	-	-
	S. Hadar (n=11)	100.0%	90.9	-	9.1%	-	-	-	-	-	-	-	-	-	-	-
Ground Beef	*S.* Heidelberg (n=0)															
	S. Typhimurium (n=0)															
	S. Kentucky (n=0)															
	S. Saintpaul (n=0)															
	S. Schwarzengrund (n=0)															
	S. Hadar (n=0)															
Pork Chop	*S.* Heidelberg (n=3)	100.0%	33.3%	-	-	-	-	-	33.3%	-	-	-	-	-	-	-
	S. Typhimurium (n=2)	100.0%	100.0%	100.0%	50.0%	-	-	-	-	-	100.0%	-	-	-	-	-
	S. Kentucky (n=0)															
	S. Saintpaul (n=0)															
	S. Schwarzengrund (n=0)															
	S. Hadar (n=0)															

[*] Where % Resistance= (# isolates per serotype resistant to antimicrobial) / (total # isolates per serotype).

[†] Includes Typhimurium var. 5-.

[‡] Grey areas indicate serotype not isolated from that meat type.

[§] Where dashes indicate 0.0% resistance to antimicrobial.

Table 13. Antimicrobial Resistance among *Salmonella* by Top 6 Serotypes within Meat Type, 2004

Meat Type	Serotype	Antimicrobial Agent														
		TET	STR	FIS	AMP	AMC	FOX	TIO	KAN	GEN	CHL	AXO	COT	AMI	CIP	NAL
Chicken Breast	*S.* Typhimurium[*] (n=49)	71.4%[†]	14.3%	73.5%	53.1%	49.0%	49.0%	49.0%	34.7%	2.0%	4.1%	-	-	-	-	-
	S. Kentucky (n=42)	54.8%	52.4%	4.8%	28.6%	26.2%	26.2%	26.2%	2.4%	2.4%	-	-	-	-	-	-
	S. Heidelberg (n=31)	6.5%	22.6%	12.9%	25.8%	9.7%	9.7%	9.7%	-	9.7%	3.2%	-	-	-	-	-
	S. Hadar (n=8)	87.5%	87.5%	-	-	-	-	-	-	-	-	-	-	-	-	-
	S. Schwarzengrund (n=5)	-[‡]	-	20.0%	-	-	-	-	-	-	-	-	-	-	-	-
	S. I 4, 12 : i : - (n=4)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ground Turkey	*S.* Heidelberg (n=37)	70.3%	43.2%	37.8%	13.5%	5.4%	5.4%	5.4%	27.0%	35.1%	5.4%	-	-	-	-	-
	S. Saintpaul (n=24)	58.3%	54.2%	54.2%	50.0%	16.7%	4.2%	4.2%	45.8%	37.5%	4.2%	-	-	-	-	-
	S. Schwarzengrund (n=16)	37.5%	-	12.5%	6.3%	-	-	-	-	6.3%	-	-	-	-	-	-
	S. Reading (n=16)	6.3%	6.3%	6.3%	-	-	-	-	-	6.3%	-	-	-	-	-	-
	S. Hadar (n=11)	100.0%	90.9%	-	9.1%	-	-	-	-	-	-	-	-	-	-	-
	S. Agona (n=6)	100.0%	66.7%	83.3%	66.7%	33.3%	16.73%	16.7%	33.3%	16.7%	-	-	-	-	-	-
Ground Beef	*S.* Muenster (n=5)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S. Braenderup (n=5)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S. Newport (n=2)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	-	-	100.0%	50.0%	50.0%	-	-	-
	S. Berta (n=1)	-	-	-	100.0%	-	-	-	-	-	-	-	-	-	-	-
	S. Dublin (n=1)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	[§]															
Pork Chop	*S.* Braenderup (n=5)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S. Heidelberg (n=3)	100.0%	33.3%	-	-	-	-	-	33.3%	-	-	-	-	-	-	-
	S. Typhimurium (n=2)	100.0%	100.0%	100.0%	50.0%	-	-	-	-	-	100.0%	-	-	-	-	-
	S. Agona (n=1)	100.0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-

[*] Includes Typhimurium var. 5-.
[†] Where % Resistance= (# isolates per serotype resistant to antimicrobial) / (total # isolates per serotype).
[‡] Where dashes indicate 0.0% resistance to antimicrobial.
[§] Grey areas indicate six serotypes not recovered from meat type.

Table 14. Antimicrobial Resistance among *Salmonella* by Site, Meat Type, and Antimicrobial Agent, 2004

Site	Meat Type	Antimicrobial Agent														
		TET	**STR**	**FIS**	**AMP**	**AMC**	**FOX**	**TIO**	**KAN**	**GEN**	**CHL**	**AXO**	**COT**	**AMI**	**CIP**	**NAL**
CA	CB (n=17)	11.8%*	11.8%	11.8%	5.9%	-	-	-	-	11.8%	-	-	-	-	-	-
	GT (n=9)	44.4%	55.6%	44.4%	22.2%	-	-	-	11.1%	22.2%	11.1%	-	-	-	-	-
	GB (n=1)	-†	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	PC (n=1)	100.0%	100.0%	100.0%	-	-	-	-	-	-	100.0%	-	-	-	-	-
	Total (n=28)	**25.0%**	**28.6%**	**25.0%**	**10.7%**	**0.0%**	**0.0%**	**0.0%**	**3.6%**	**14.3%**	**7.1%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**
CO	CB (n=0)	‡														
	GT (n=9)	55.6%	33.3%	33.3%	11.1%	-	-	-	11.1%	22.2%	-	-	-	-	-	-
	GB (n=0)															
	PC (n=0)															
	Total (n=28)	**55.6%**	**33.3%**	**33.3%**	**11.1%**	**0.0%**	**0.0%**	**0.0%**	**11.1%**	**22.2%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**
CT	CB (n=30)	83.3%	36.7%	70.0%	53.3%	46.7%	46.7%	46.7%	23.3%	3.3%	6.7%	-	-	-	-	-
	GT (n=26)	61.5%	15.4%	23.1%	15.4%	11.5%	3.8%	3.8%	15.4%	15.4%	-	-	-	-	-	-
	GB (n=5)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	PC (n=5)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total (n=66)	**62.1%**	**22.7%**	**40.9%**	**30.3%**	**25.8%**	**22.7%**	**22.7%**	**16.7%**	**7.6%**	**3.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**
GA	CB (n=6)	50.0%	33.3%	33.3%	33.3%	-	-	-	-	16.7%	-	-	-	-	-	-
	GT (n=38)	57.9%	42.1%	36.8%	18.4%	5.3%	-	-	31.6%	28.9%	-	-	-	-	-	-
	GB (n=1)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	-	-	100.0%	100.0%	-	-	-	-
	PC (n=0)															
	Total (n=45)	**57.8%**	**42.2%**	**37.8%**	**22.2%**	**6.7%**	**2.2%**	**2.2%**	**26.7%**	**26.7%**	**2.2%**	**2.2%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**
MD	CB (n=24)	62.5%	20.8%	50.0%	45.8%	45.8%	45.8%	45.8%	25.0%	4.2%	-	-	-	-	-	-
	GT (n=13)	23.1%	-	7.7%	38.5%	15.4%	15.4%	15.4%	-	7.7%	-	-	-	-	-	-
	GB (n=1)	-	-	-	100.0%	-	-	-	-	-	-	-	-	-	-	-
	PC (n=0)															
	Total (n=38)	**47.4%**	**13.2%**	**34.2%**	**44.7%**	**34.2%**	**34.2%**	**34.2%**	**15.8%**	**5.3%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**

* Where % Resistance = (# isolates resistant to antimicrobial per meat type per site) / (total # isolates per meat type per site).

† Where dashes indicate 0.0% resistance to antimicrobial.

‡ Grey areas indicate no isolates from meat type for that site.

Table 14$_{(cont'd)}$. Percent Resistance among *Salmonella* Isolates by Site, Meat Type, and Antimicrobial Agent, 2004

Site	Meat Type	Antimicrobial Agent														
		TET	**STR**	**FIS**	**AMP**	**AMC**	**FOX**	**TIO**	**KAN**	**GEN**	**CHL**	**AXO**	**COT**	**AMI**	**CIP**	**NAL**
MN	CB (n=20)	15.0%	5.0%	-	25.0%	5.0%	5.0%	5.0%	-	-	-	-	-	-	-	-
	GT (n=14)	50.0%	35.7%	14.3%	-	-	-	-	7.1%	14.3%	-	-	-	-	-	-
	GB (n=0)															
	PC (n=0)															
	Total (n=34)	**29.4%**	**17.6%**	**5.9%**	**14.7%**	**2.9%**	**2.9%**	**2.9%**	**2.9%**	**5.9%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**
NM	CB (n=3)	33.3%	66.7%	33.3%	-	-	-	-	-	-	-	-	-	-	-	-
	GT (n=9)	44.4%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	22.2%	33.3%	33.3%	-	-	-	-	-
	GB (n=0)															
	PC (n=0)															
	Total (n=12)	**41.7%**	**41.7%**	**33.3%**	**25.0%**	**25.0%**	**25.0%**	**25.0%**	**16.7%**	**25.0%**	**25.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**
NY	CB (n=16)	93.8%	56.3%	31.3%	68.8%	68.8%	68.8%	68.8%	18.8%	-	-	-	-	-	-	-
	GT (n=11)	72.7%	54.5%	36.4%	45.5%	9.1%	9.1%	9.1%	36.4%	27.3%	-	-	-	-	-	-
	GB (n=0)															
	PC (n=3)	100.0%	66.7%	33.3%	33.3%	-	-	-	33.3%	-	33.3%	-	-	-	-	-
	Total (n=30)	**86.7%**	**56.7%**	**33.3%**	**56.7%**	**40.0%**	**40.0%**	**40.0%**	**26.7%**	**10.0%**	**3.3%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**
OR	CB (n=25)	28.0%	28.0%	8.0%	8.0%	8.0%	8.0%	8.0%	-	4.0%	4.0%	-	-	-	-	-
	GT (n=6)	66.7%	16.7%	33.3%	33.3%	-	-	-	16.7%	16.7%	-	-	-	-	-	-
	GB (n=6)	16.7%	16.7%	16.7%	16.7%	16.7%	16.7%	16.7%	-	-	16.7%	-	16.7%	-	-	-
	PC (n=2)	100.0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total (n=39)	**35.9%**	**23.1%**	**12.8%**	**12.8%**	**7.7%**	**7.7%**	**7.7%**	**2.6%**	**5.1%**	**5.1%**	**0.0%**	**2.6%**	**0.0%**	**0.0%**	**0.0%**
TN	CB (n=16)	12.5%	37.5%	-	-	-	-	-	12.5%	-	-	-	-	-	-	-
	GT (n=7)	100.0%	71.4%	14.3%	-	-	-	-	-	-	-	-	-	-	-	-
	GB (n=0)															
	PC (n=0)															
	Total (n=23)	**39.1%**	**47.8%**	**4.3%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**8.7%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**
	Total %R (N=324)	**49.7%**	**30.2%**	**27.5%**	**25.0%**	**16.0%**	**14.8%**	**14.8%**	**13.9%**	**10.8%**	**3.4%**	**0.3%**	**0.3%**	**0.0%**	**0.0%**	**0.0%**

Table 15. Number of *Salmonella* (N=324) Resistant to Multiple Antimicrobial Agents, 2004

Meat Type	Number of Antimicrobials				
	0	**1**	**2-4**	**5-7**	**≥8**
Chicken Breast	63	16	42	33	3
Ground Turkey	41	43	35	19	4
Ground Beef	11	1	0	0	2
Pork Chop	5	3	2	1	0
Total	**120**	**63**	**79**	**53**	**9**

Table 16. Overall *Campylobacter* Species Identified, 2004

Species	N
C. coli	204
C. jejuni	517
Total	**721**

Table 17. *Campylobacter* Species by Meat Type, 2004

Species	Chicken Breast		Ground Turkey		Ground Beef		Pork Chop	
	n	***%*** [*]	***n***	***%***	***n***	***%***	***n***	***%***
C. coli **(n=204)**	196	96.1%	5	2.5%	0	- [†]	3	1.5%
C. jejuni **(n=517)**	510	98.6%	7	1.4%	0	-	0	-
Total (N=721)	**706**	**97.9%**	**12**	**1.7%**	**0**	**0.0%**	**3**	**0.4%**

[*] Where % = (# of isolates per species per meat type) / (total # of isolates per species).

[†] Dashes indicate no isolates from that species per meat type.

Table 18. *Campylobacter* Species by Site and Meat Type*, 2004

Site	Species	Chicken Breast		Ground Turkey		Pork Chop	
		n	%†	n	%	n	%
CA	*C. coli* (n=13)	12	92.3%	0	-‡	1	7.7%
	C. jejuni (n=84)	84	100.0%	0	-	0	-
	Total (n=97)	**96**	**99.0%**	**0**	**-**	**1**	**1.0%**
CO	*C. coli* (n=11)	11	100.0%	0	-	0	-
	C. jejuni (n=10)	10	100.0%	0	-	0	-
	Total (n=21)	**21**	**100.0%**	**0**	**-**	**0**	**-**
CT	*C. coli* (n=17)	16	94.1%	0	-	1	5.9%
	C. jejuni (n=72)	70	97.2%	2	2.8%	0	-
	Total (n=89)	**86**	**96.6%**	**2**	**2.2%**	**1**	**1.1%**
GA	*C. coli* (n=25)	25	100.0%	0	-	0	-
	C. jejuni (n=37)	36	97.3%	1	2.7%	0	-
	Total (n=62)	**61**	**98.4%**	**1**	**1.6%**	**0**	**-**
MD	*C. coli* (n=26)	26	100.0%	0	-	0	-
	C. jejuni (n=52)	50	96.2%	2	3.8%	0	-
	Total (n=78)	**76**	**97.4%**	**2**	**2.6%**	**0**	**-**
MN	*C. coli* (n=18)	13	72.2%	5	27.8%	0	-
	C. jejuni (n=61)	60	98.4%	1	1.6%	0	-
	Total (n=79)	**73**	**92.4%**	**6**	**7.6%**	**0**	**-**
NM	*C. coli* (n=23)	22	95.7%	0	-	1	4.3%
	C. jejuni (n=31)	31	100.0%	0	-	0	-
	Total (n=54)	**53**	**98.1%**	**0**	**-**	**1**	**1.9%**
NY	*C. coli* (n=39)	39	100.0%	0	-	0	-
	C. jejuni (n=57)	57	100.0%	0	-	0	-
	Total (n=96)	**96**	**100.0%**	**0**	**-**	**0**	**-**
OR	*C. coli* (n=5)	5	100.0%	0	-	0	-
	C. jejuni (n=68)	68	100.0%	0	-	0	-
	Total (n=73)	**73**	**100.0%**	**0**	**-**	**0**	**-**
TN	*C. coli* (n=27)	27	100.0%	0	-	0	-
	C. jejuni (n=45)	44	97.8%	1	2.2%	0	-
	Total (n=72)	**71**	**98.6%**	**1**	**1.4%**	**0**	**-**
Grand Total (N=721)		**706**	**97.9%**	**12**	**1.7%**	**3**	**0.4%**

* No *Campylobacter* recovered from ground beef.
† Where % = (# isolates per species per meat type per site) / (total # isolates per species per site).
‡ Dashes indicate no isolates from that species per meat type isolated from that site.

Table 19. *Campylobacter* Isolates by Month for All Sites, 2004

Month	n	%*
January	61	8.5%
February	59	8.2%
March	49	6.8%
April	35	4.9%
May	51	7.1%
June	62	8.6%
July	67	9.3%
August	62	8.6%
September	73	10.1%
October	74	10.3%
November	64	8.9%
December	64	8.9%
Total (N)	**721**	**100.0%**

* Where % = (n/N).

Table 20. Antimicrobial Resistance among *Campylobacter* Isolates (N=721), 2004

Antimicrobial Agent	n	%R*
Tetracycline	352	48.8%
Nalidixic Acid	111	15.4%
Ciprofloxacin	111	15.4%
Azithromycin	23	3.2%
Erythromycin	23	3.2%
Telithromycin	18	2.5%
Clindamycin	17	2.4%
Florfenicol	0	0.0%
Gentamicin	0	0.0%

* Where %R = (n/N).

Figure 8. Antimicrobial Resistance among *Campylobacter* isolates (n =721), 2004

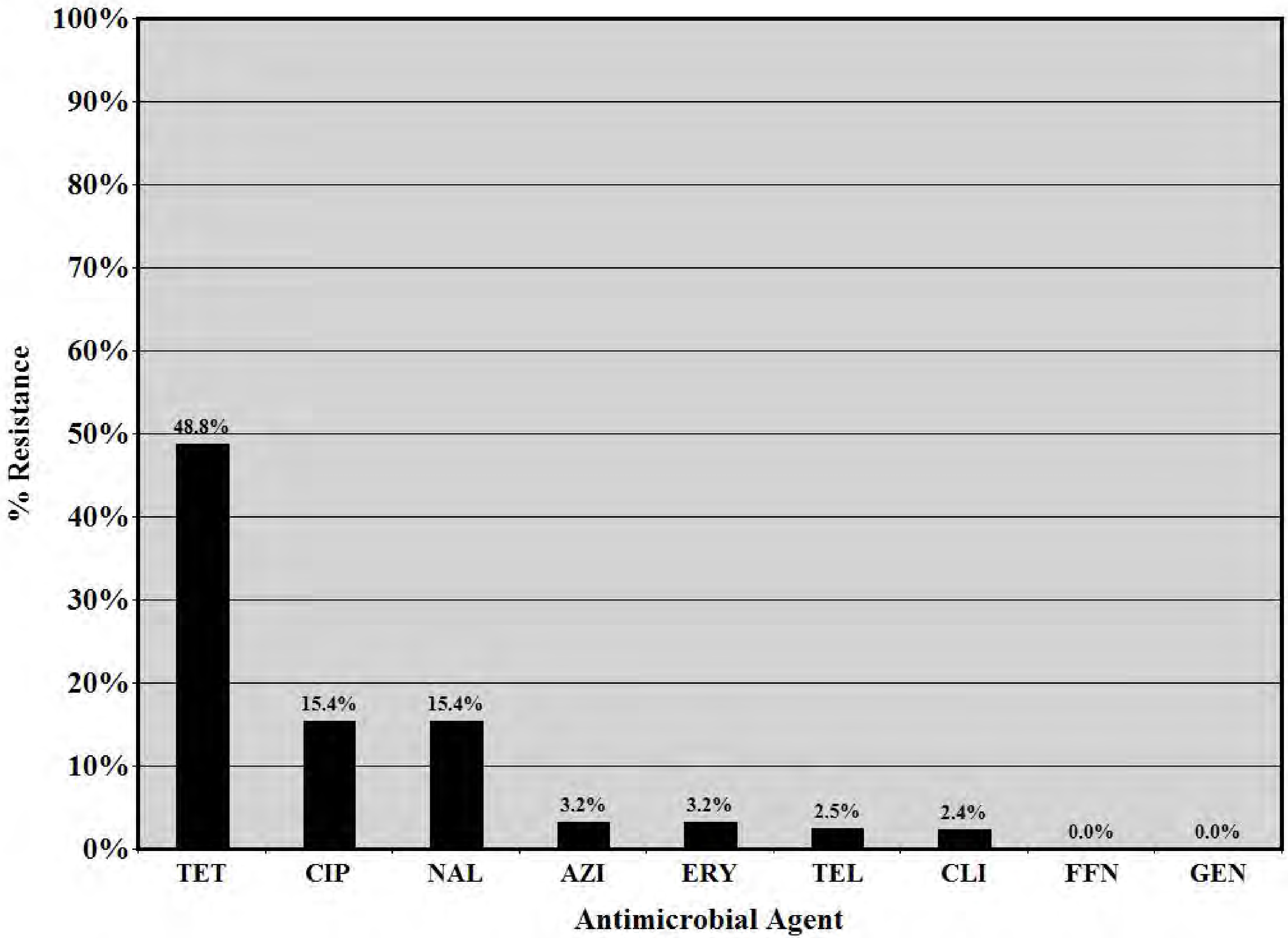


Figure 9. MIC Distribution among all Antimicriobial Agents, 2004

Campylobacter from All Meats (N=721)		Distribution (%) of MICs (in µg/ml)													
Antimicrobial Agent	**%R[†]**	**0.015**	**0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**>64**
Nalidixic Acid*	**15.5%**									58.9	25.0	0.6	**0.1**	**1.2**	**14.1**
Ciprofloxacin	**15.4%**		0.1	34.8	37.7	11.8		0.1		**0.3**	**6.9**	**6.7**	**1.5**		
Azithromycin*	**3.2%**	3.7	39.1	39.4	12.6	1.0	0.3	0.6	0.1						**3.2**
Clindamycin*	**2.4%**		0.4	7.6	44.9	35.5	5.4	2.8	0.4	0.6	**0.8**	**1.5**			
Erythromycin	**3.2%**			0.3	2.2	43.8	30.0	17.6	2.4	0.4	0.1				**3.2**
Telithromycin*	**2.5%**	0.3		0.3	0.4	15.1	41.7	23.3	13.2	2.1	**1.1**	**2.5**			
Gentamicin*	**0.0%**				1.4	4.9	84.6	9.2							
Florfenicol*	**§**				0.4		4.3	78.8	16.0	0.6					
Tetracycline	**48.8%**			0.4	19.1	16.9	8.3	4.3	1.8	0.1	0.1	**1.5**	**3.7**	**19.1**	**24.4**

[†]Discrepancies between %R and sums of distribution %s are due to rounding.

Vertical bars show the CLSI Susceptible/Resistant breakpoints for each drug.

Unshaded areas indicate the dilution ranges used to test the 2004 isolates.

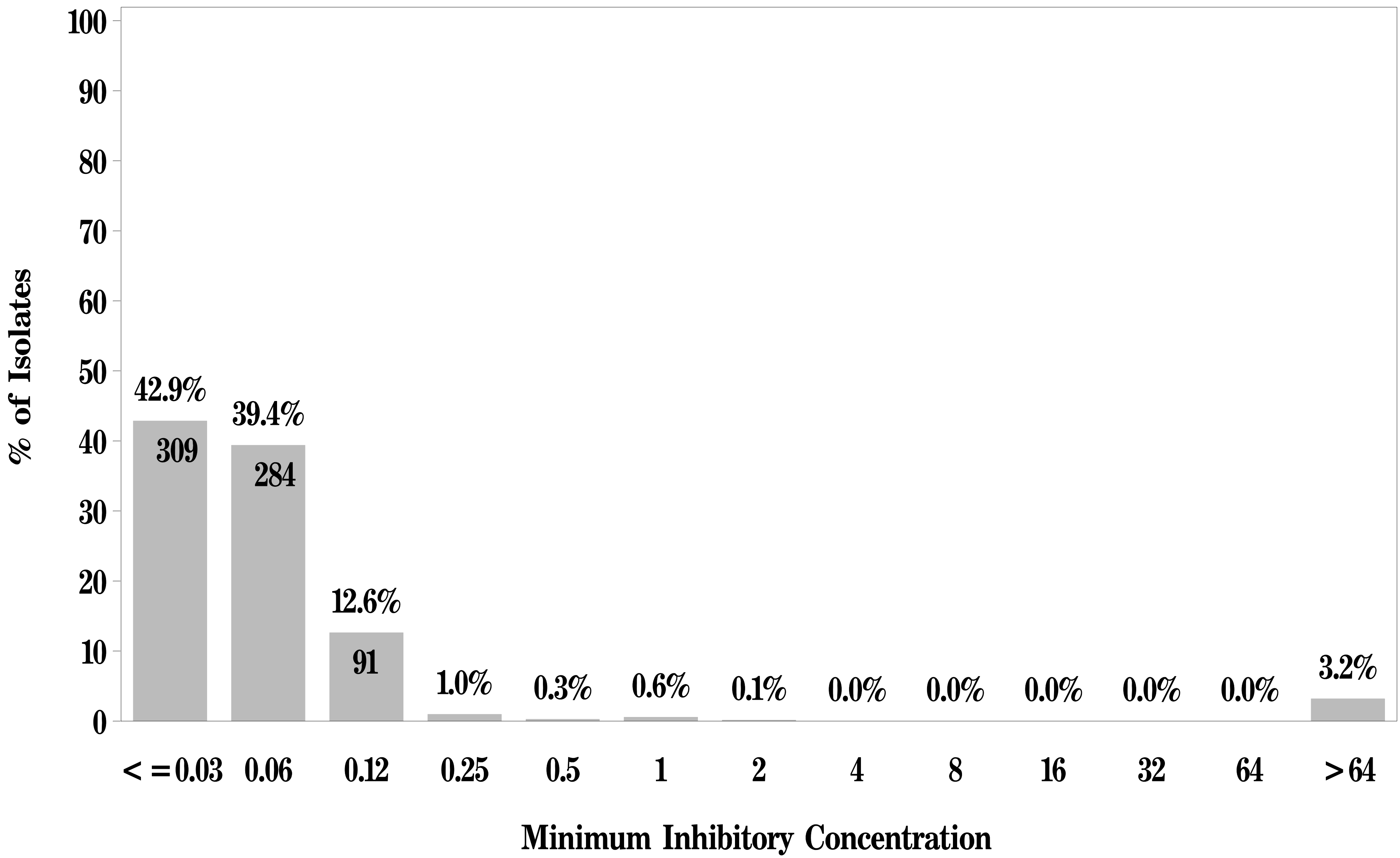
*Currently no CLSI breakpoints have been established for this organism/antimicrobial combination. Indicated breakpoints were established by NARMS.

§Absence of resistant strains precludes defining any results category other than "susceptible."

NARMS

Figure 9a: Minimum Inhibitory Concentration of Azithromycin for *Campylobacter* (N=721 Isolates)

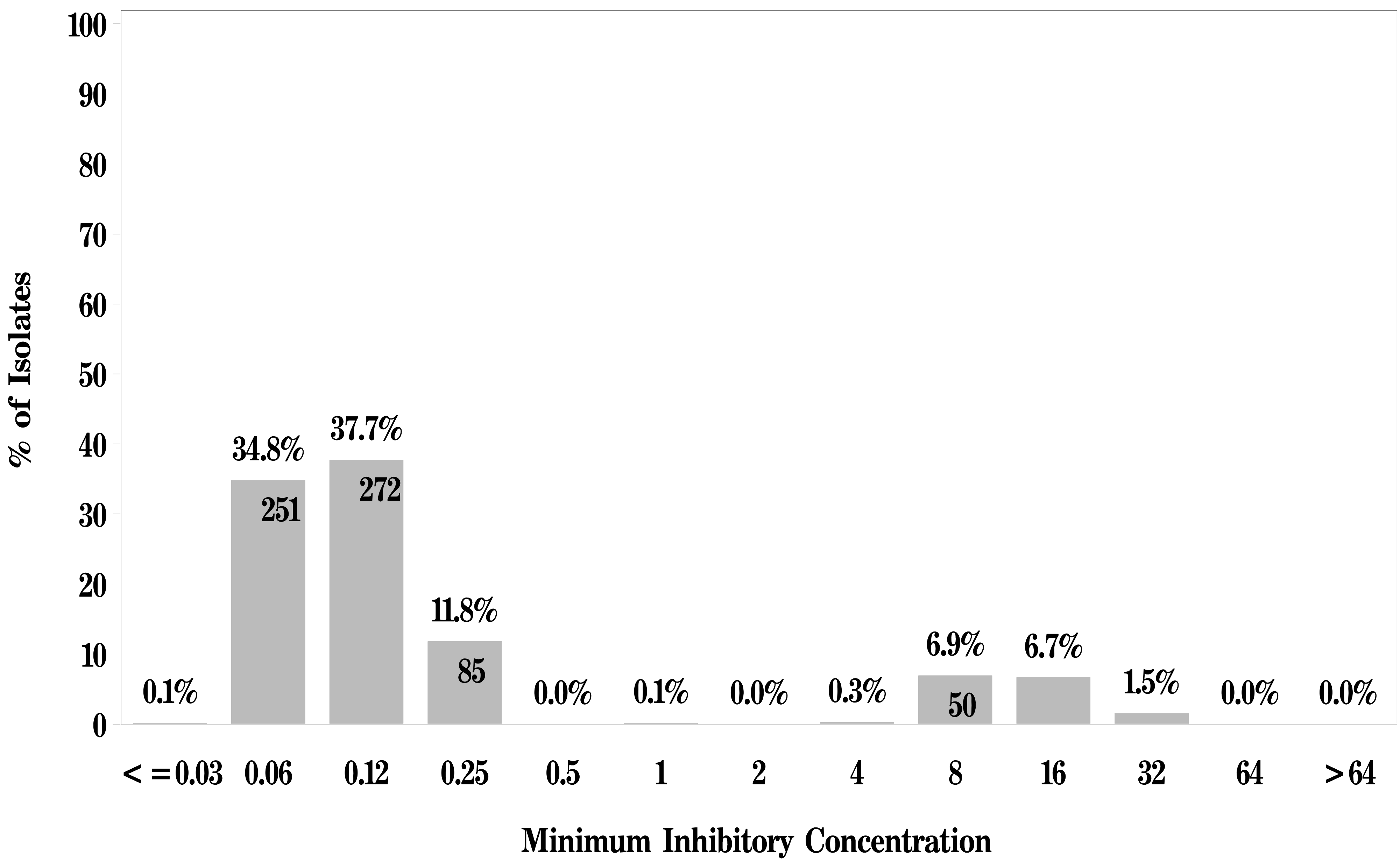
Breakpoints: Susceptible <=2 μg/mL Resistant >=8 μg/mL



NARMS

Figure 9b: Minimum Inhibitory Concentration of Ciprofloxacin for *Campylobacter* (N=721 Isolates)

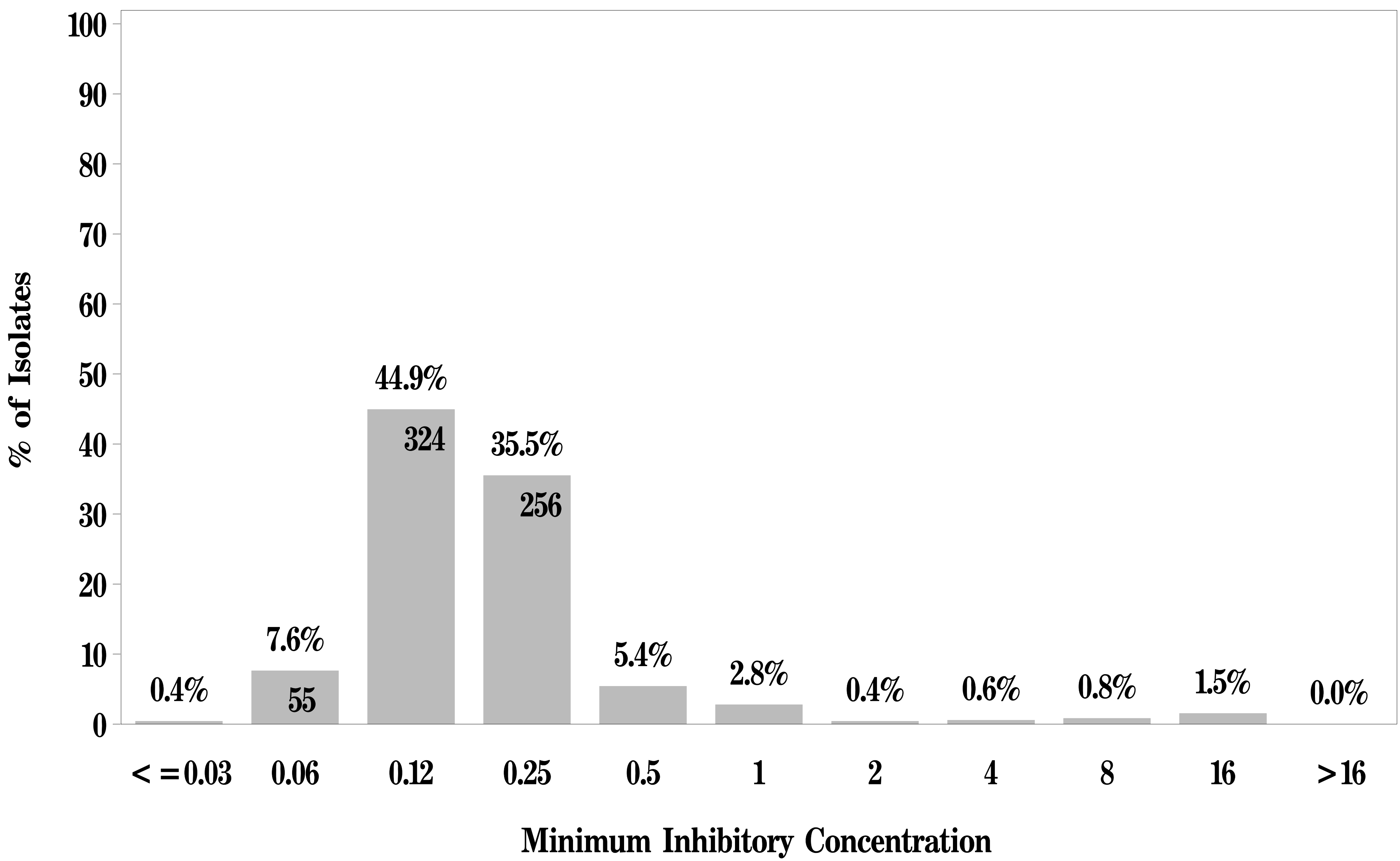
Breakpoints: Susceptible <=1 μg/mL Resistant >=4 μg/mL



NARMS

Figure 9c: Minimum Inhibitory Concentration of Clindamycin for *Campylobacter* (N=721 Isolates)

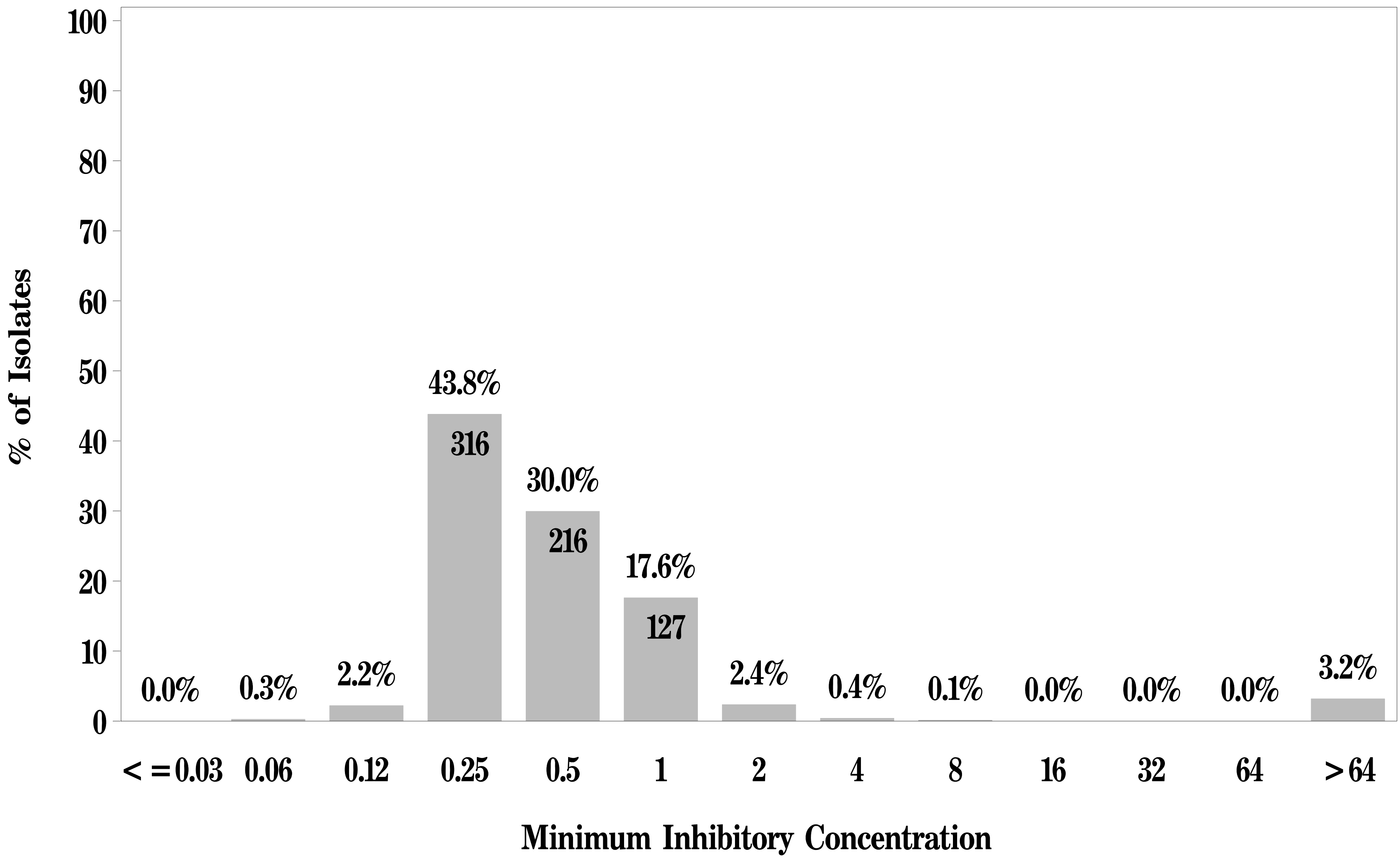
Breakpoints: Susceptible <=2 μg/mL Resistant >=8 μg/mL



NARMS

Figure 9d: Minimum Inhibitory Concentration of Erythromycin for *Campylobacter* (N=721 Isolates)

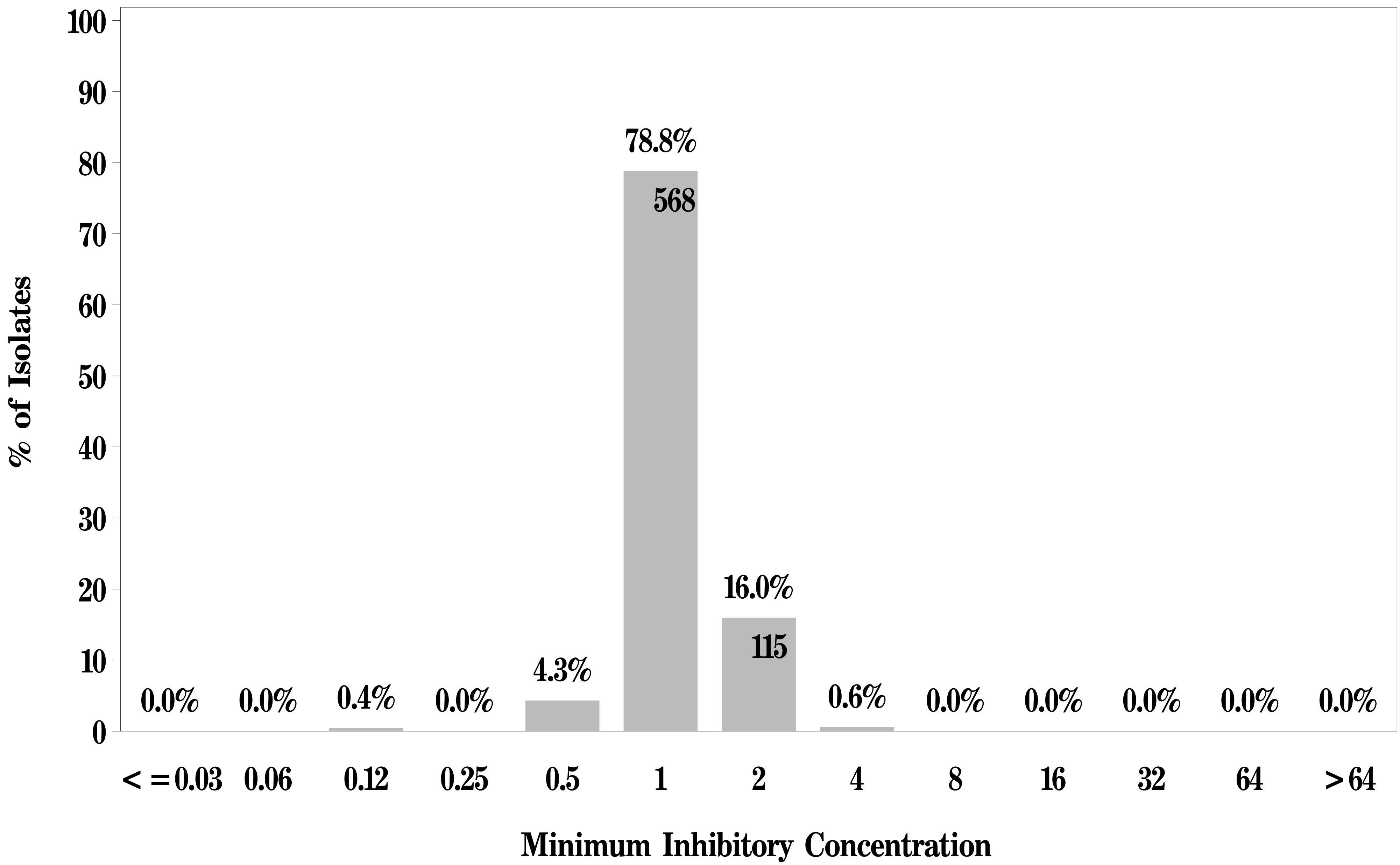
Breakpoints: Susceptible <=8 μg/mL Resistant >=32 μg/mL



NARMS

Figure 9e: Minimum Inhibitory Concentration of Florfenicol for *Campylobacter* (N=721 Isolates)

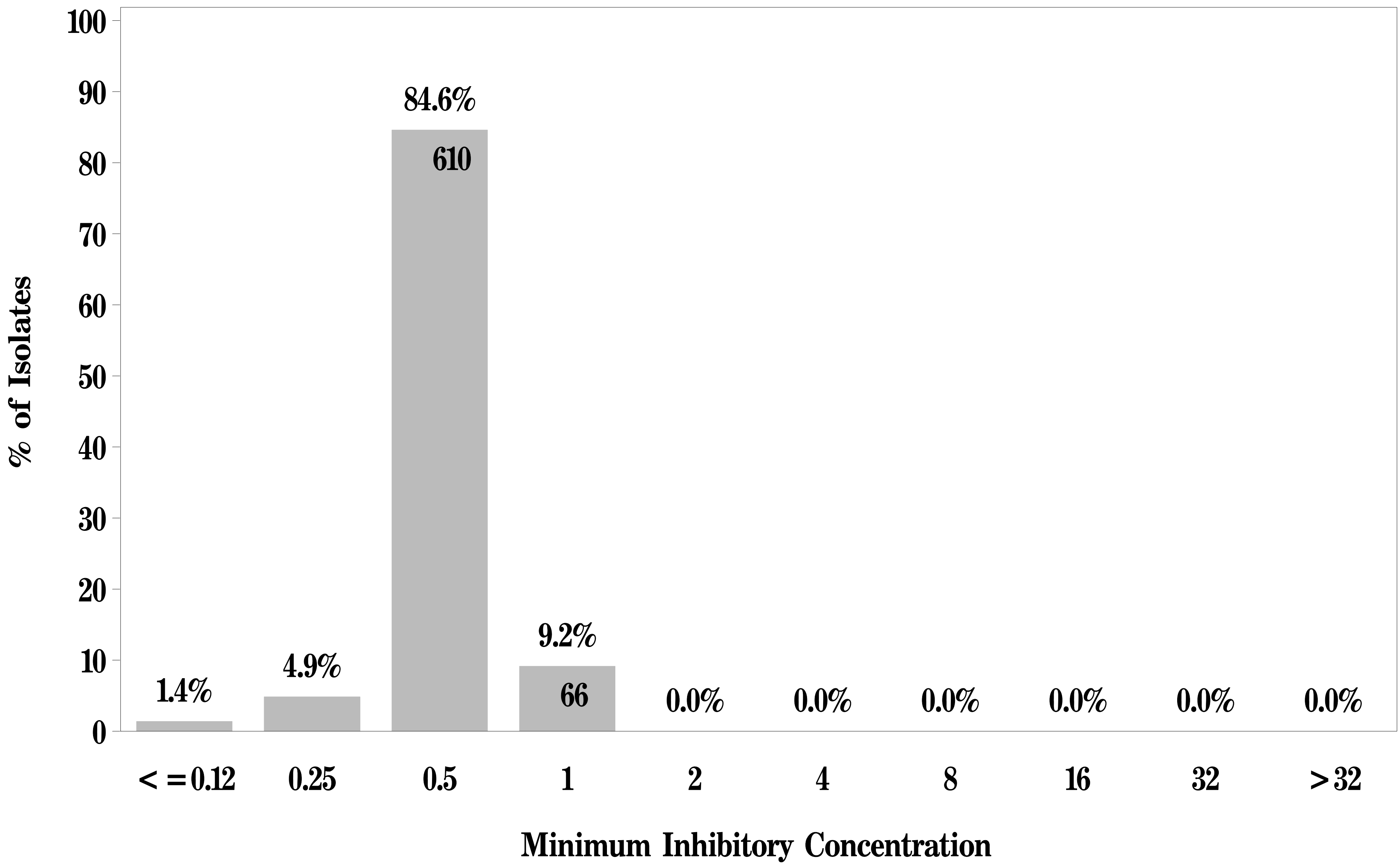
Breakpoint: Susceptible <=4 µg/mL



NARMS

Figure 9f: Minimum Inhibitory Concentration of Gentamicin for *Campylobacter* (N=721 Isolates)

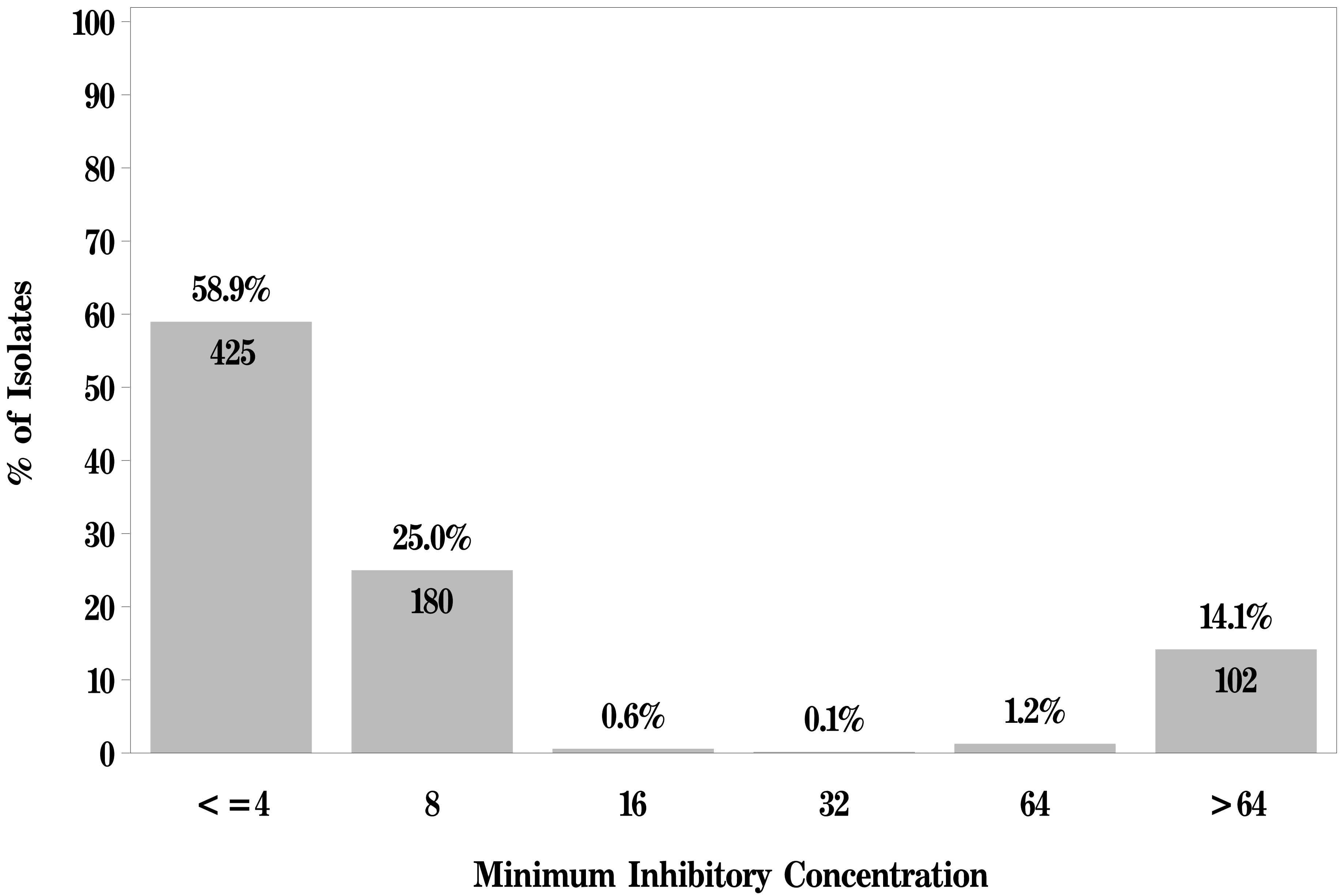
Breakpoints: Susceptible <=2 μg/mL Resistant >=8 μg/mL

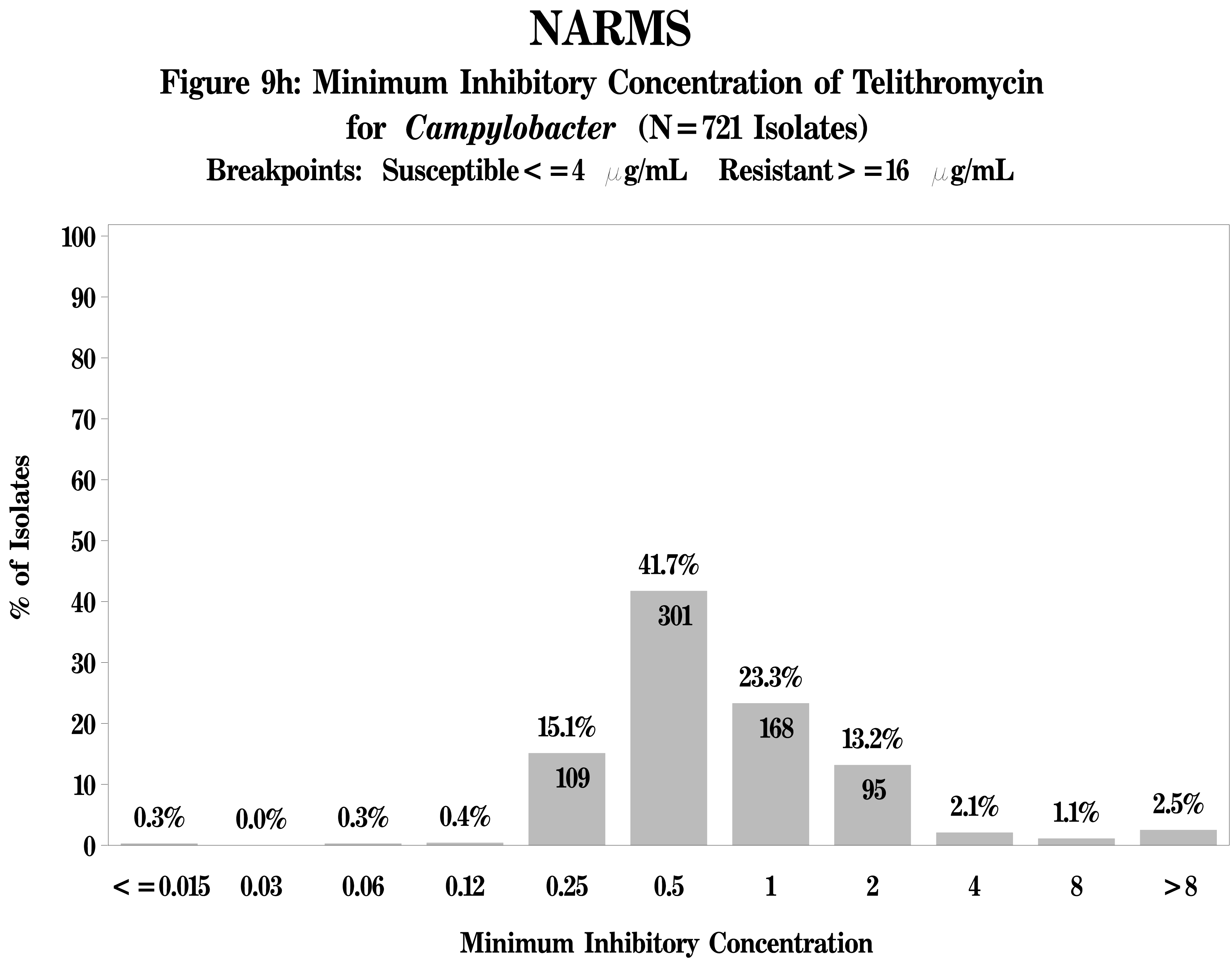


NARMS

Figure 9g: Minimum Inhibitory Concentration of Nalidixic acid for *Campylobacter* (N=721 Isolates)

Breakpoints: Susceptible <=16 µg/mL Resistant >=64 µg/mL




NARMS
Figure 9h: Minimum Inhibitory Concentration of Telithromycin
for *Campylobacter* (N=721 Isolates)
Breakpoints: Susceptible <=4 μg/mL Resistant >=16 μg/mL
% of Isolates
100
90
80
70
60
50
40
30
20
10
0
0.3%
0.0%
0.3%
0.4%
15.1%
109
41.7%
301
23.3%
168
13.2%
95
2.1%
1.1%
2.5%
<=0.015
0.03
0.06
0.12
0.25
0.5
1
2
4
8
>8
Minimum Inhibitory Concentration

NARMS

Figure 9i: Minimum Inhibitory Concentration of Tetracycline for *Campylobacter* (N=721 Isolates)

Breakpoints: Susceptible <=4 μg/mL Resistant >=16 μg/mL

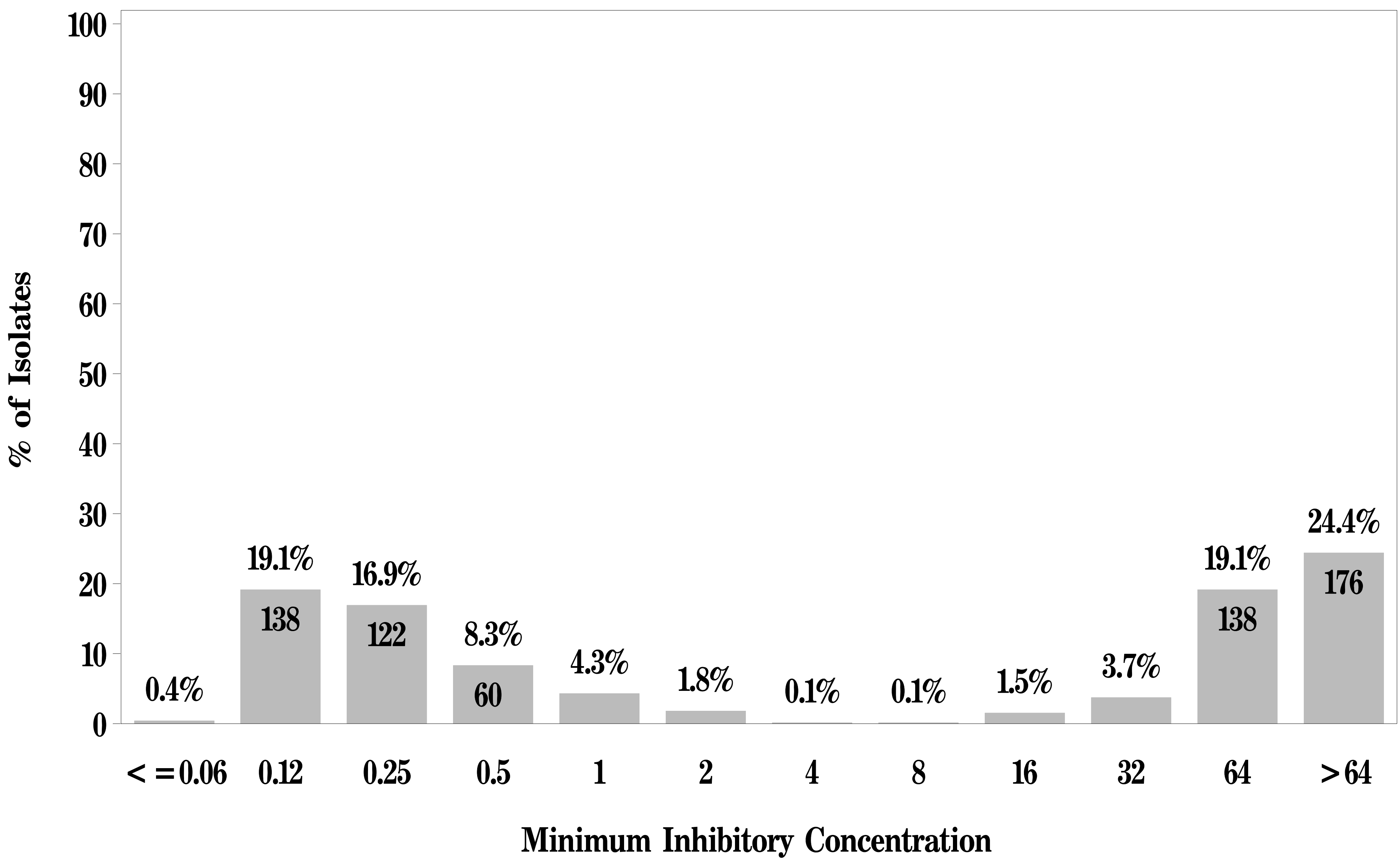


Table 21. Antimicrobial Resistance among *Campylobacter* by Meat Type*, 2004

Antimicrobial Agent	Chicken Breast (n=706)	Ground Turkey (n=12)	Pork Chop (n=3)
Tetracycline	49.2%†	25.0%	66.7%
Nalidixic Acid	15.4%	16.7%	-‡
Ciprofloxacin	15.4%	16.7%	-
Telithromycin	2.5%	-	-
Azithromycin	3.1%	-	33.3%
Erythromycin	3.1%	-	33.3%
Clindamycin	2.3%	-	33.3%
Florfenicol	-	-	-
Gentamicin	-	-	-

* No *Campylobacter* recovered from ground beef.

† Where % Resistance = (# isolates per meat type resistant to antimicrobial) / (total # isolates per meat type).

‡ Dashes indicate 0.0% resistance to antimicrobial.

Figure 10a. MIC Distribution among *Campylobacter* Isolates from Chicken Breast, 2004

Campylobacter from Chicken Breast (N=706)		Distribution (%) of MICs (in µg/ml)													
Antimicrobial Agent	**%R[†]**	**0.015**	**0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**>64**
Nalidixic Acid	**15.6%**									59.6	24.4	0.4	**0.1**	**1.3**	**14.2**
Ciprofloxacin	**15.4%**		0.1	35.1	37.1	12.0		0.1		**0.3**	**7.1**	**6.8**	**1.3**		
Azithromycin	**3.1%**	3.5	39.8	39.5	12	1.0	0.3	0.6	0.1						**3.1**
Clindamycin	**2.3%**		0.4	7.8	45.5	35.6	5.4	2.1	0.4	0.6	**0.8**	**1.4**			
Erythromycin	**3.1%**			0.3	2.1	44.5	30.3	16.7	2.4	0.4	0.1				**3.1**
Telithromycin	**3.5%**	0.3		0.3	0.4	15.2	42.4	22.4	13.5	2.1	**1.0**	**2.5**			
Gentamicin*	**0.0%**				1.4	4.8	85.3	8.5							
Florfenicol*	**§**				0.4		4.1	79.9	15.2	0.4					
Tetracycline	**49.2%**			0.4	19.4	17.0	8.2	4.0	1.6	0.1	0.1	**1.6**	**3.8**	**19.4**	**24.4**

[†]Discrepancies between %R and sums of distribution %s are due to rounding.

Vertical bars show the CLSI Susceptible/Resistant breakpoints for each drug.

Unshaded areas indicate the dilution ranges used to test the 2004 isolates.

*Currently no CLSI breakpoints have been established for this organism/antimicrobial combination. Indicated breakpoints were established by NARMS.

§Absence of resistant strains precludes defining any results category other than "susceptible."

Figure 10b. MIC Distribution among *Campylobacter* Isolates from Ground Turkey, 2004

Campylobacter from Ground Turkey (N=12)		Distribution (%) of MICs (in µg/ml)													
Antimicrobial Agent	**%R[†]**	**0.015**	**0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**>64**
Nalidixic Acid	**16.7%**									33.3	50.0				**16.7**
Ciprofloxacin	**16.7%**			25.0	58.3								**16.7**		
Azithromycin	**0.0%**	8.3	8.3	33.3	50.0										
Clindamycin	**0.0%**				25.0	25.0	8.3	41.7							
Erythromycin	**0.0%**				8.3	8.3	16.7	66.7							
Telithromycin	**0.0%**					8.3	16.7	75.0							
Gentamicin*	**0.0%**					8.3	66.7	25.0							
Florfenicol*	**§**						16.7	16.7	66.7						
Tetracycline	**25.0%**				8.3	16.7	8.3	25.0	16.7					**8.3**	**16.7**

[†]Discrepancies between %R and sums of distribution %s are due to rounding.

Vertical bars show the CLSI Susceptible/Resistant breakpoints for each drug.

Unshaded areas indicate the dilution ranges used to test the 2004 isolates.

*Currently no CLSI breakpoints have been established for this organism/antimicrobial combination. Indicated breakpoints were established by NARMS.

§Absence of resistant strains precludes defining any results category other than "susceptible."

Figure 10c. MIC Distribution among *Campylobacter* Isolates from Pork Chops, 2004

Campylobacter from Pork Chops (N=3)		Distribution (%) of MICs (in µg/ml)													
Antimicrobial Agent	**%R[†]**	**0.015**	**0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**>64**
Nalidixic Acid	**0.0%**										66.7	33.3			
Ciprofloxacin	**0.0%**				100.0										
Azithromycin	**33.3%**	33.3		33.3											**33.3**
Clindamycin	**33.3%**					66.7						**33.3**			
Erythromycin	**33.3%**					33.3		33.3							**33.3**
Telithromycin	**33.3%**					33.3		33.3			**33.3**				
Gentamicin*	**0.0%**							100.0							
Florfenicol*	**§**							66.7		33.3					
Tetracycline	**66.7%**						33.3								**66.7**

[†]Discrepancies between %R and sums of distribution %s are due to rounding.

Vertical bars show the CLSI Susceptible/Resistant breakpoints for each drug.

Unshaded areas indicate the dilution ranges used to test the 2004 isolates.

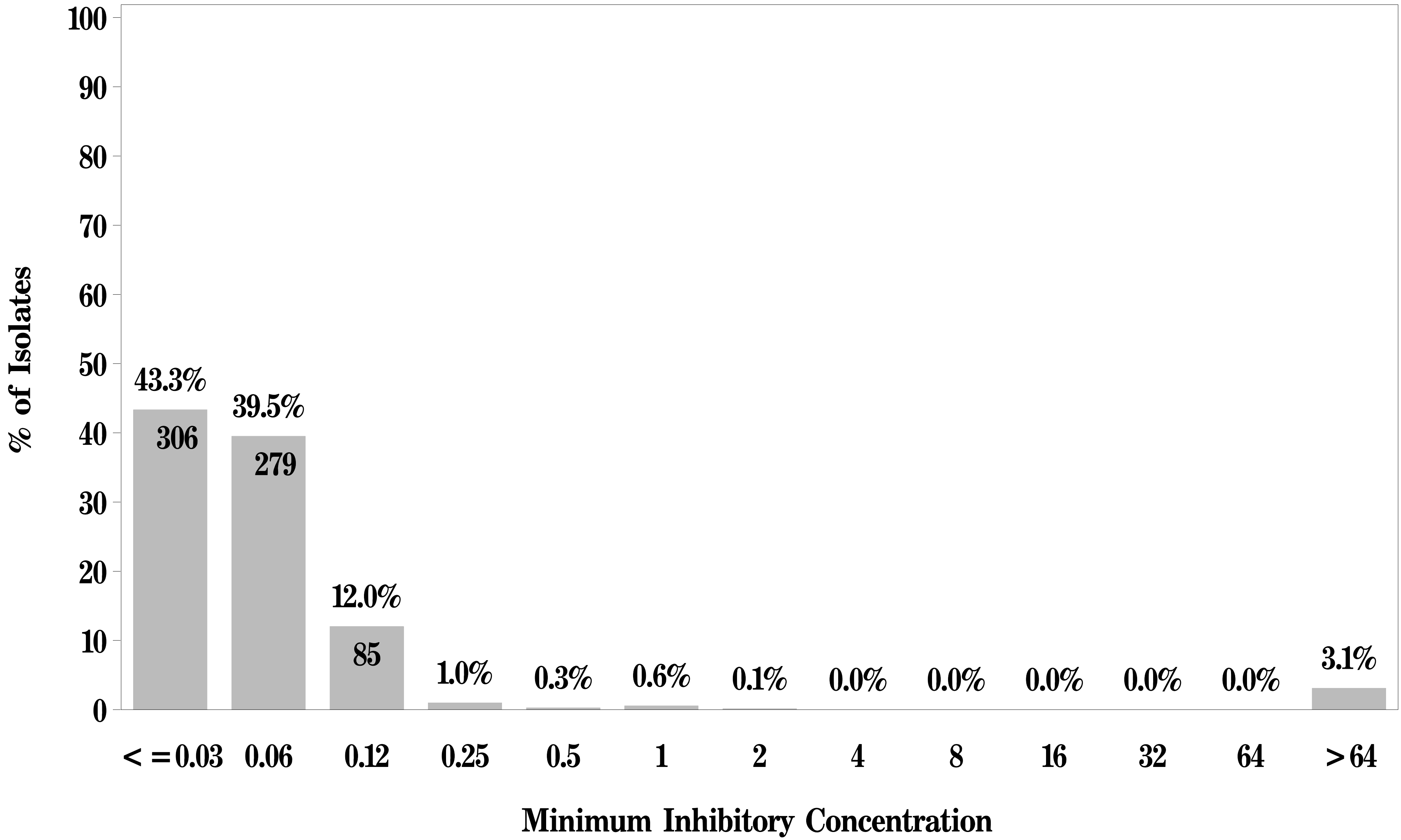
*Currently no CLSI breakpoints have been established for this organism/antimicrobial combination. Indicated breakpoints were established by NARMS.

§Absence of resistant strains precludes defining any results category other than "susceptible."

NARMS

Figure 11a: Minimum Inhibitory Concentration of Azithromycin for *Campylobacter* in Chicken Breast (N=706 Isolates)

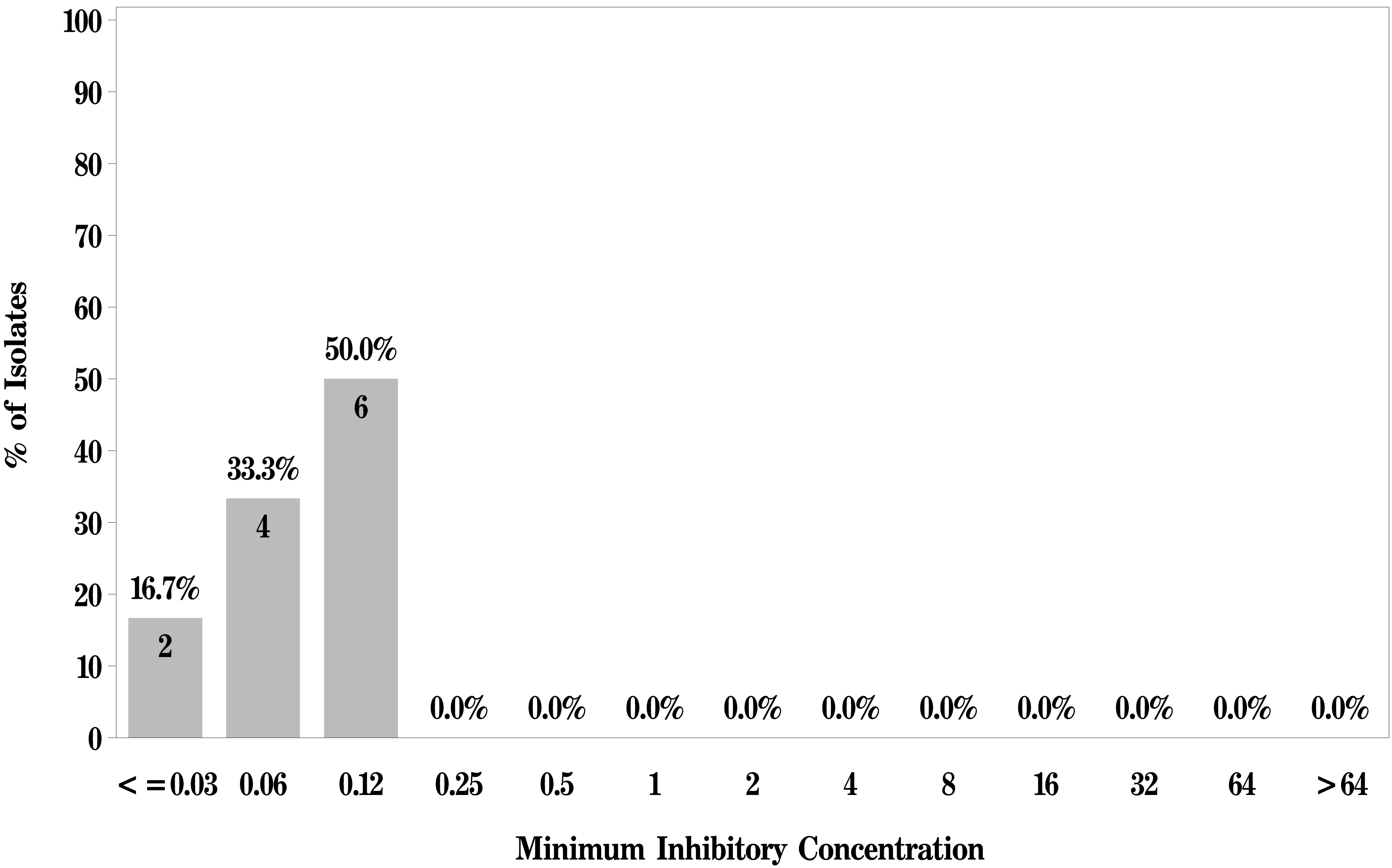
Breakpoints: Susceptible<=2 µg/mL Resistant>=8 µg/mL



NARMS

Figure 11a: Minimum Inhibitory Concentration of Azithromycin for *Campylobacter* in Ground Turkey (N=12 Isolates)

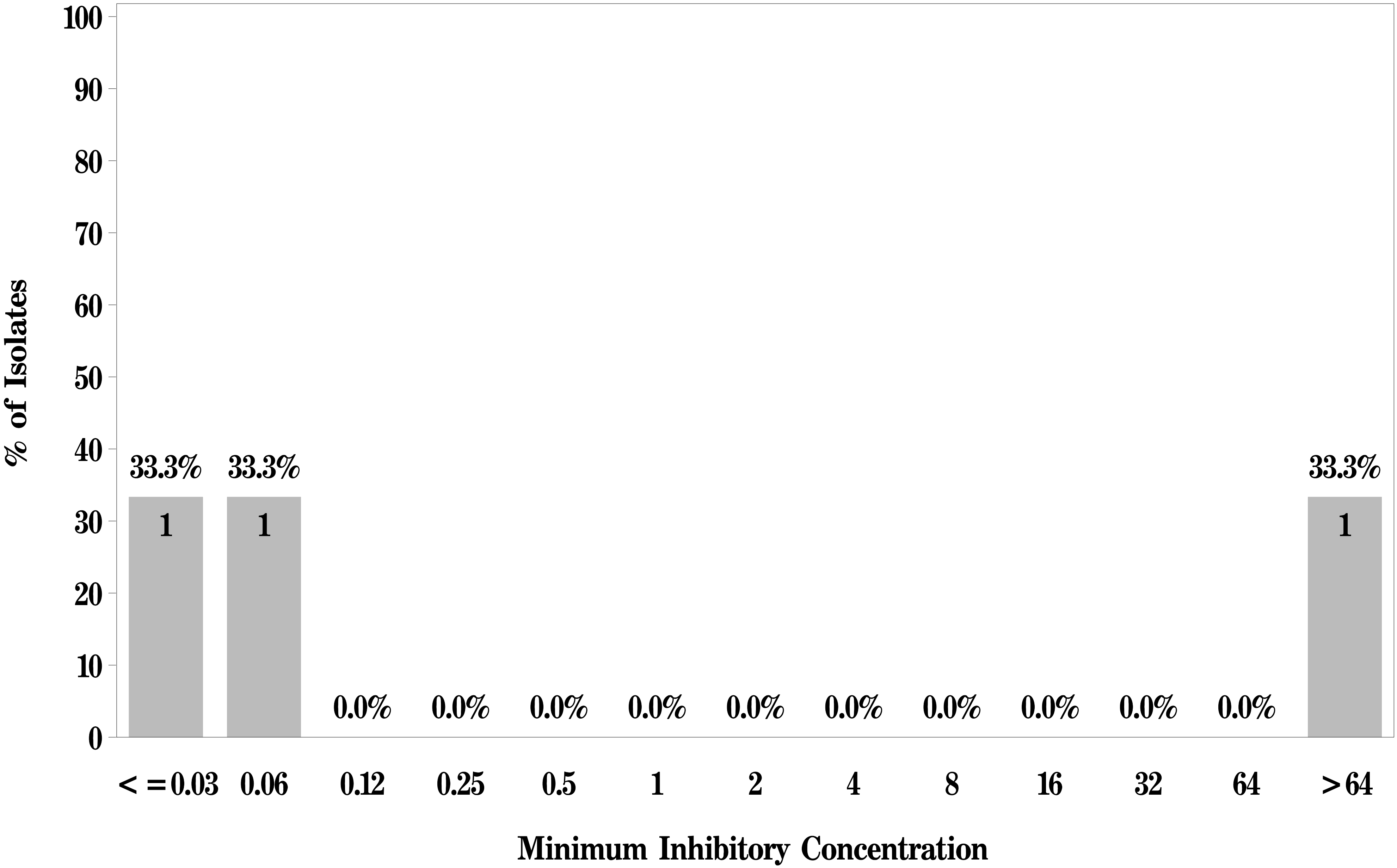
Breakpoints: Susceptible <=2 µg/mL Resistant >=8 µg/mL



NARMS

Figure 11a: Minimum Inhibitory Concentration of Azithromycin for *Campylobacter* in Pork Chop (N=3 Isolates)

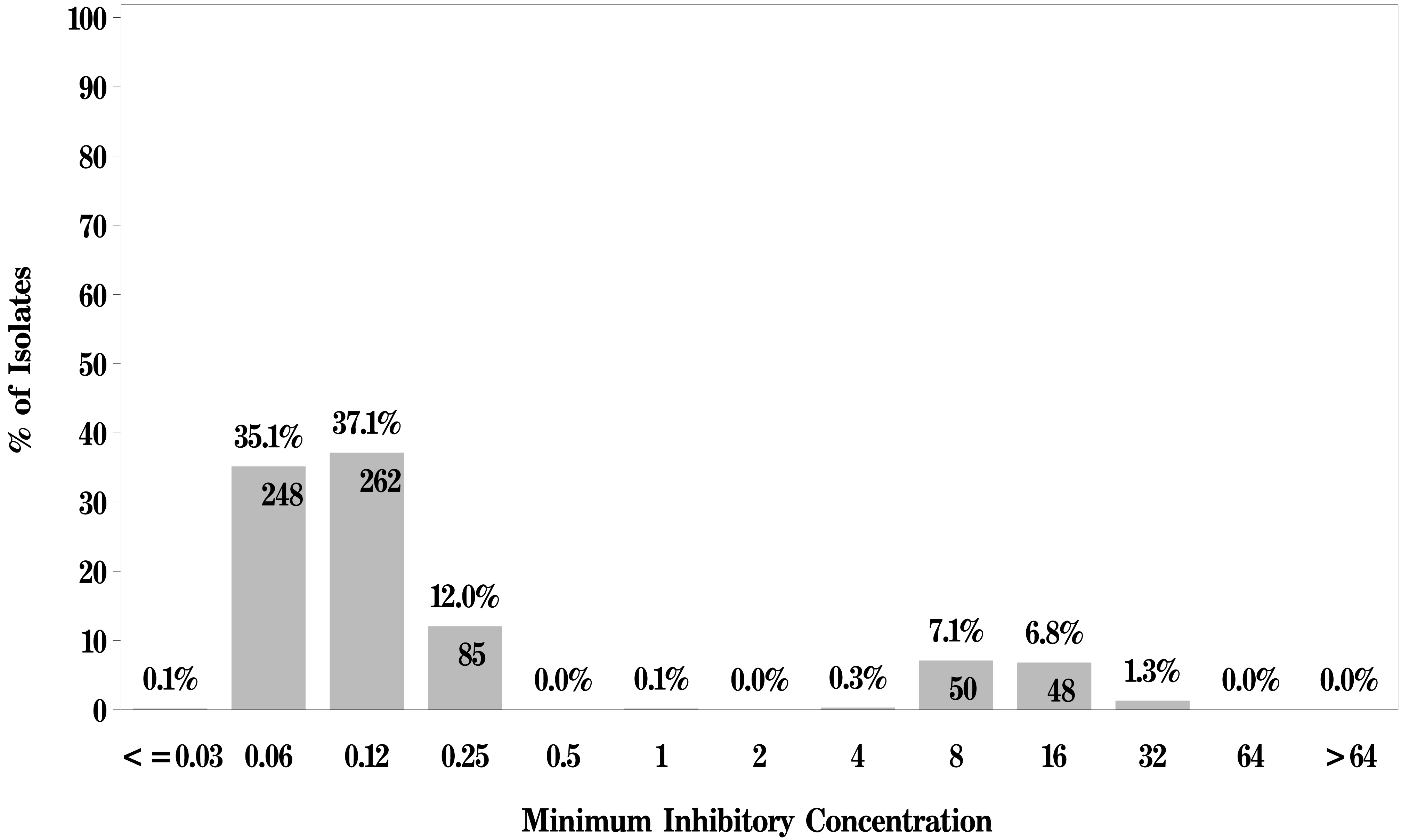
Breakpoints: Susceptible <=2 µg/mL Resistant >=8 µg/mL



NARMS

Figure 11b: Minimum Inhibitory Concentration of Ciprofloxacin for *Campylobacter* in Chicken Breast (N=706 Isolates)

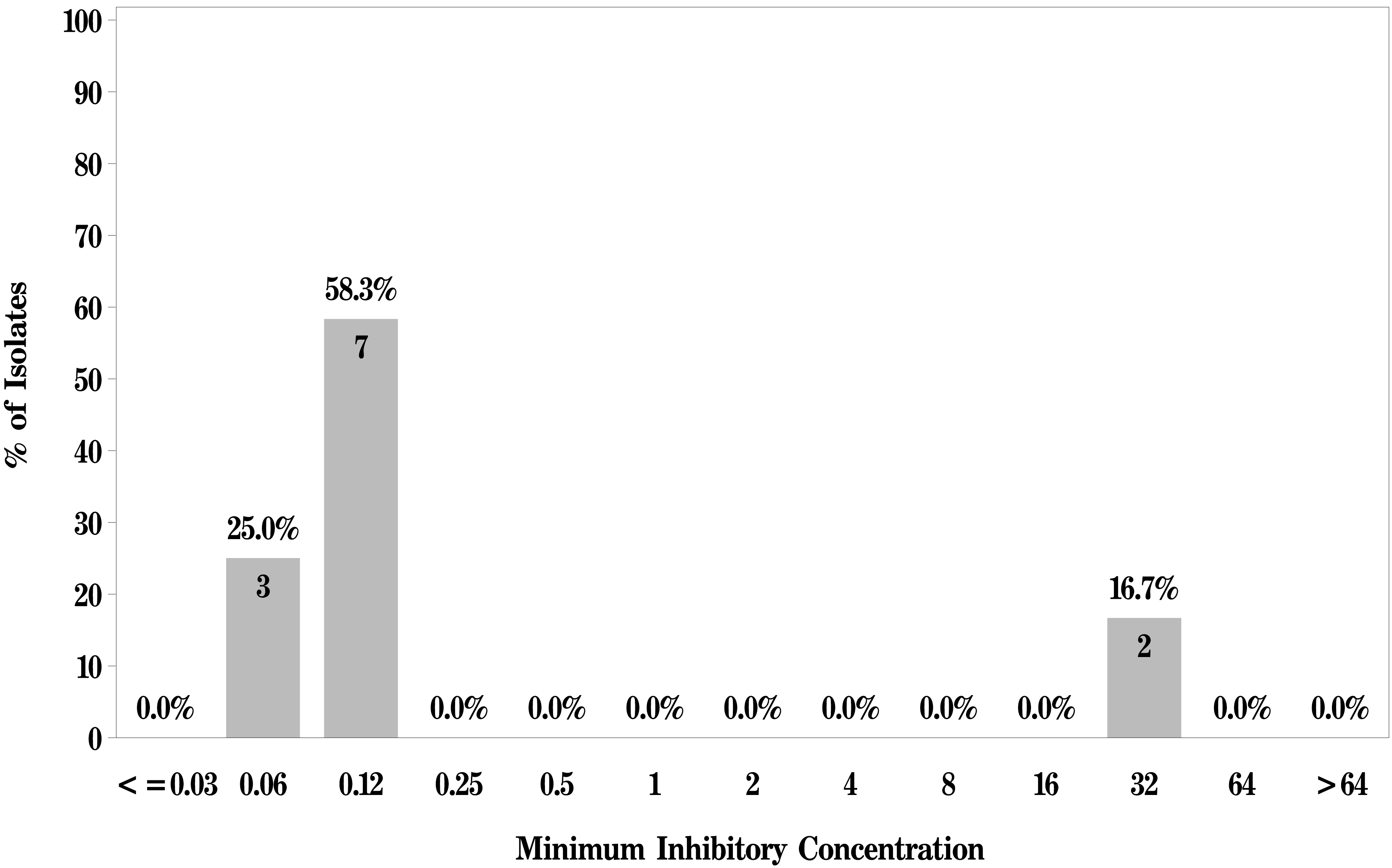
Breakpoints: Susceptible <=1 μg/mL Resistant >=4 μg/mL



NARMS

Figure 11b: Minimum Inhibitory Concentration of Ciprofloxacin for *Campylobacter* in Ground Turkey (N=12 Isolates)

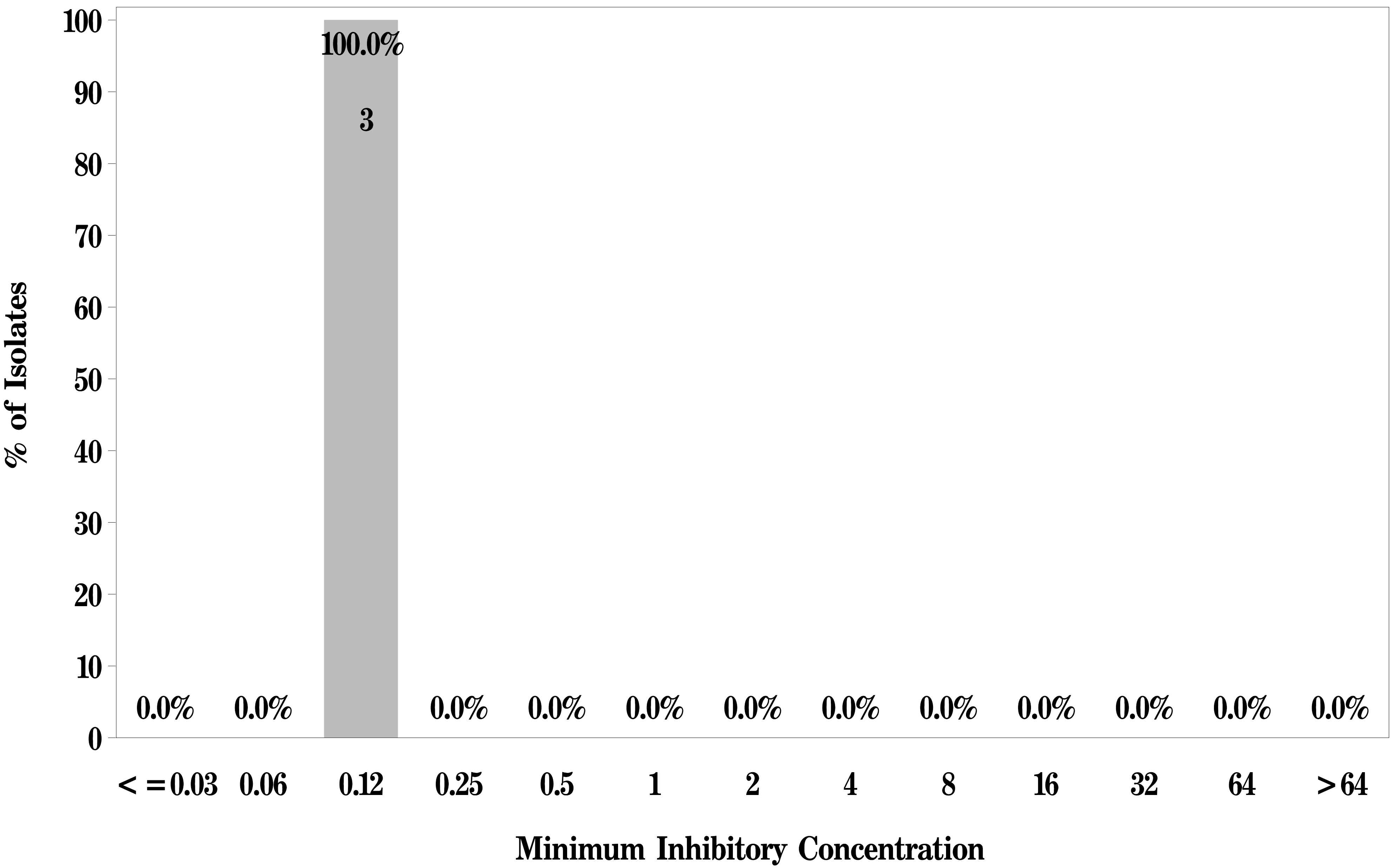
Breakpoints: Susceptible <=1 μg/mL Resistant >=4 μg/mL



NARMS

Figure 11b: Minimum Inhibitory Concentration of Ciprofloxacin for *Campylobacter* in Pork Chop (N=3 Isolates)

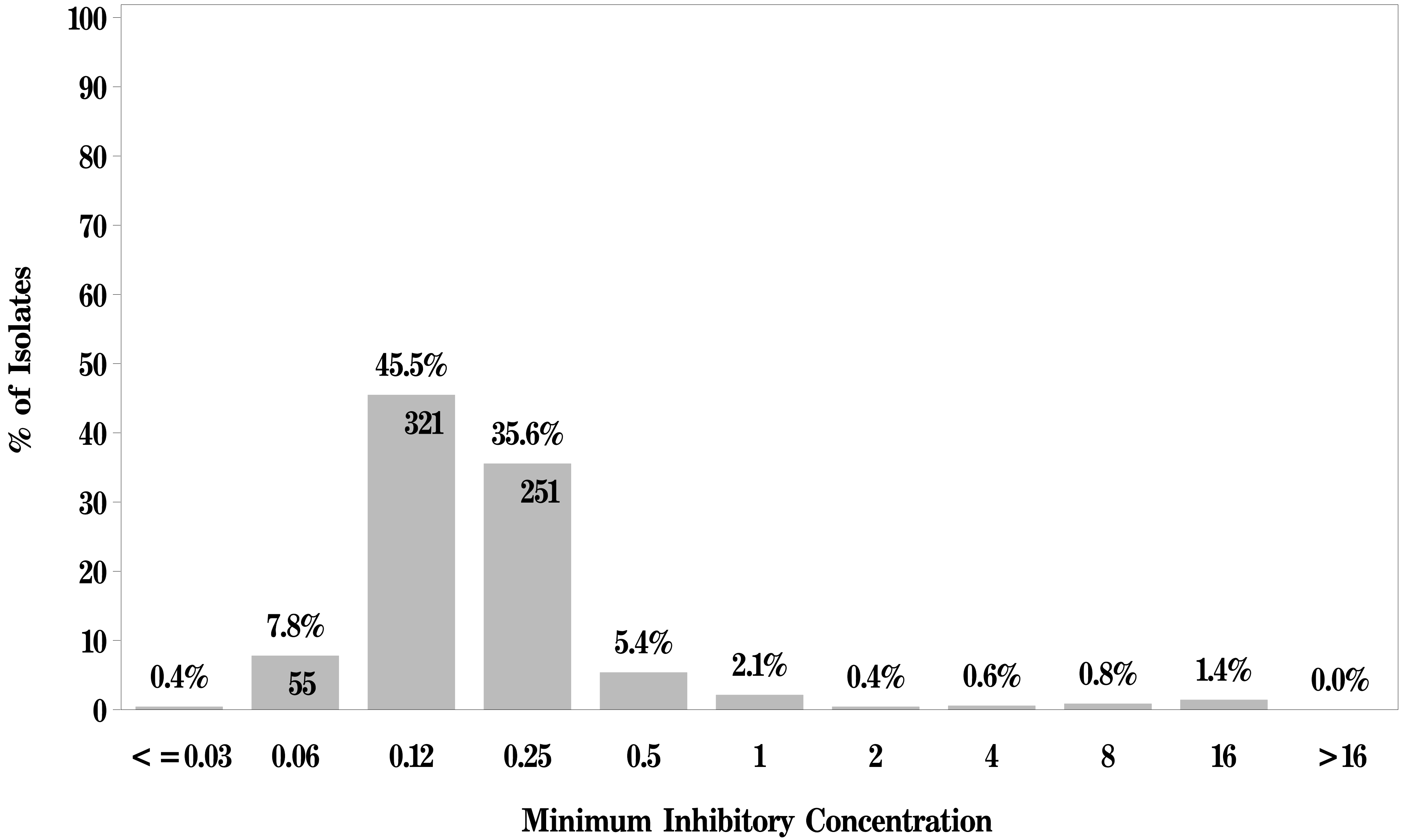
Breakpoints: Susceptible<=1 μg/mL Resistant>=4 μg/mL



NARMS

Figure 11c: Minimum Inhibitory Concentration of Clindamycin for *Campylobacter* in Chicken Breast (N=706 Isolates)

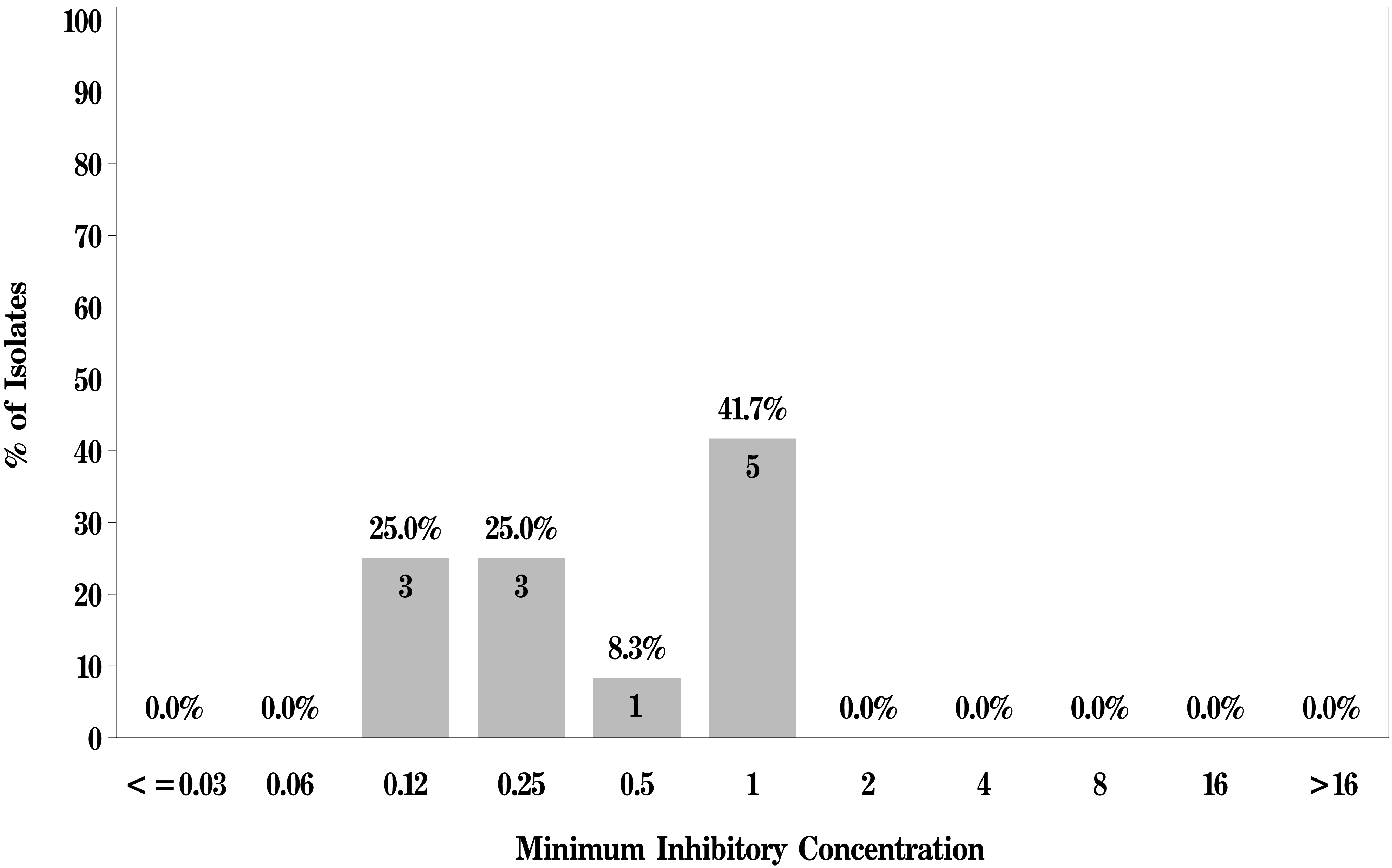
Breakpoints: Susceptible<=2 μg/mL Resistant>=8 μg/mL



NARMS

Figure 11c: Minimum Inhibitory Concentration of Clindamycin for *Campylobacter* in Ground Turkey (N=12 Isolates)

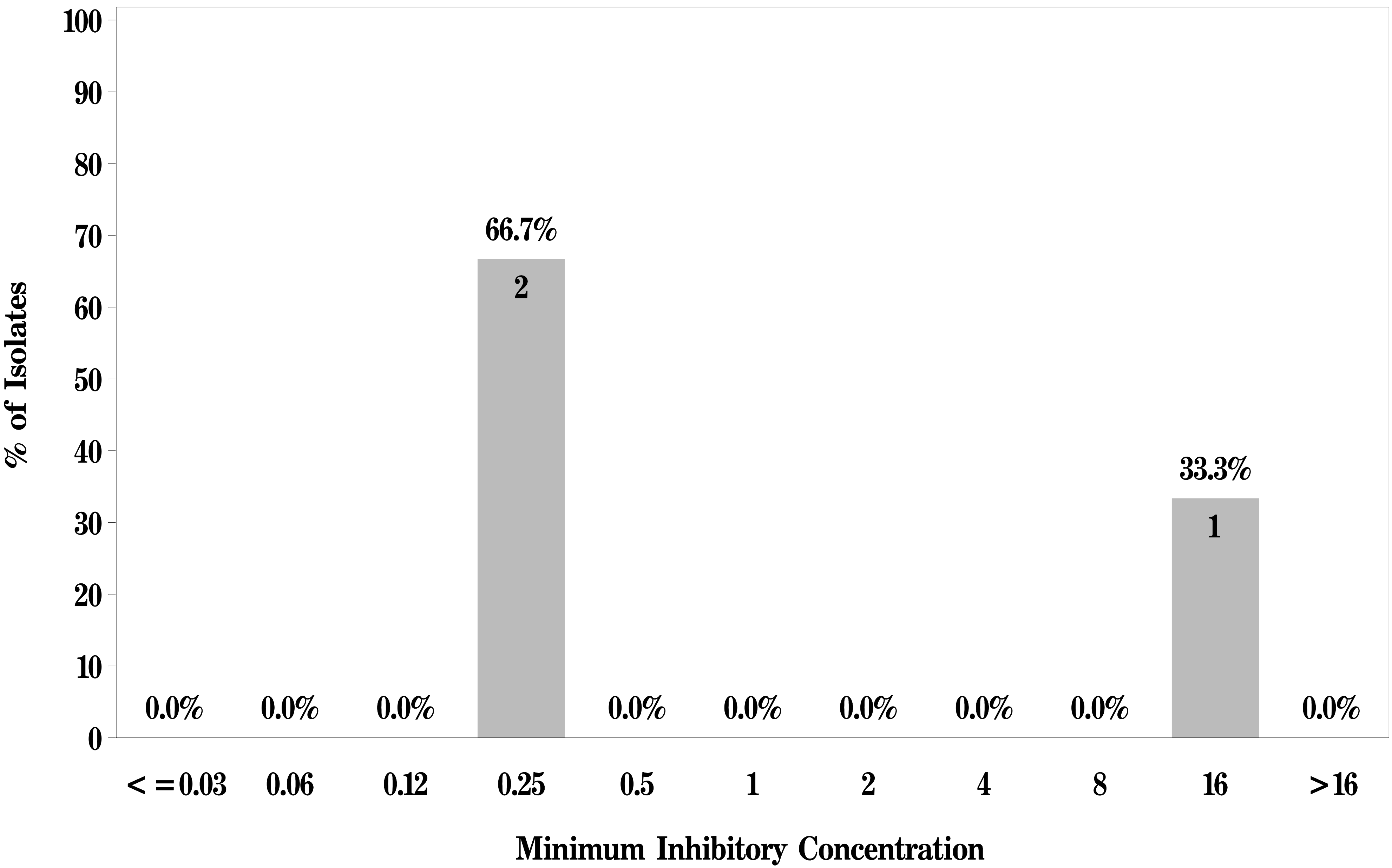
Breakpoints: Susceptible <=2 µg/mL Resistant >=8 µg/mL



NARMS

Figure 11c: Minimum Inhibitory Concentration of Clindamycin for *Campylobacter* in Pork Chop (N=3 Isolates)

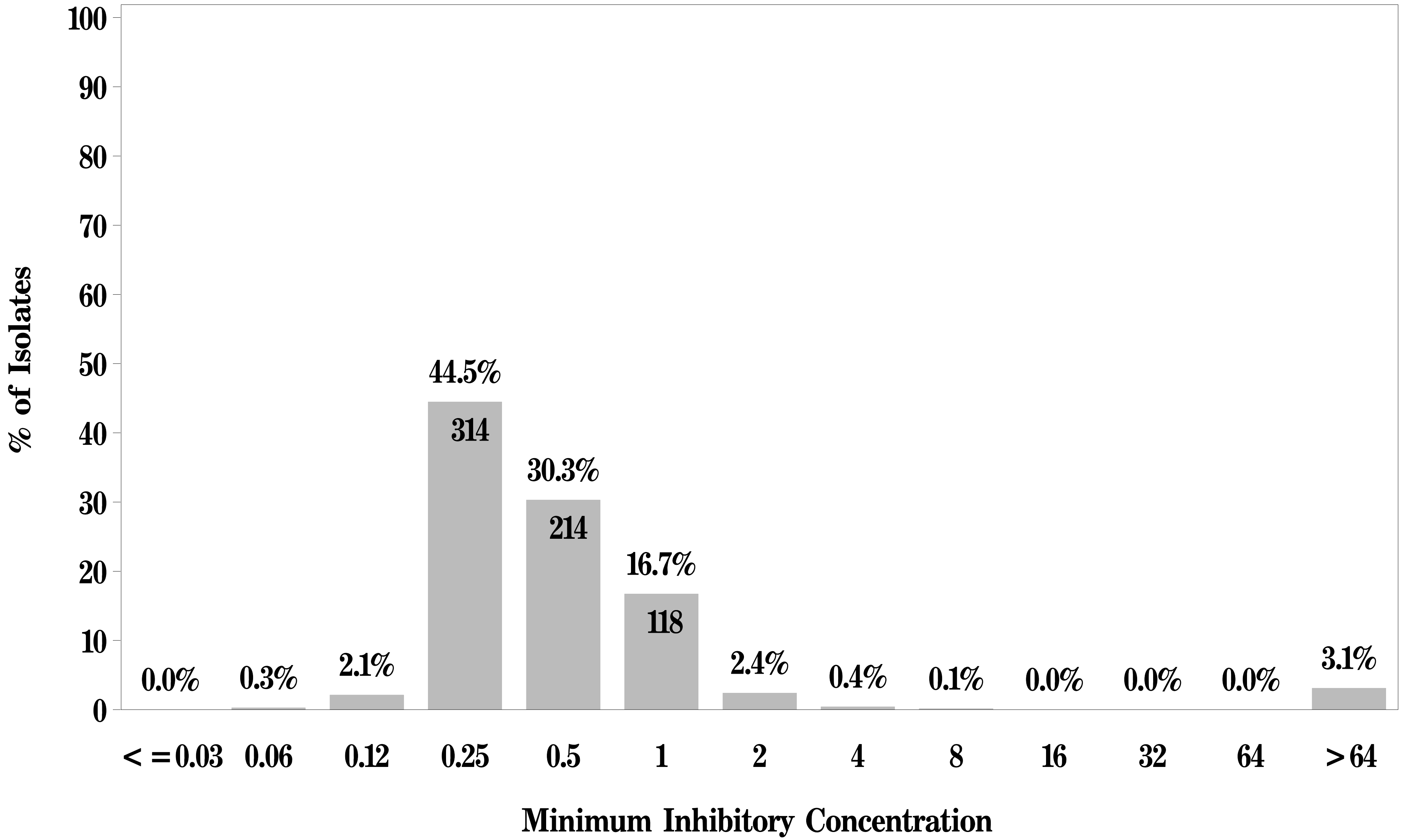
Breakpoints: Susceptible<=2 µg/mL Resistant>=8 µg/mL



NARMS

Figure 11d: Minimum Inhibitory Concentration of Erythromycin for *Campylobacter* in Chicken Breast (N=706 Isolates)

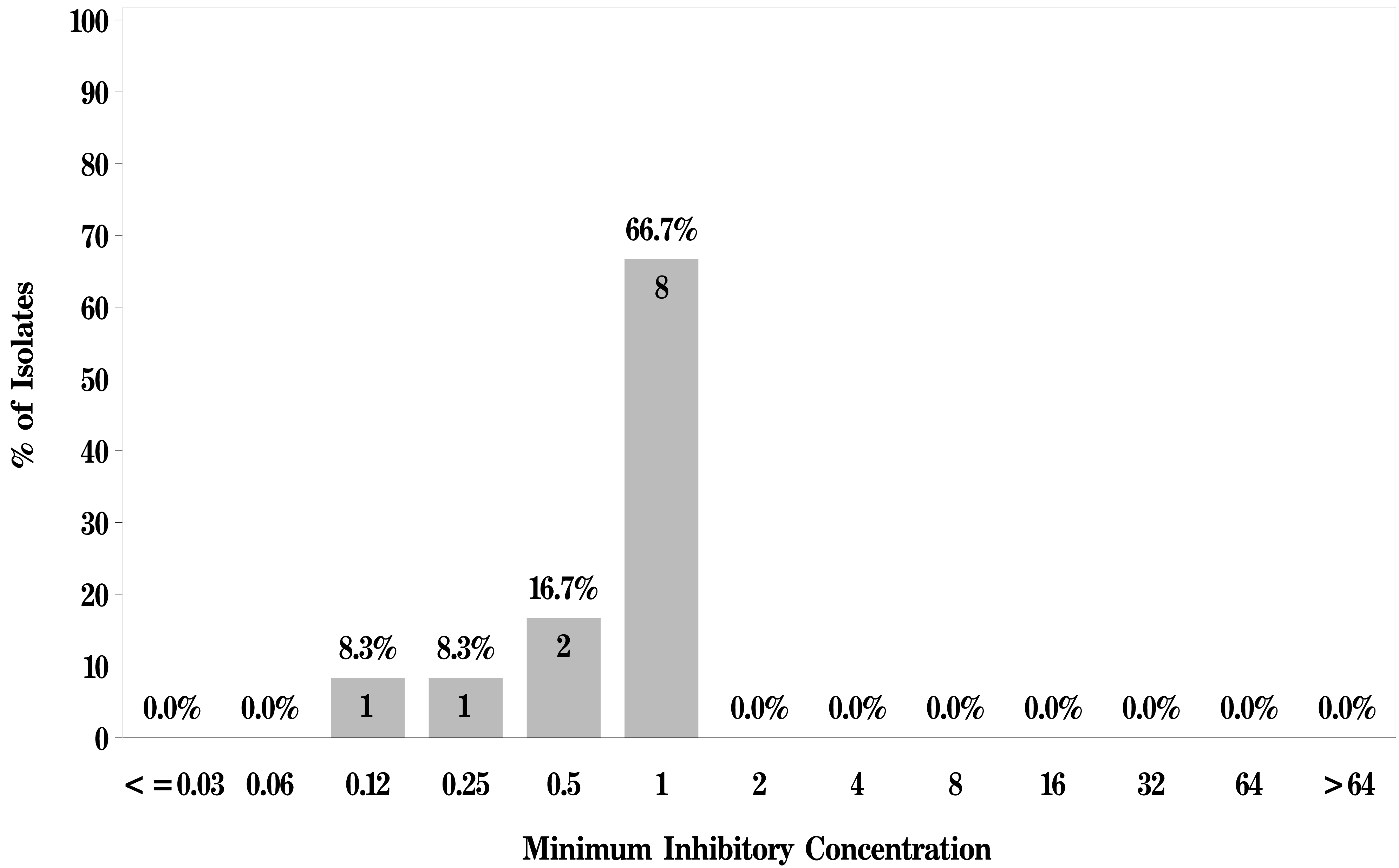
Breakpoints: Susceptible <=8 μg/mL Resistant >=32 μg/mL



NARMS

Figure 11d: Minimum Inhibitory Concentration of Erythromycin for *Campylobacter* in Ground Turkey (N=12 Isolates)

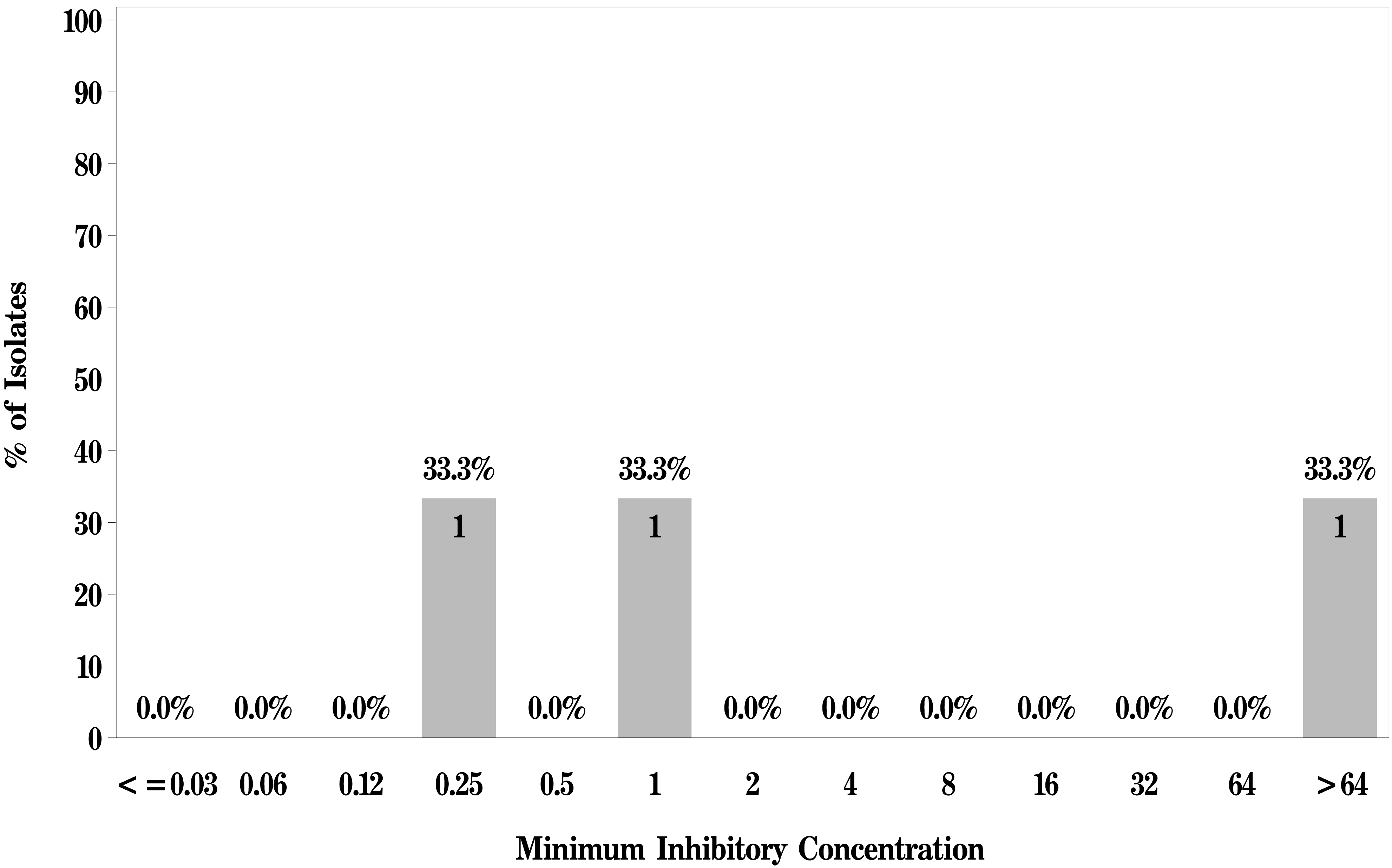
Breakpoints: Susceptible <=8 μg/mL Resistant >=32 μg/mL

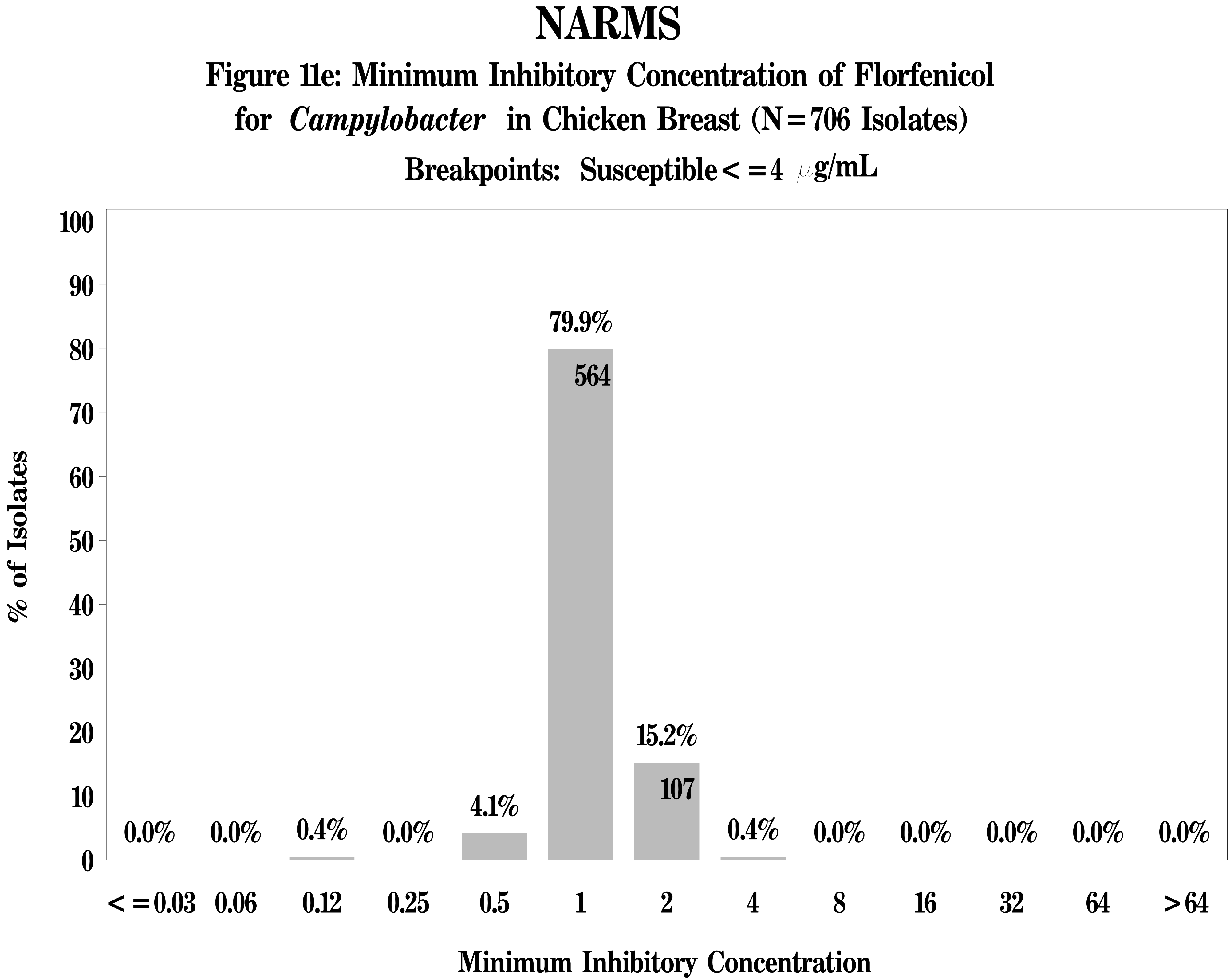


NARMS

Figure 11d: Minimum Inhibitory Concentration of Erythromycin for *Campylobacter* in Pork Chop (N=3 Isolates)

Breakpoints: Susceptible <=8 µg/mL Resistant >=32 µg/mL

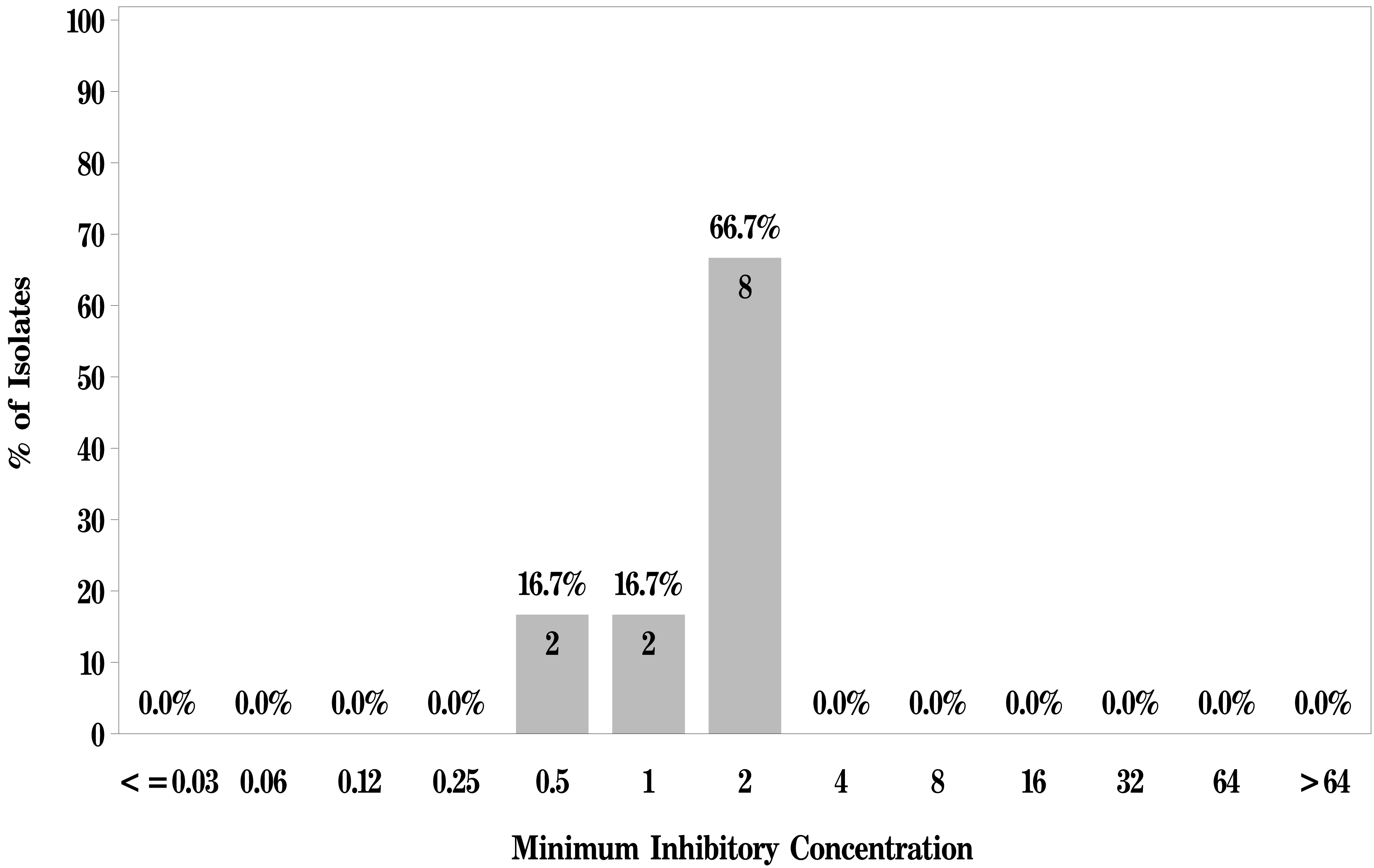



NARMS
Figure 11e: Minimum Inhibitory Concentration of Florfenicol
for Campylobacter in Chicken Breast (N=706 Isolates)
Breakpoints: Susceptible<=4 µg/mL
% of Isolates
100
90
80
70
60
50
40
30
20
10
0
0.0%
0.0%
0.4%
0.0%
4.1%
79.9%
564
15.2%
107
0.4%
0.0%
0.0%
0.0%
0.0%
0.0%
<=0.03
0.06
0.12
0.25
0.5
1
2
4
8
16
32
64
>64
Minimum Inhibitory Concentration

NARMS

Figure 11e: Minimum Inhibitory Concentration of Florfenicol for *Campylobacter* in Ground Turkey (N=12 Isolates)

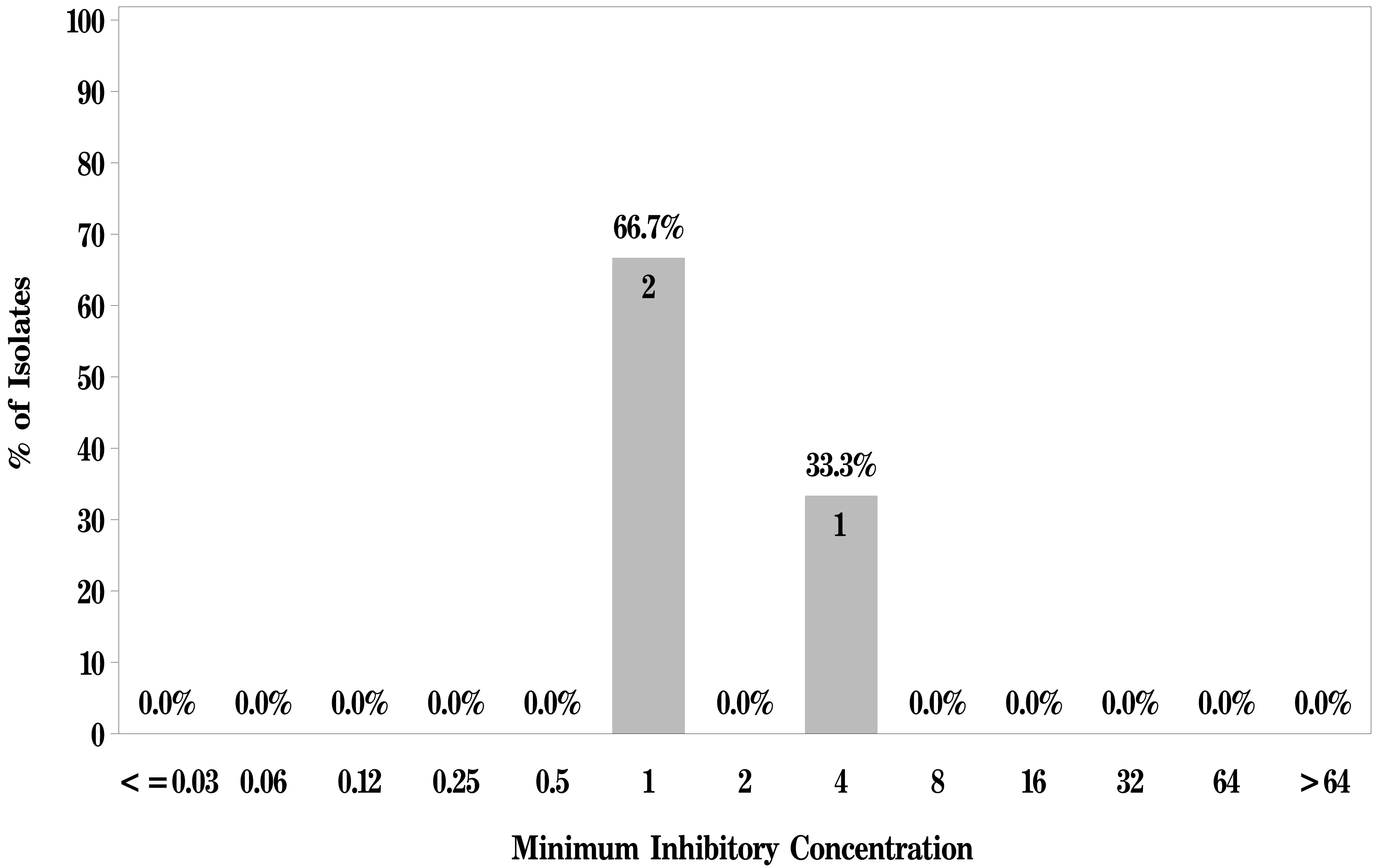
Breakpoints: Susceptible<=4 μg/mL



NARMS

Figure 11e: Minimum Inhibitory Concentration of Florfenicol for *Campylobacter* in Pork Chop (N=3 Isolates)

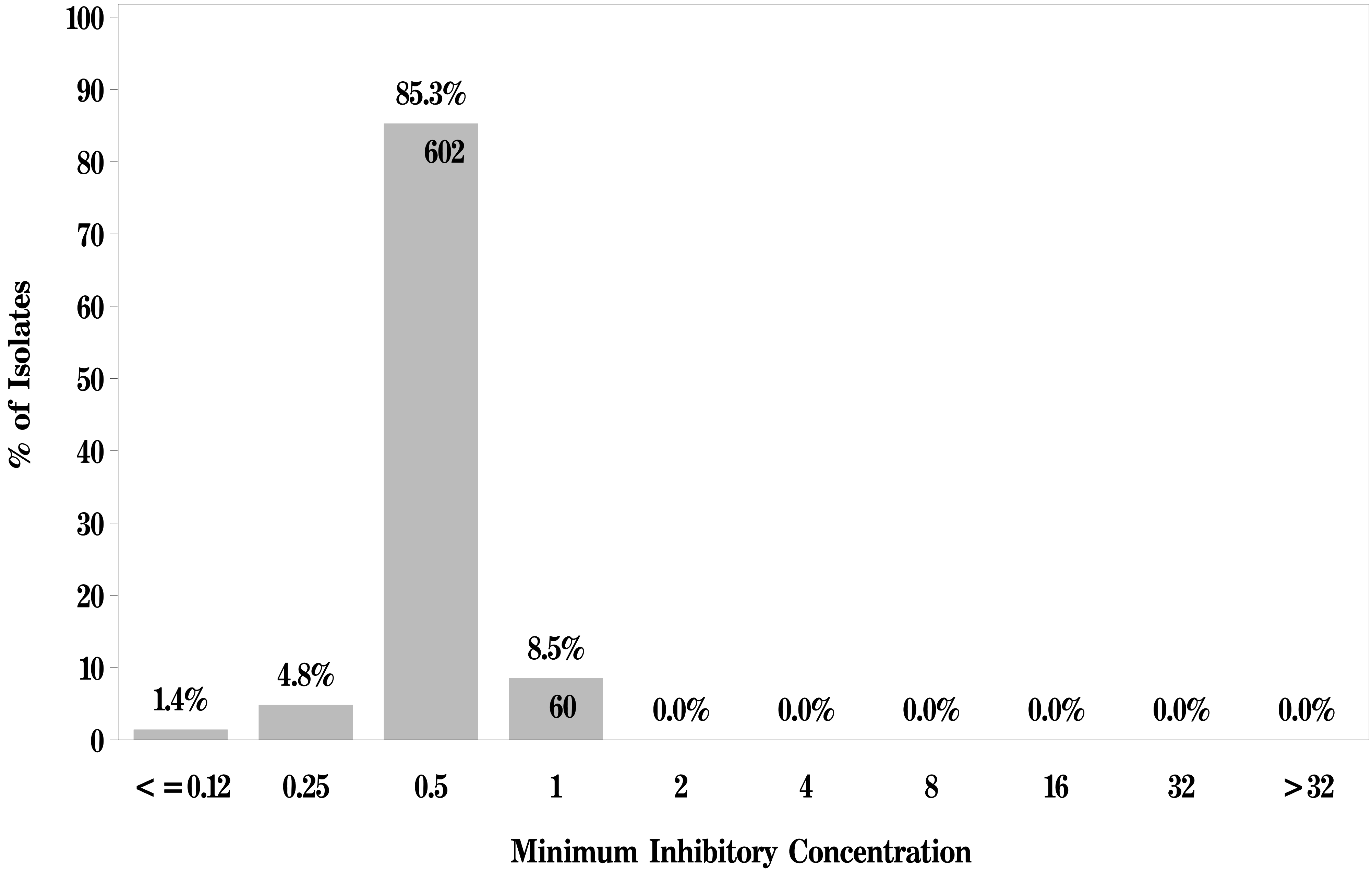
Breakpoints: Susceptible<=4 μg/mL



NARMS

Figure 11f: Minimum Inhibitory Concentration of Gentamicin for *Campylobacter* in Chicken Breast (N=706 Isolates)

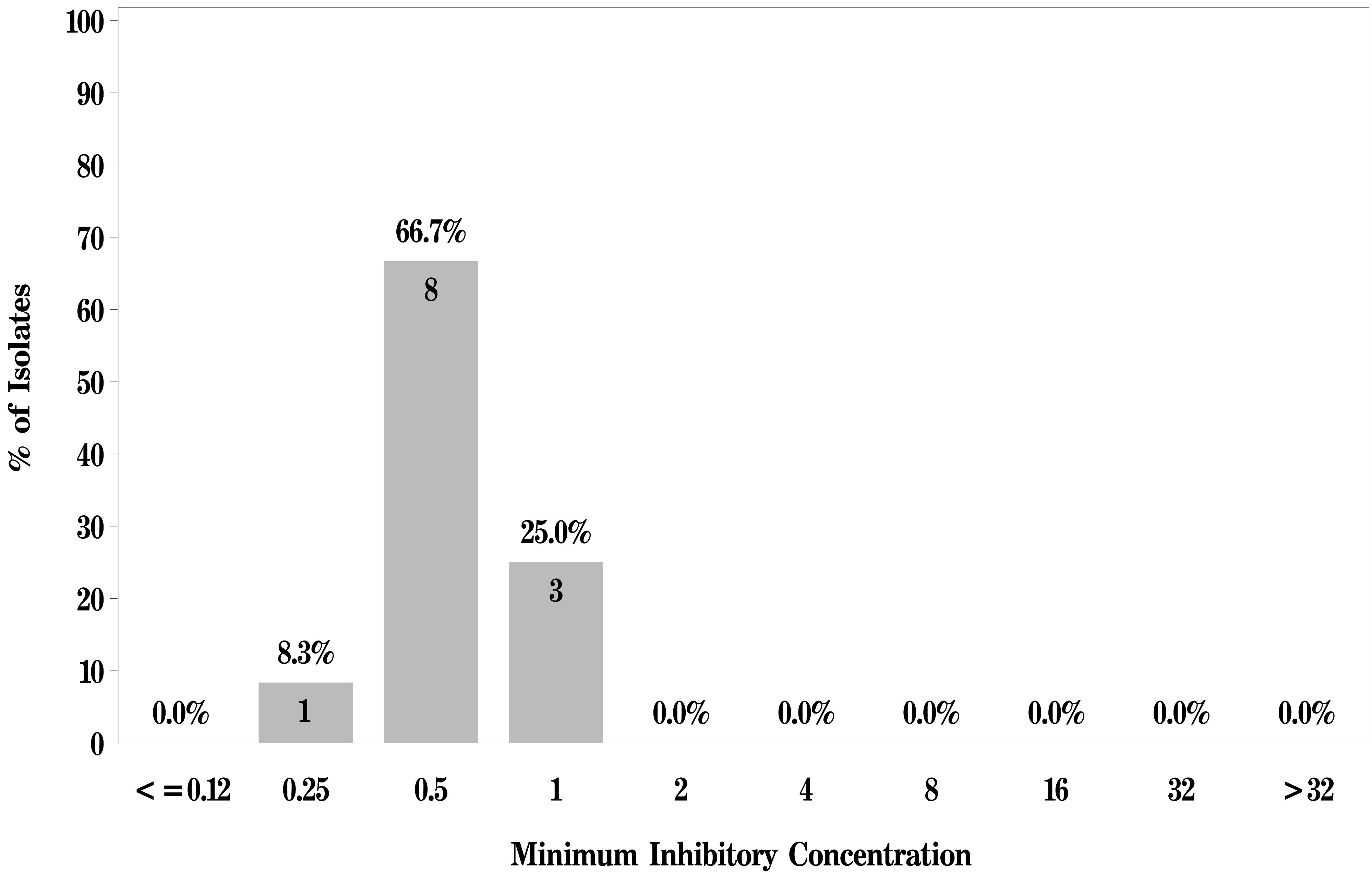
Breakpoints: Susceptible<=2 µg/mL Resistant>=8 µg/mL



NARMS

Figure 11f: Minimum Inhibitory Concentration of Gentamicin for *Campylobacter* in Ground Turkey (N=12 Isolates)

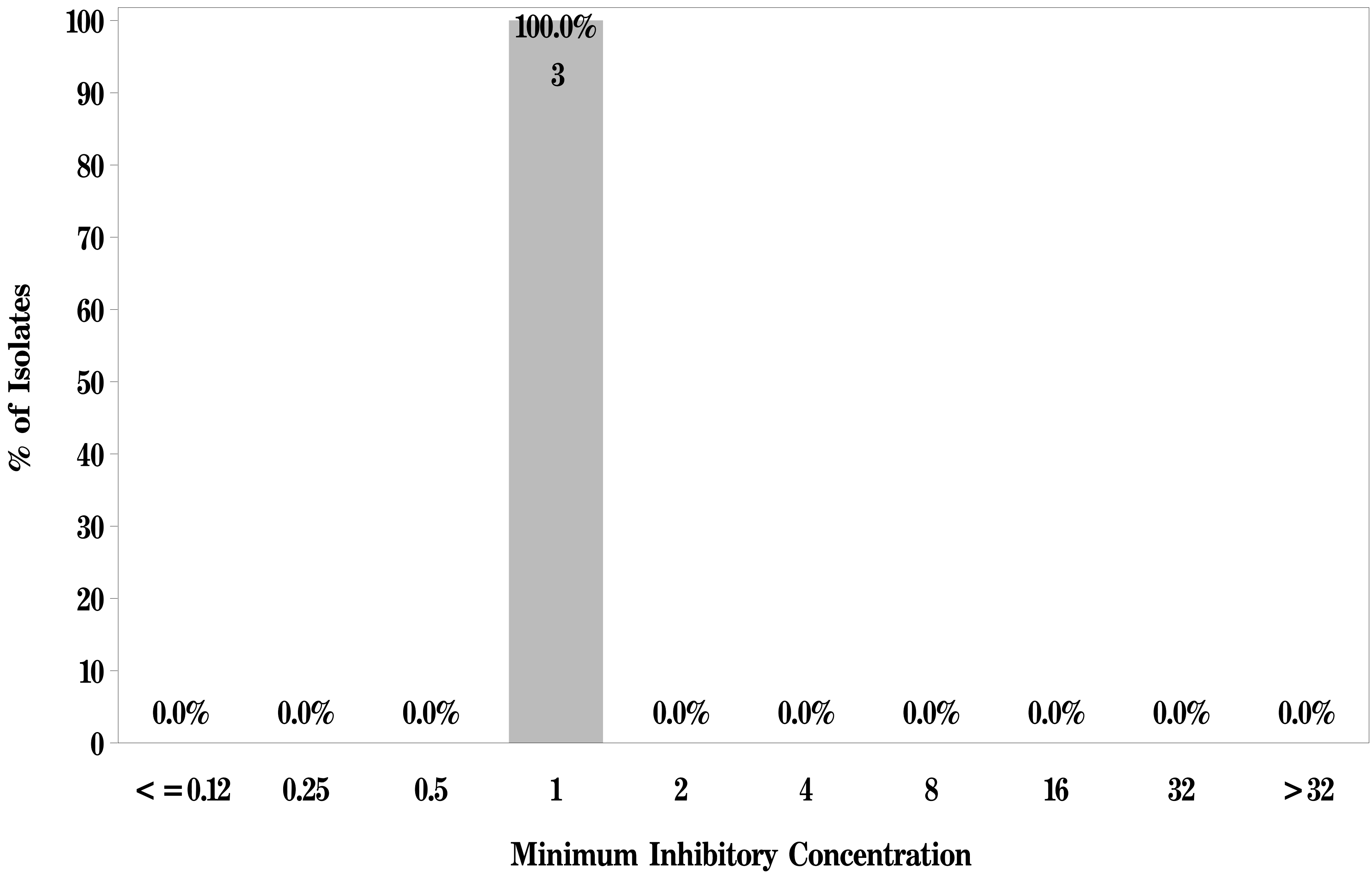
Breakpoints: Susceptible <=2 μg/mL Resistant >=8 μg/mL



NARMS

Figure 11f: Minimum Inhibitory Concentration of Gentamicin for *Campylobacter* in Pork Chop (N=3 Isolates)

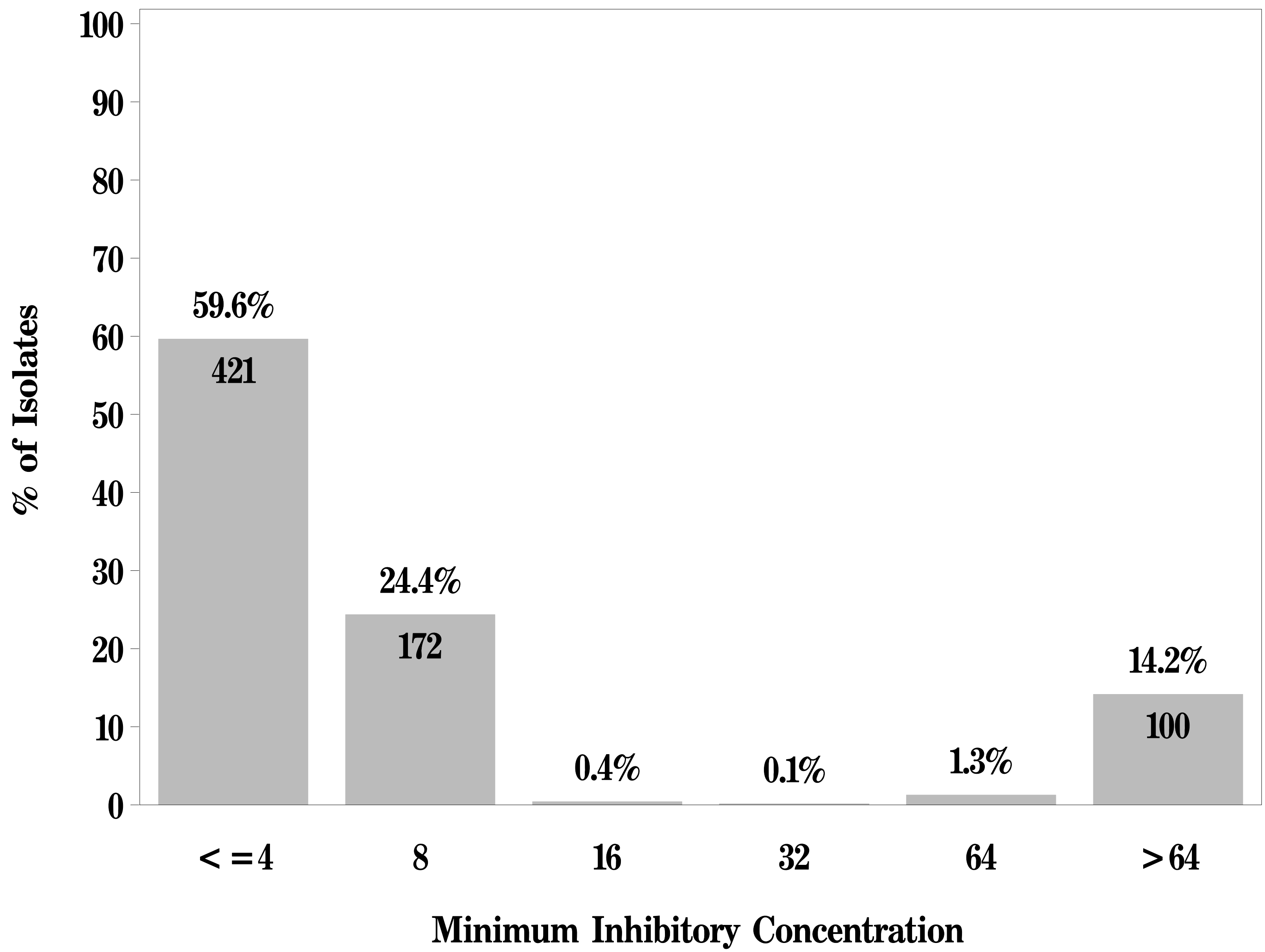
Breakpoints: Susceptible <=2 μg/mL Resistant >=8 μg/mL



NARMS

Figure 11g: Minimum Inhibitory Concentration of Nalidixic acid for *Campylobacter* in Chicken Breast (N=706 Isolates)

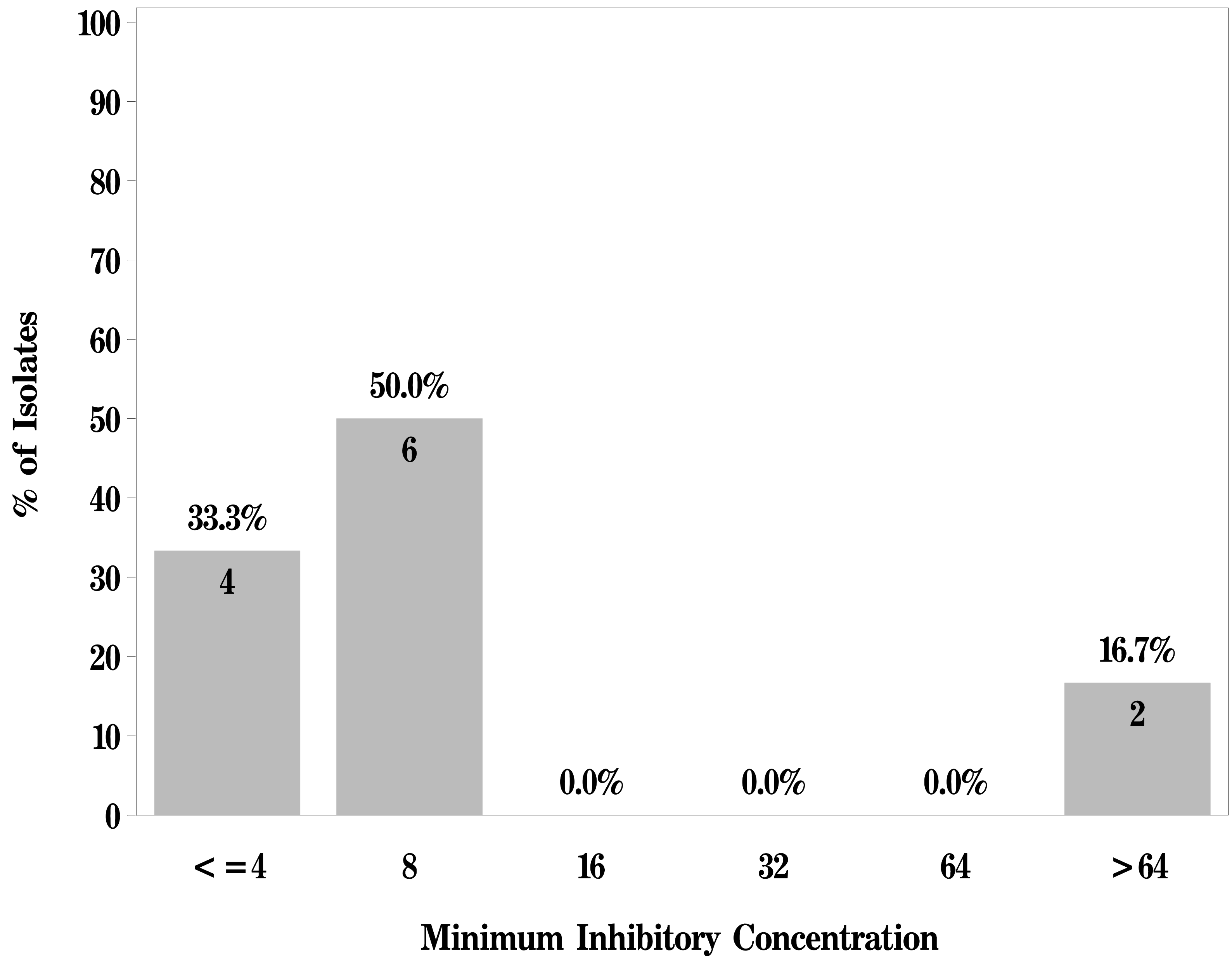
Breakpoints: Susceptible <=16 μg/mL Resistant >=64 μg/mL



NARMS

Figure 11g: Minimum Inhibitory Concentration of Nalidixic acid for *Campylobacter* in Ground Turkey (N=12 Isolates)

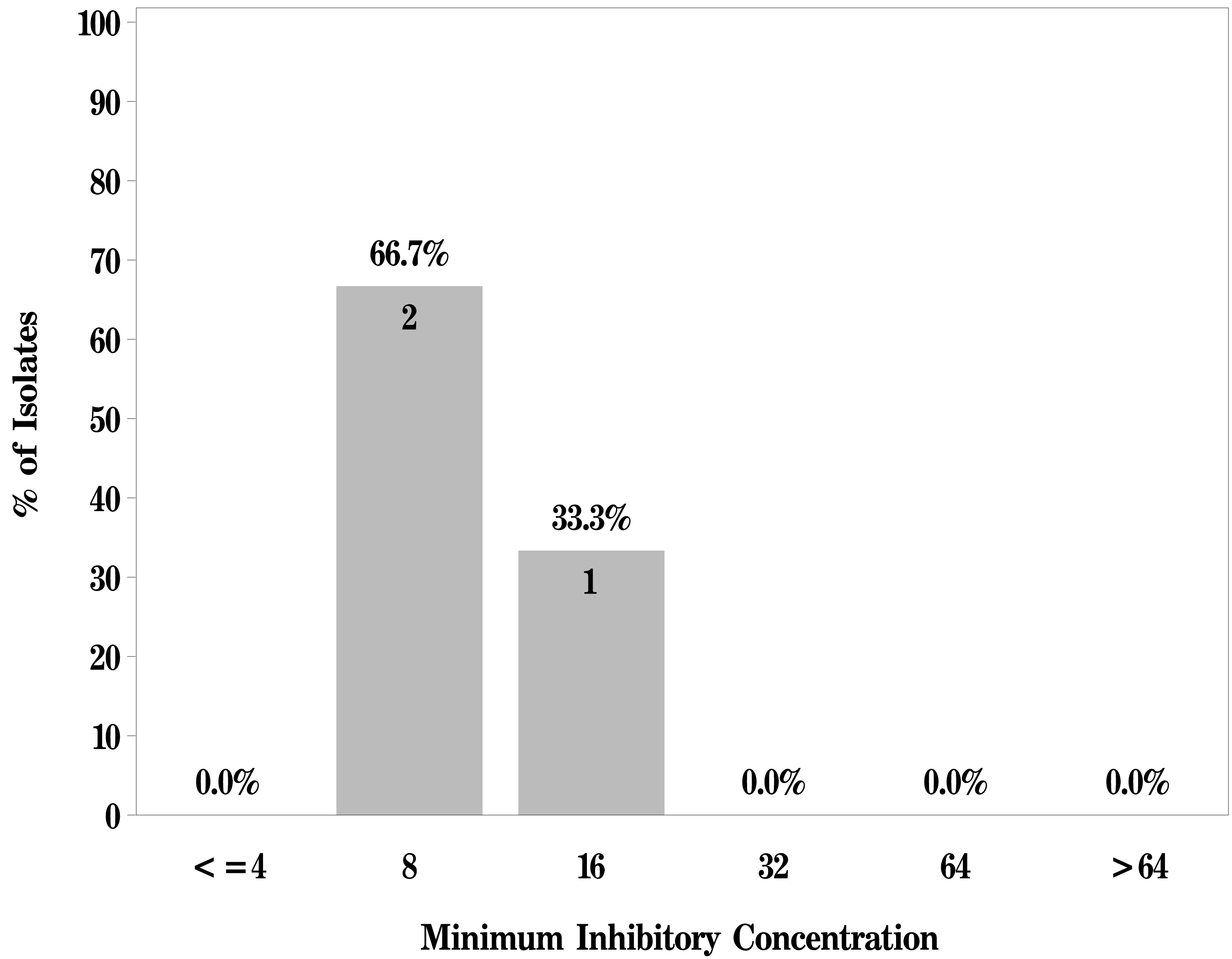
Breakpoints: Susceptible <=16 μg/mL Resistant >=64 μg/mL



NARMS

Figure 11g: Minimum Inhibitory Concentration of Nalidixic acid for *Campylobacter* in Pork Chop (N=3 Isolates)

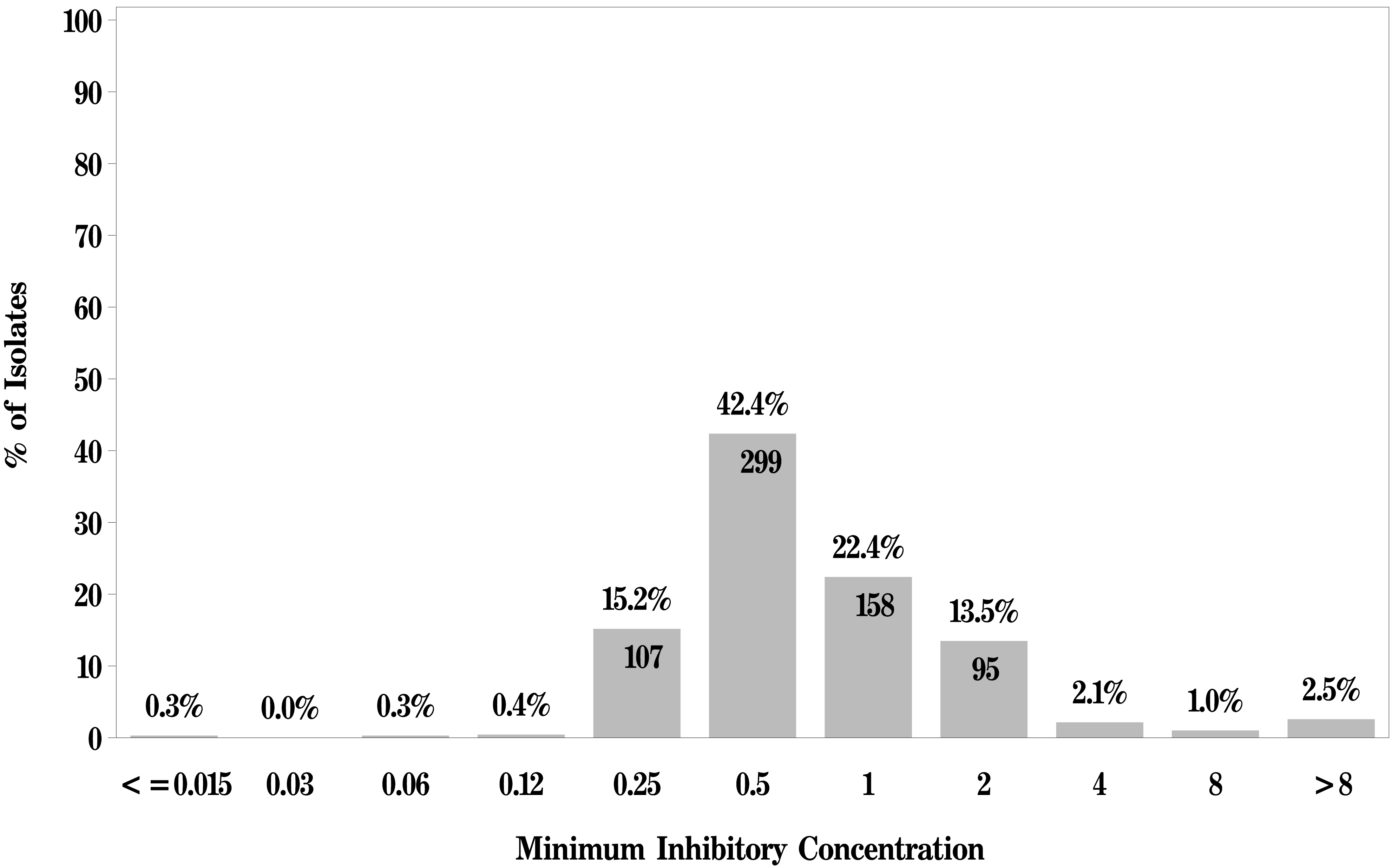
Breakpoints: Susceptible <=16 μg/mL Resistant >=64 μg/mL



NARMS

Figure 11h: Minimum Inhibitory Concentration of Telithromycin for *Campylobacter* in Chicken Breast (N=706 Isolates)

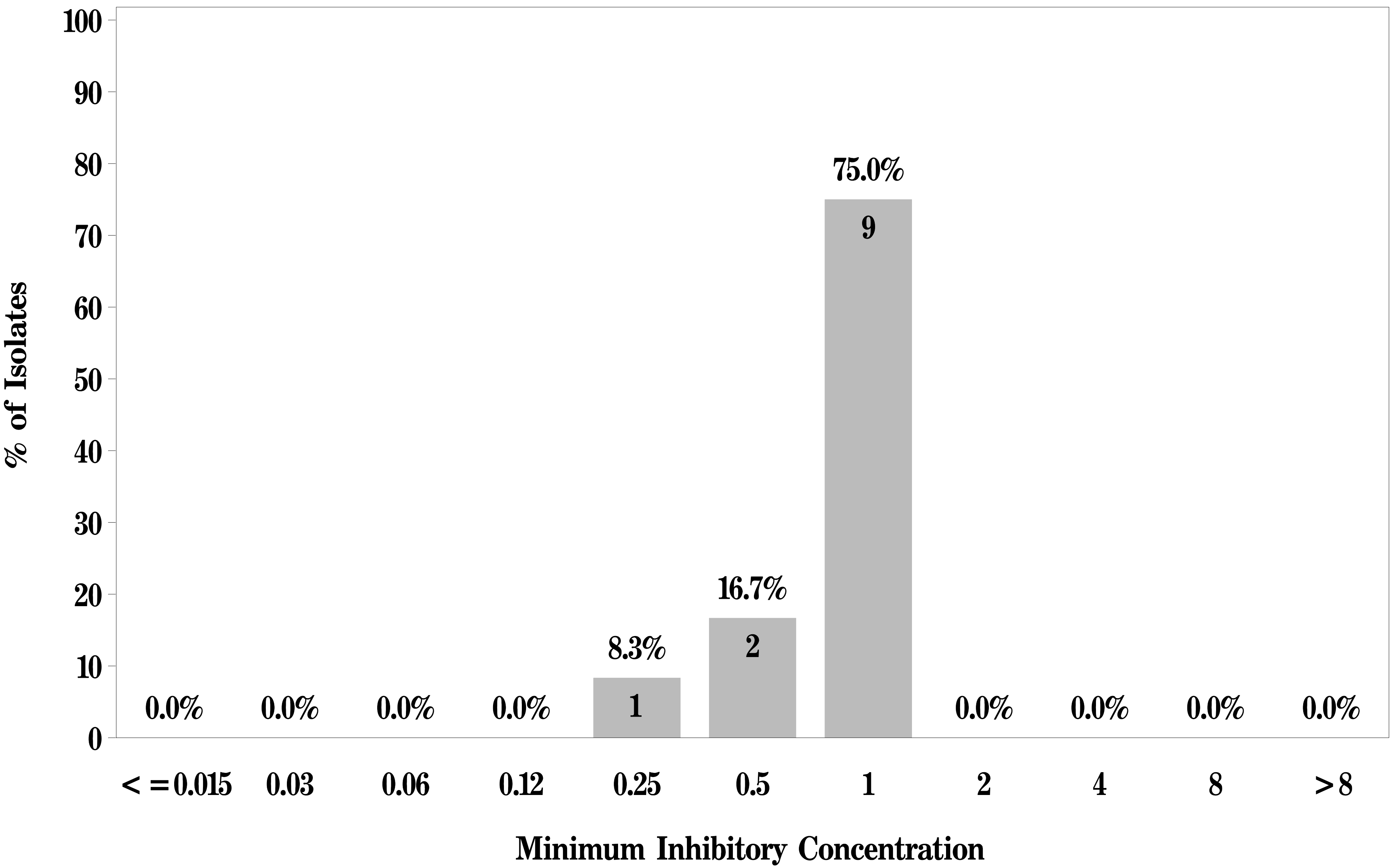
Breakpoints: Susceptible <=4 µg/mL Resistant >=16 µg/mL



NARMS

Figure 11h: Minimum Inhibitory Concentration of Telithromycin for *Campylobacter* in Ground Turkey (N=12 Isolates)

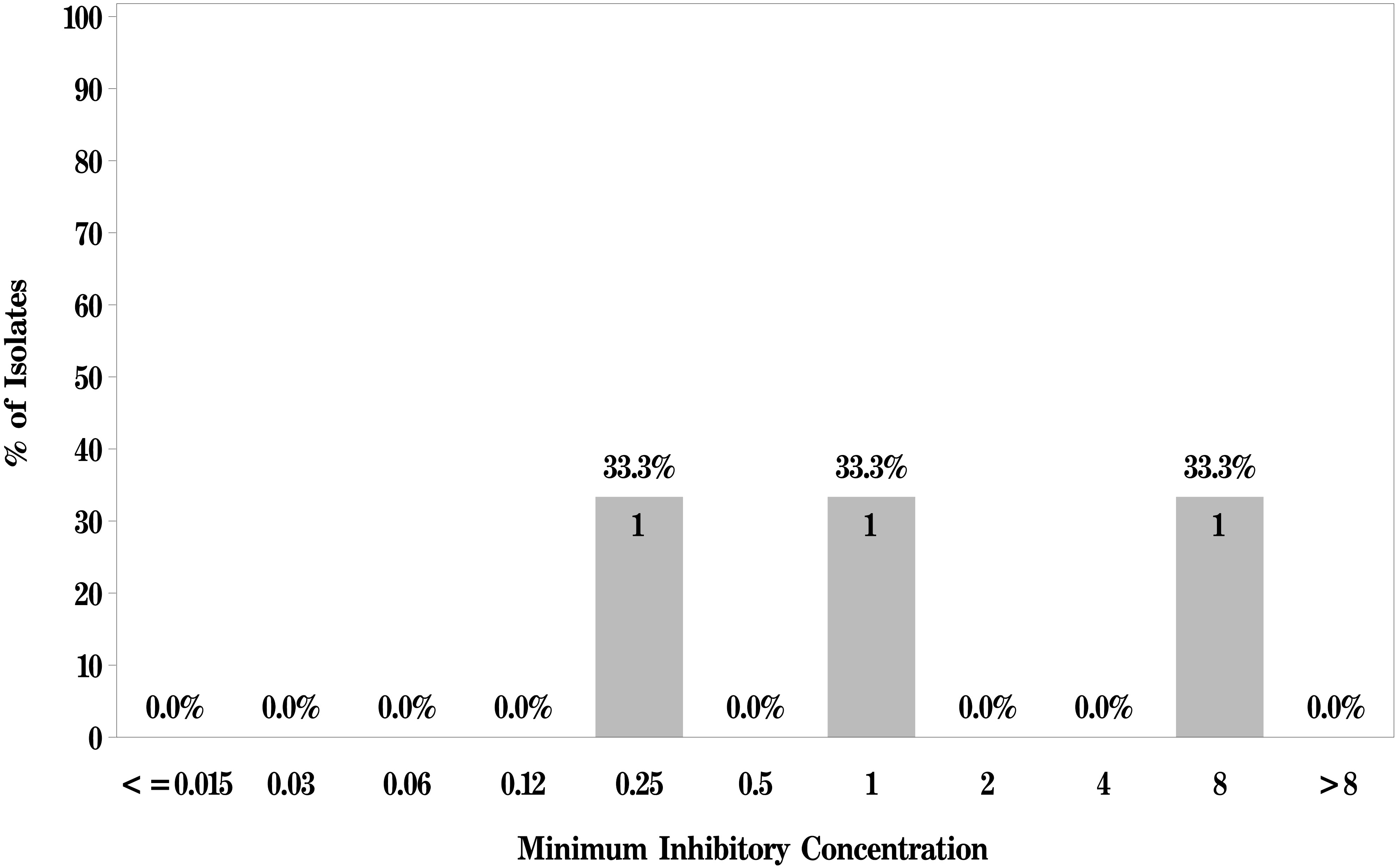
Breakpoints: Susceptible <=4 µg/mL Resistant >=16 µg/mL



NARMS

Figure 11h: Minimum Inhibitory Concentration of Telithromycin for *Campylobacter* in Pork Chop (N=3 Isolates)

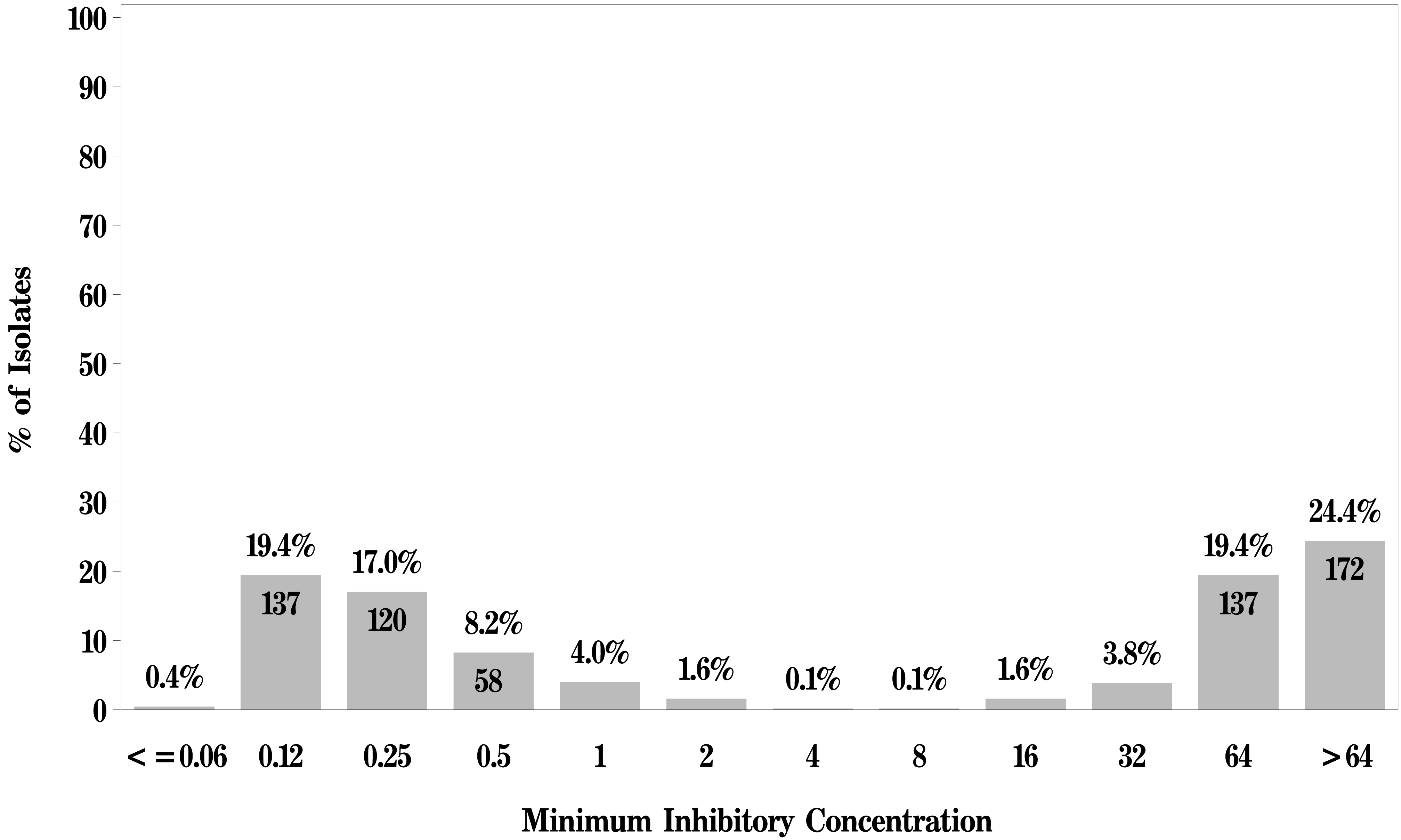
Breakpoints: Susceptible <=4 µg/mL Resistant >=16 µg/mL



NARMS

Figure 11i: Minimum Inhibitory Concentration of Tetracycline for *Campylobacter* in Chicken Breast (N=706 Isolates)

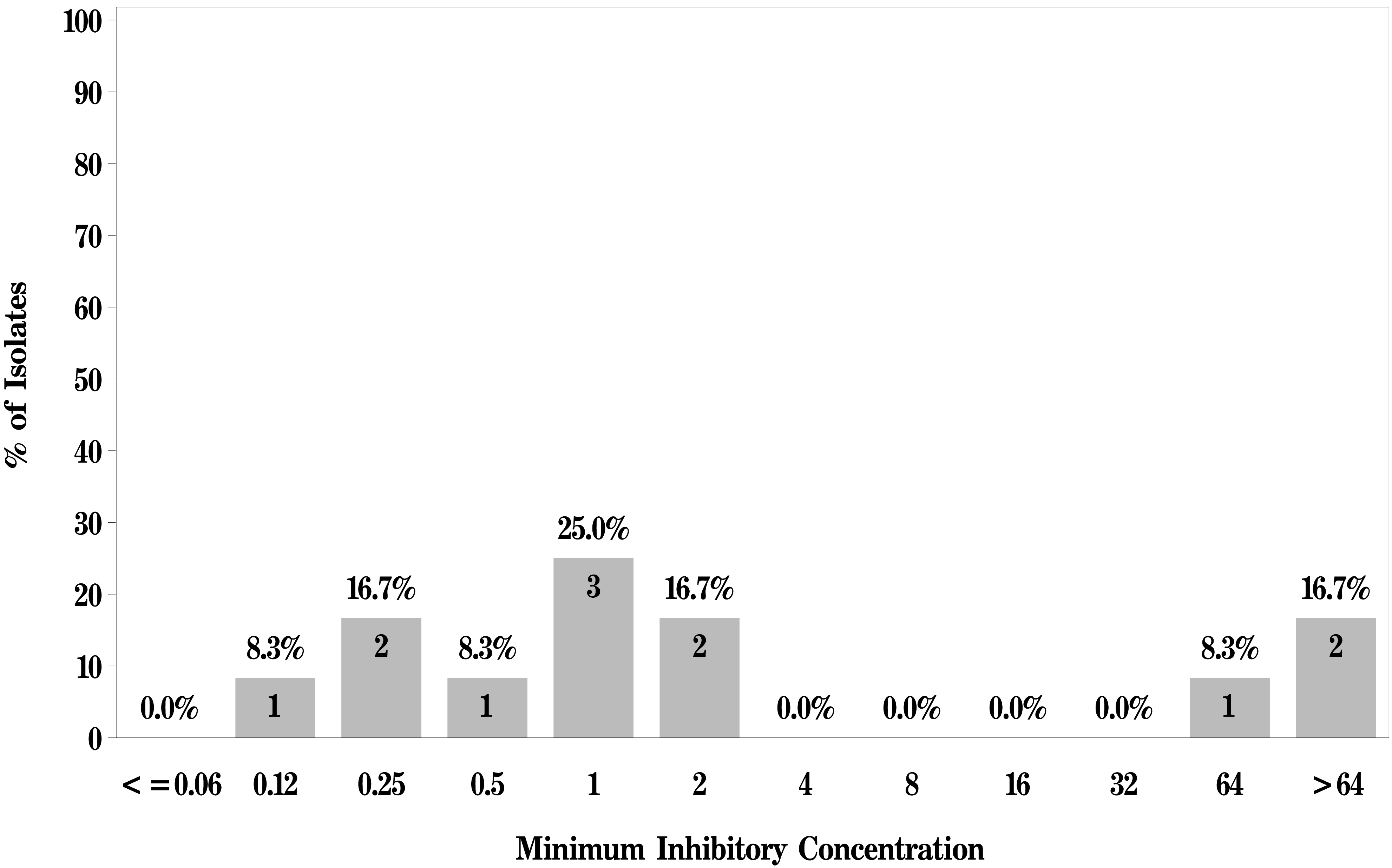
Breakpoints: Susceptible <=4 μg/mL Resistant >=16 μg/mL



NARMS

Figure 11i: Minimum Inhibitory Concentration of Tetracycline for *Campylobacter* in Ground Turkey (N=12 Isolates)

Breakpoints: Susceptible <=4 μg/mL Resistant >=16 μg/mL



NARMS

Figure 11i: Minimum Inhibitory Concentration of Tetracycline for *Campylobacter* in Pork Chop (N=3 Isolates)

Breakpoints: Susceptible <=4 μg/mL Resistant >=16 μg/mL

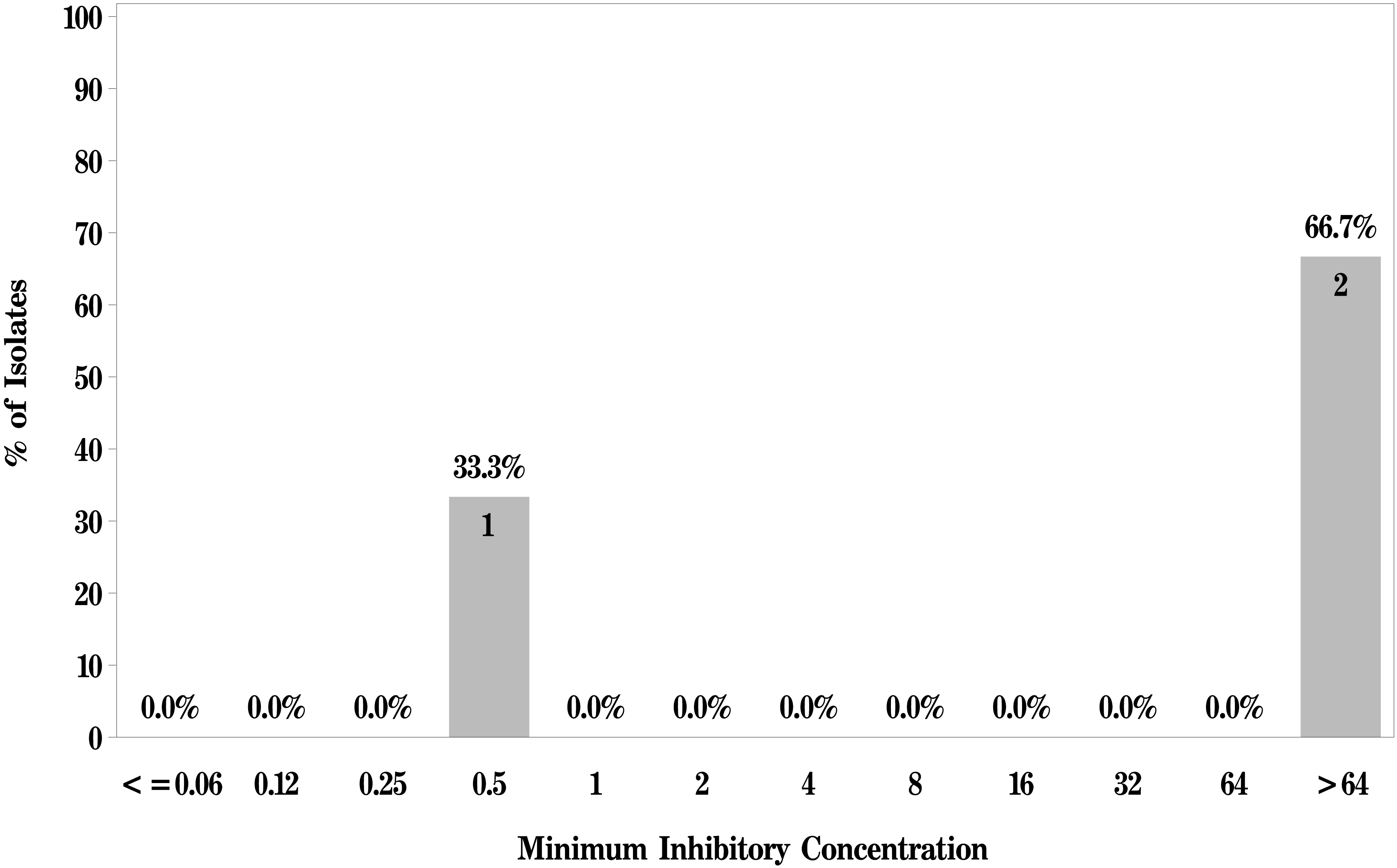


Table 22. Antimicrobial Resistance among *Campylobacter* by Species, 2004

Species	Antimicrobial Agent								
	TET	NAL	CIP	TEL	AZI	ERY	CLI	FFN	GEN
C. coli (n=204)	45.6%[*]	15.7%	15.7%	7.8%	9.3%	9.3%	7.4%	-	-[†]
C. jejuni (n=517)	50.1%	15.3%	15.3%	0.4%	0.8%	0.8%	0.4%	-	-
Total %R (N=721)	**48.8%**	**15.4%**	**15.4%**	**2.5%**	**3.2%**	**3.2%**	**2.4%**	**0.0%**	**0.0%**

[*] Where % Resistance = (# isolates per species resistant to antimicrobial) / (total # isolates per species).
[†] Dashes indicate 0.0% resistance to antimicrobial.

Table 23. Antimicrobial Resistance among *Campylobacter* Species by Meat Type, 2004

Meat Type[*]	Species	Antimicrobial Agent								
		TET	NAL	CIP	TEL	AZI	ERY	CLI	FFN	GEN
Chicken Breast	*C. coli* (n=196)	46.4%[†]	16.3%	16.3%	8.2%	9.2%	9.2%	7.1%	-	-
	C. jejuni (n=510)	50.2%	15.1%	15.1%	0.4%	0.8%	0.8%	0.4%	-	-
Ground Turkey	*C .coli* (n=5)	-[‡]	-	-	-	-	-	-	-	-
	C. jejuni (n=7)	42.9%	28.6%	28.6%	-	-	-	-	-	-
Pork Chop	*C .coli* (n=3)	66.7%	-	-	-	33.3%	33.3%	33.3%	-	-
	C. jejuni (n=0)	[§]								

[*] No *Campylobacter* recovered from ground beef.
[†] Where % Resistance = (# isolates per species resistant to antimicrobial within meat type) / (total # isolates per species within meat type).
[‡] Where dashes indicate 0.0% resistance to antimicrobial.
[§] Grey areas indicate species not isolated from that meat type.

Table 24. Antimicrobial Resistance among *Campylobacter* by Site, Meat Type, and Antimicrobial Agent, 2004

Site	Meat Type*	Antimicrobial Agent								
		TET	NAL	CIP	TEL	AZI	ERY	CLI	FFN	GEN
CA	CB (n=96)	54.2%†	6.3%	6.3%	-	-	-	-	-	-
	GT (n=0)	‡								
	PC (n=1)	100.0%	-§	-	-	-	-	-	-	-
	Total (n=97)	**54.6%**	**6.2%**	**6.2%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**
CO	CB (n=21)	38.1%	19.0%	19.0 %	4.8%	4.8%	4.8%	4.8%	-	-
	GT (n=0)									
	PC (n=0)									
	Total (n=21)	**38.1%**	**19.0%**	**19.0%**	**4.8%**	**4.8%**	**4.8%**	**4.8%**	**0.0%**	**0.0%**
CT	CB (n=86)	65.1%	27.9%	27.9%	2.3%	2.3%	2.3%	2.3%	-	-
	GT (n=2)	100.0%	50.0%	50.0%	-	-	-	-	-	-
	PC (n=1)	100.0%	-	-	-	100.0%	100.0%	100.0%	-	-
	Total (n=89)	**66.3%**	**28.1%**	**28.1%**	**2.3%**	**3.4%**	**3.4%**	**3.4%**	**0.0%**	**0.0%**
GA	CB (n=61)	39.3%	13.1%	13.1%	6.6%	8.2%	8.2%	6.6%	-	-
	GT (n=0)									
	PC (n=0)									
	Total (n=62)	**38.7%**	**12.9%**	**12.9%**	**6.6%**	**8.1%**	**8.1%**	**6.5%**	**0.0%**	**0.0%**
MD	CB (n=76)	43.4%	27.6%	27.6%	-	1.3%	1.3%	-	-	-
	GT (n=2)	-	50.0%	50.0%	-	-	-	-	-	-
	PC (n=0)									
	Total (n=78)	**42.3%**	**28.2%**	**28.2%**	**0.0%**	**1.3%**	**1.3%**	**0.0%**	**0.0%**	**0.0%**

* No *Campylobacter* recovered from ground beef.
† Where % Resistance = (# isolates resistant to antimicrobial per meat type per site) / (total # isolates per meat type per site).
‡ Grey areas indicate species not isolated from that meat type.
§ Where dashes indicate 0.0% resistance to antimicrobial.

Table 24(cont'd). Antimicrobial Resistance among *Campylobacter* by Site, Meat Type, and Antimicrobial Agent, 2004

Site	Meat Type	Antimicrobial Agent								
		TET	NAL	CIP	TEL	AZI	ERY	CLI	FFN	GEN
MN	CB (n=73)	68.5%	4.1%	4.1%	2.7%	2.7%	2.7%	2.7%	-	-
	GT (n=6)	16.7%	-	-	-	-	-	-	-	-
	PC (n=0)									
	Total (n=79)	**64.6%**	**3.8%**	**3.8%**	**2.5%**	**2.5%**	**2.5%**	**2.5%**	**0.0%**	**0.0%**
NM	CB (n=53)	35.8%	5.7%	5.7%	11.3%	11.3%	11.3%	9.4%	-	-
	GT (n=0)									
	PC (n=1)	-	-	-	-	-	-	-	-	-
	Total (n=54)	**35.2%**	**5.6%**	**5.6%**	**11.1%**	**11.1%**	**11.1%**	**9.4%**	**0.0%**	**0.0%**
NY	CB (n=96)	40.6%	35.4%	35.4%	-	-	-	-	-	-
	GT (n=0)									
	PC (n=0)									
	Total (n=96)	**40.6**	**35.4%**	**35.4%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**
OR	CB (n=73)	52.1%	-	-	-	1.4%	1.4%	-	-	-
	GT (n=0)									
	PC (n=0)									
	Total (n=73)	**52.1%**	**0.0%**	**0.0%**	**0.0%**	**1.4%**	**1.4%**	**0.0%**	**0.0%**	**0.0%**
TN	CB (n=71)	39.4%	8.5%	8.5%	4.2%	5.6%	5.6%	2.8%	-	-
	GT (n=0)									
	PC (n=0)									
	Total (n=72)	**38.9%**	**8.3%**	**8.3%**	**4.2%**	**5.6%**	**5.6%**	**2.8%**	**0.0%**	**0.0%**
Total %R (N=721)		**48.8%**	**15.5%**	**15.4%**	**3.6%**	**3.2%**	**3.2%**	**2.4%**	**0.0%**	**0.0%**

Table 25. Number of *Campylobacter* (N=721) Resistant to Multiple Antimicrobial Agents, 2004

Meat Type	Number of Antimicrobials			
	0	**1**	**2-4**	**≥5**
Chicken Breast	280	296	124	6
Ground Turkey	8	2	2	0
Pork Chop	1	1	0	1
Total	**289**	**299**	**126**	**7**

Table 26. Overall *Enterococcus* Species Identified, 2004

	Species	n
1.	*E. faecalis*	855
2.	*E. faecium*	757
3.	*E. hirae*	129
4.	*E. gallinarum*	7
5.	*E. durans*	3
6.	*E. casseliflavus*	3
7.	*E. mundtii*	1
	Total	**1755**

Table 27. *Enterococcus* Species by Meat Type, 2004

Species	Chicken Breast		Ground Turkey		Ground Beef		Pork Chop	
	n	%*	n	%	n	%	n	%
E. faecalis (n=855)	88	10.3%	260	30.4%	194	22.7%	313	36.6%
E. faecium (n=757	348	46.0%	172	22.7%	162	21.4%	75	9.9%
E. hirae (n=129)	27	20.9%		-	88	68.2%	14	10.9%
E. gallinarium (n=7)		-†	4	57.1%	2	28.6%	1	14.3%
E. durans (n=3)	2	66.7%	1	33.3%		-		-
E. casseliflavus (n=3)		-		-	2	66.7%	1	33.3%
E. mundtii (n=1)	1	100.0%		-		-		-
Total (N=1755)	466	26.6%	437	24.9%	448	25.5%	404	23.0%

* Where % = (# isolates per species per meat) / (total # isolates per species).

† Dashes indicate no isolates of that species were isolated from that meat type.

Table 28. *Enterococcus* Species by Site and Meat Type, 2004

Site	Species	Chicken Breast		Ground Turkey		Ground Beef		Pork Chop	
		n	%*	n	%	n	%	n	%
GA	*E. faecalis* (n=346)	54	15.6%	108	31.2%	78	22.5%	106	30.6%
	E. faecium (n=100)	59	59.0%	11	11.0%	22	22.2%	8	8.0%
	E. hirae (n=23)	5	21.2%		-†	16	69.6%	2	8.7%
	E. durans (n=2)	1	50.0%	1	50.0%		-		-
	E. casseliflavus (n=1)		-		-	1	100.0%		-
	E. mundtii (n=1)	1	100.0%						
	Total (n=473)	**120**	**25.1%**	**120**	**25.3%**	**117**	**24.7%**	**116**	**24.5%**
MD	*E. faecalis* (n=110)	3	2.9%	30	29.4%	21	20.6%	48	47.1%
	E. faecium (n=233)	106	41.1%	75	29.1%	54	20.9%	23	8.9%
	E. hirae (n=43)	5	14.3%		-	24	68.6%	6	17.1%
	E. gallinarum (n=5)		-	1	50.0%	1	50.0%		-
	Total (n=397)	**114**	**28.7%**	**106**	**26.7%**	**100**	**25.2%**	**77**	**19.4%**
OR	*E. faecalis* (n=201)	18	9.0%	67	33.3%	37	18.4%	79	39.3%
	E. faecium (n=181)	85	47.0%	35	19.3%	37	20.4%	24	13.3%
	E. hirae (n=58)	15	25.9%		-	39	67.2%	4	6.9%
	E. gallinarum (n=4)		-	3	75.0%	1	25.0%		-
	E. casseliflavus (n=2)		-		-	1	50.0%	1	50.0%
	Total (n=446)	**118**	**26.5%**	**105**	**23.5%**	**115**	**25.8%**	**108**	**24.2%**
TN	*E. faecalis* (n=206)	13	6.3%	55	26.7%	58	28.2%	80	38.8%
	E. faecium (n=218)	98	45.0%	51	23.4%	49	22.5%	20	9.2%
	E. hirae (n=13)	2	15.4%		-	9	69.2%	2	15.4%
	E. gallinarum (n=1)		-		-		-	1	100.0%
	E. durans (n=1)	1	100.0%		-		-		-
	Total (n=439)	**114**	**26.0%**	**106**	**24.1%**	**116**	**26.4%**	**103**	**23.5%**

* Where % = (# isolates per species per meat type per site) / (total # isolates per species per site).

† Dashes indicate no isolates for that species were isolated from that meat type.

Table 29. *Enterococcus* Isolates by Month for All Sites, 2004

Month	n	%*
January	148	8.4%
February	144	8.2%
March	140	8.0%
April	156	8.9%
May	153	8.7%
June	136	7.7%
July	135	7.7%
August	148	8.4%
September	154	8.8%
October	141	8.0%
November	148	8.4%
December	152	8.7%
Total (N)	**1755**	**100.0%**

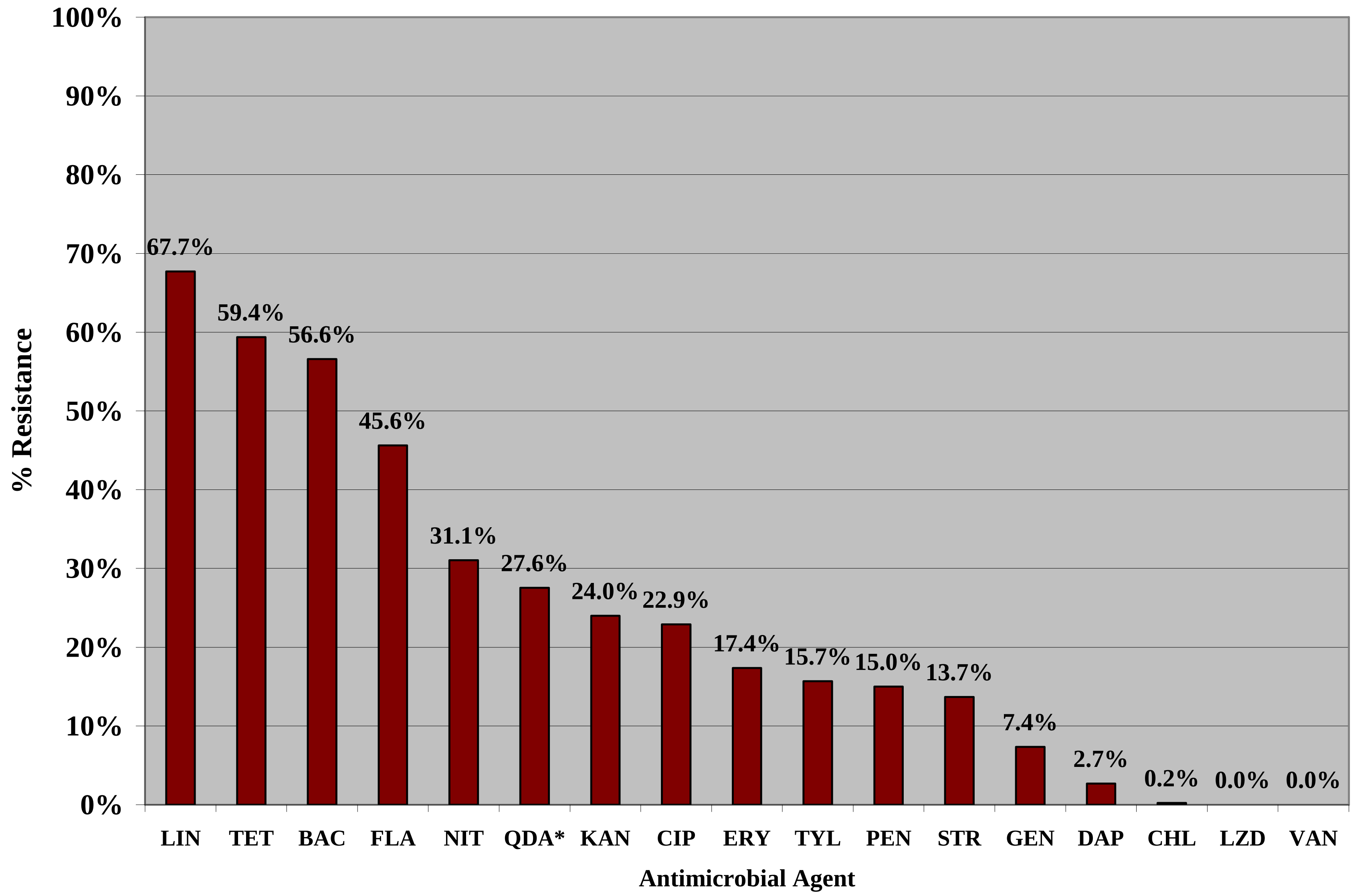
* Where % = (n / N).

Table 30. Antimicrobial Resistance among *Enterococcus* Isolates (N=1755), 2004

Antimicrobial Agent	n	%R*
Lincomycin	1188	67.7%
Tetracycline	1042	59.4%
Bacitracin	993	56.6%
Flavomycin	801	45.6%
Quinupristin-Dalfopristin†	248	27.6%
Nitrofurantoin	545	31.1%
Kanamycin	421	24.0%
Ciprofloxacin	402	22.9%
Erythromycin	305	17.4%
Tylosin	275	15.7%
Penicillin	263	15.0%
Streptomycin	240	13.7%
Gentamicin	129	7.4%
Daptomycin	48	2.7
Chloramphenicol	4	0.2%
Linezolid	0	0.0%
Vancomycin	0	0.0%

* Where % R = (n / N).
† Presented for all species except *E. faecalis* (n = 855).

Figure 12. Antimicrobial Resistance among *Enterococcus* Isolates (N=1755), 2004



*** Presented for all species except *E. faecalis* in QDA (N=1755-855=900 non- *faecalis*)**

Figure 13. MIC Distribution among all Antimicrobial Agents

***Enterococcus* from All Meats (N=1755)**		Distribution (%) of MICs (in µg/ml)																		
Antimicrobial Agent	**%R†**	**0.015**	**0.03**	**0.06**	**0.125**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**
Bacitracin*	**56.6**										7.3	3.1	7.5	25.6	**17.4**	**39.1**				
Chloramphenicol	**0.2**								0.1	4.6	88.4	6.8	**0.2**	**0.1**						
Ciprofloxacin	**22.9**				0.1	0.3	5.3	30.3	41.1	**18.3**	**4.6**									
Daptomycin*	**§**						4.1	37.8	24.2	31.2	2.1	0.6								
Erythromycin	**17.4**						40.2	23.7	12.0	6.8	**1.2**	**16.2**								
Tylosin*	**15.7**						0.2	4.2	29.1	41.7	8.9	0.3	0.1	**15.6**						
Gentamicin	**7.4**														92.2	0.5	**0.6**	**0.5**	**6.4**	
Kanamycin*	**24.0**														64.2	11.8	**11.2**	**1.1**	**11.7**	
Streptomycin*	**13.7**																86.4	**3.5**	**3.8**	**6.5**
Lincomycin*	**67.7**							9.5	0.5	0.7	5.7	16.0	**34.5**	**33.2**						
Linezolid	**0.0**						0.2	1.5	88.5	9.9										
Nitrofurantoin	**31.1**									0.1	18.6	29.1	4.3	17.0	**31.0**					
Flavomycin*	**45.6**							45.5	2.8	1.0	2.3	2.7	**1.5**	**44.2**						
Penicillin	**15.0**						7.0	3.7	26.4	43.8	4.2	**7.8**	**7.2**							
Tetracycline	**59.4**									38.8	1.8	**1.2**	**4.4**	**53.8**						
Quinupristin/Dalfopristin↑	**27.4**							24.7	47.7	**7.4**	**13.1**	**5.9**	**1.1**							
Vancomycin	**0.0**						32.7	44.3	21.2	1.4	0.5									

Vertical bars show the CLSI Susceptible/Resistant breakpoints for each drug where appropriate.

*Currently no CLSI breakpoints have been established for this organism/antimicrobial combination. Indicated breakpoints were established by NARMS.

†Discrepancies between %R and sums of distribution %s are due to rounding.

Unshaded areas indicate the dilution ranges of the Sensititre plate used to test the 2004 isolates.

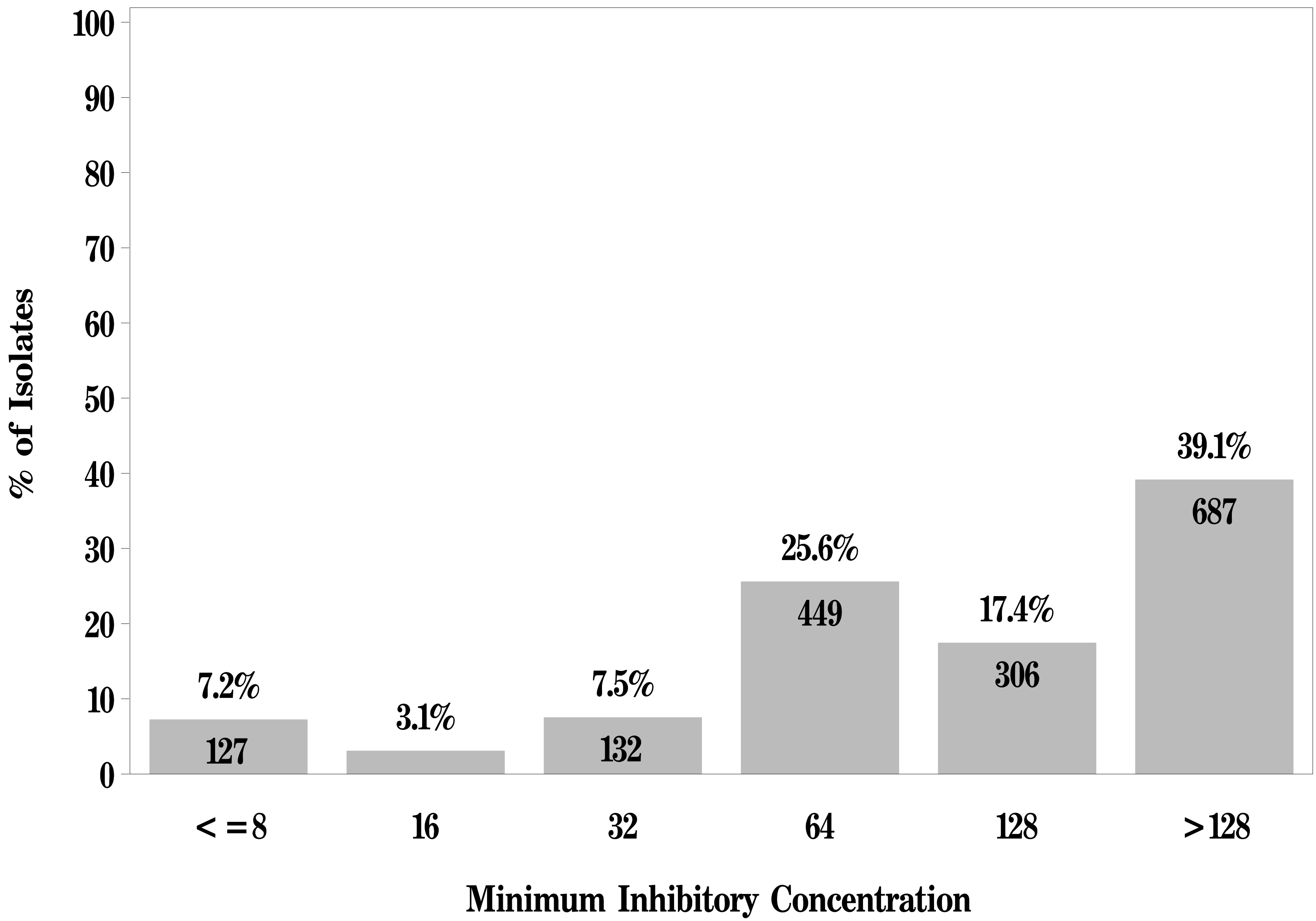
↑ Presented for all species except *E. faecalis* in QDA (n=1755-855= 900 non *E. faecalis*)

§Absence of resistant strains precludes defining any results category other than "susceptible."

NARMS

Figure 13a: Minimum Inhibitory Concentration of Bacitracin for *Enterococcus* (N=1755 Isolates)

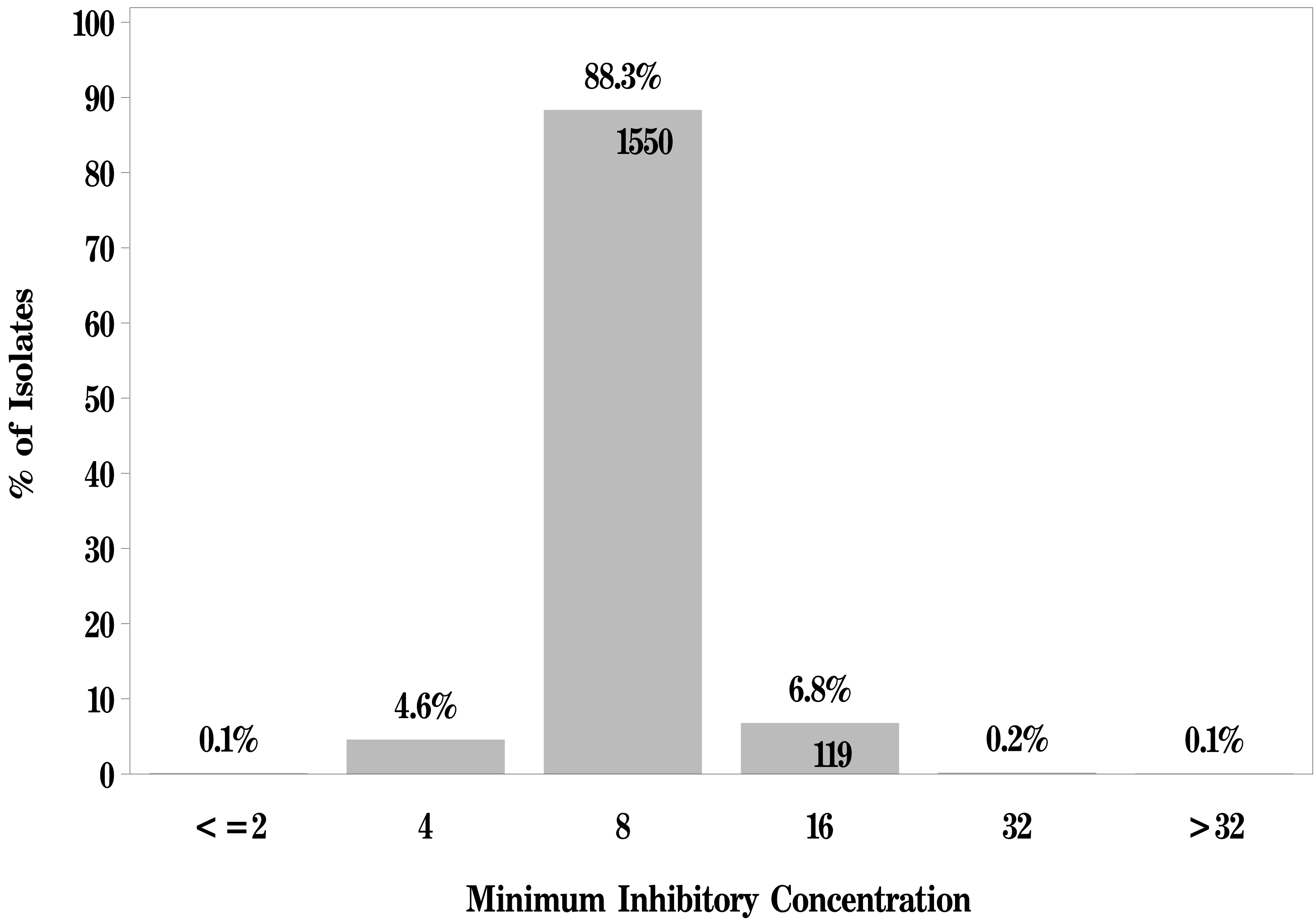
Breakpoints: Susceptible <=32 μg/mL Resistant >=128 μg/mL



NARMS

Figure 13b: Minimum Inhibitory Concentration of Chloramphenicol for *Enterococcus* (N=1755 Isolates)

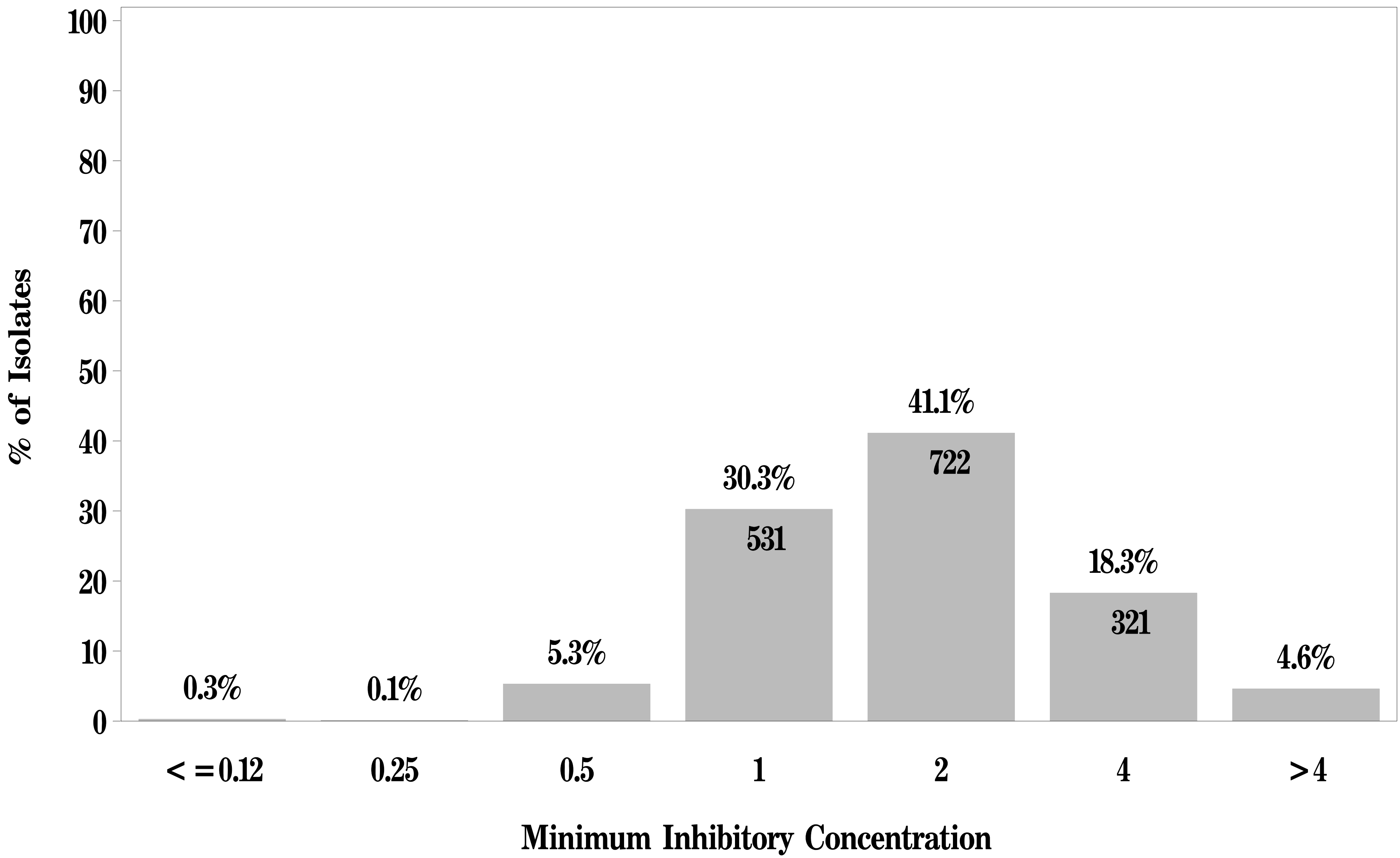
Breakpoints: Susceptible <=8 µg/mL Resistant >=32 µg/mL



NARMS

Figure 13c: Minimum Inhibitory Concentration of Ciprofloxacin for *Enterococcus* (N=1755 Isolates)

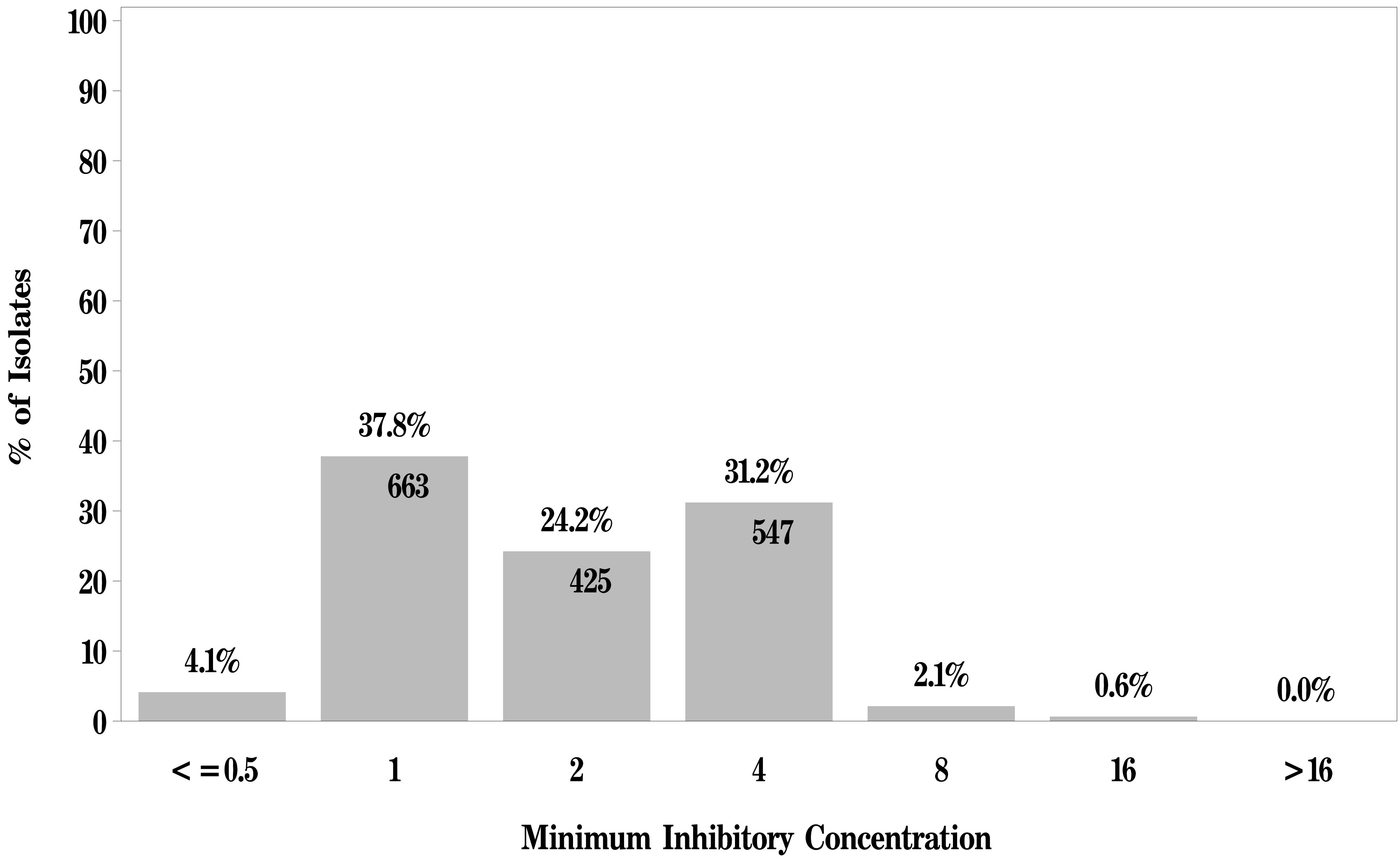
Breakpoints: Susceptible <=1 μg/mL Resistant >=4 μg/mL



NARMS

Figure 13d: Minimum Inhibitory Concentration of Daptomycin for *Enterococcus* (N=1755 Isolates)

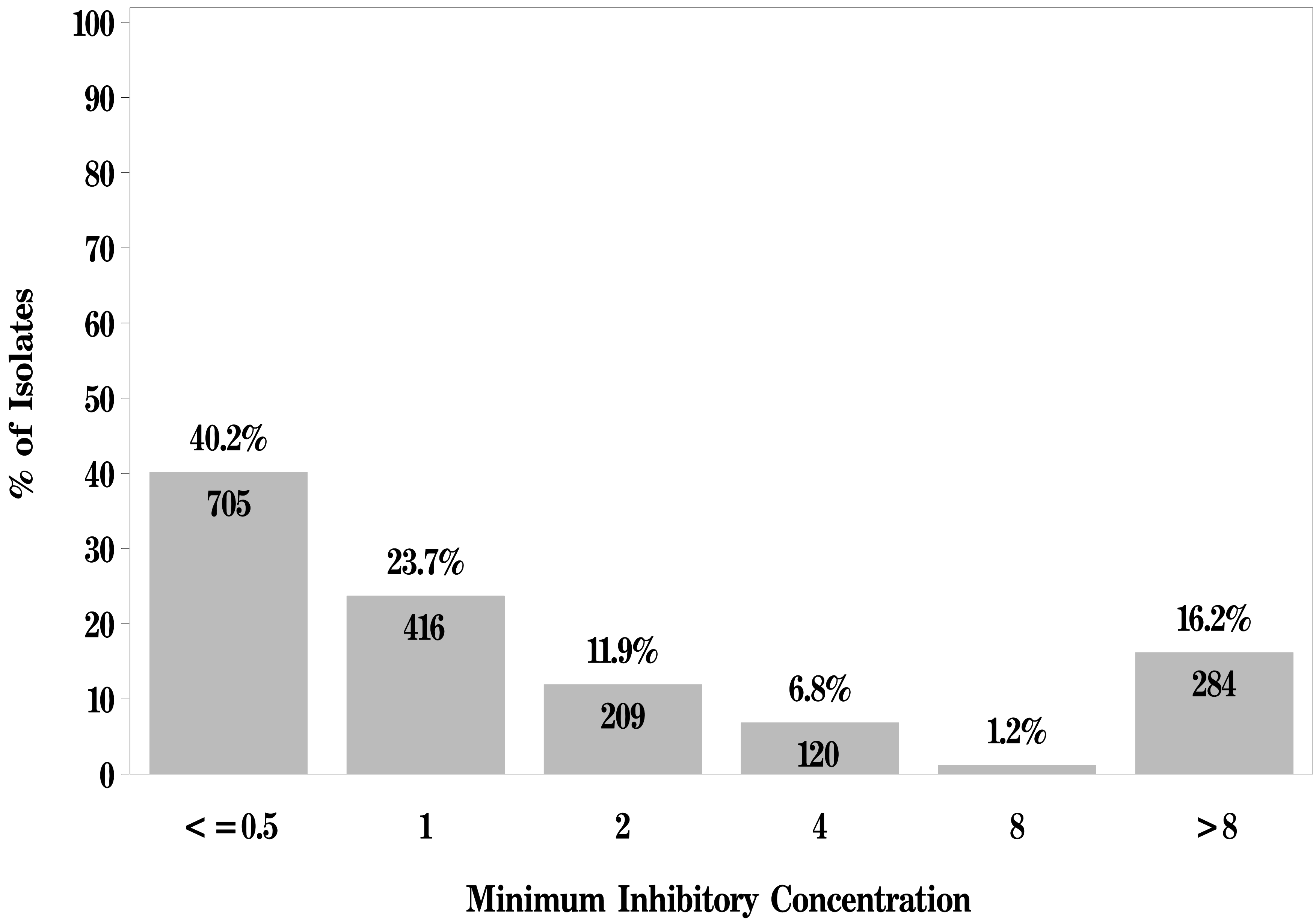
Breakpoint: Susceptible <=4 μg/mL



NARMS

Figure 13e: Minimum Inhibitory Concentration of Erythromycin for *Enterococcus* (N=1755 Isolates)

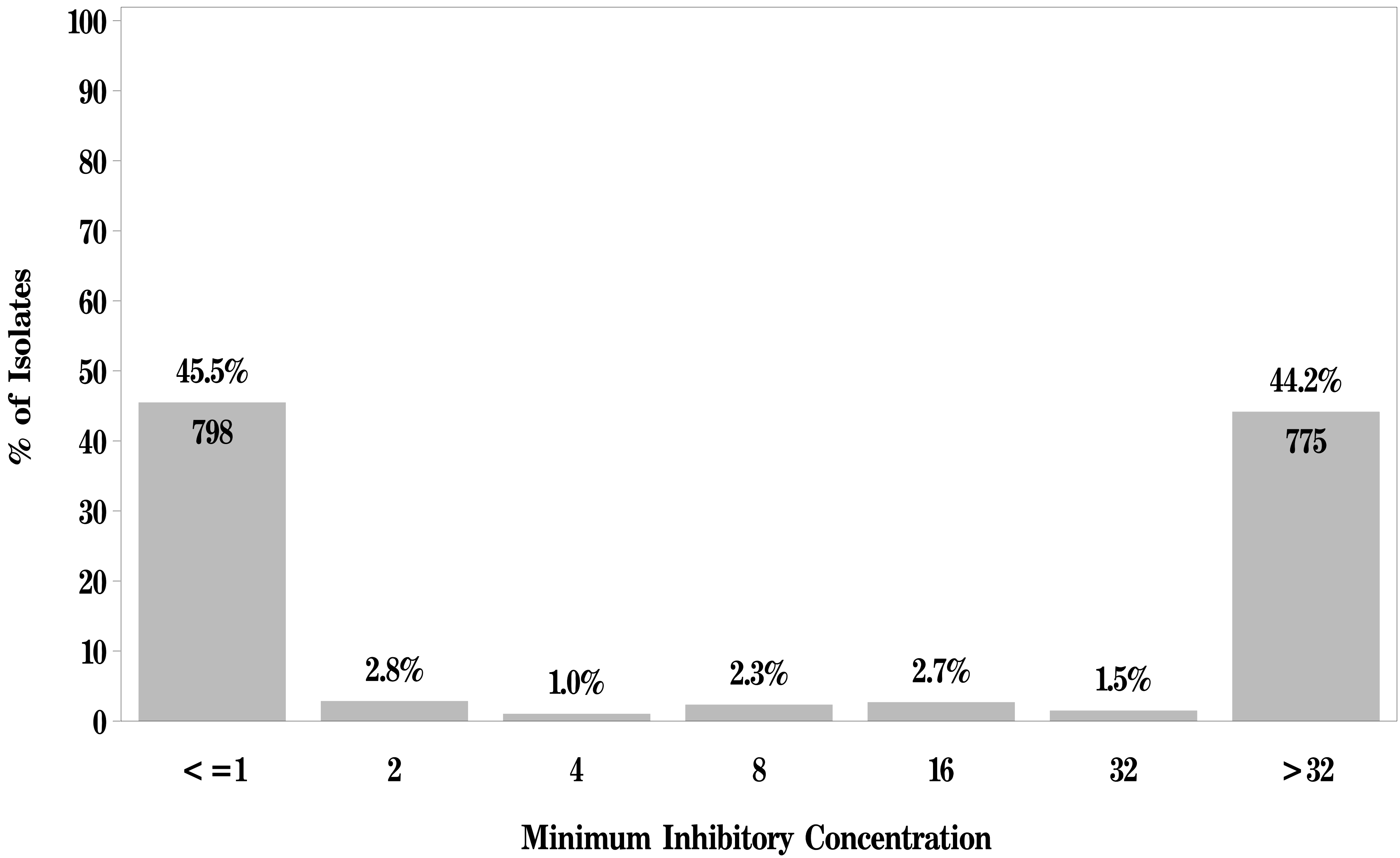
Breakpoints: Susceptible <=0.5 μg/mL Resistant >=8 μg/mL



NARMS

Figure 13f: Minimum Inhibitory Concentration of Flavomycin for *Enterococcus* (N=1755 Isolates)

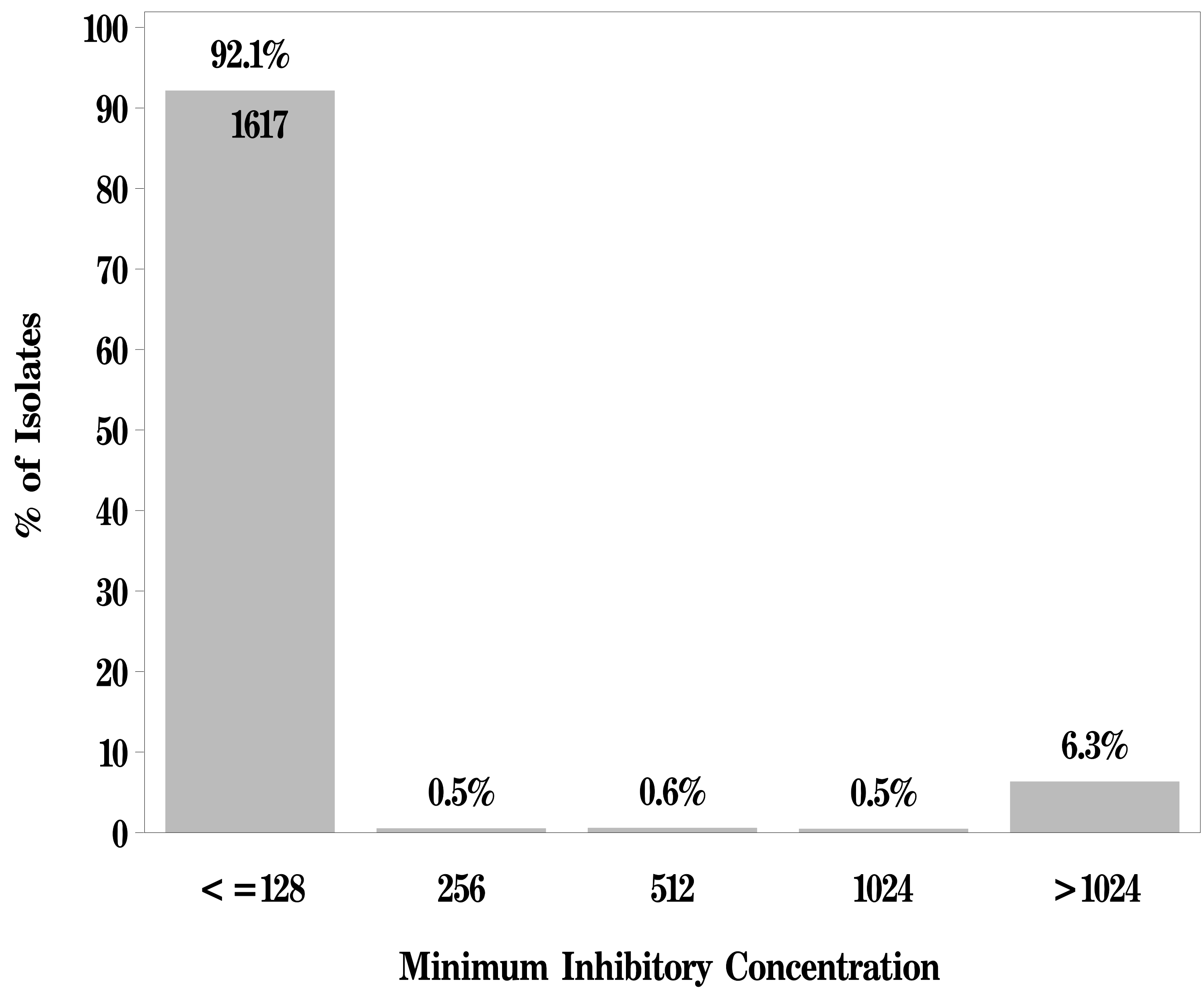
Breakpoints: Susceptible <=8 μg/mL Resistant >=32 μg/mL



NARMS

Figure 13g: Minimum Inhibitory Concentration of Gentamicin for *Enterococcus* (N=1755 Isolates)

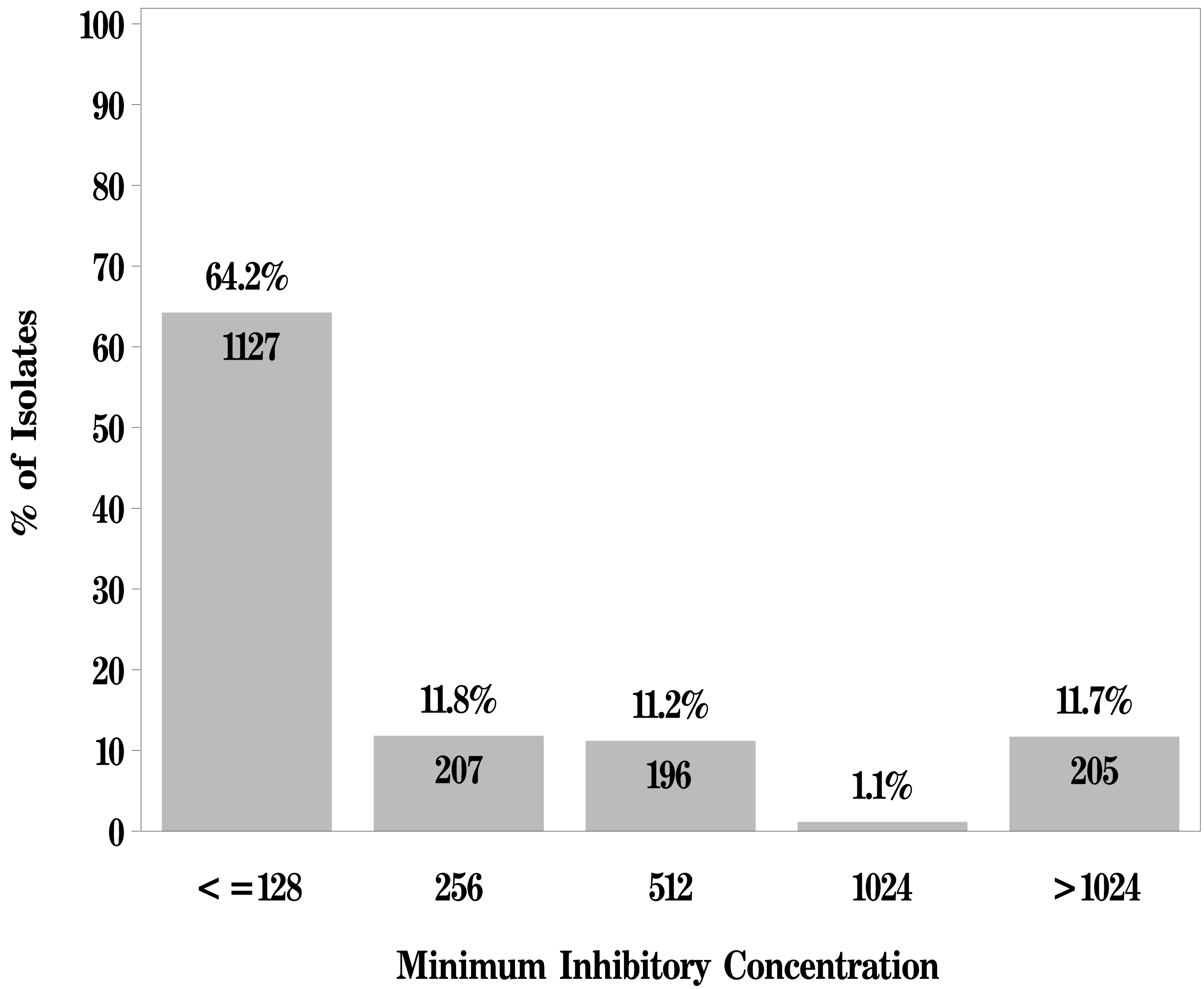
Breakpoints: Susceptible <=500 μg/mL Resistant >=500 μg/mL



NARMS

Figure 13h: Minimum Inhibitory Concentration of Kanamycin for *Enterococcus* (N=1755 Isolates)

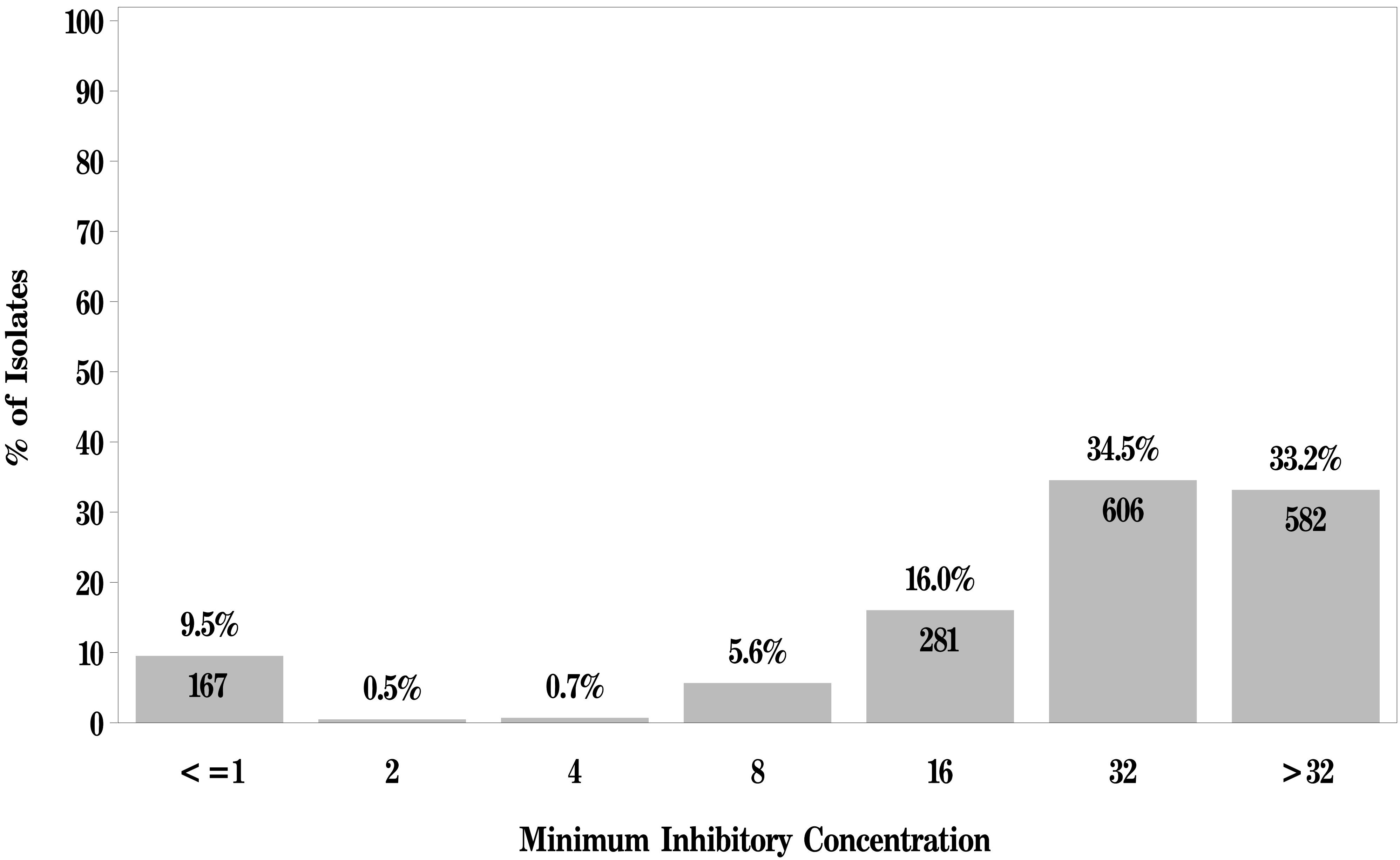
Breakpoints: Susceptible <=128 μg/mL Resistant >=512 μg/mL



NARMS

Figure 13i: Minimum Inhibitory Concentration of Lincomycin for *Enterococcus* (N=1755 Isolates)

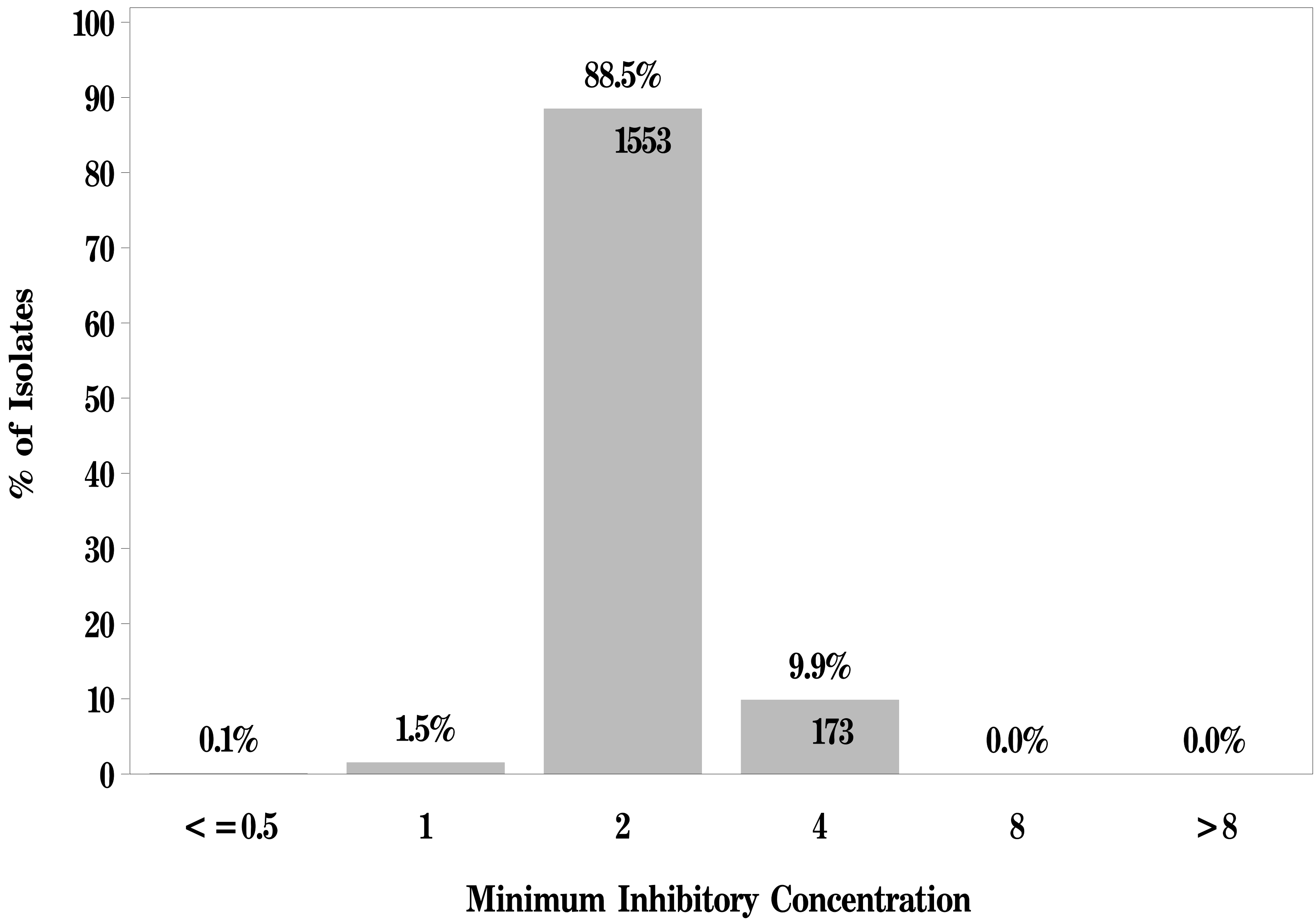
Breakpoints: Susceptible <=8 μg/mL Resistant >=32 μg/mL



NARMS

Figure 13j: Minimum Inhibitory Concentration of Linezolid for *Enterococcus* (N=1755 Isolates)

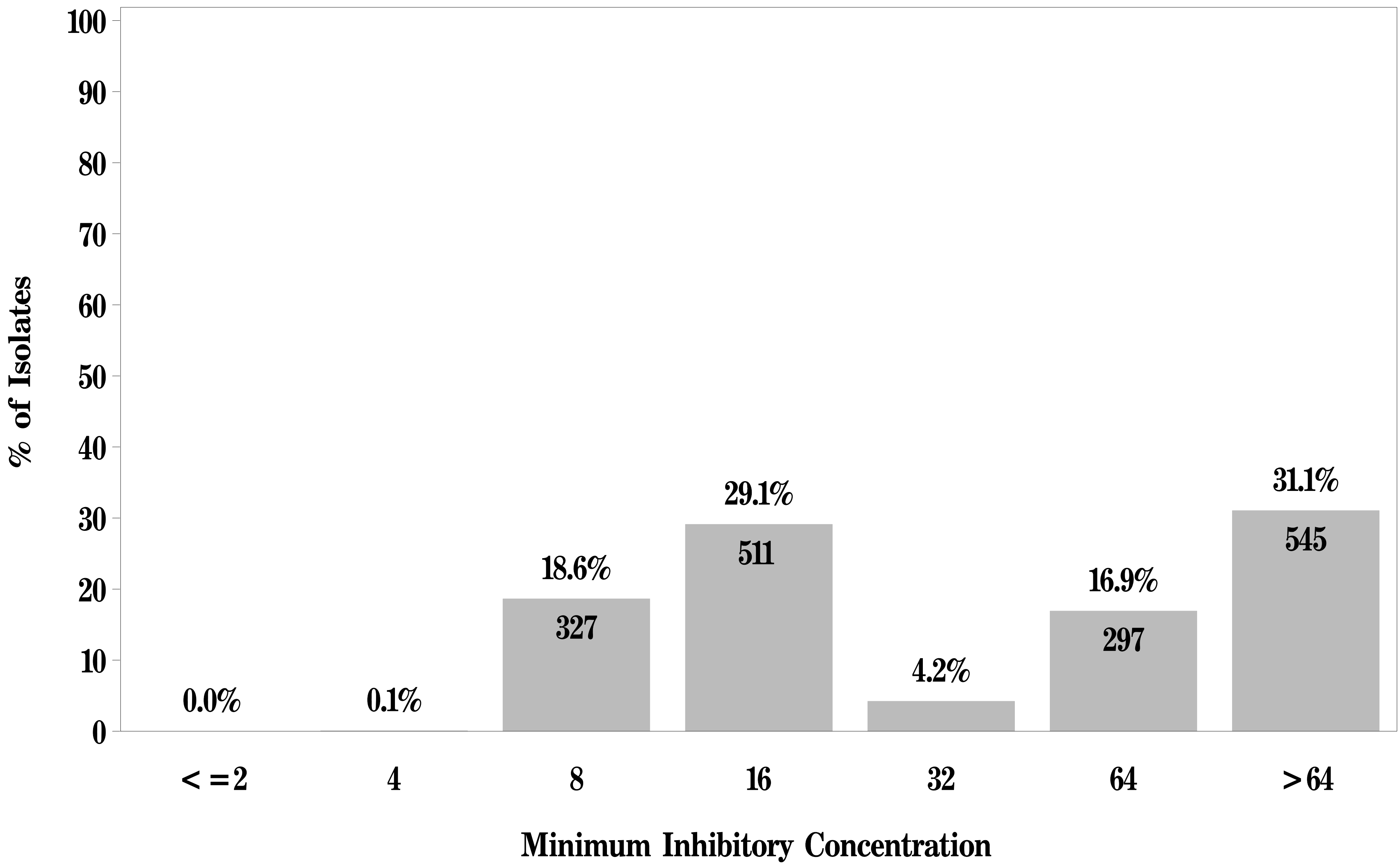
Breakpoints: Susceptible<=2 μg/mL Resistant>=8 μg/mL



NARMS

Figure 13k: Minimum Inhibitory Concentration of Nitrofurantoin for *Enterococcus* (N=1755 Isolates)

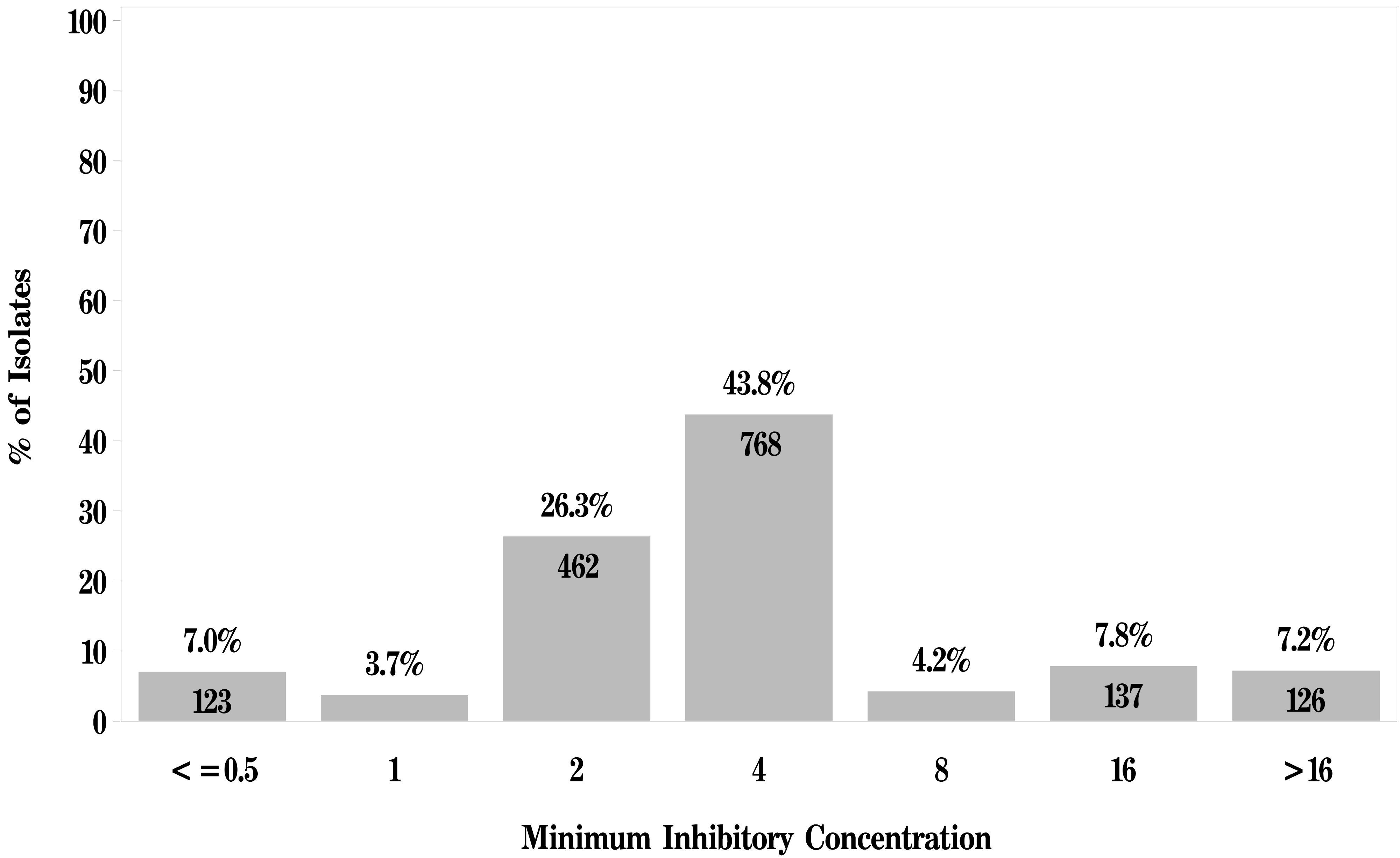
Breakpoints: Susceptible<=32 μg/mL Resistant>=128 μg/mL



NARMS

Figure 13l: Minimum Inhibitory Concentration of Penicillin for *Enterococcus* (N=1755 Isolates)

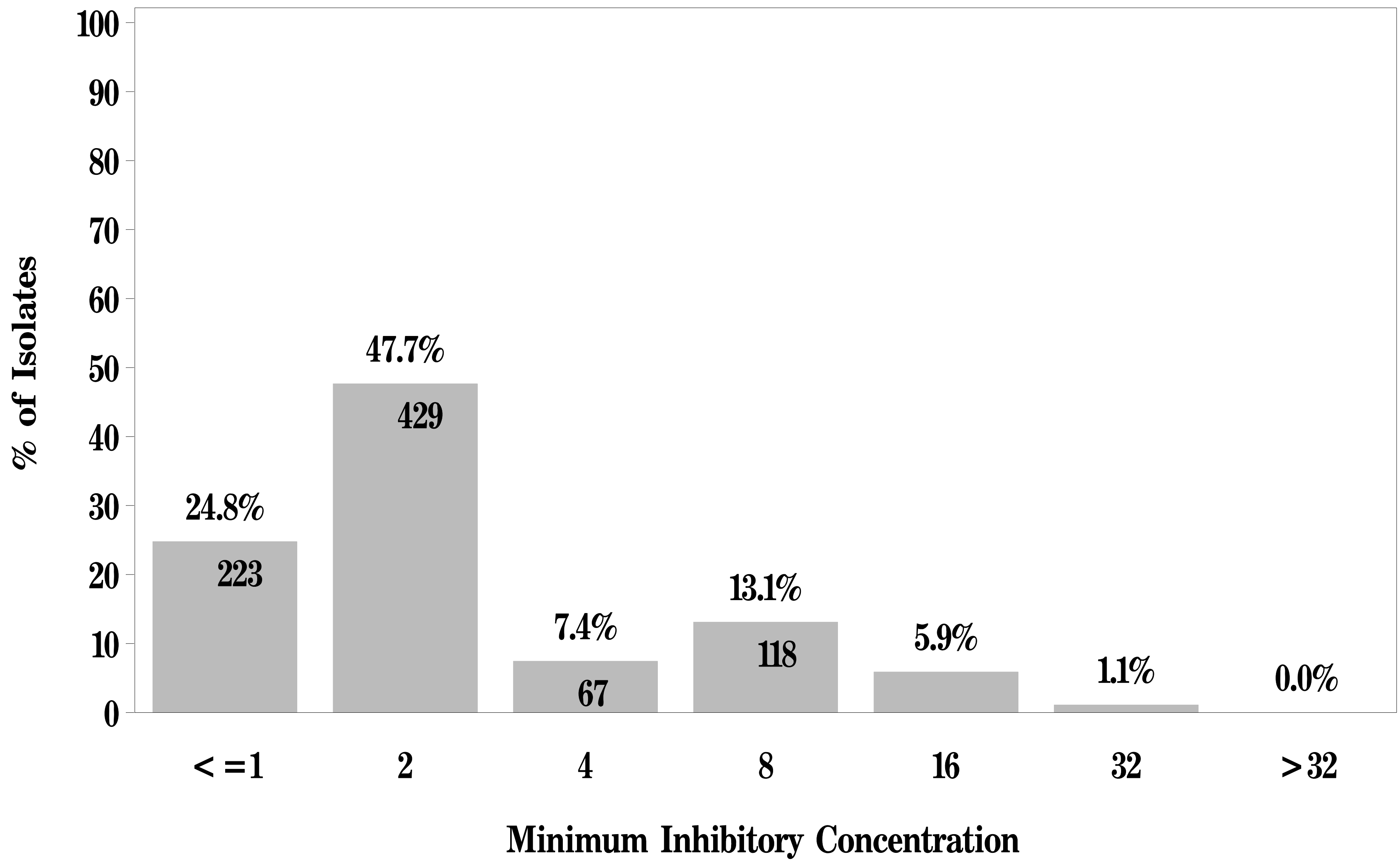
Breakpoints: Susceptible<=8 μg/mL Resistant>=16 μg/mL



NARMS

Figure 13m: Minimum Inhibitory Concentration of Quinupristin−dalfopristin* for *Enterococcus* (N=900 Isolates)

Breakpoints: Susceptible <=1 μg/mL Resistant >=4 μg/mL

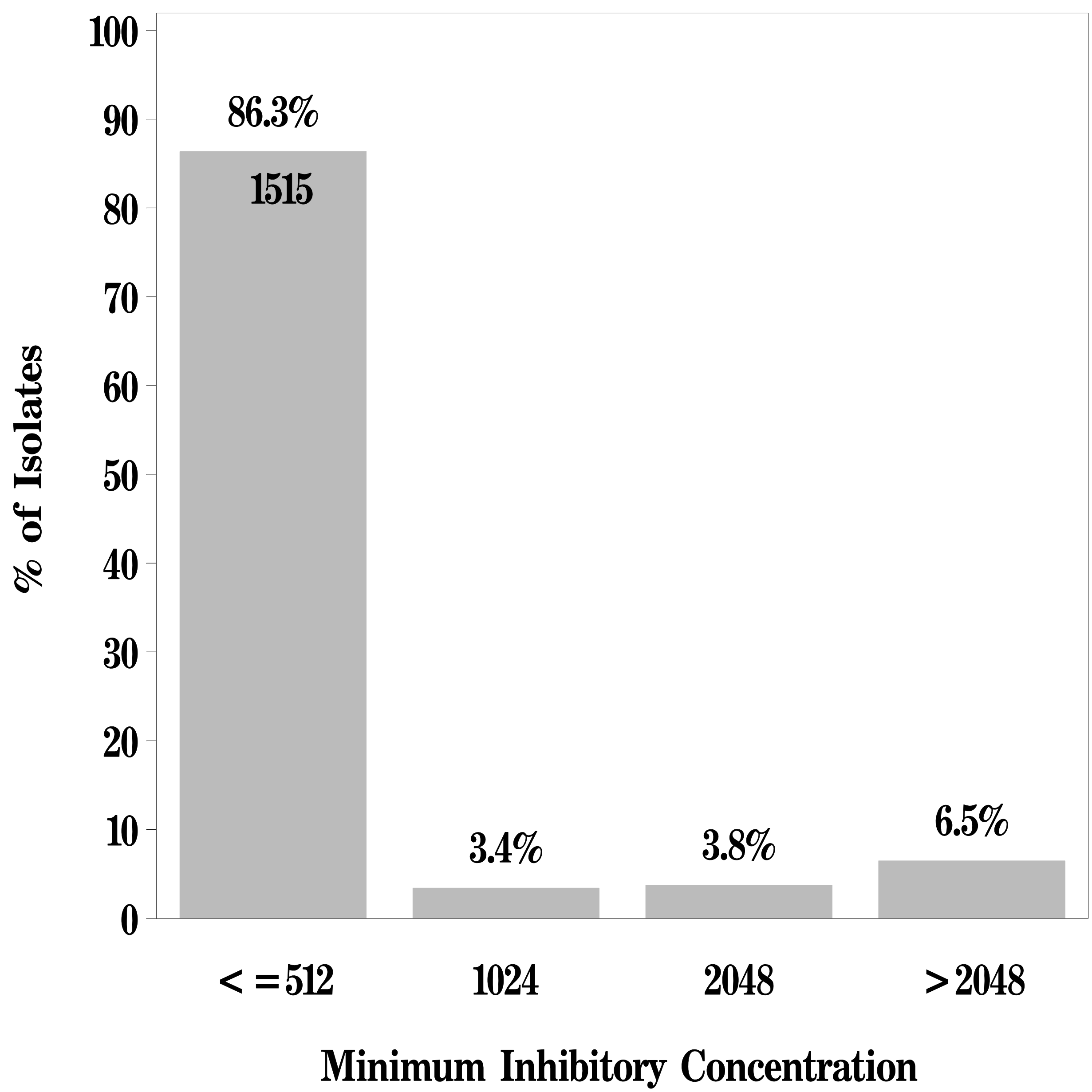


*Presented for all species except *E. faecalis* (N=1755−855=900)

NARMS

Figure 13n: Minimum Inhibitory Concentration of Streptomycin for *Enterococcus* (N=1755 Isolates)

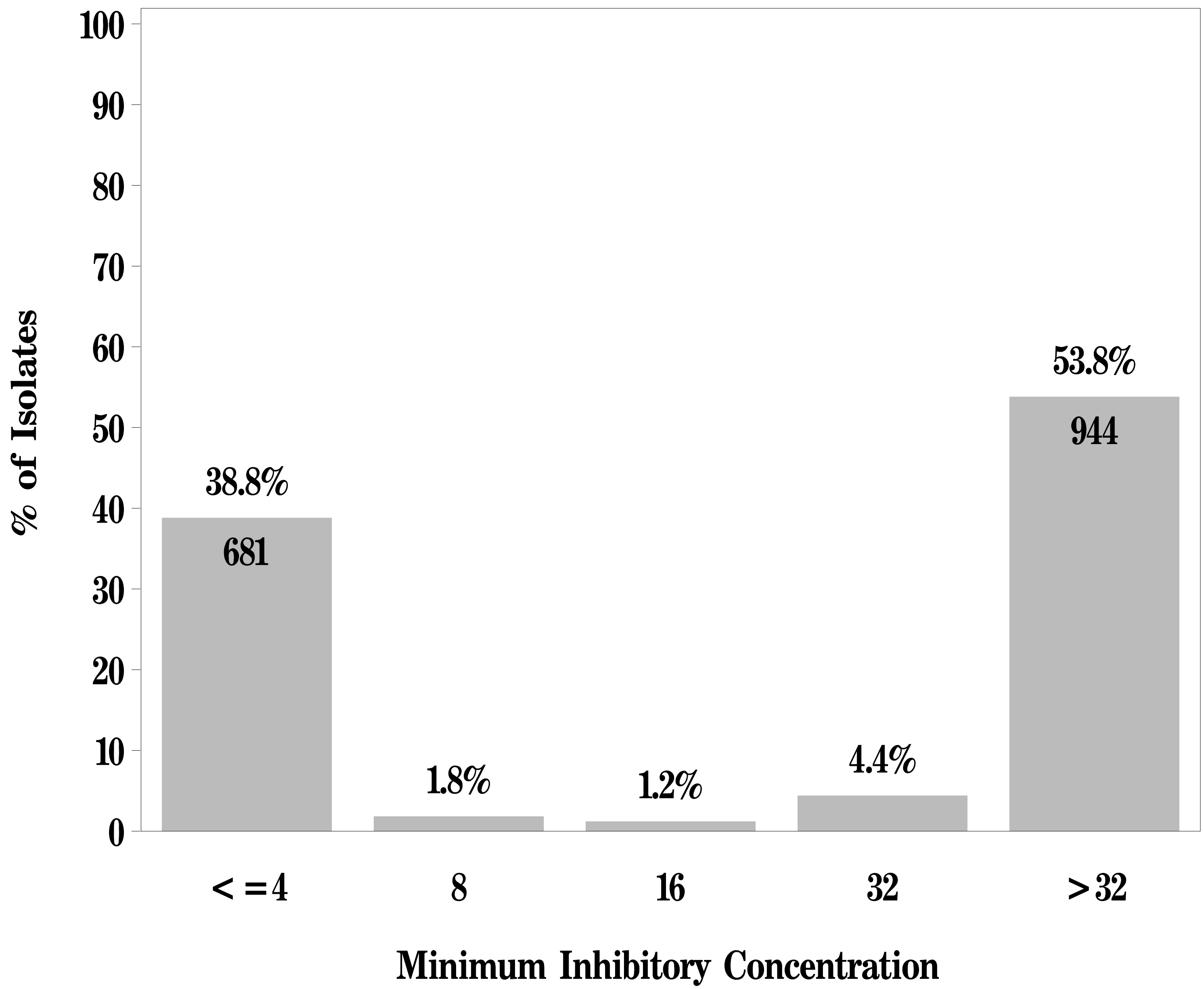
Breakpoints: Susceptible <=1000 µg/mL Resistant >=1000 µg/mL



NARMS

Figure 13o: Minimum Inhibitory Concentration of Tetracycline for *Enterococcus* (N=1755 Isolates)

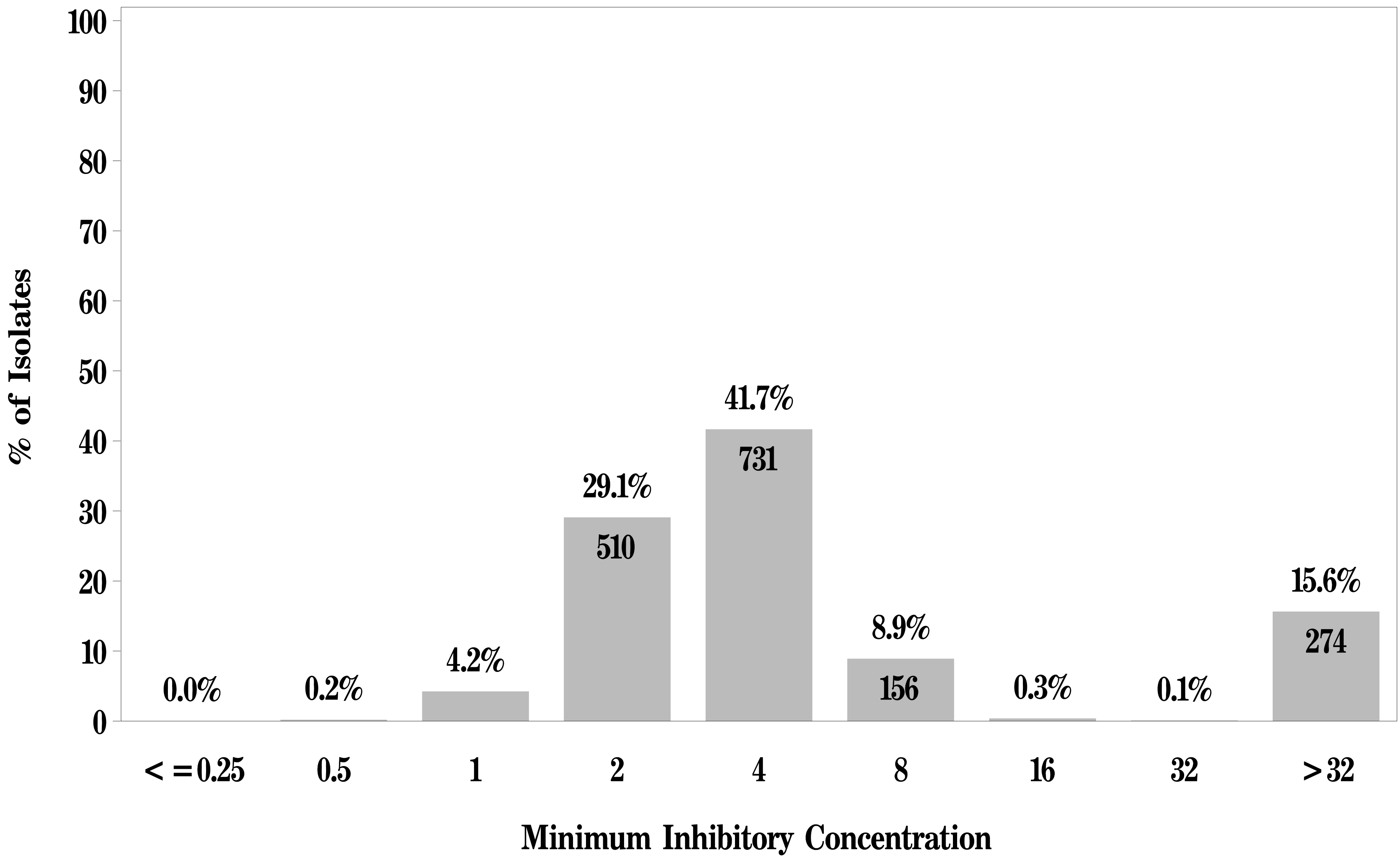
Breakpoints: Susceptible <=4 μg/mL Resistant >=16 μg/mL



NARMS

Figure 13p: Minimum Inhibitory Concentration of Tylosin for *Enterococcus* (N=1755 Isolates)

Breakpoints: Susceptible <=8 µg/mL Resistant >=32 µg/mL



NARMS

Figure 13q: Minimum Inhibitory Concentration of Vancomycin for *Enterococcus* (N=1755 Isolates)

Breakpoints: Susceptible <=4 μg/mL Resistant >=32 μg/mL

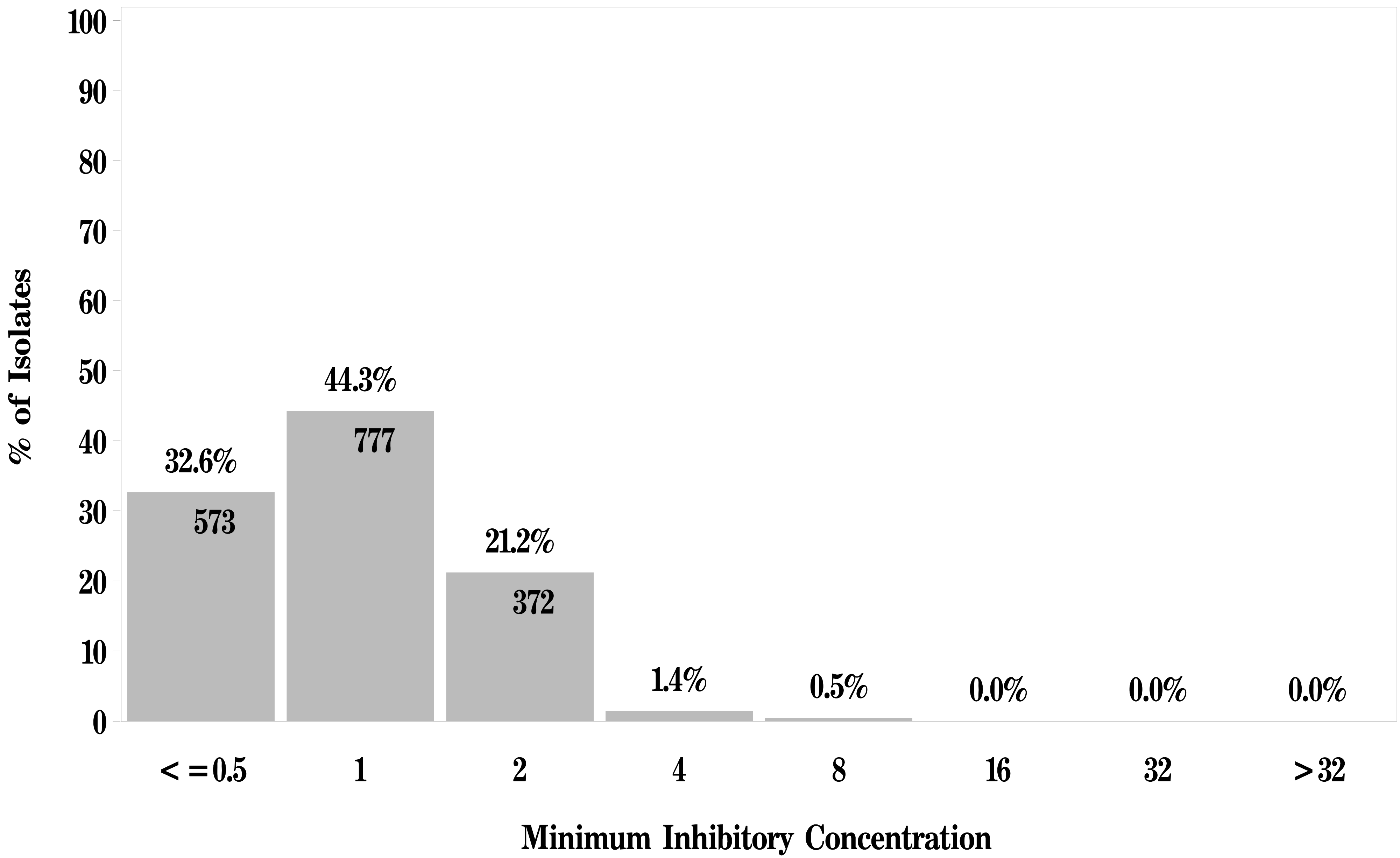


Table 31. Antimicrobial Resistance among *Enterococcus* by Meat Type for all Sites, 2004

Antimicrobial Agent	Chicken Breast (N=466)		Ground Turkey (N=418)		Ground Beef (N=432)		Pork Chop (N=426)	
	n	***%***	***n***	***%***	***n***	***%***	***n***	***%***
Lincomycin	313	67.2%[*]	376	86.0%	234	52.2%	265	65.6%
Quinupristin-Dalfopristin[†‡]	113	29.9%	111	62.7%	19	7.5%	5	5.5%
Tetracycline	229	49.1%	380	87.0%	136	30.4%	297	73.5%
Bacitracin	376	80.7%	350	80.1%	149	33.3%	118	29.2%
Flavomycin	319	68.5%	156	35.7%	239	53.3%	87	21.5%
Nitrofurantoin	305	65.5%	118	27.0%	90	20.1%	32	7.9%
Kanamycin	162	34.8%	179	41.0%	61	13.6%	19	4.7%
Ciprofloxacin	190	40.8%	108	24.7%	71	15.8%	33	8.2%
Erythromycin	79	17.0%	162	37.1%	29	6.5%	35	8.7%
Tylosin	70	15.0%	151	34.6%	23	5.1%	31	7.7%
Penicillin	144	30.9%	106	24.3%	6	1.3%	7	1.7%
Streptomycin	53	11.4%	129	29.5%	24	5.4%	34	8.4%
Gentamicin	33	7.1%	88	20.1%	2	0.4%	6	1.5%
Daptomycin	14	3.0%	13	3.0%	21	4.7%	0	0.0%
Chloramphenicol	0	-[§]	0	-	2	0.4%	2	0.5%
Linezolid,	0	-	0	-	0	-	0	-
Vancomycin	0	-	0	-	0	-	0	-

[*] Where % Resistance = (# isolates per meat type resistant to antimicrobial) / (total # isolates per meat type).
[†] Data presented for all species except *E. faecalis*, which is considered intrinsically resistant to Quinupristin-Dalfopristin.
[‡] Number of *E. faecalis* in CB = 88, GT = 260, GB =194, PC = 313.
[§] Dashes indicate 0.0% resistance to antimicrobial.

Figure 14a. MIC Distribution among *Enterococcus* from Chicken Breast

Enterococcus **from Chicken Breast (N=466)**		**Distribution (%) of MICs (in µg/ml)**																		
Antimicrobial Agent	**%R**	**0.015**	**0.03**	**0.06**	**0.125**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**
Bacitracin*	**80.7**										2.8	1.5	1.7	13.3	**16.5**	**64.2**				
Chloramphenicol	**0.0**									4.7	88.4	6.9								
Ciprofloxacin	**40.8**				0.2	0.4	4.9	13.1	40.6	**32.6**	**8.2**									
Daptomycin*	**§**						0.4	14.8	24.7	57.1	2.1	0.9								
Erythromycin	**17.0**						38.0	18.9	18.9	7.3	**1.7**	**15.2**								
Tylosin*	**15.0**																			
Gentamicin	**7.1**														92.3	0.6	**1.1**	**0.6**	**5.4**	
Kanamycin*	**34.8**														41.0	24.2	**23.0**	**2.6**	**9.2**	
Streptomycin*	**11.4**																88.6	**3.4**	**4.1**	**3.9**
Lincomycin*	**67.2**							13.1		0.2	1.9	17.6	**12.9**	**54.3**						
Linezolid	**0.0**							1.1	87.8	11.2										
Nitrofurantoin	**65.5**										4.7	13.1	2.8	13.9	**65.5**					
Flavomycin*	**68.5**							18.2	0.6	1.5	5.6	5.6	3.4	**65.0**						
Penicillin	**30.9**						1.1	3.0	20.4	35.6	9.0	**16.5**	**14.4**							
Tetracycline	**49.1**									45.3	5.6	**2.1**	**3.2**	**43.8**						
Quinupristin/Dalfopristin↑	**29.9**							27.5	42.6	**6.3**	**18.5**	**5.0**								
Vancomycin	**0.0**						47.6	36.1	15.7	0.6										

Vertical bars show the CLSI Susceptible/Resistant breakpoints for each drug where appropriate.

*Currently no CLSI breakpoints have been established for this organism/antimicrobial combination. Indicated breakpoints were established by NARMS.

†Discrepancies between %R and sums of distribution %s are due to rounding.

Unshaded areas indicate the dilution ranges of the Sensititre plate used to test the 2004 isolates.

↑ Presented for all species except *E. faecalis* in QDA (n=466-88= 378 non *E. faecalis*)

§Absence of resistant strains precludes defining any results category other than "susceptible."

Figure 14b. MIC Distribution among *Enterococcus* from Ground Turkey

***Enterococcus* from Ground Turkey (N=437)**		**Distribution (%) of MICs (in µg/ml)**																		
Antimicrobial Agent	**%R**	**0.015**	**0.03**	**0.06**	**0.125**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**
Bacitracin*	**80.1**										0.5	0.9	2.7	**15.8**	**12.8**	**67.3**				
Chloramphenicol	**0.0**								0.5	3.7	85.1	10.8								
Ciprofloxacin	**24.7**					0.2	3.7	25.4	46.0	**19.5**	**5.3**									
Daptomycin*	**§**						5.9	47.1	16.9	27.0	2.7	0.2								
Erythromycin	**37.1**						34.6	21.3	5.7	1.4	**1.1**	**35.9**								
Tylosin*	**34.6**						0.2	3.9	21.7	34.8	4.8		**0.2**	**34.3**						
Gentamicin	**20.1**														79.4	0.5	**0.7**	**0.5**	**18.9**	
Kanamycin*	**41.0**														49.4	9.6	**9.2**	**0.9**	**30.9**	
Streptomycin*	**29.5**																70.5	**6.6**	**5.7**	**17.1**
Lincomycin*	**86.0**							4.3	0.5	0.5	0.7	8.0	**30.0**	**56.1**						
Linezolid	**0.0**						0.2	2.3	90.8	6.6										
Nitrofurantoin	**27.0**										29.3	28.8	1.1	13.7	**27.0**					
Flavomycin*	**35.7**							55.8	2.1	1.1	2.7	2.5	**0.9**	**34.8**						
Penicillin	**24.3**						1.1	0.9	26.1	43.5	4.1	**11.9**	**12.4**							
Tetracycline	**87.0**									12.8	0.2	**0.9**	**3.2**	**82.8**						
Quinupristin/Dalfopristin↑	**62.7**							14.7	22.6	**11.3**	**26.6**	**19.2**	**5.6**							
Vancomycin	**0.0**						22.7	46.0	28.6	1.8	0.9									

Vertical bars show the CLSI Susceptible/Resistant breakpoints for each drug where appropriate.

*Currently no CLSI breakpoints have been established for this organism/antimicrobial combination. Indicated breakpoints were established by NARMS.

†Discrepancies between %R and sums of distribution %s are due to rounding.

Unshaded areas indicate the dilution ranges of the Sensititre plate used to test the 2004 isolates.

↑ Presented for all species except *E. faecalis* in QDA (n=437-260= 177 non *E. faecalis*)

§Absence of resistant strains precludes defining any results category other than "susceptible."

Figure 14c. MIC Distribution among *Enterococcus* from Ground Beef

Enterococcus from Ground Beef (N=448)		Distribution (%) of MICs (in µg/ml)																		
Antimicrobial Agent	**%R**	**0.015**	**0.03**	**0.06**	**0.125**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**
Bacitracin*	**33.3**										20.1	4.2	13.4	29.0	**21.2**	**12.1**				
Chloramphenicol	**0.4**									6.5	88.6	4.5	**0.4**							
Ciprofloxacin	**15.8**					0.2	7.8	37.9	38.2	**13.2**	**2.7**									
Daptomycin*	**§**						2.9	34.6	33.3	24.6	3.3	1.3								
Erythromycin	**6.5**						46.7	23.0	13.2	10.7	0.9	**5.6**								
Tylosin*	**5.1**							6.7	39.1	38.6	9.4	1.1		**5.1**						
Gentamicin	**0.4**														99.1	**0.4**		**0.2**	**0.2**	
Kanamycin*	**13.6**														78.1	8.3	**9.2**	**0.4**	**4.0**	
Streptomycin*	**5.4**																94.6	**2.0**	**1.1**	**2.2**
Lincomycin*	**52.2**							13.6	0.9	1.1	8.3	23.9	**44.9**	**7.4**						
Linezolid	**0.0**						0.2	0.4	87.7	11.6										
Nitrofurantoin	**20.1**									0.2	15.4	27.9	8.7	27.7	**20.0**					
Flavomycin*	**53.3**							39.5	3.6	1.1	0.4	2.0	**1.1**	**52.2**						
Penicillin	**1.3**						14.1	8.5	27.7	45.8	2.7	**0.4**	**0.9**							
Tetracycline	**30.4**									69.4	0.2	**0.9**	**5.8**	**23.7**						
Quinupristin/Dalfopristin↑	**7.5**							29.1	63.4	**7.5**										
Vancomycin	**0.0**						43.1	38.8	16.1	1.3	0.7									

Vertical bars show the CLSI Susceptible/Resistant breakpoints for each drug where appropriate.

*Currently no CLSI breakpoints have been established for this organism/antimicrobial combination. Indicated breakpoints were established by NARMS.

[†]Discrepancies between %R and sums of distribution %s are due to rounding.

Unshaded areas indicate the dilution ranges of the Sensititre plate used to test the 2004 isolates.

↑ Presented for all species except *E. faecalis* in QDA (n=448-194= 254 non *E. faecalis*)

§Absence of resistant strains precludes defining any results category other than "susceptible."

Figure 14d. MIC Distribution among *Enterococcus* from Pork Chops

Enterococcus from Pork Chops (N=404)		Distribution (%) of MICs (in µg/ml)																		
Antimicrobial Agent	**%R**	**0.015**	**0.03**	**0.06**	**0.125**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**
Bacitracin*	**29.2**										5.4	5.9	12.9	46.5	**19.3**	**9.9**				
Chloramphenicol	**0.5**									3.2	91.3	5.0	**0.2**	**0.2**						
Ciprofloxacin	**8.2**					0.5	4.7	46.8	39.9	**6.2**	**2.0**									
Daptomycin*	**§**						7.7	57.7	21.5	13.1										
Erythromycin	**8.7**						41.6	32.7	9.1	7.9	**1.0**	**7.7**								
Tylosin*	**7.7**						0.5	4.0	30.2	49.2	7.4	0.2	**7.7**							
Gentamicin	**1.5**														98.0	0.5	**0.5**	**0.5**	**0.5**	
Kanamycin*	**4.7**														91.6	3.7	**1.9**	**0.5**	**2.2**	
Streptomycin*	**8.4**																91.5	**1.5**	**4.2**	**2.7**
Lincomycin*	**65.6**							6.4	0.5	1.0	12.3	14.1	**53.0**	**12.6**						
Linezolid	**0.0**							2.5	87.6	9.9										
Nitrofurantoin	**7.9**										26.7	49.3	4.2	11.6	**7.9**					
Flavomycin*	**21.5**							72.3	5.4	0.2	0.2	0.2	**0.2**	**21.2**						
Penicillin	**1.7**						12.4	2.2	31.9	51.2	0.5	**1.5**	**0.2**							
Tetracycline	**73.5**									25.4	1.0	**0.7**	**5.4**	**67.3**						
Quinupristin/Dalfopristin↑	**5.5**							20.9	73.6	**4.4**	**1.1**									
Vancomycin	**0.0**						14.6	57.9	25.2	2.0	0.2									

Vertical bars show the CLSI Susceptible/Resistant breakpoints for each drug where appropriate.

*Currently no CLSI breakpoints have been established for this organism/antimicrobial combination. Indicated breakpoints were established by NARMS.

†Discrepancies between %R and sums of distribution %s are due to rounding.

Unshaded areas indicate the dilution ranges of the Sensititre plate used to test the 2003 isolates.

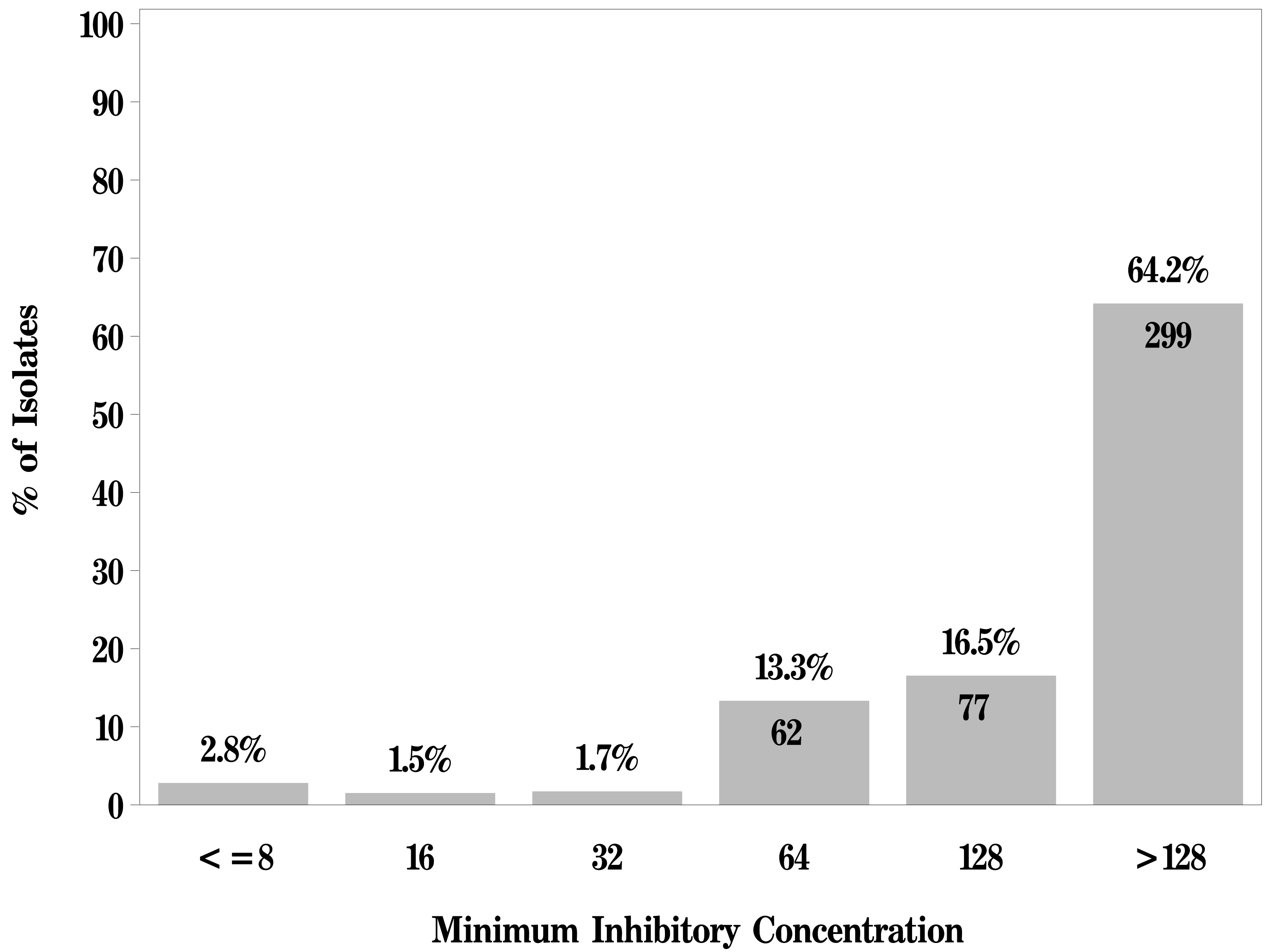
↑ Presented for all species except *E. faecalis* in QDA (n=404-313= 91 non *E. faecalis*)

§Absence of resistant strains precludes defining any results category other than "susceptible."

NARMS

Figure 15a: Minimum Inhibitory Concentration of Bacitracin for *Enterococcus* in Chicken Breast (N=466 Isolates)

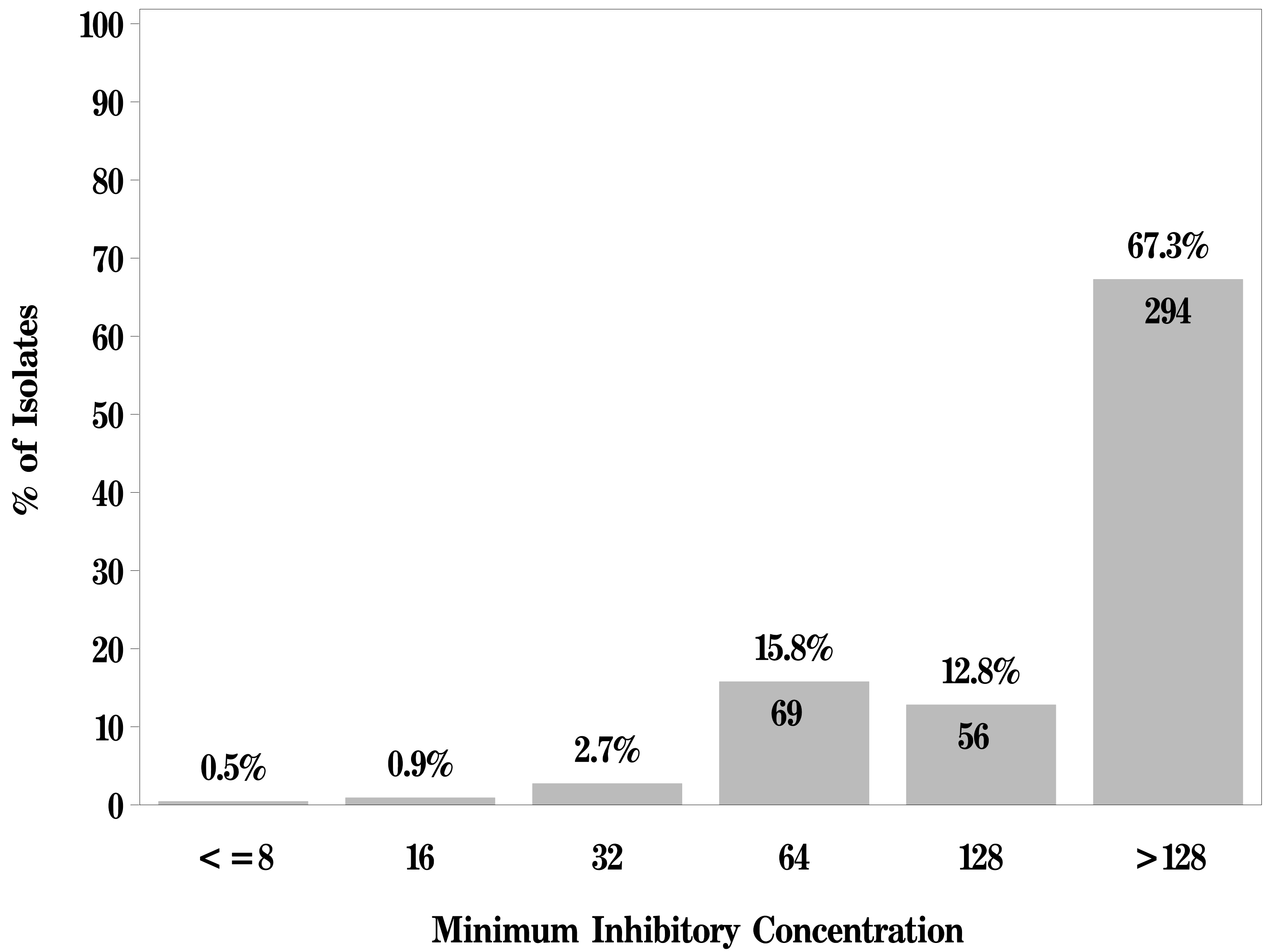
Breakpoints: Susceptible <=32 µg/mL Resistant >=128 µg/mL



NARMS

Figure 15a: Minimum Inhibitory Concentration of Bacitracin for *Enterococcus* in Ground Turkey (N=437 Isolates)

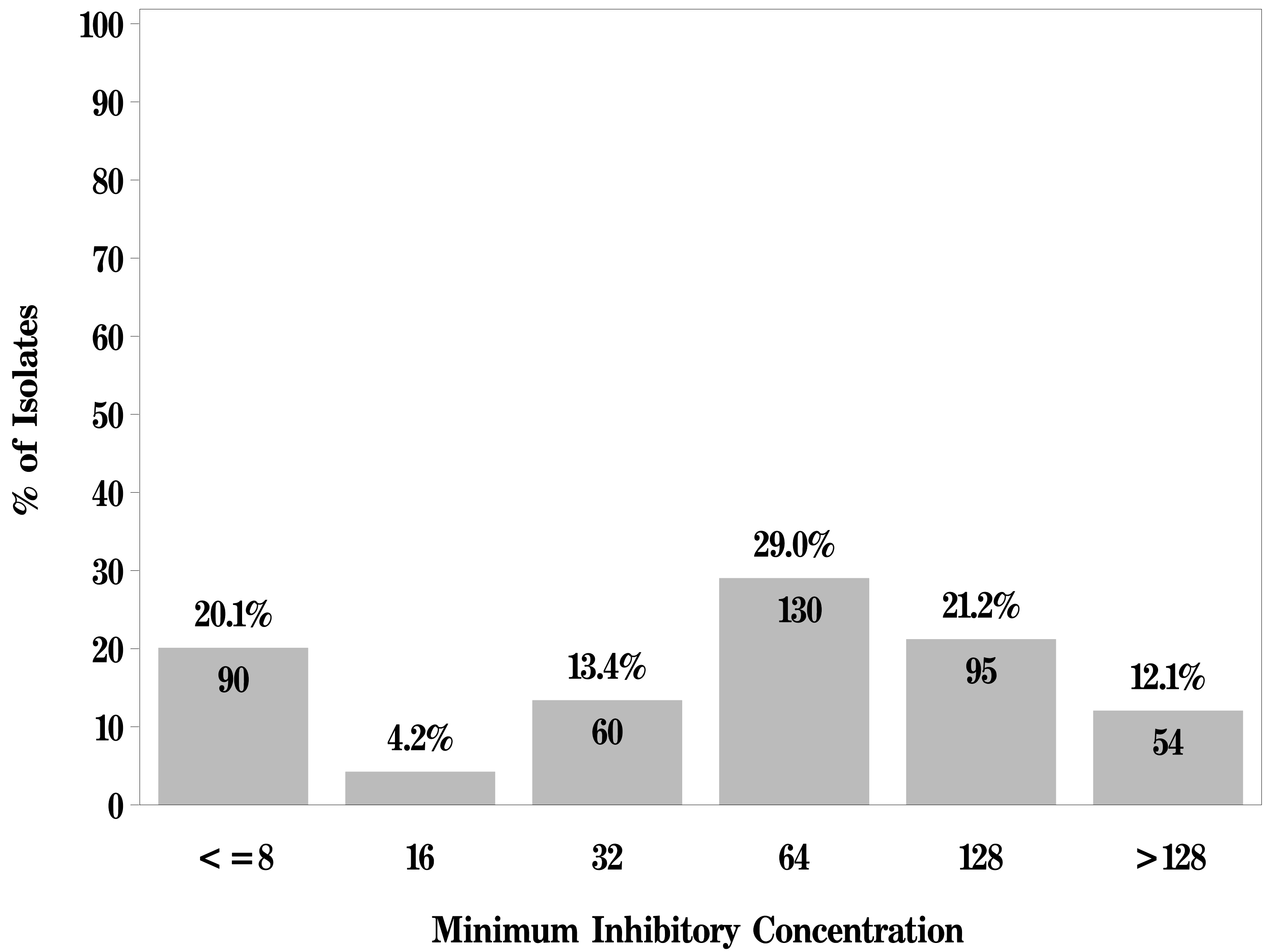
Breakpoints: Susceptible<=32 µg/mL Resistant>=128 µg/mL



NARMS

Figure 15a: Minimum Inhibitory Concentration of Bacitracin for *Enterococcus* in Ground Beef (N=448 Isolates)

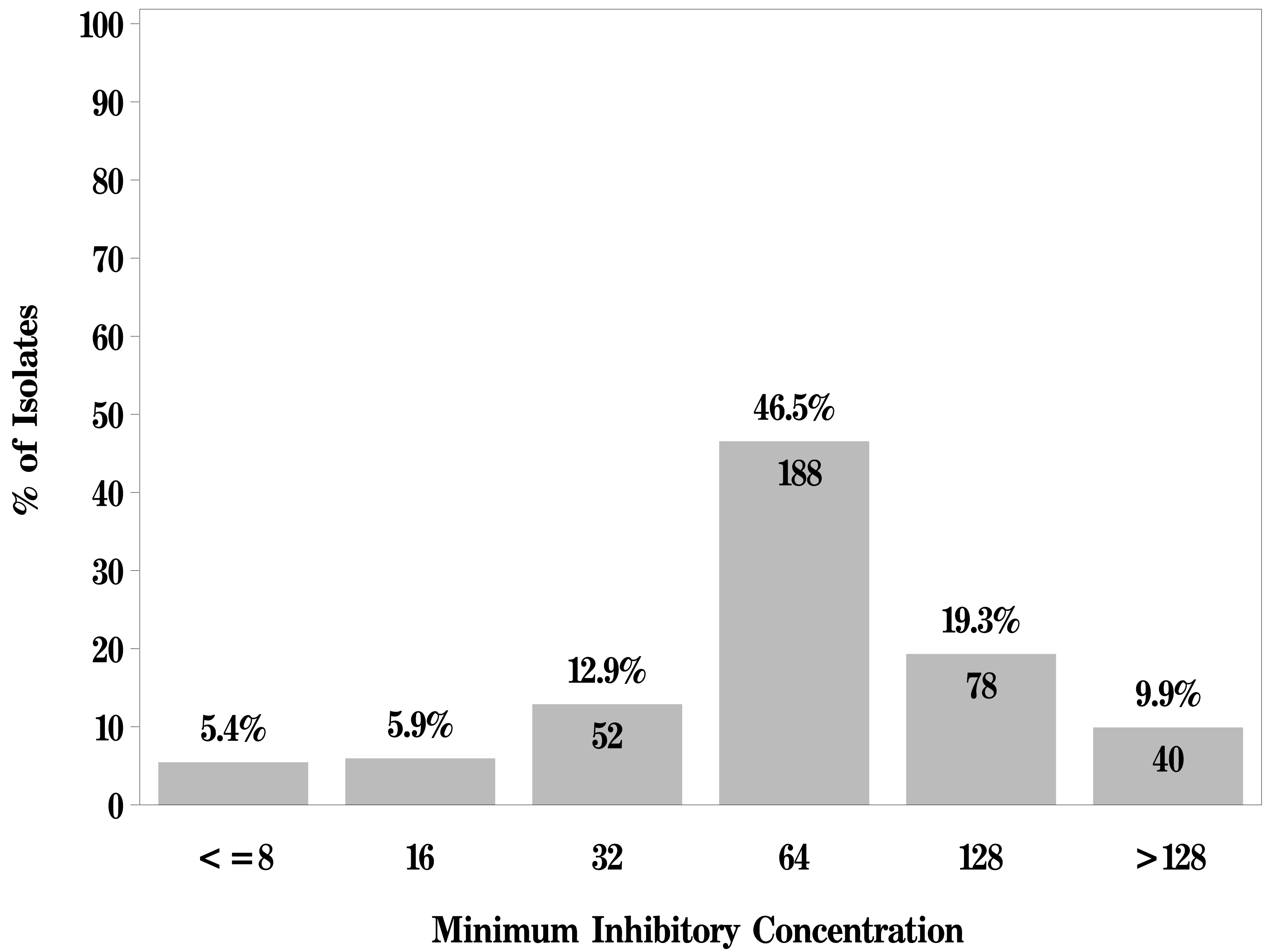
Breakpoints: Susceptible <=32 µg/mL Resistant >=128 µg/mL



NARMS

Figure 15a: Minimum Inhibitory Concentration of Bacitracin for *Enterococcus* in Pork Chop (N=404 Isolates)

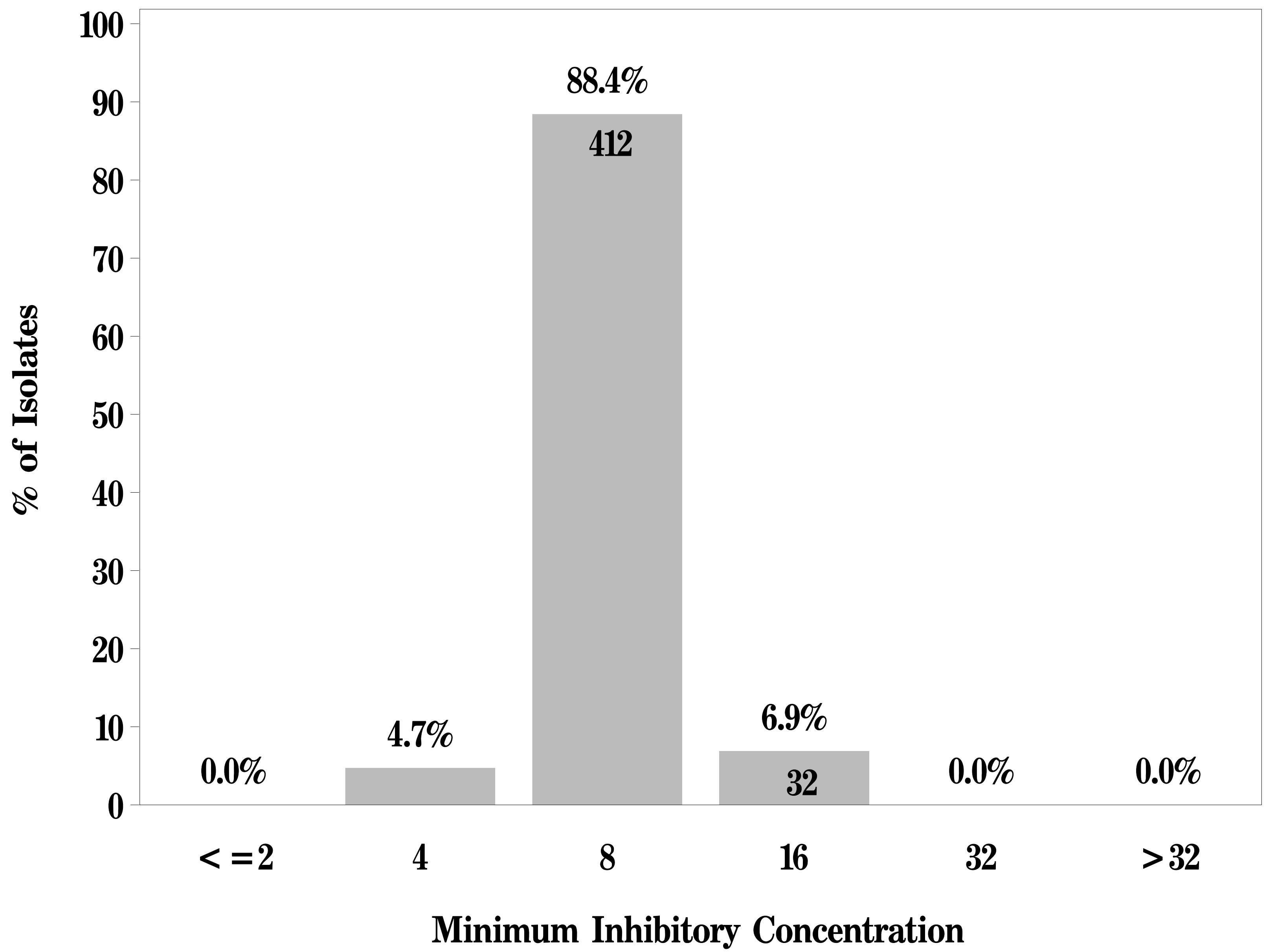
Breakpoints: Susceptible <=32 μg/mL Resistant >=128 μg/mL



NARMS

Figure 15b: Minimum Inhibitory Concentration of Chloramphenicol for *Enterococcus* in Chicken Breast (N=466 Isolates)

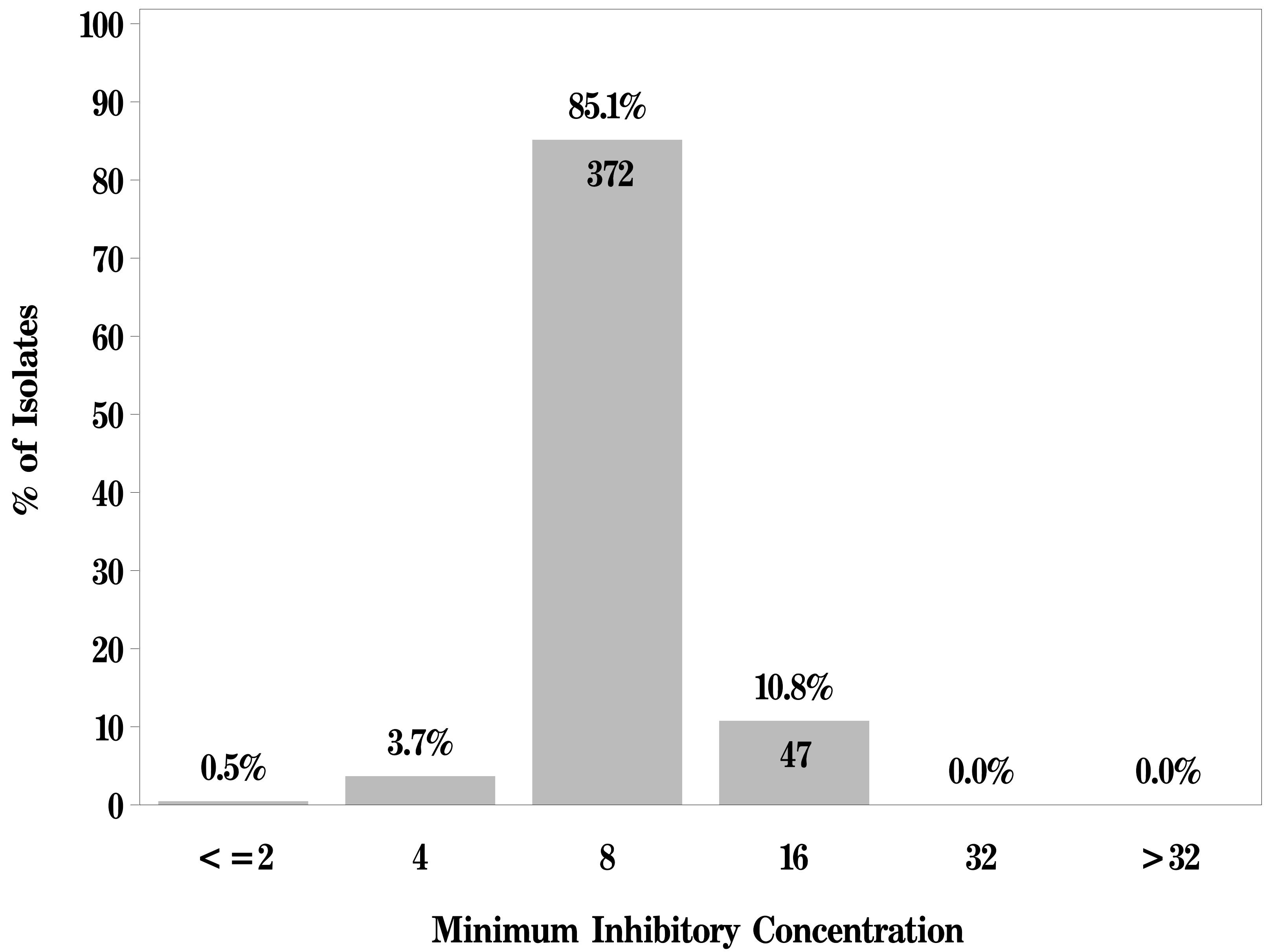
Breakpoints: Susceptible <=8 µg/mL Resistant >=32 µg/mL



NARMS

Figure 15b: Minimum Inhibitory Concentration of Chloramphenicol for *Enterococcus* in Ground Turkey (N=437 Isolates)

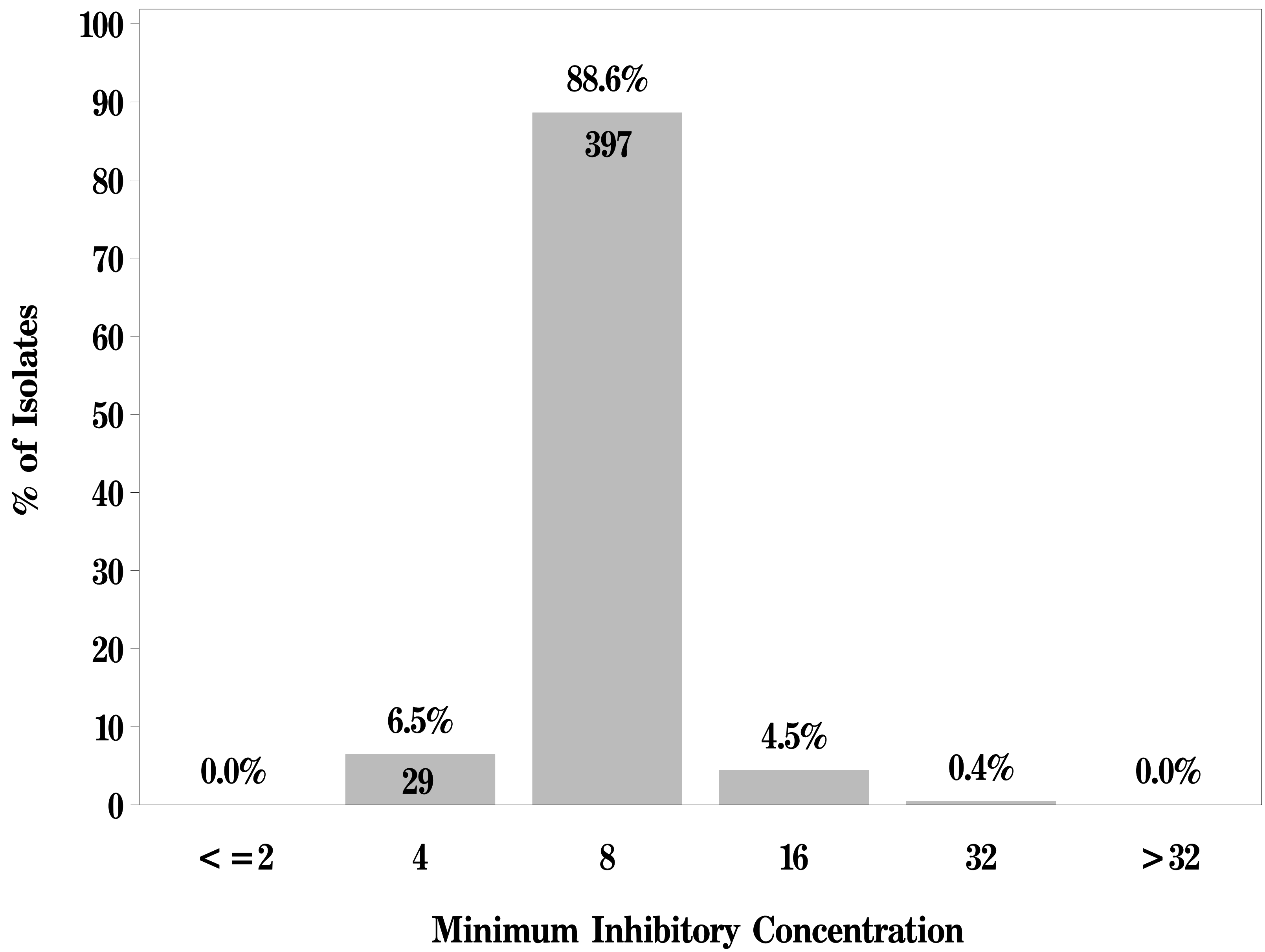
Breakpoints: Susceptible <=8 µg/mL Resistant >=32 µg/mL



NARMS

Figure 15b: Minimum Inhibitory Concentration of Chloramphenicol for *Enterococcus* in Ground Beef (N=448 Isolates)

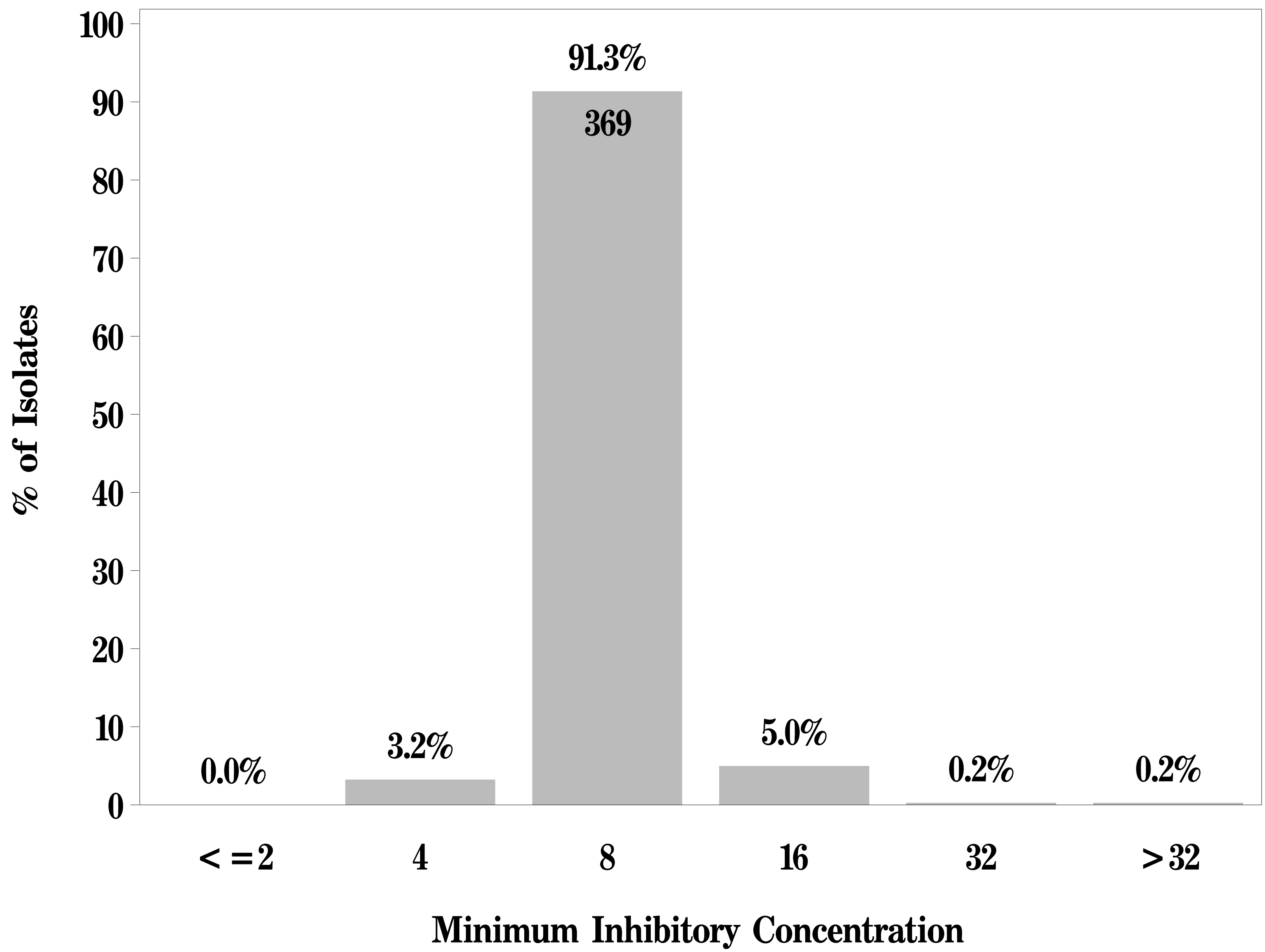
Breakpoints: Susceptible <=8 μg/mL Resistant >=32 μg/mL



NARMS

Figure 15b: Minimum Inhibitory Concentration of Chloramphenicol for *Enterococcus* in Pork Chop (N=404 Isolates)

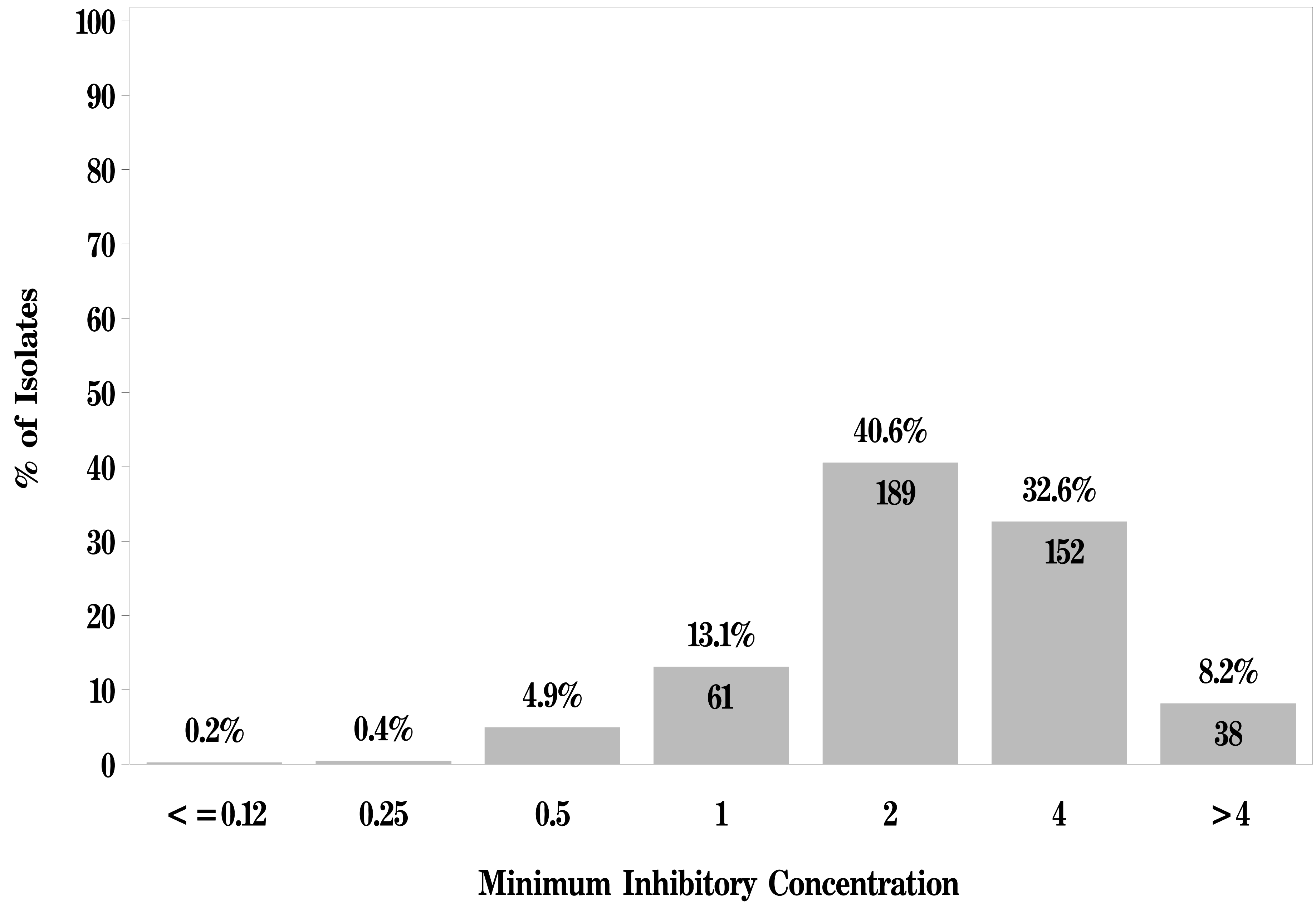
Breakpoints: Susceptible <=8 μg/mL Resistant >=32 μg/mL



NARMS

Figure 15c: Minimum Inhibitory Concentration of Ciprofloxacin for *Enterococcus* in Chicken Breast (N=466 Isolates)

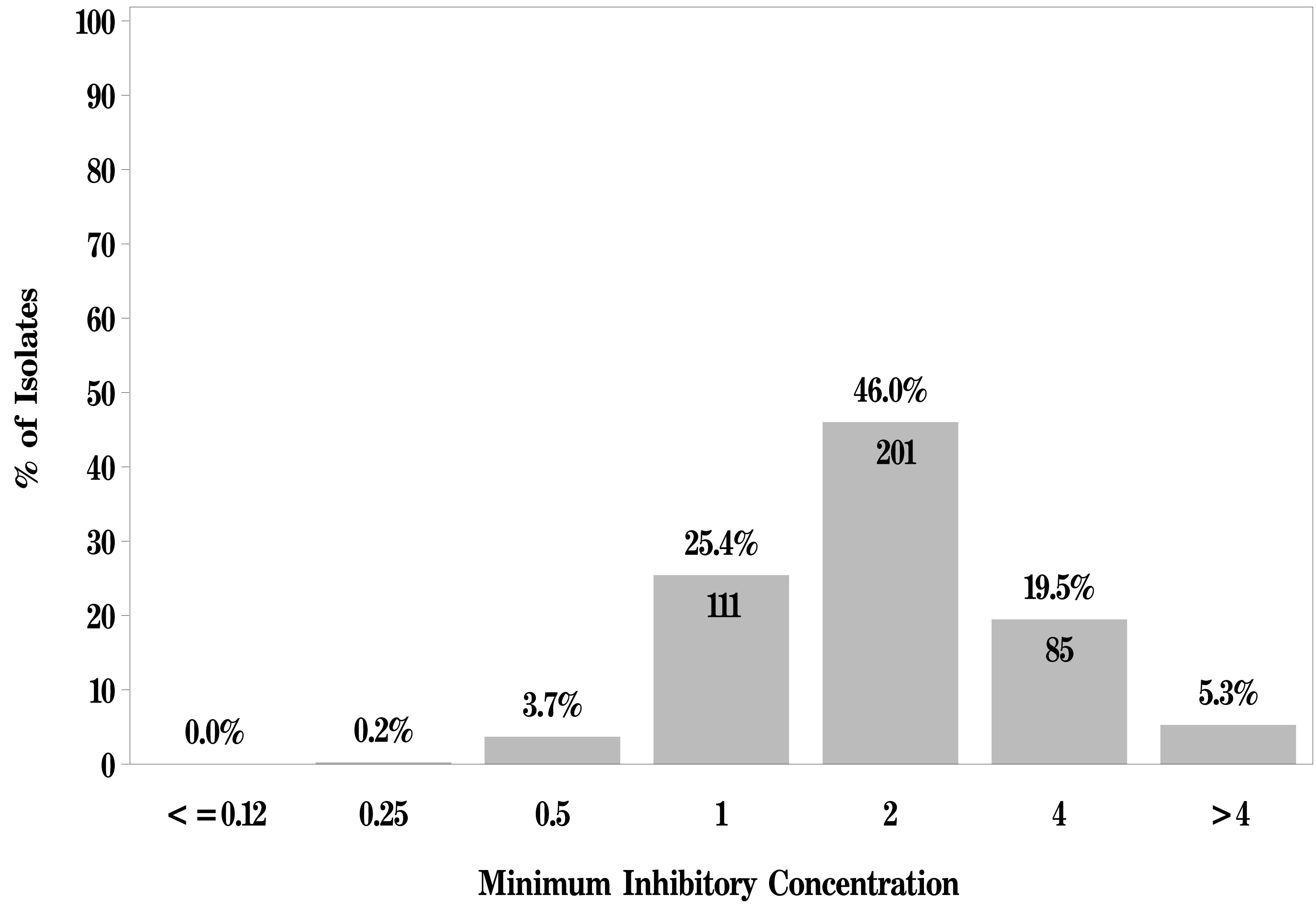
Breakpoints: Susceptible <=1 µg/mL Resistant >=4 µg/mL



NARMS

Figure 15c: Minimum Inhibitory Concentration of Ciprofloxacin for *Enterococcus* in Ground Turkey (N=437 Isolates)

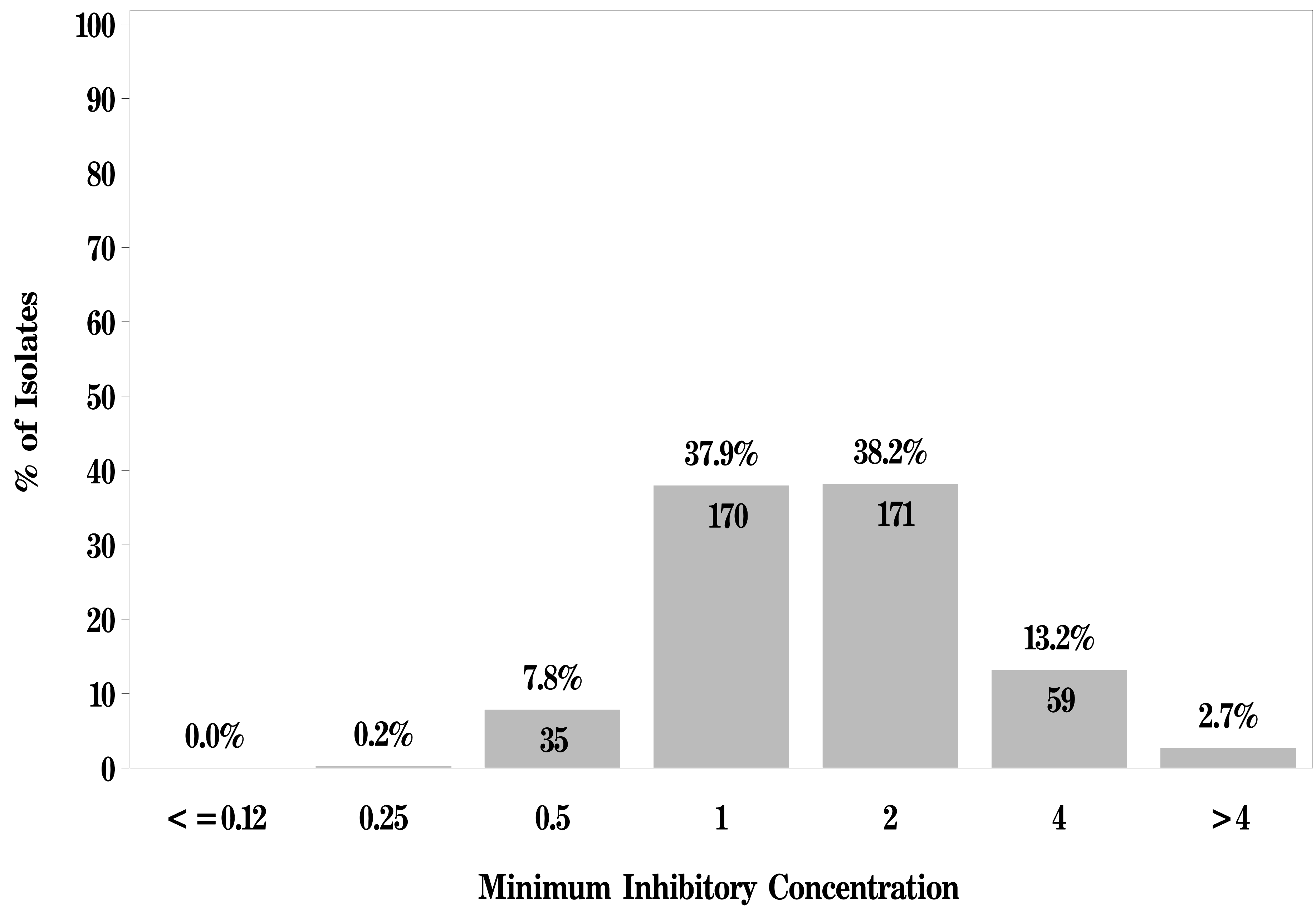
Breakpoints: Susceptible <=1 μg/mL Resistant >=4 μg/mL



NARMS

Figure 15c: Minimum Inhibitory Concentration of Ciprofloxacin for *Enterococcus* in Ground Beef (N=448 Isolates)

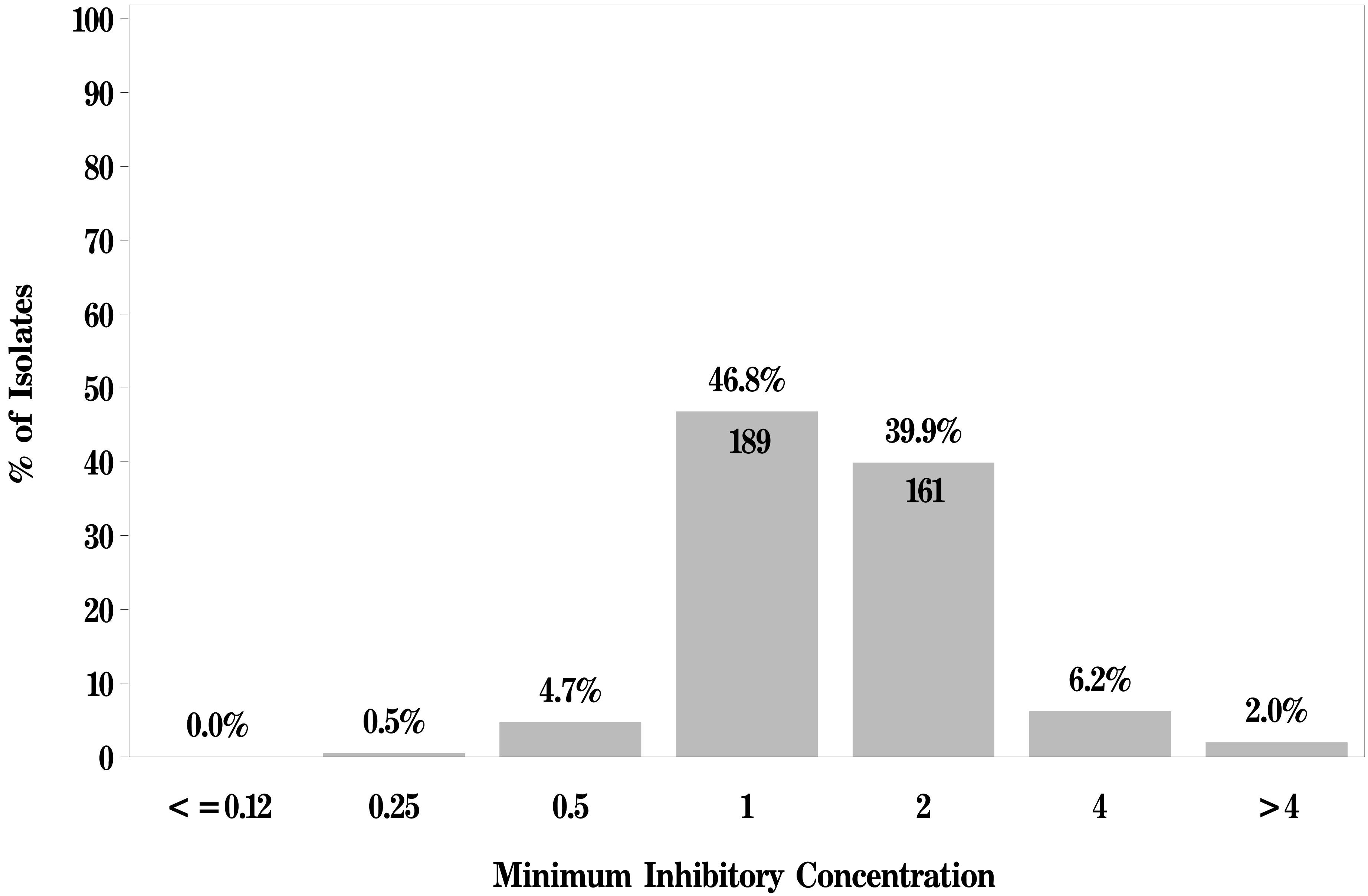
Breakpoints: Susceptible <=1 μg/mL Resistant >=4 μg/mL



NARMS

Figure 15c: Minimum Inhibitory Concentration of Ciprofloxacin for *Enterococcus* in Pork Chop (N=404 Isolates)

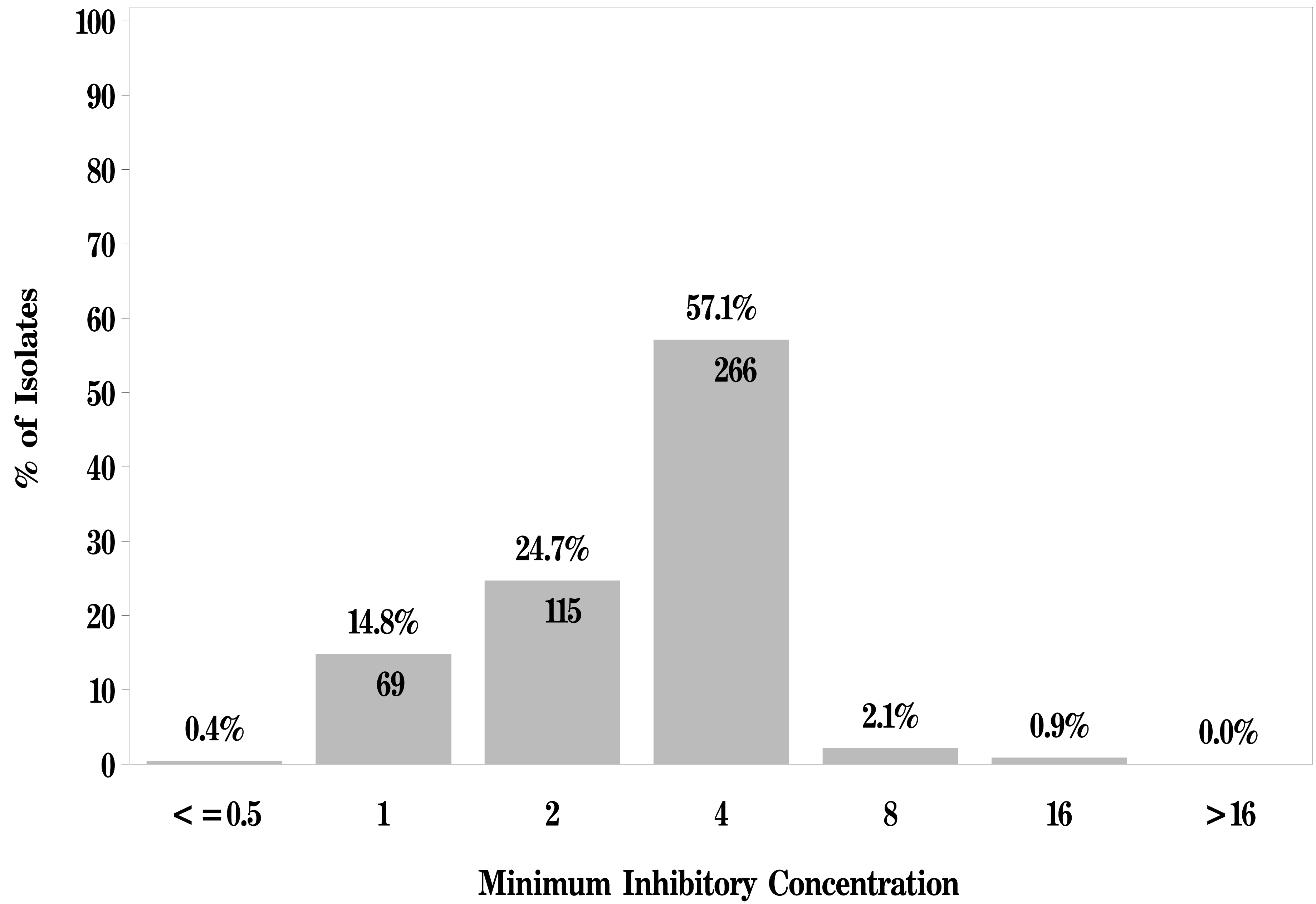
Breakpoints: Susceptible <=1 μg/mL Resistant >=4 μg/mL



NARMS

Figure 15d: Minimum Inhibitory Concentration of Daptomycin for *Enterococcus* in Chicken Breast (N=466 Isolates)

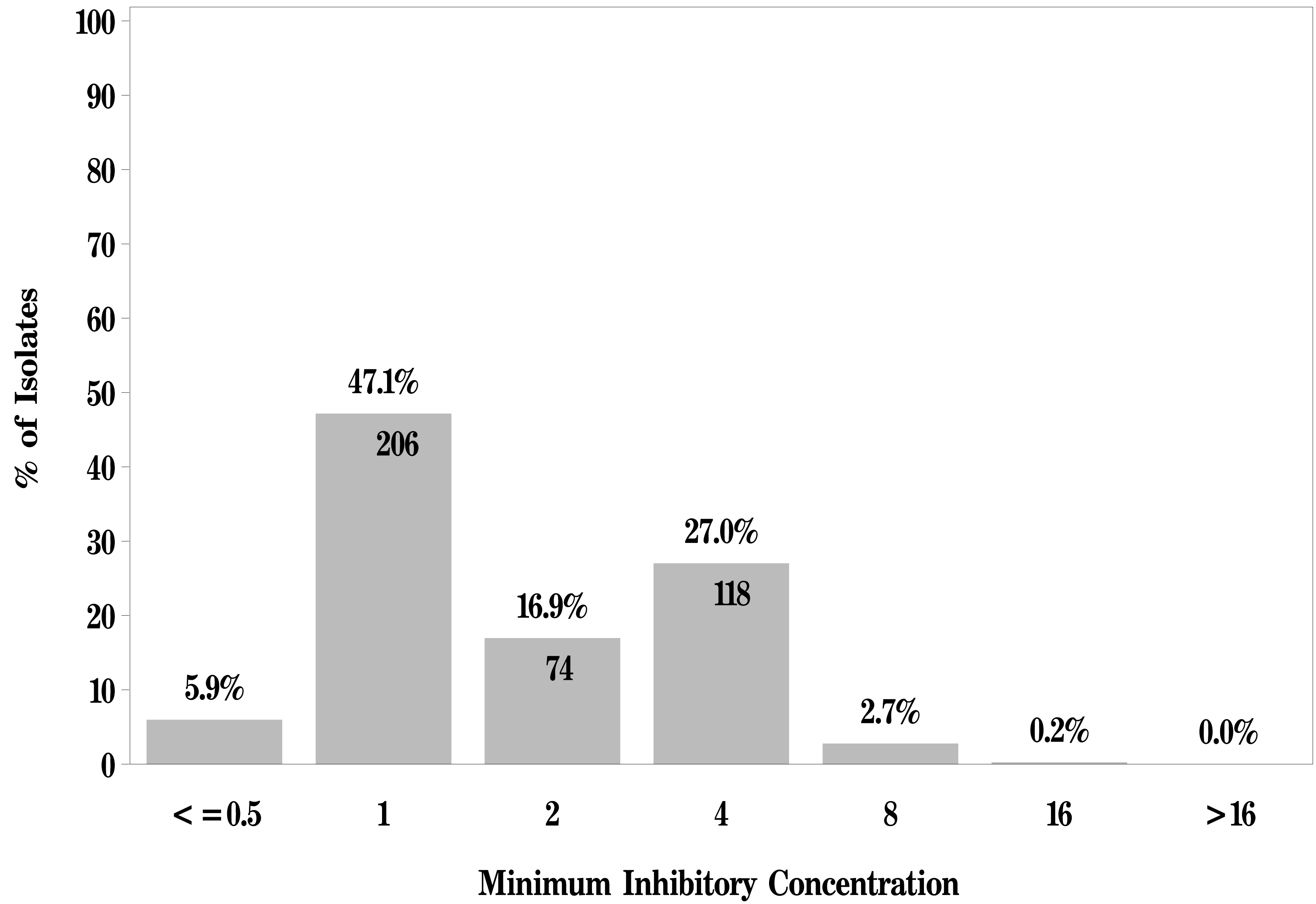
Breakpoint: Susceptible <=4 μg/mL



NARMS

Figure 15d: Minimum Inhibitory Concentration of Daptomycin for *Enterococcus* in Ground Turkey (N=437 Isolates)

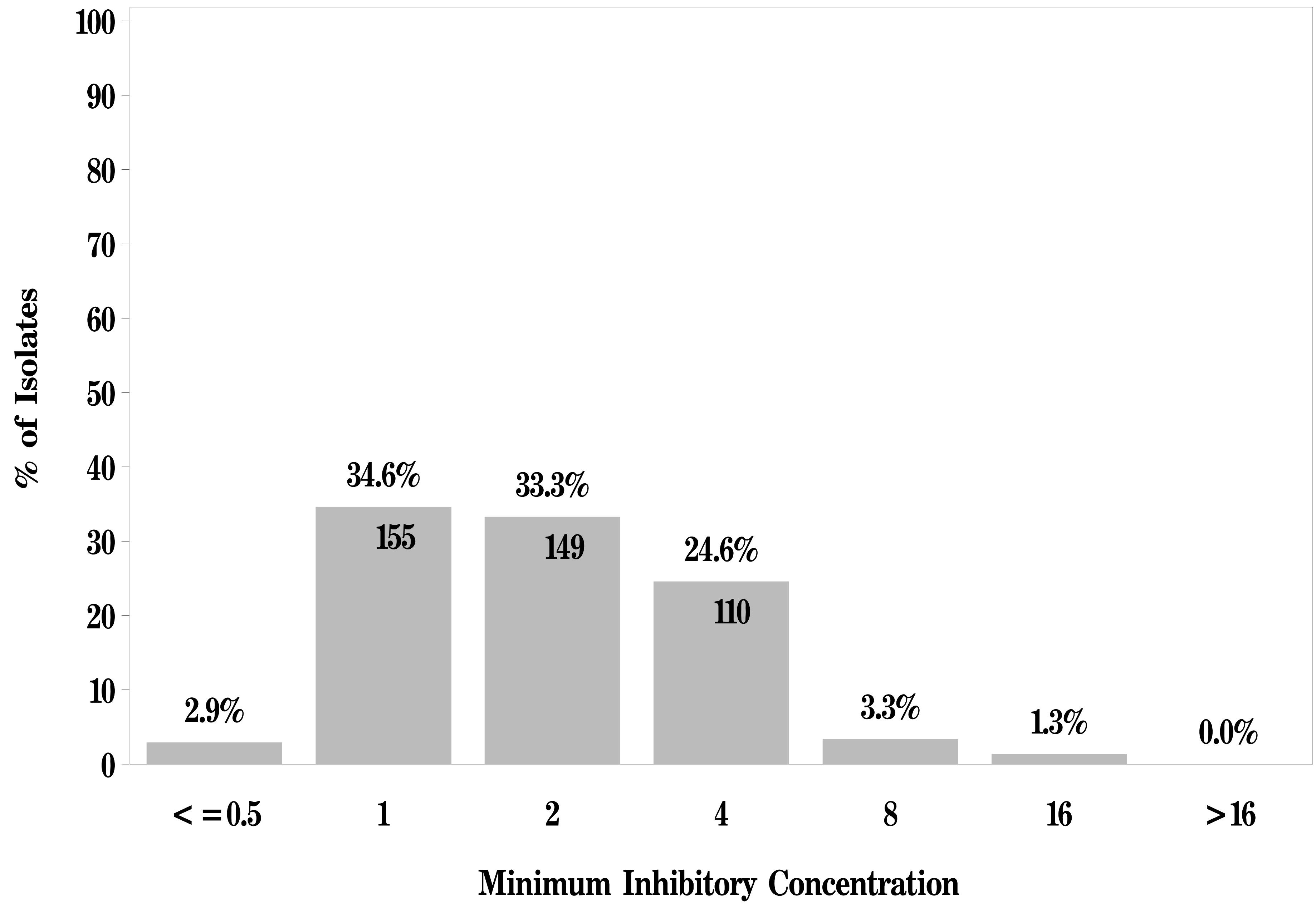
Breakpoint: Susceptible <=4 μg/mL



NARMS

Figure 15d: Minimum Inhibitory Concentration of Daptomycin for *Enterococcus* in Ground Beef (N=448 Isolates)

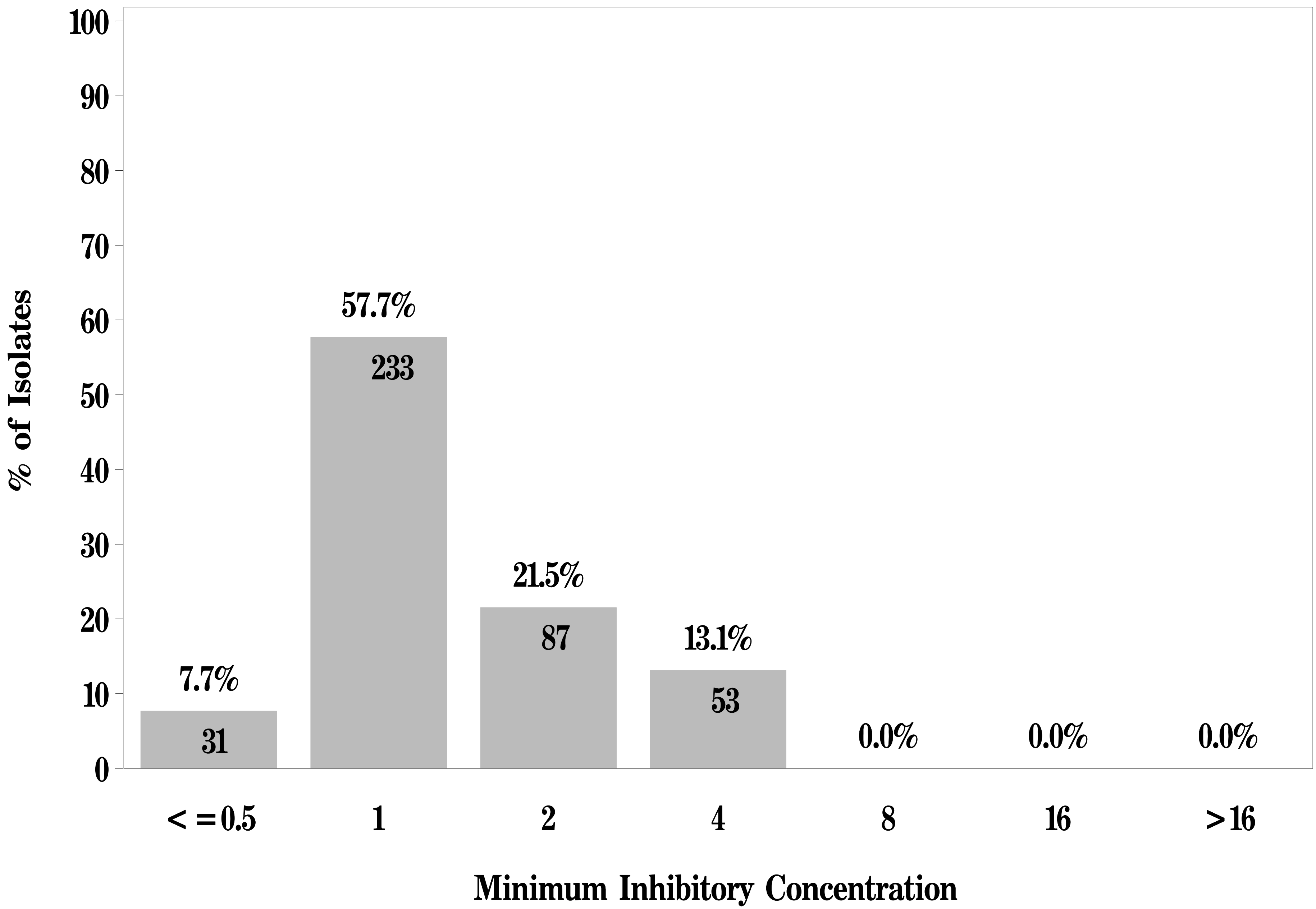
Breakpoint: Susceptible<=4 μg/mL



NARMS

Figure 15d: Minimum Inhibitory Concentration of Daptomycin for *Enterococcus* in Pork Chop (N=404 Isolates)

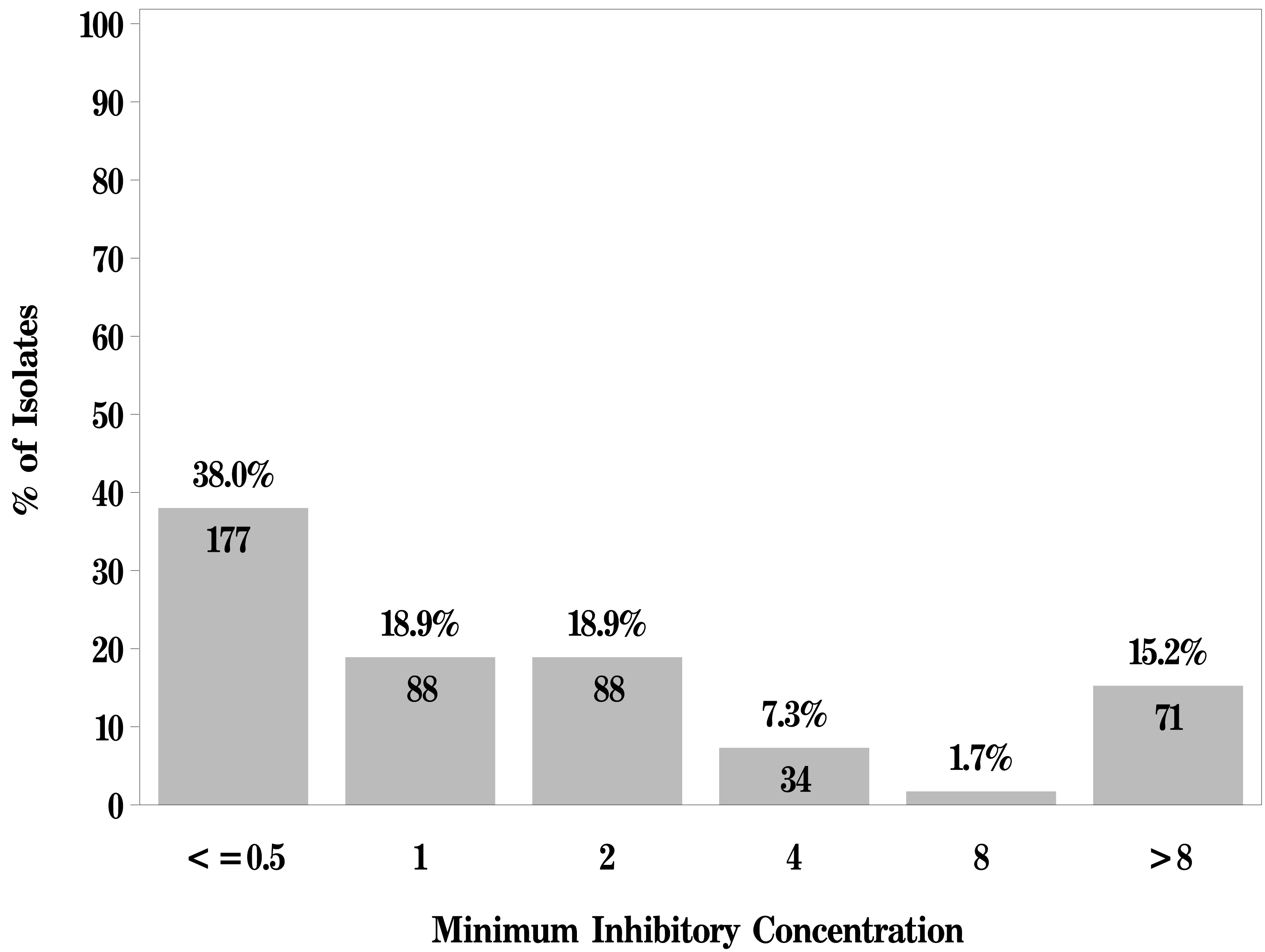
Breakpoint: Susceptible <=4 µg/mL



NARMS

Figure 15e: Minimum Inhibitory Concentration of Erythromycin for *Enterococcus* in Chicken Breast (N=466 Isolates)

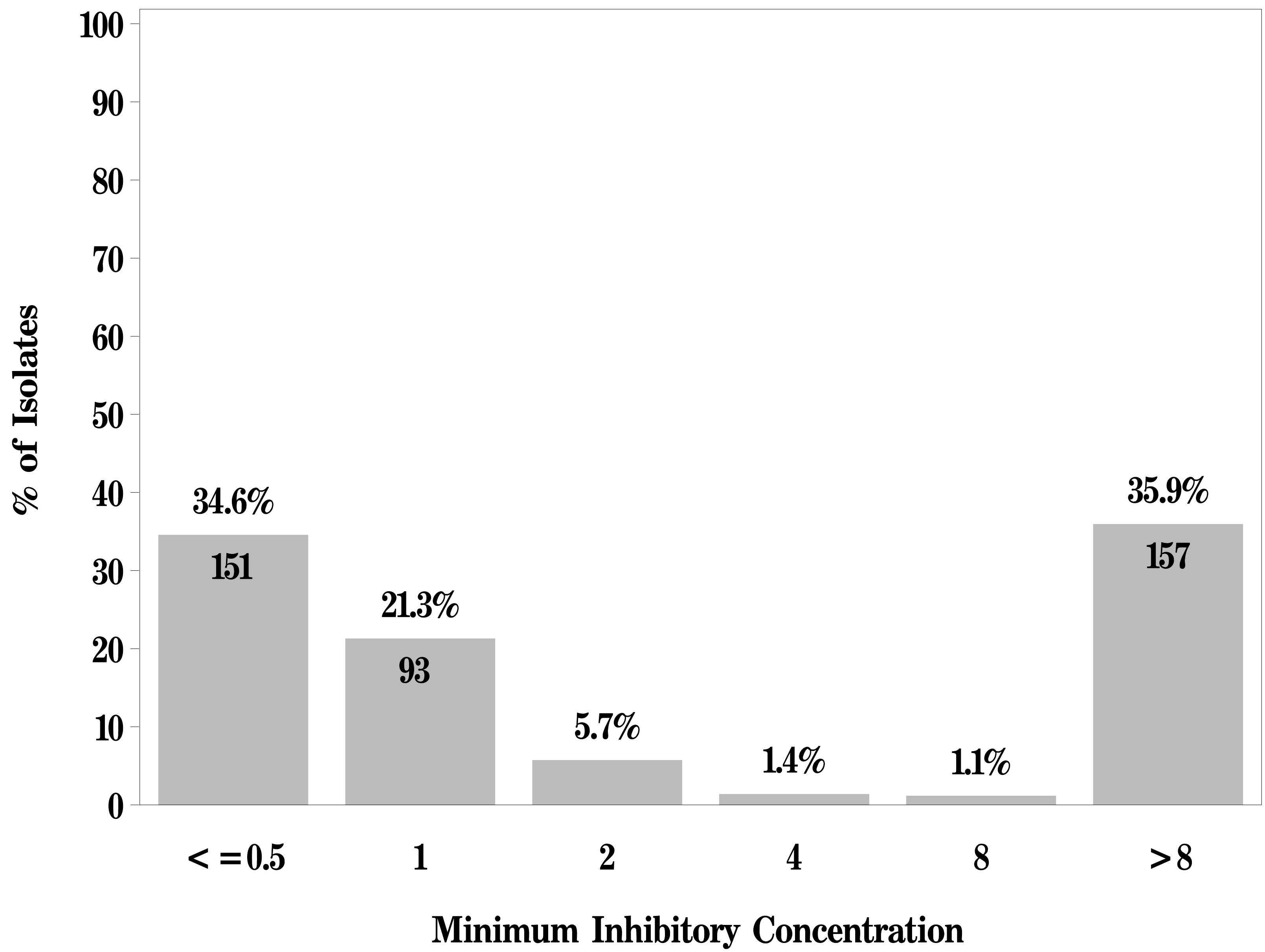
Breakpoints: Susceptible <=0.5 μg/mL Resistant >=8 μg/mL



NARMS

Figure 15e: Minimum Inhibitory Concentration of Erythromycin for *Enterococcus* in Ground Turkey (N=437 Isolates)

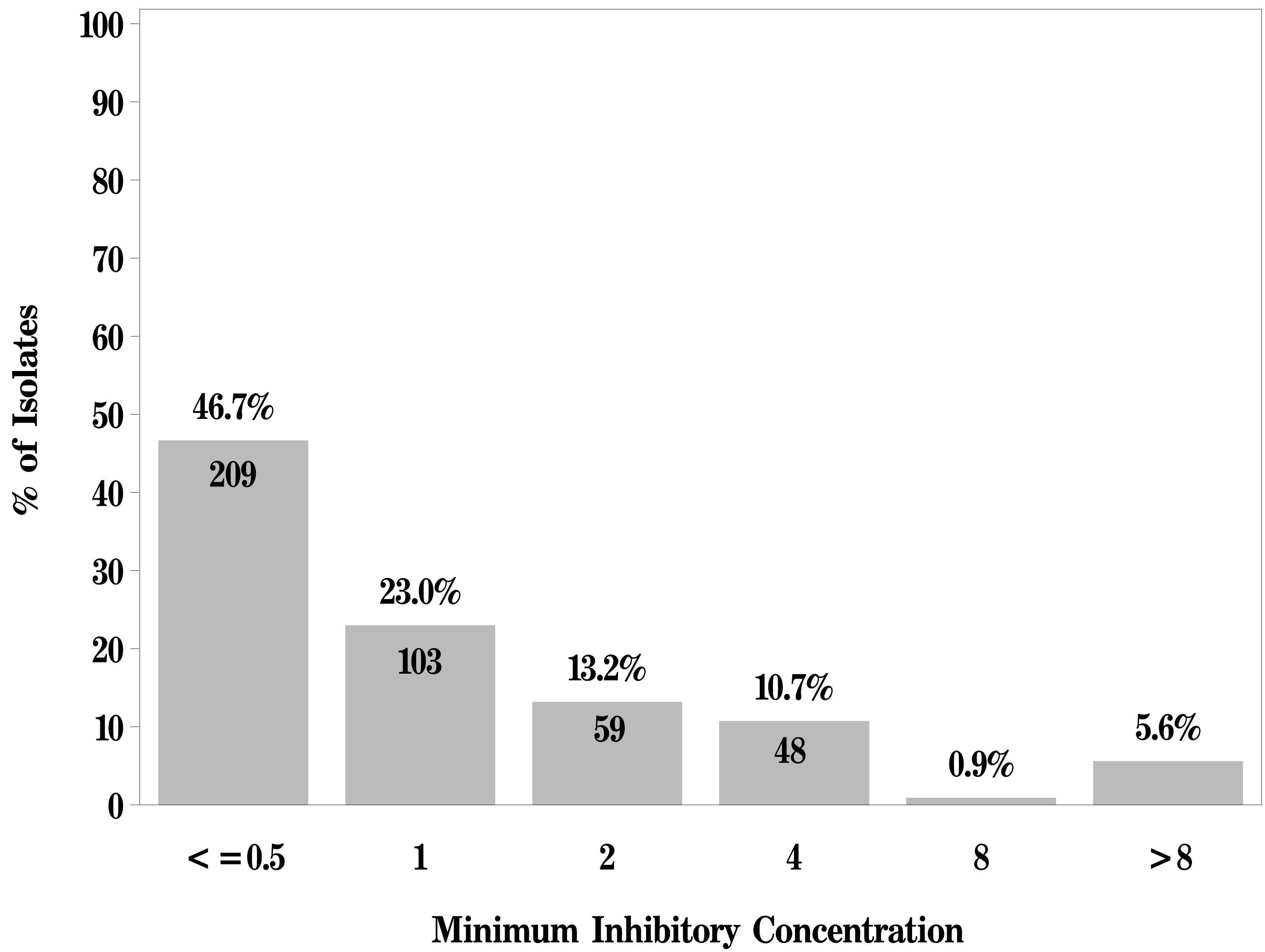
Breakpoints: Susceptible<=0.5 μg/mL Resistant>=8 μg/mL



NARMS

Figure 15e: Minimum Inhibitory Concentration of Erythromycin for *Enterococcus* in Ground Beef (N=448 Isolates)

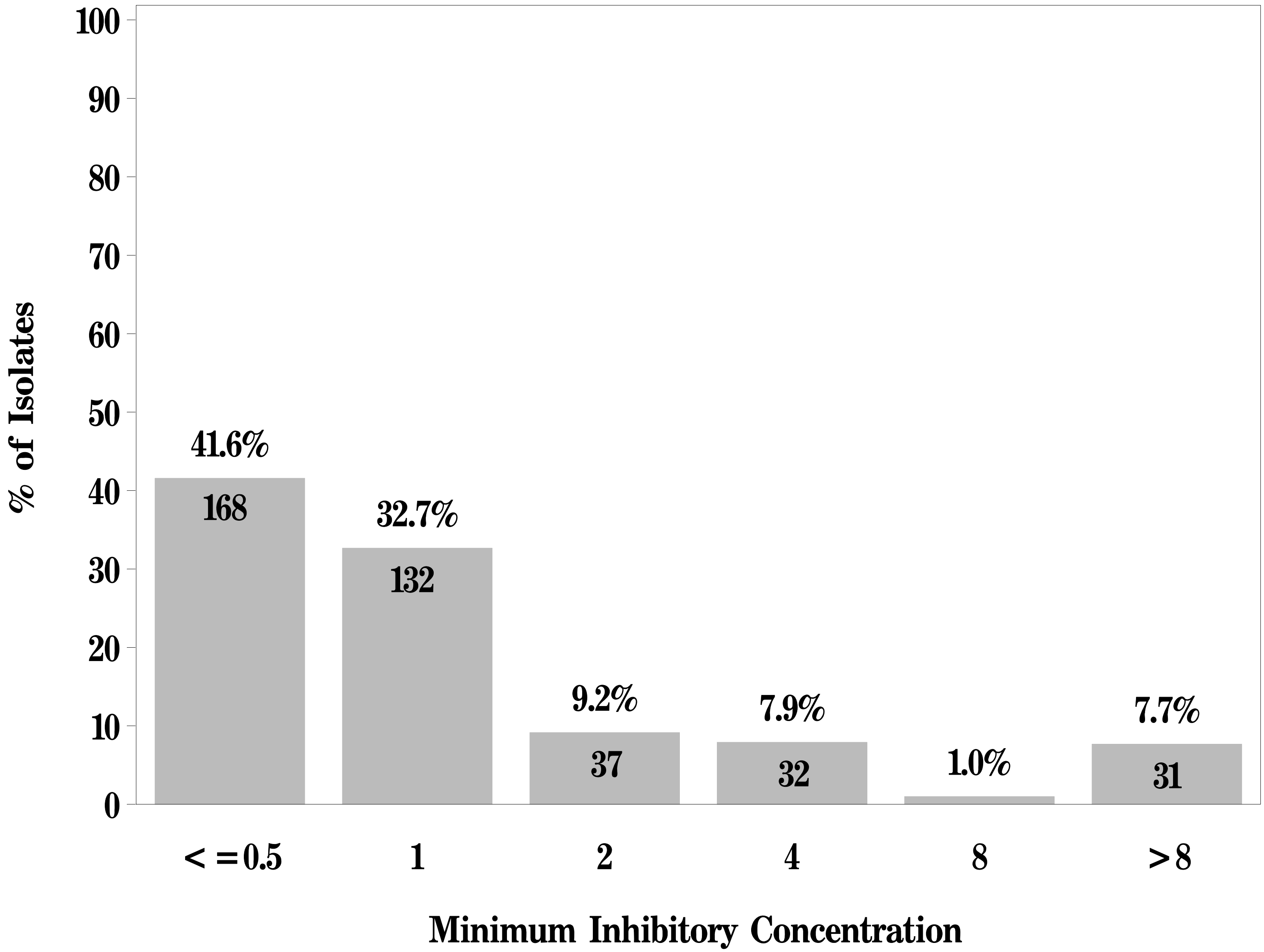
Breakpoints: Susceptible<=0.5 μg/mL Resistant>=8 μg/mL



NARMS

Figure 15e: Minimum Inhibitory Concentration of Erythromycin for *Enterococcus* in Pork Chop (N=404 Isolates)

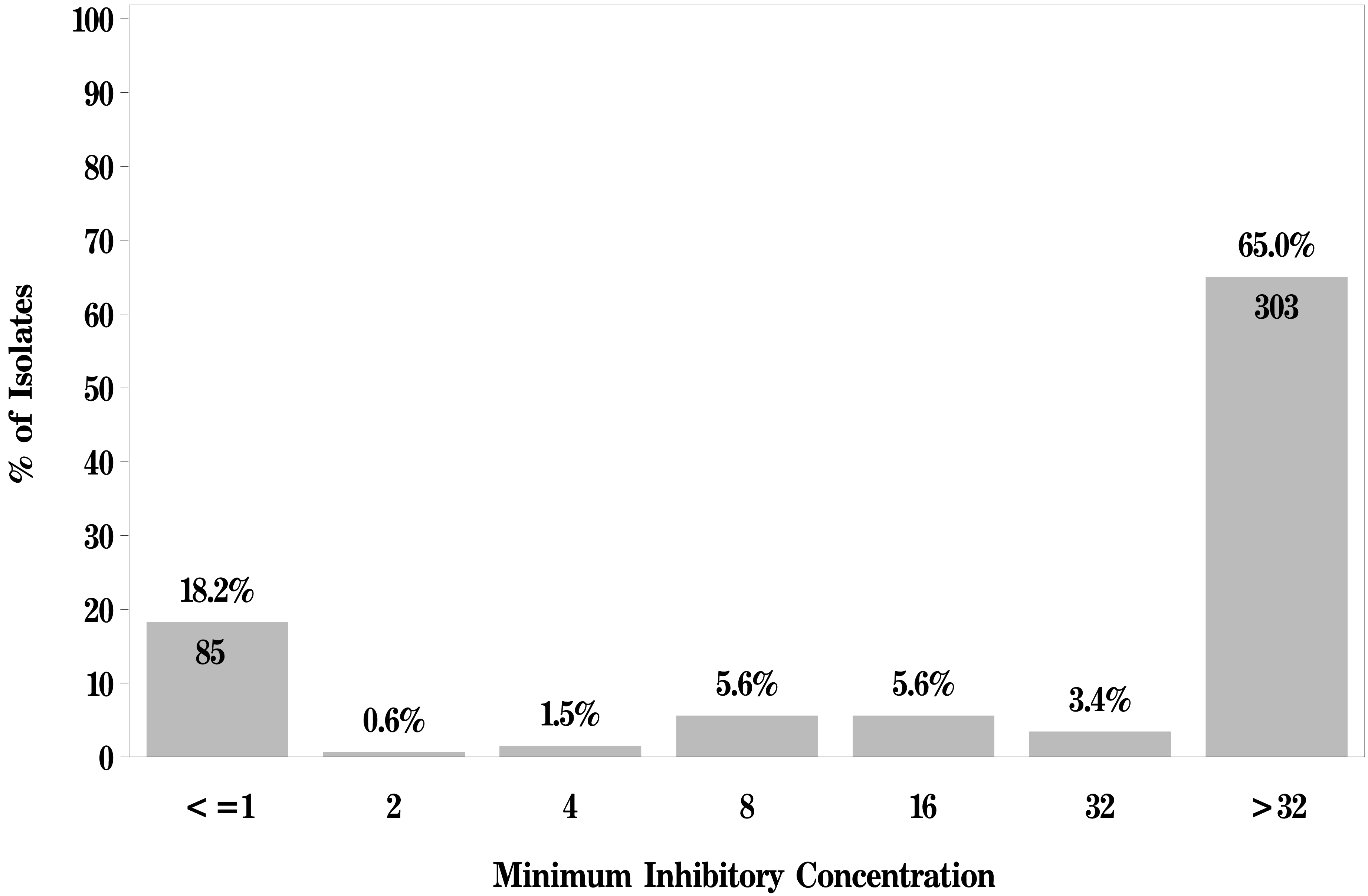
Breakpoints: Susceptible <=0.5 μg/mL Resistant >=8 μg/mL



NARMS

Figure 15f: Minimum Inhibitory Concentration of Flavomycin for *Enterococcus* in Chicken Breast (N=466 Isolates)

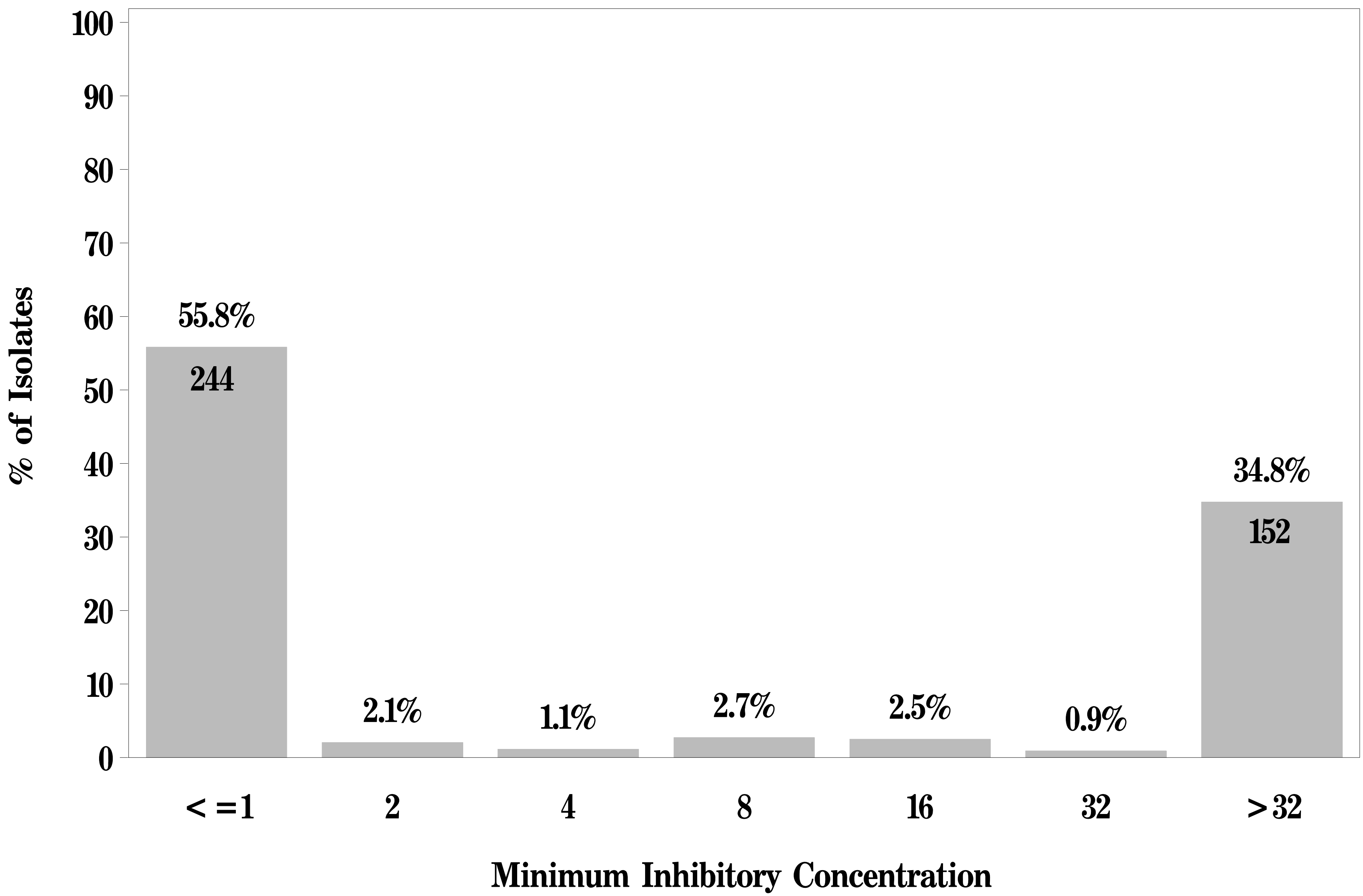
Breakpoints: Susceptible <=8 μg/mL Resistant >=32 μg/mL



NARMS

Figure 15f: Minimum Inhibitory Concentration of Flavomycin for *Enterococcus* in Ground Turkey (N=437 Isolates)

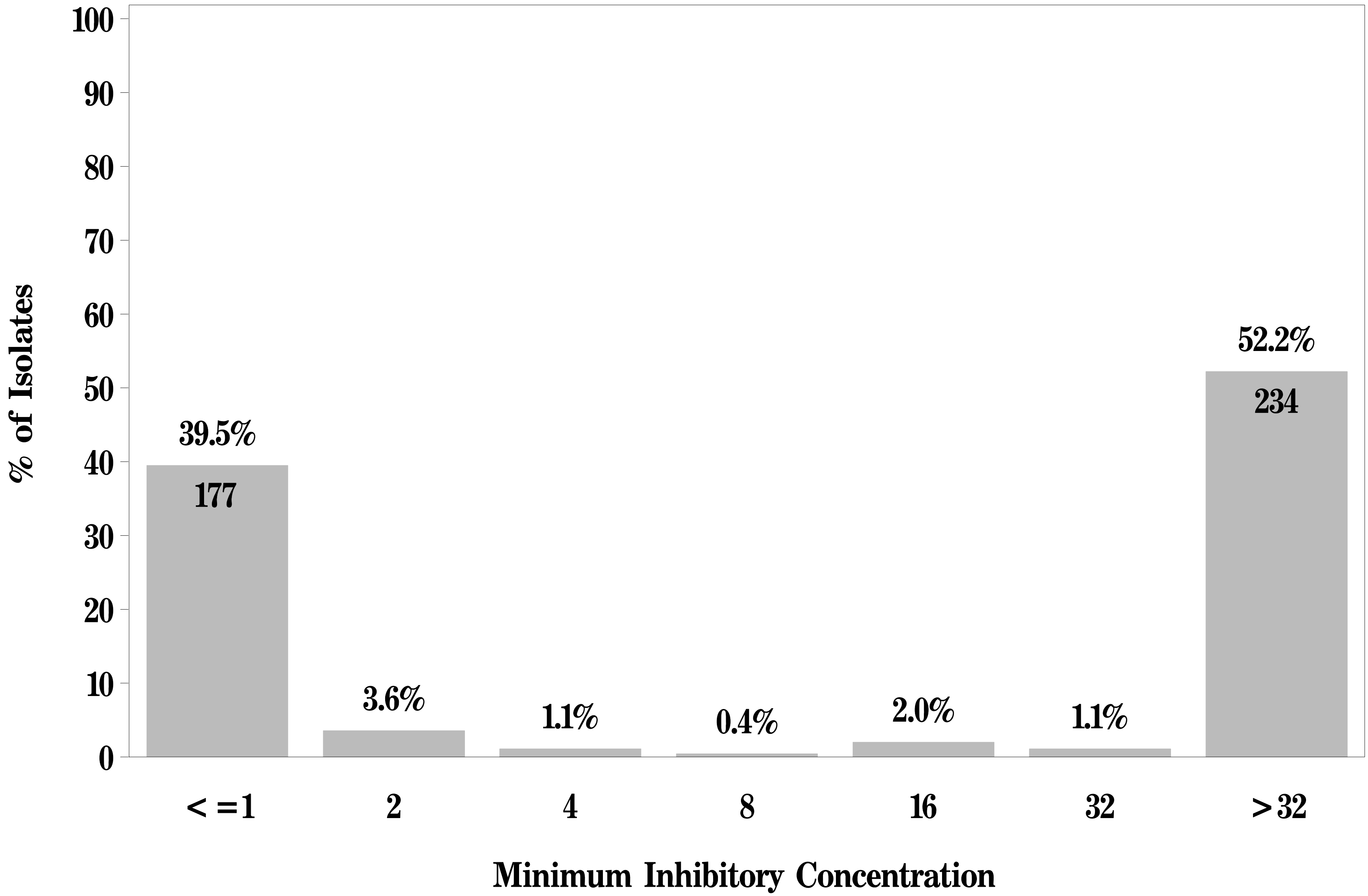
Breakpoints: Susceptible <=8 µg/mL Resistant >=32 µg/mL



NARMS

Figure 15f: Minimum Inhibitory Concentration of Flavomycin for *Enterococcus* in Ground Beef (N=448 Isolates)

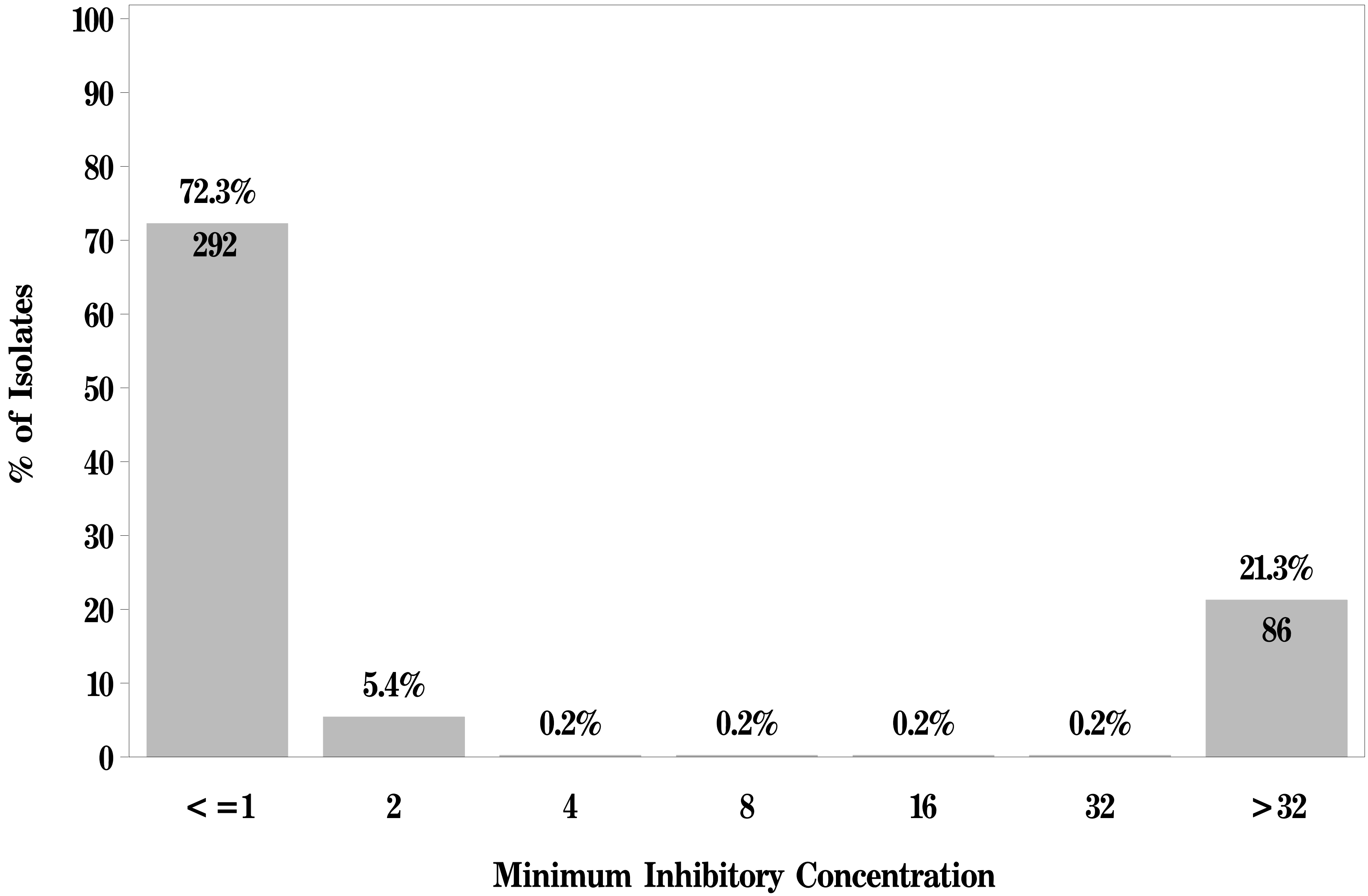
Breakpoints: Susceptible <=8 μg/mL Resistant >=32 μg/mL



NARMS

Figure 15f: Minimum Inhibitory Concentration of Flavomycin for *Enterococcus* in Pork Chop (N=404 Isolates)

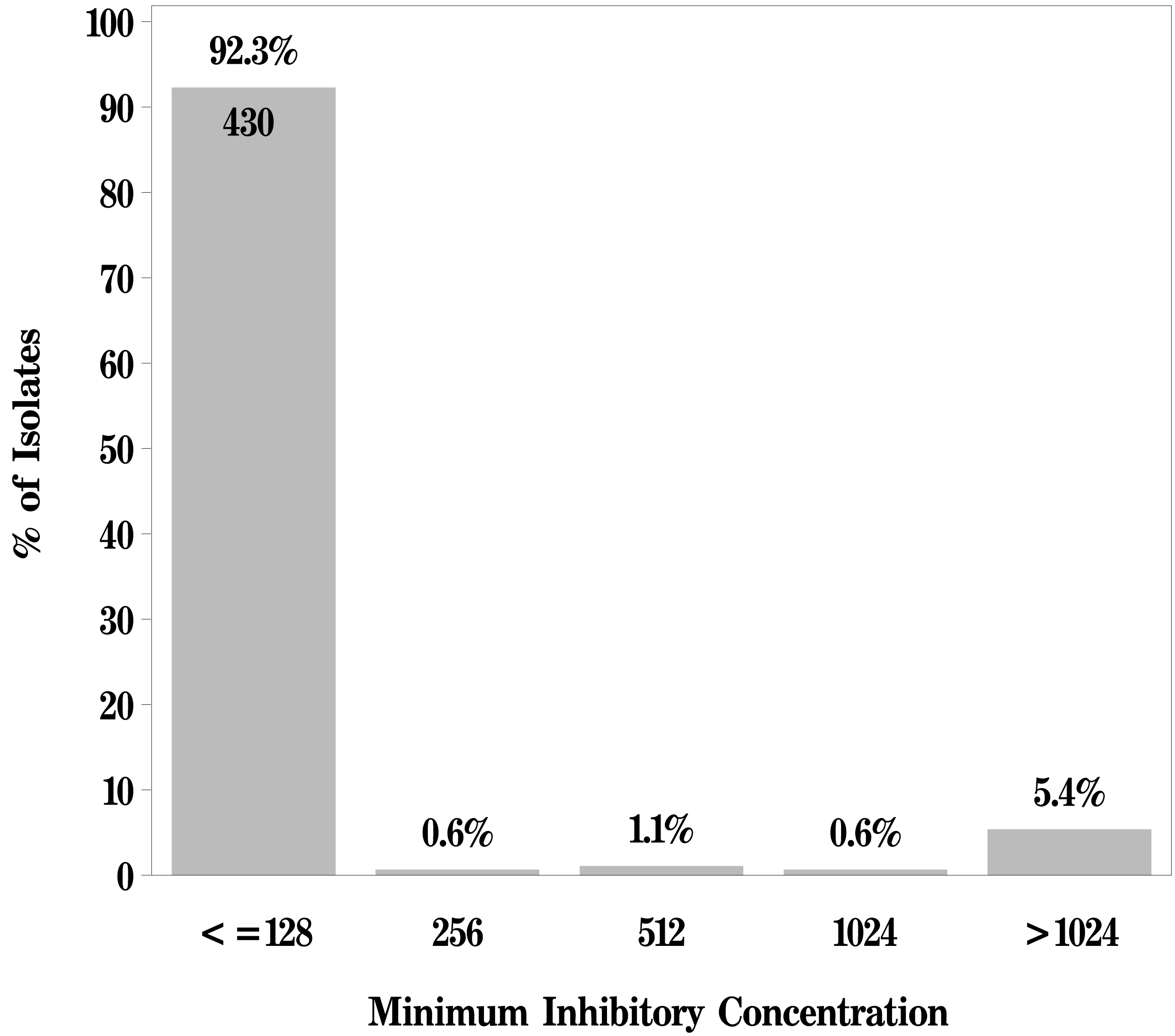
Breakpoints: Susceptible <=8 μg/mL Resistant >=32 μg/mL



NARMS

Figure 15g: Minimum Inhibitory Concentration of Gentamicin for *Enterococcus* in Chicken Breast (N=466 Isolates)

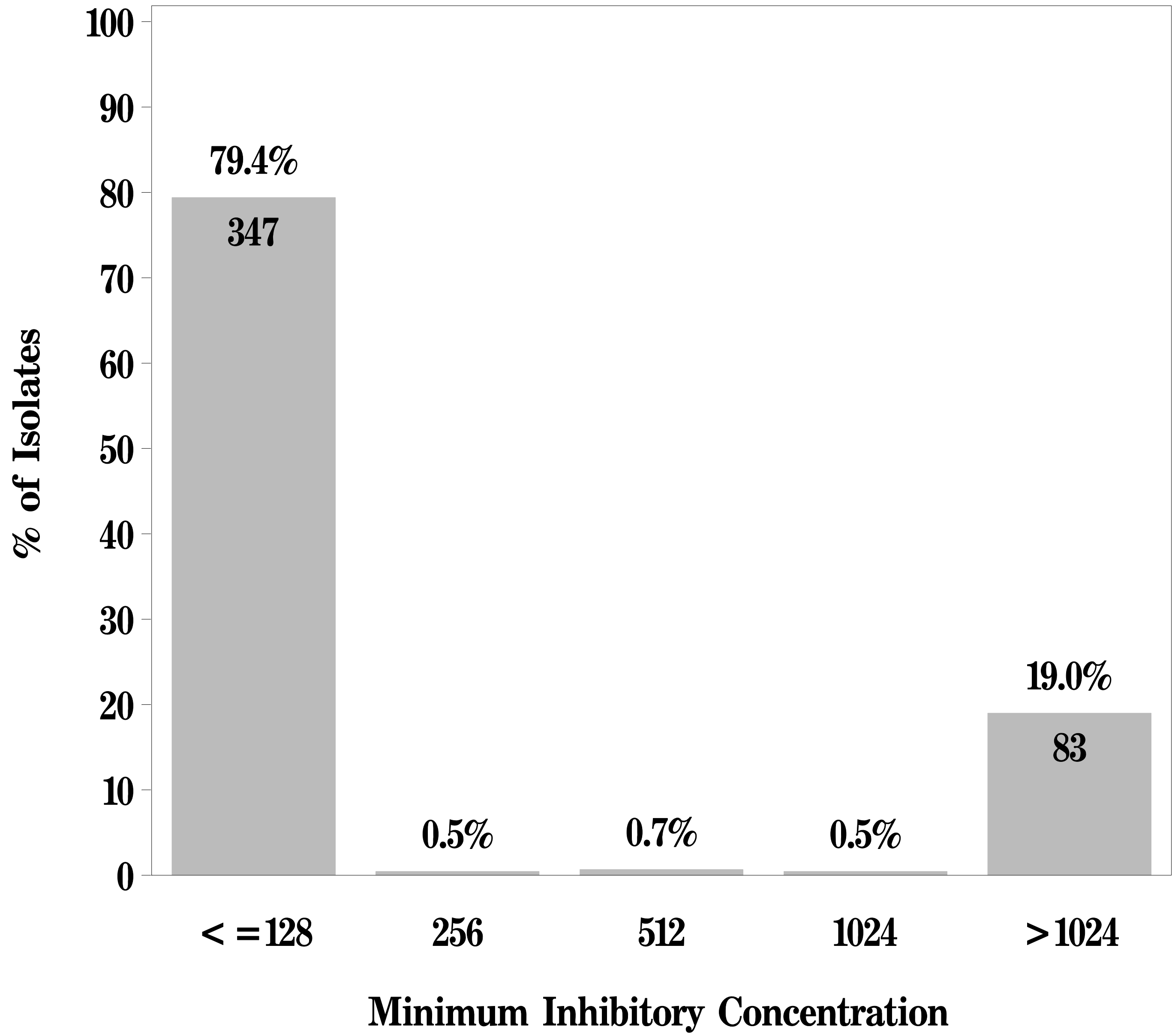
Breakpoints: Susceptible <=500 µg/mL Resistant >=500 µg/mL



NARMS

Figure 15g: Minimum Inhibitory Concentration of Gentamicin for *Enterococcus* in Ground Turkey (N=437 Isolates)

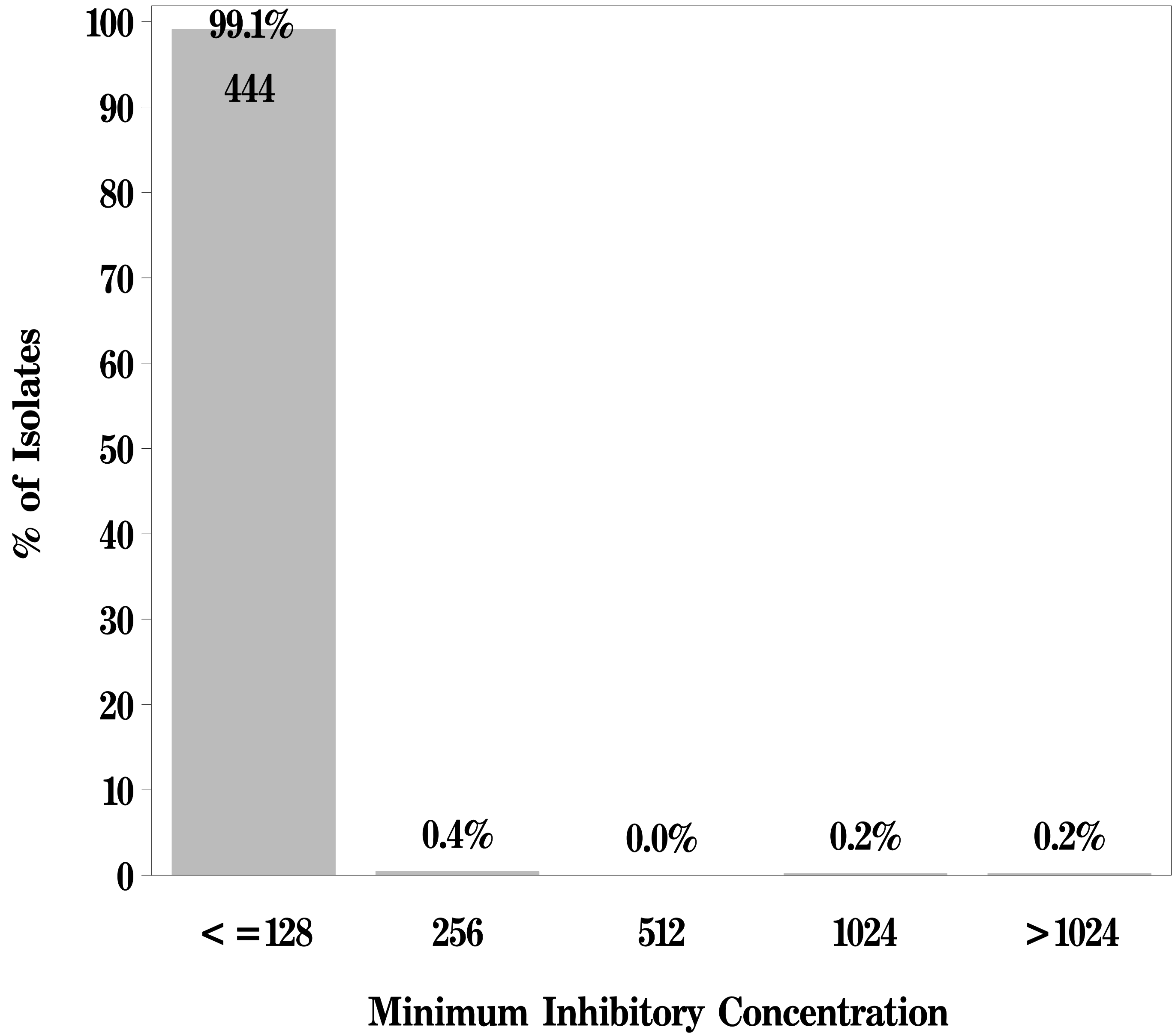
Breakpoints: Susceptible <=500 μg/mL Resistant >=500 μg/mL



NARMS

Figure 15g: Minimum Inhibitory Concentration of Gentamicin for *Enterococcus* in Ground Beef (N=448 Isolates)

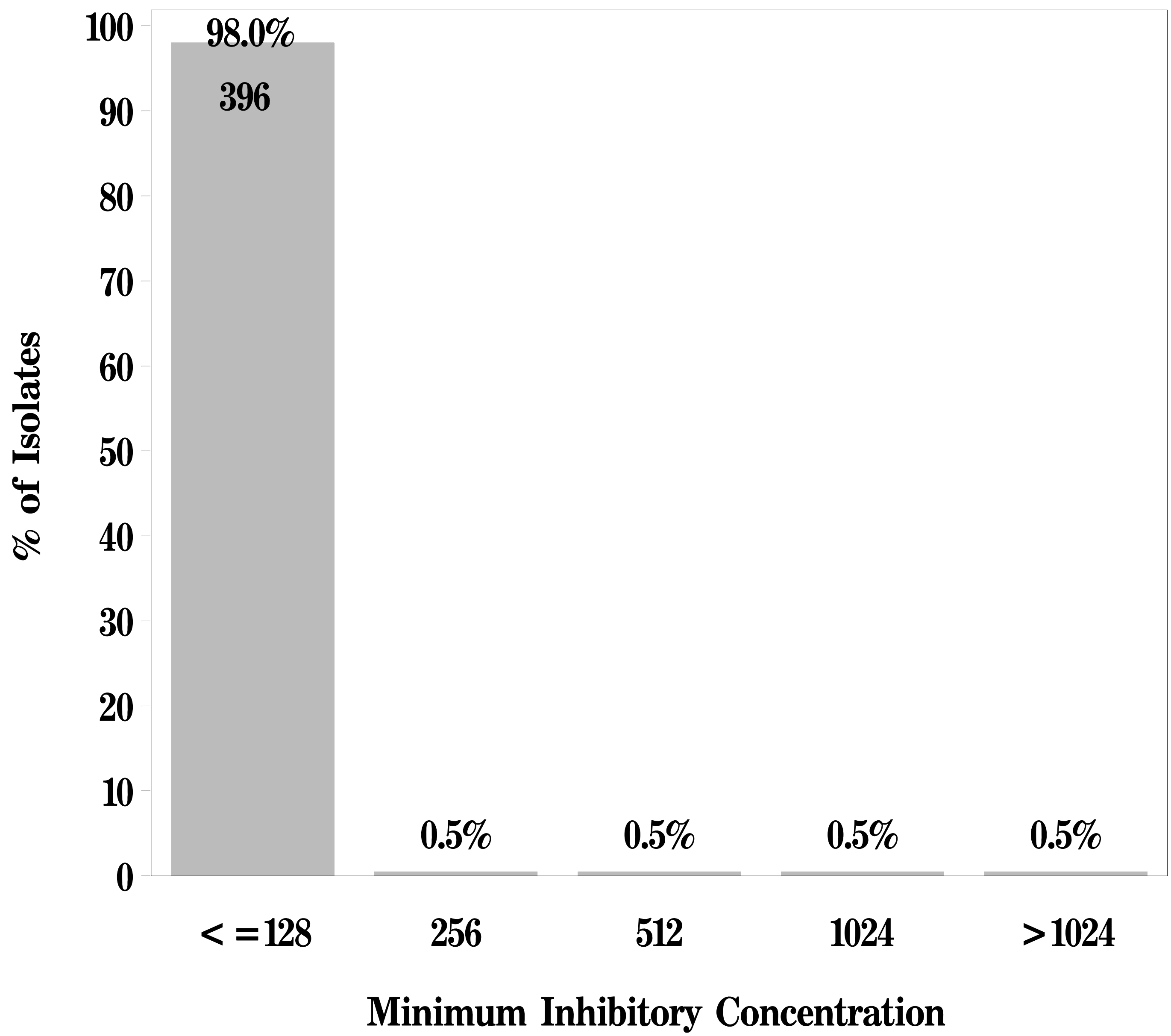
Breakpoints: Susceptible<=500 µg/mL Resistant>=500 µg/mL



NARMS

Figure 15g: Minimum Inhibitory Concentration of Gentamicin for *Enterococcus* in Pork Chop (N=404 Isolates)

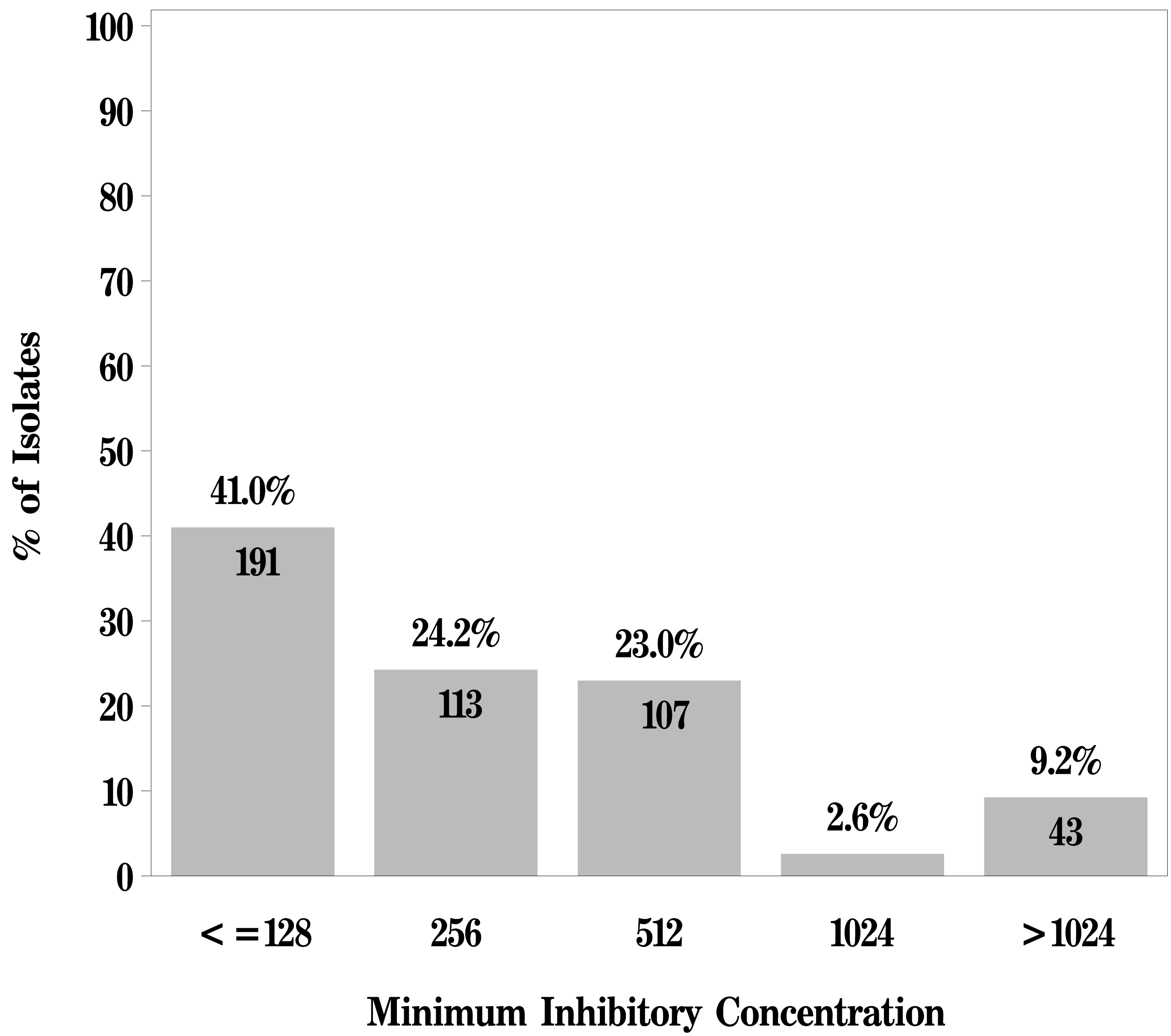
Breakpoints: Susceptible <=500 μg/mL Resistant >=500 μg/mL



NARMS

Figure 15h: Minimum Inhibitory Concentration of Kanamycin for *Enterococcus* in Chicken Breast (N=466 Isolates)

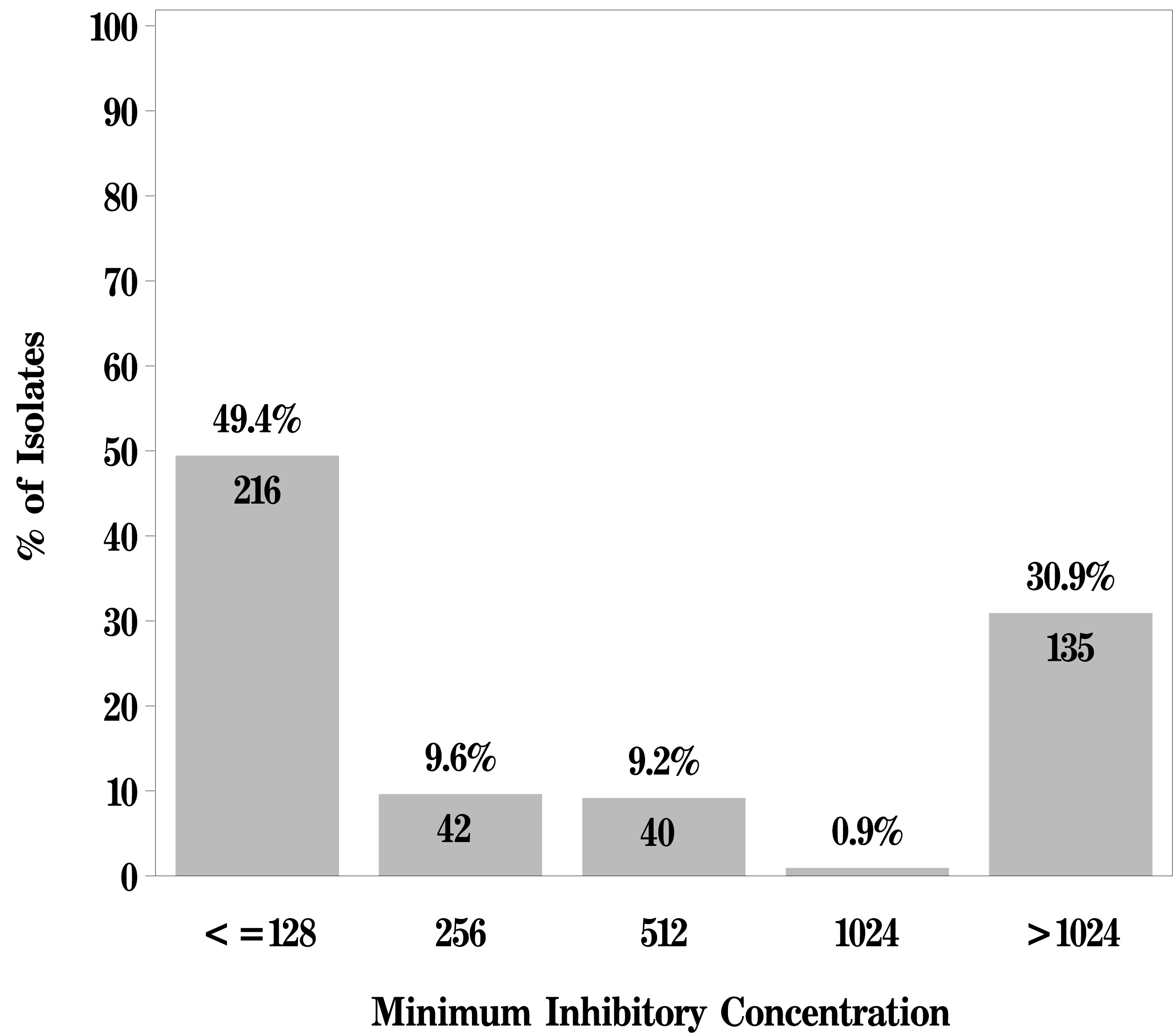
Breakpoints: Susceptible <=128 µg/mL Resistant >=512 µg/mL



NARMS

Figure 15h: Minimum Inhibitory Concentration of Kanamycin for *Enterococcus* in Ground Turkey (N=437 Isolates)

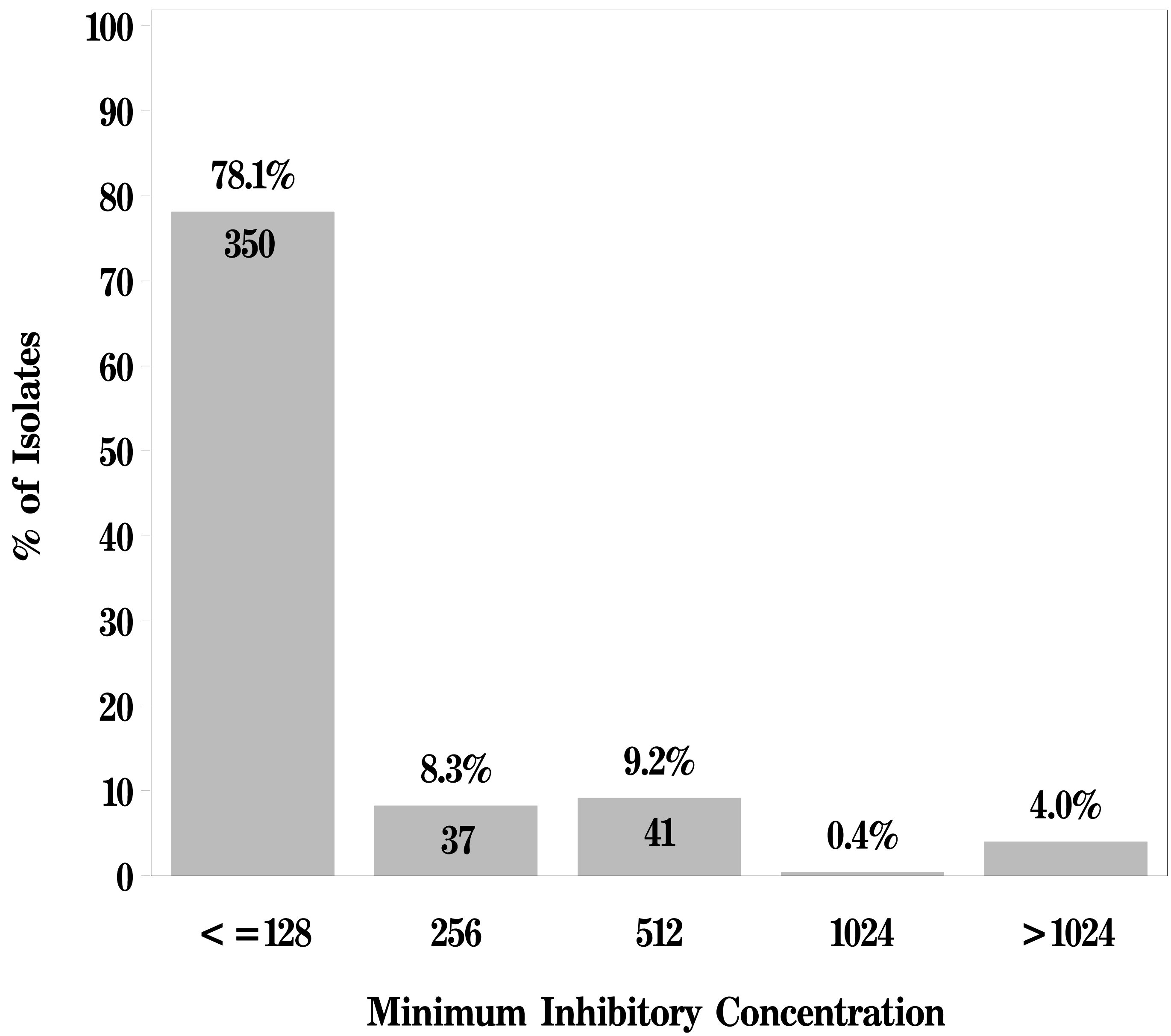
Breakpoints: Susceptible<=128 µg/mL Resistant>=512 µg/mL



NARMS

Figure 15h: Minimum Inhibitory Concentration of Kanamycin for *Enterococcus* in Ground Beef (N=448 Isolates)

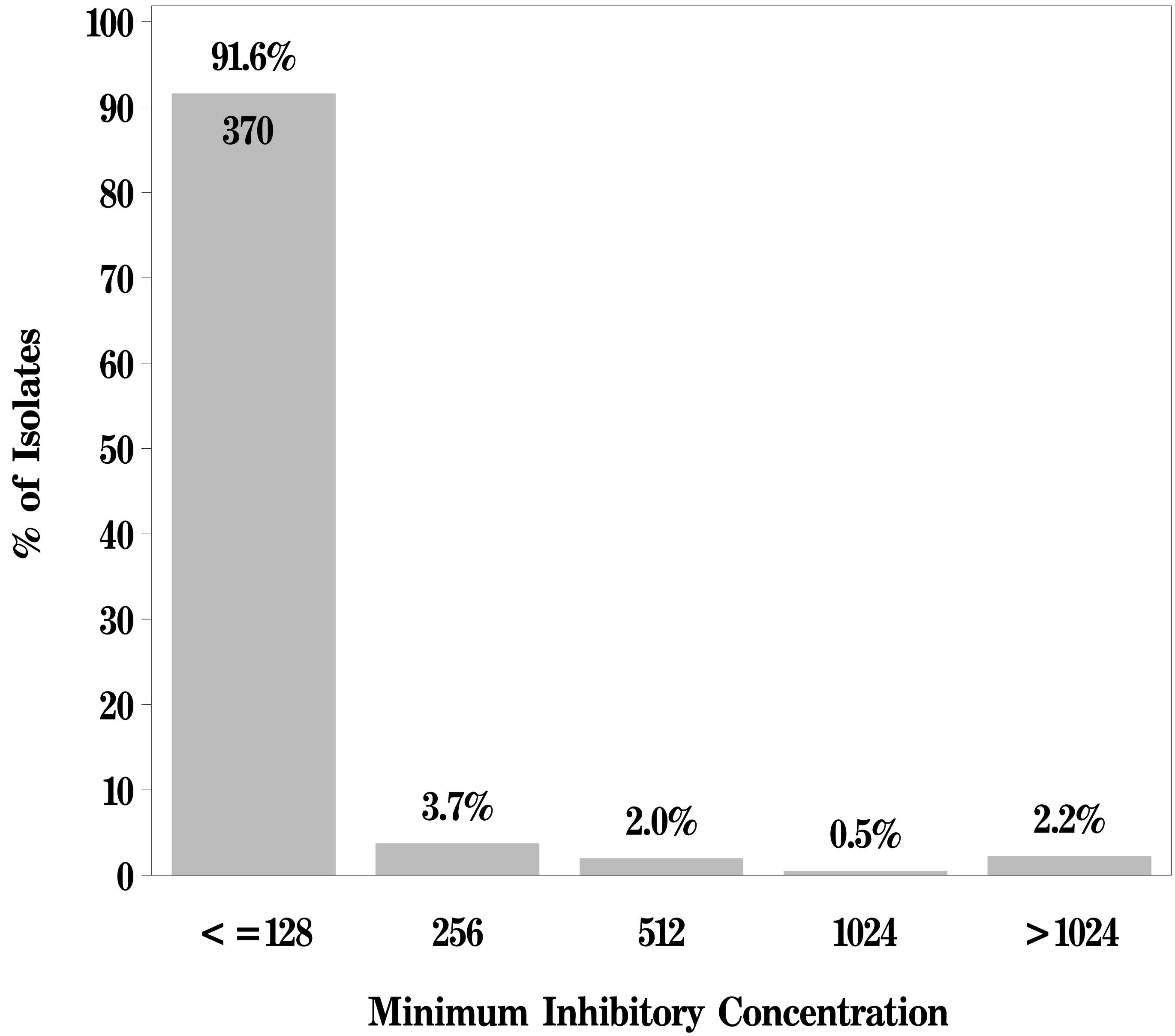
Breakpoints: Susceptible <=128 μg/mL Resistant >=512 μg/mL



NARMS

Figure 15h: Minimum Inhibitory Concentration of Kanamycin for *Enterococcus* in Pork Chop (N=404 Isolates)

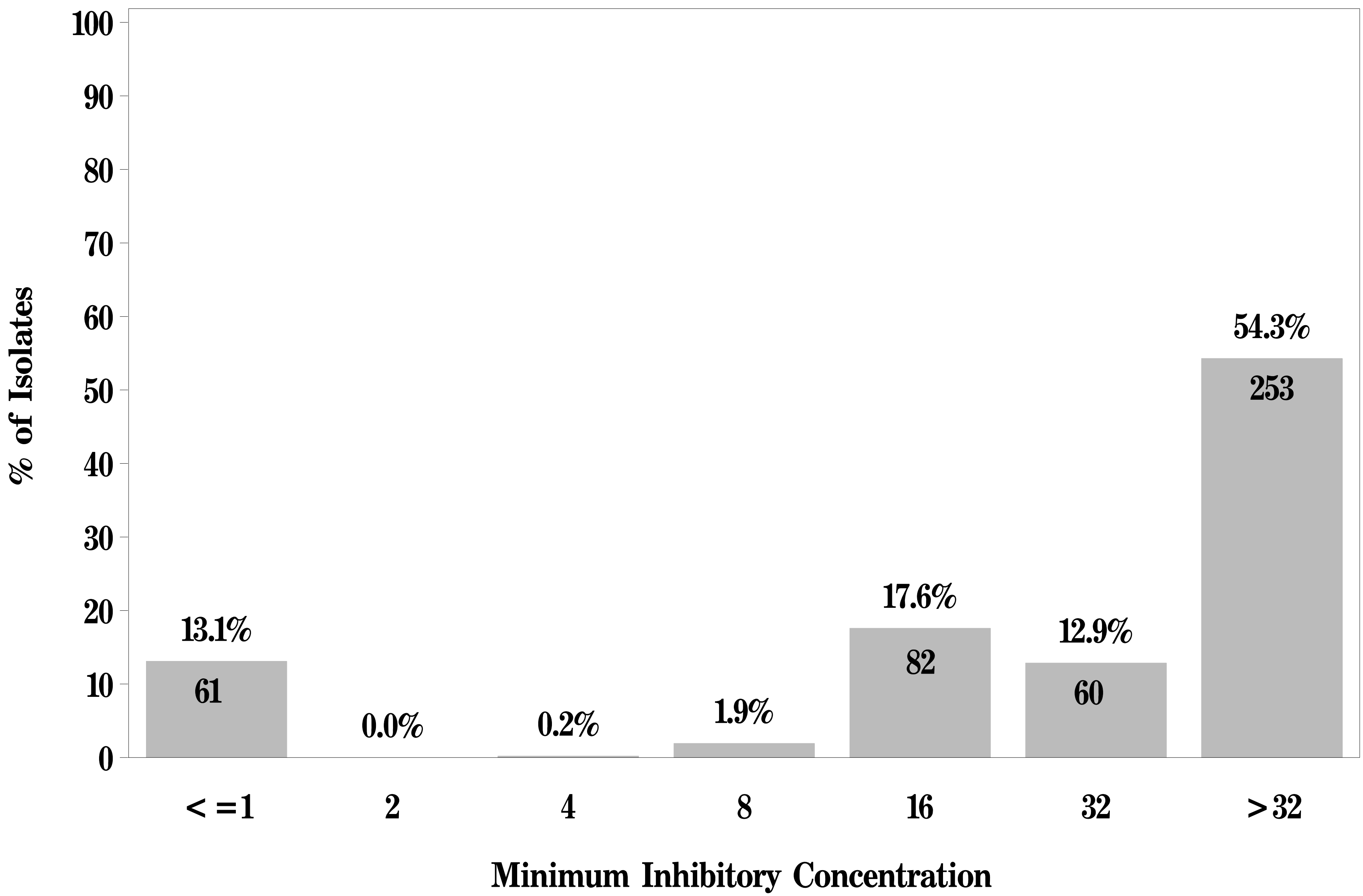
Breakpoints: Susceptible <=128 µg/mL Resistant >=512 µg/mL



NARMS

Figure 15i: Minimum Inhibitory Concentration of Lincomycin for *Enterococcus* in Chicken Breast (N=466 Isolates)

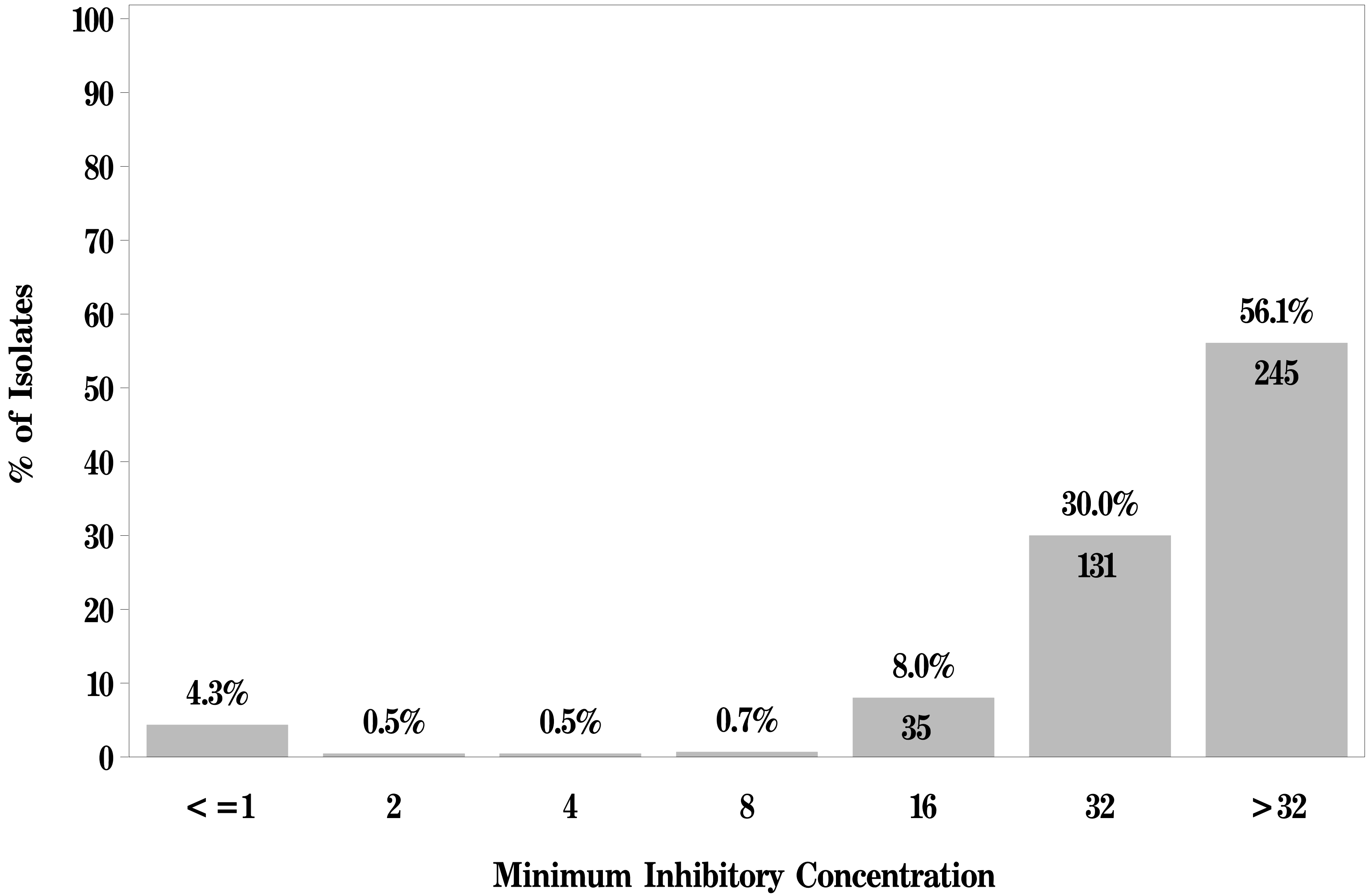
Breakpoints: Susceptible <=8 μg/mL Resistant >=32 μg/mL



NARMS

Figure 15i: Minimum Inhibitory Concentration of Lincomycin for *Enterococcus* in Ground Turkey (N=437 Isolates)

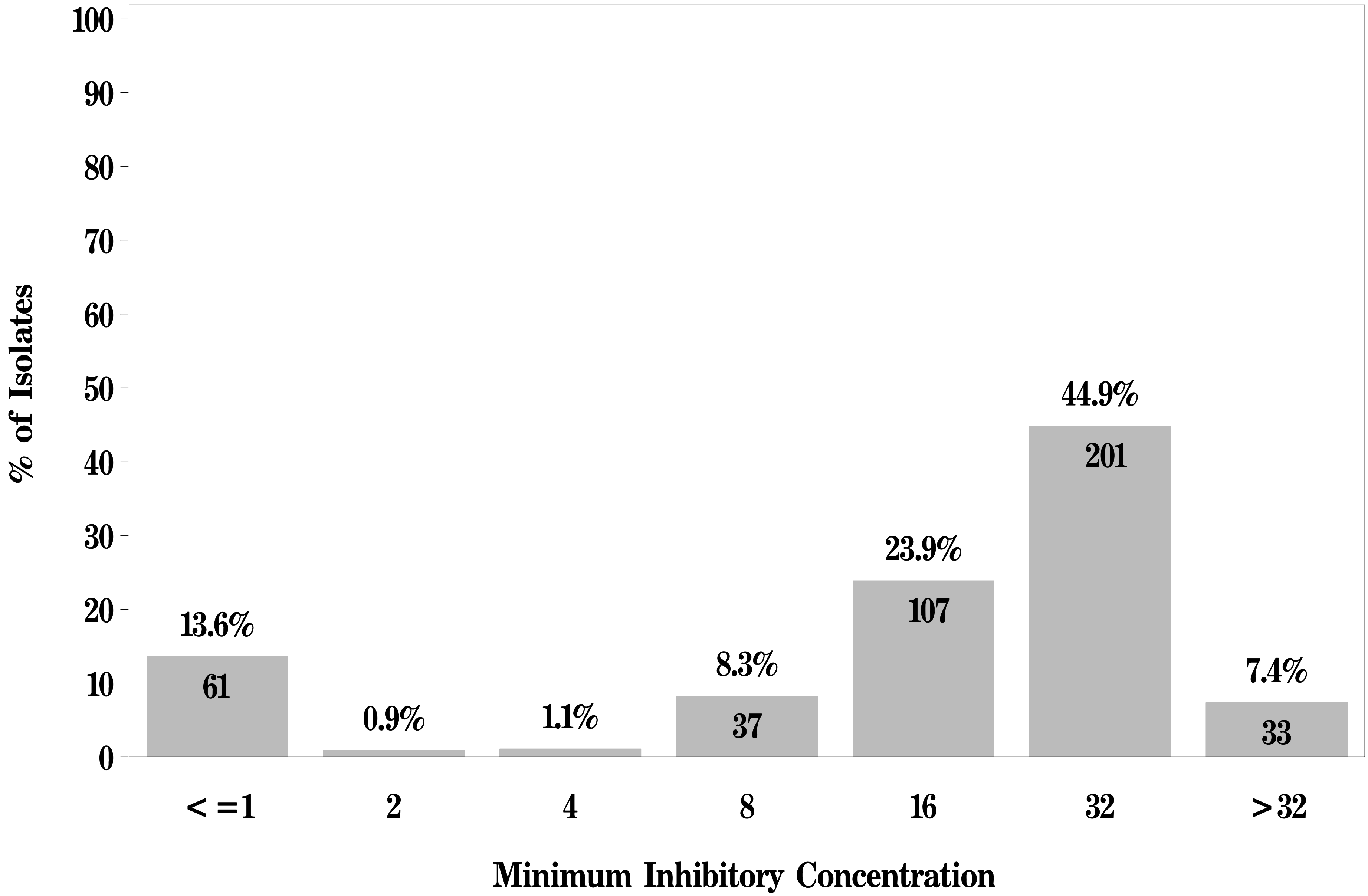
Breakpoints: Susceptible <=8 μg/mL Resistant >=32 μg/mL



NARMS

Figure 15i: Minimum Inhibitory Concentration of Lincomycin for *Enterococcus* in Ground Beef (N=448 Isolates)

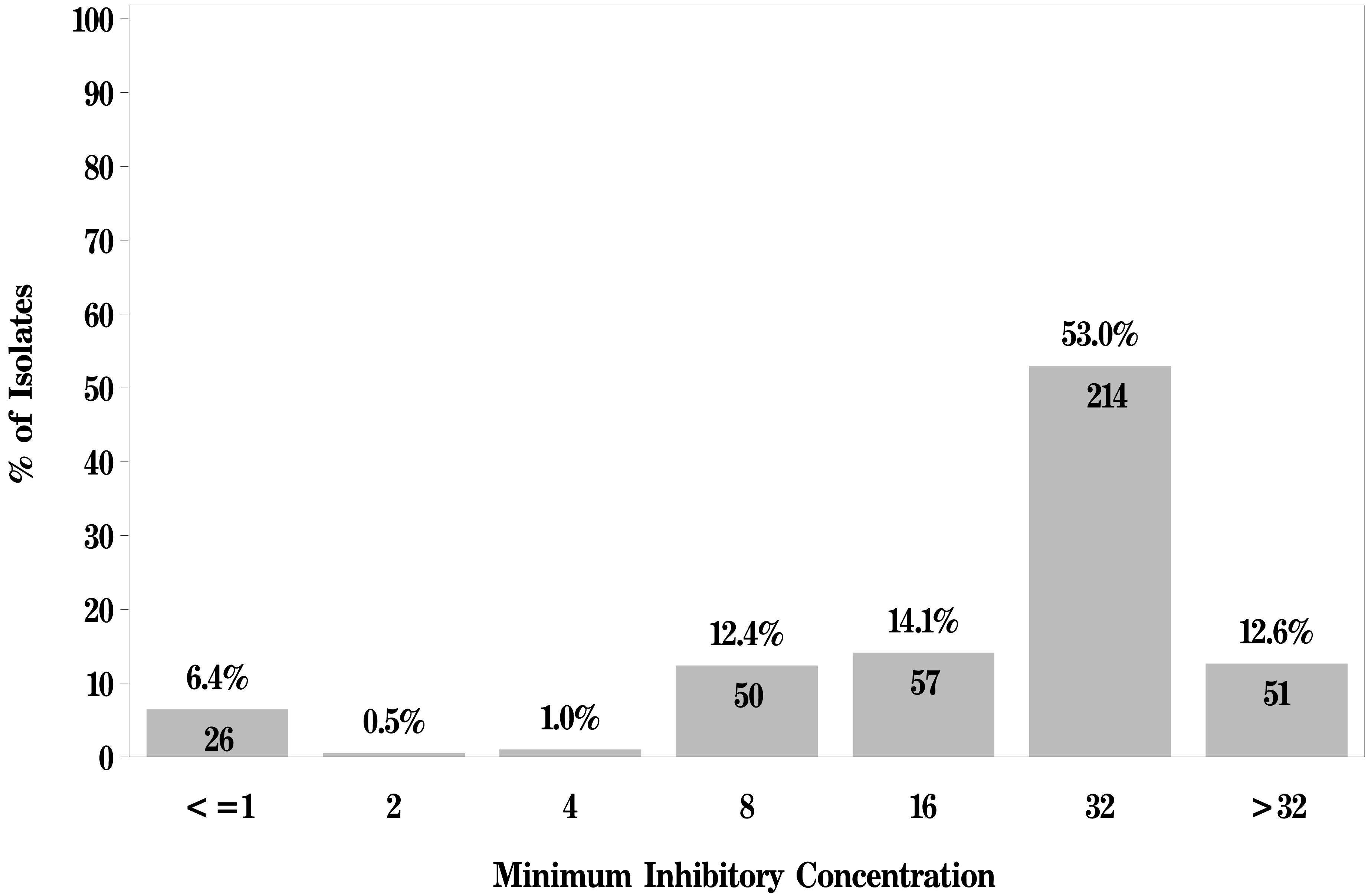
Breakpoints: Susceptible <=8 μg/mL Resistant >=32 μg/mL



NARMS

Figure 15i: Minimum Inhibitory Concentration of Lincomycin for *Enterococcus* in Pork Chop (N=404 Isolates)

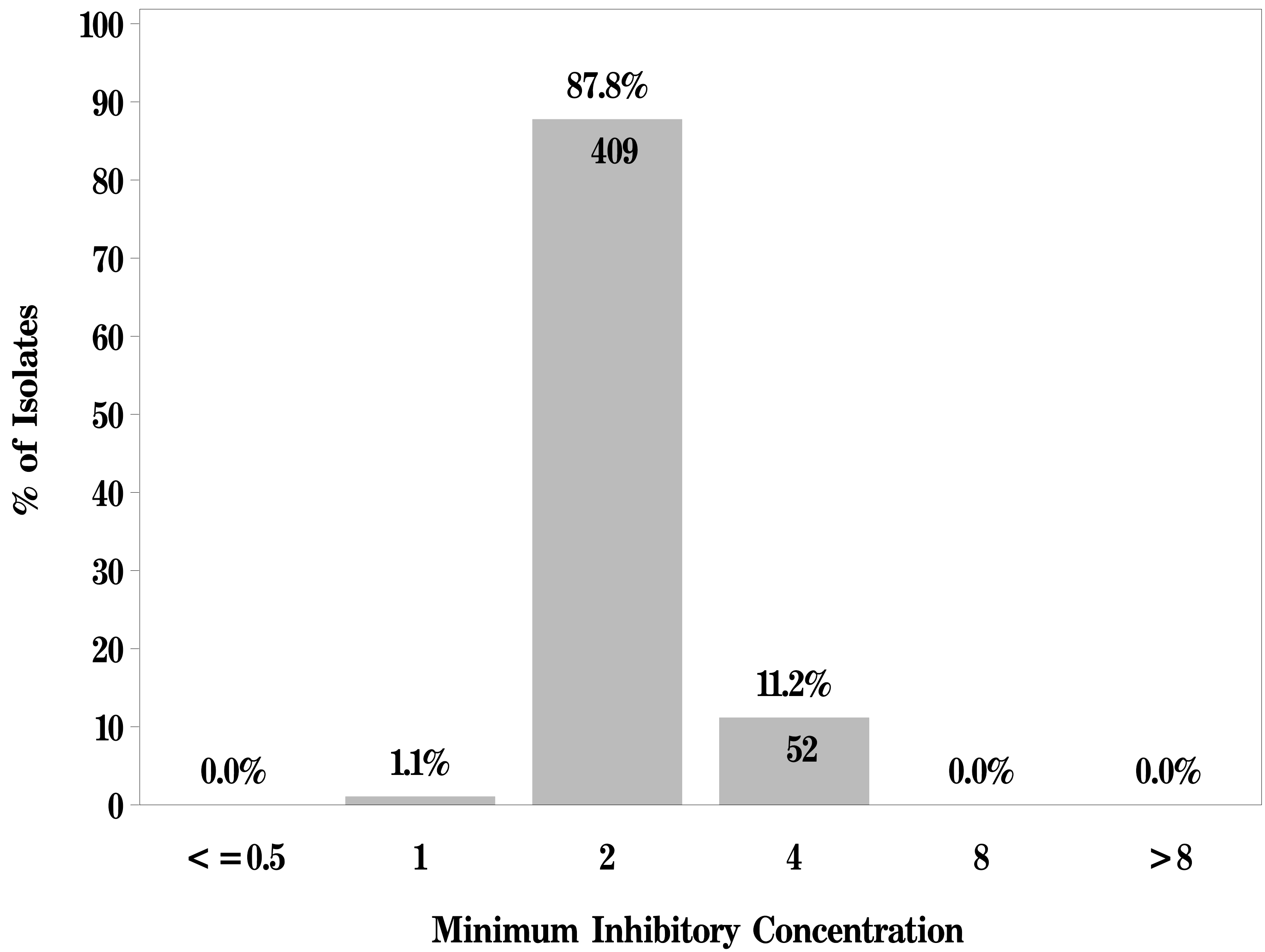
Breakpoints: Susceptible <=8 μg/mL Resistant >=32 μg/mL



NARMS

Figure 15j: Minimum Inhibitory Concentration of Linezolid for *Enterococcus* in Chicken Breast (N=466 Isolates)

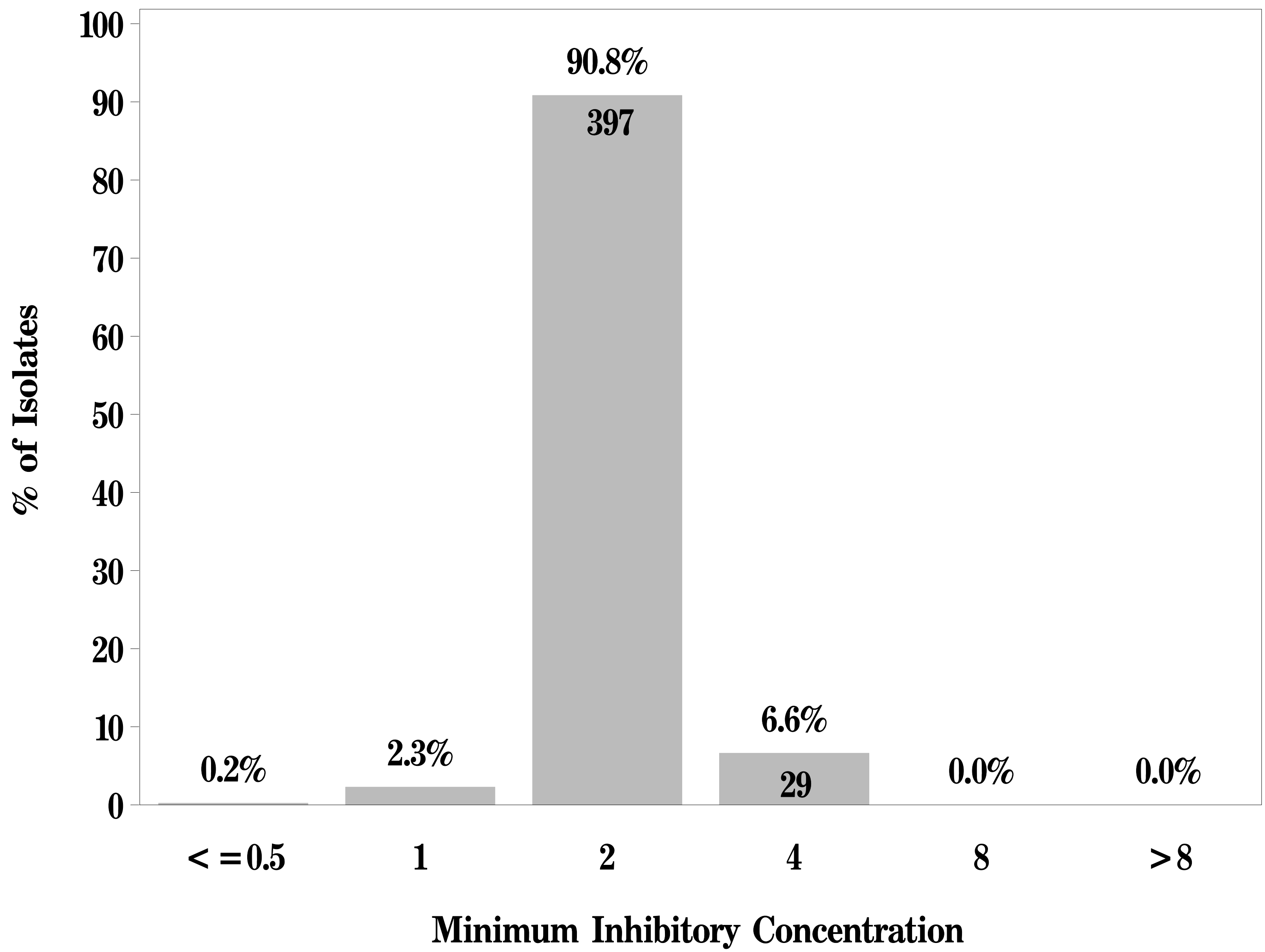
Breakpoints: Susceptible <=2 μg/mL Resistant >=8 μg/mL



NARMS

Figure 15j: Minimum Inhibitory Concentration of Linezolid for *Enterococcus* in Ground Turkey (N=437 Isolates)

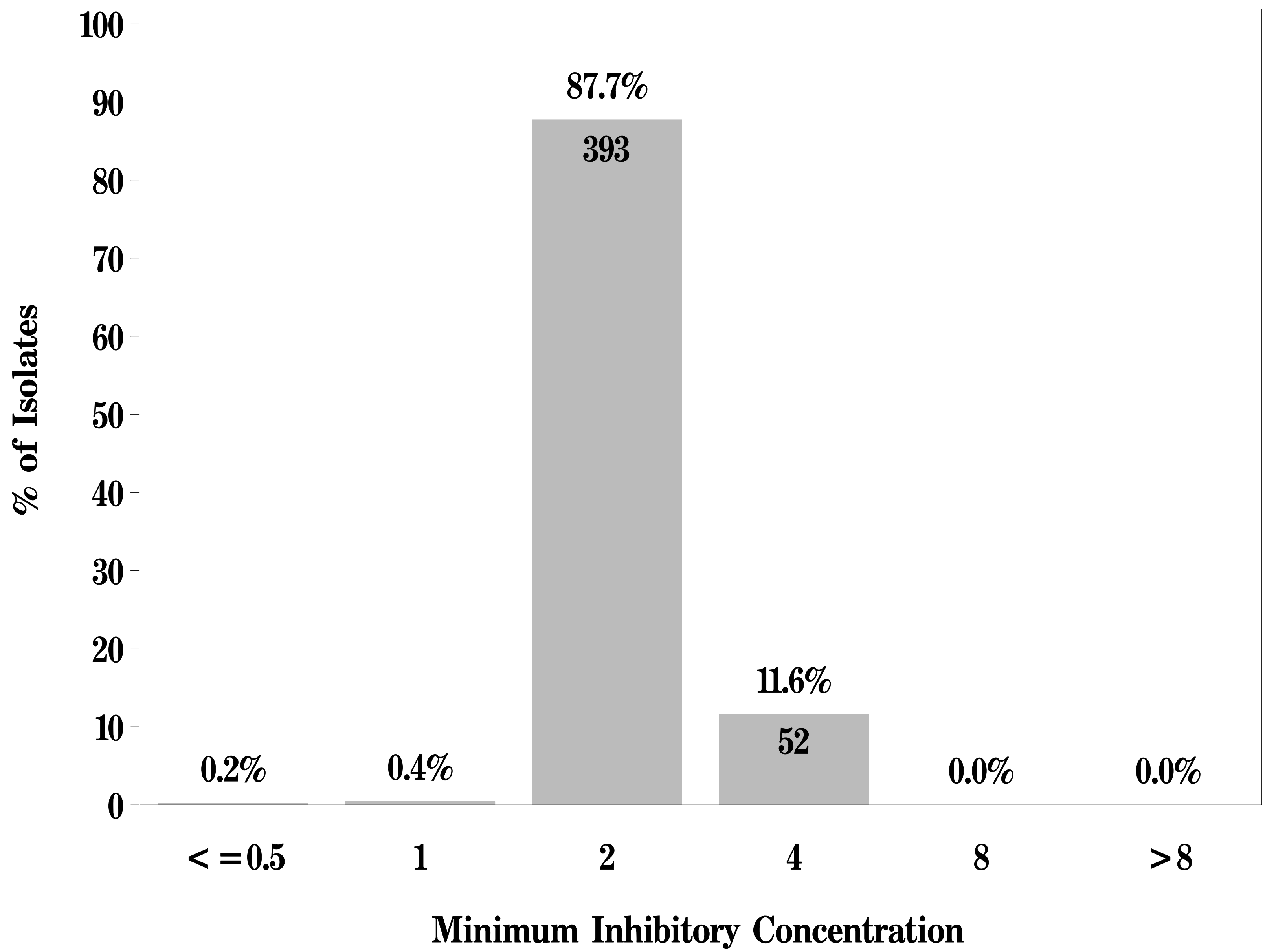
Breakpoints: Susceptible<=2 µg/mL Resistant>=8 µg/mL



NARMS

Figure 15j: Minimum Inhibitory Concentration of Linezolid for *Enterococcus* in Ground Beef (N=448 Isolates)

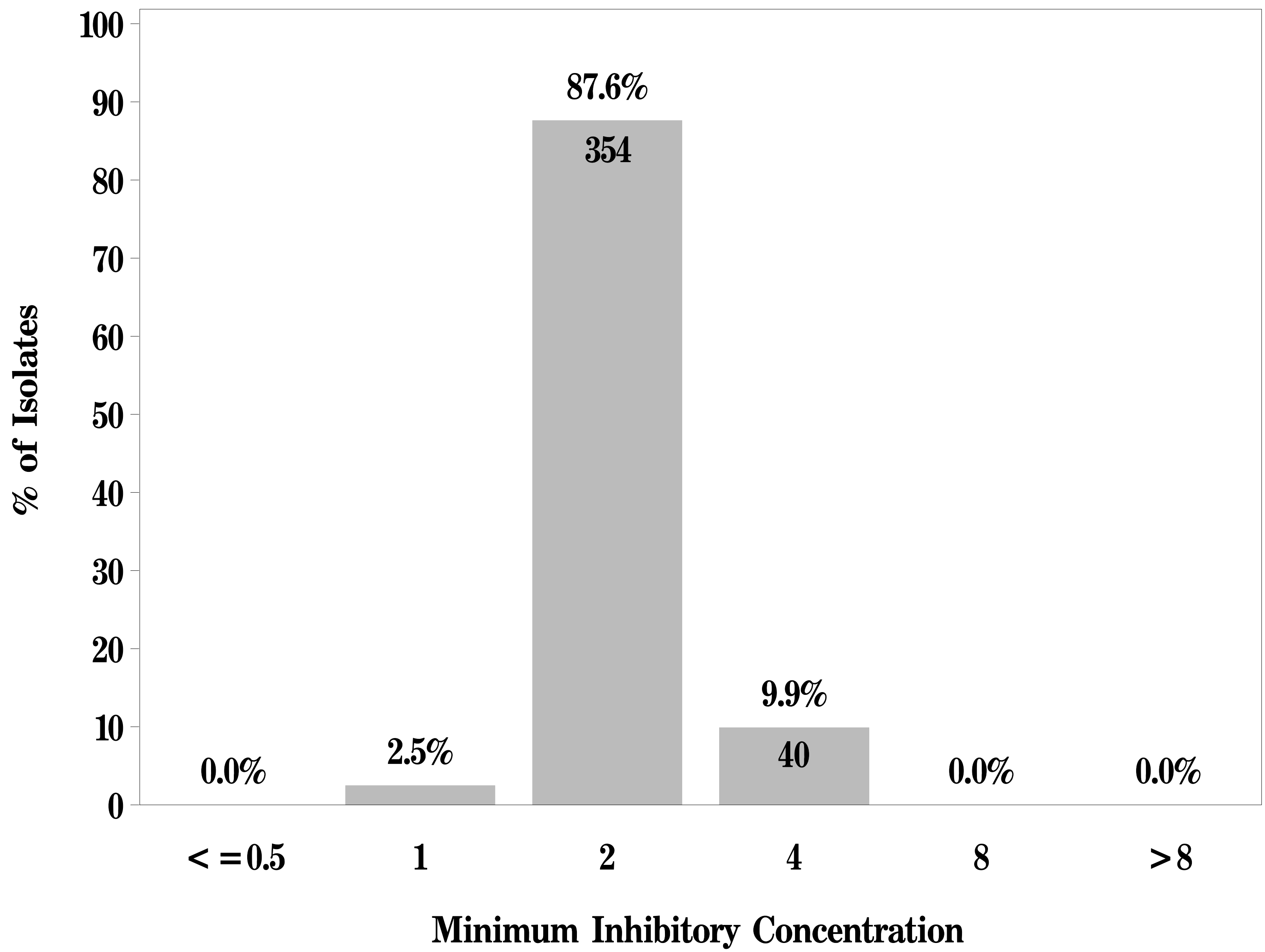
Breakpoints: Susceptible<=2 μg/mL Resistant>=8 μg/mL



NARMS

Figure 15j: Minimum Inhibitory Concentration of Linezolid for *Enterococcus* in Pork Chop (N=404 Isolates)

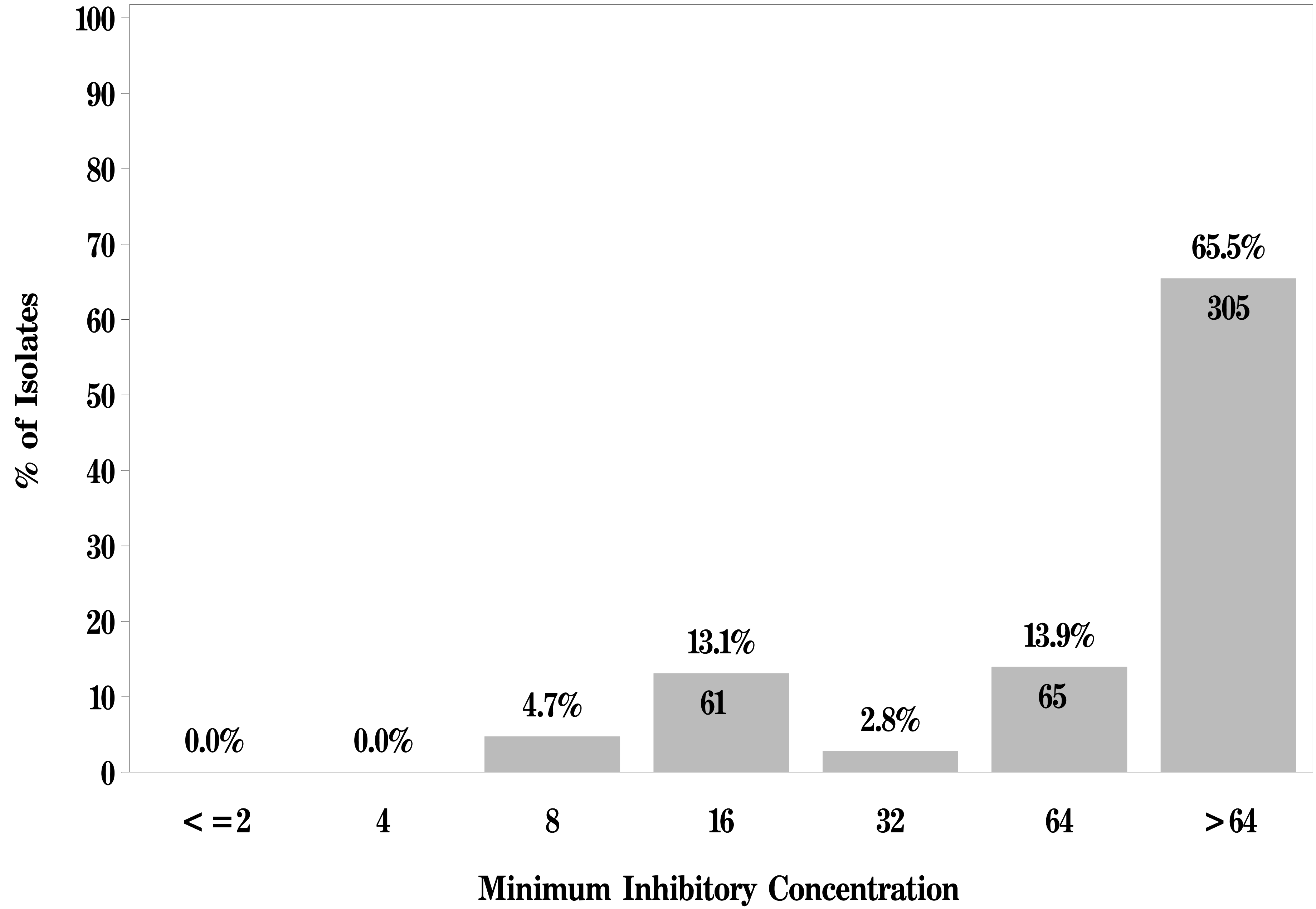
Breakpoints: Susceptible<=2 μg/mL Resistant>=8 μg/mL



NARMS

Figure 15k: Minimum Inhibitory Concentration of Nitrofurantoin for *Enterococcus* in Chicken Breast (N=466 Isolates)

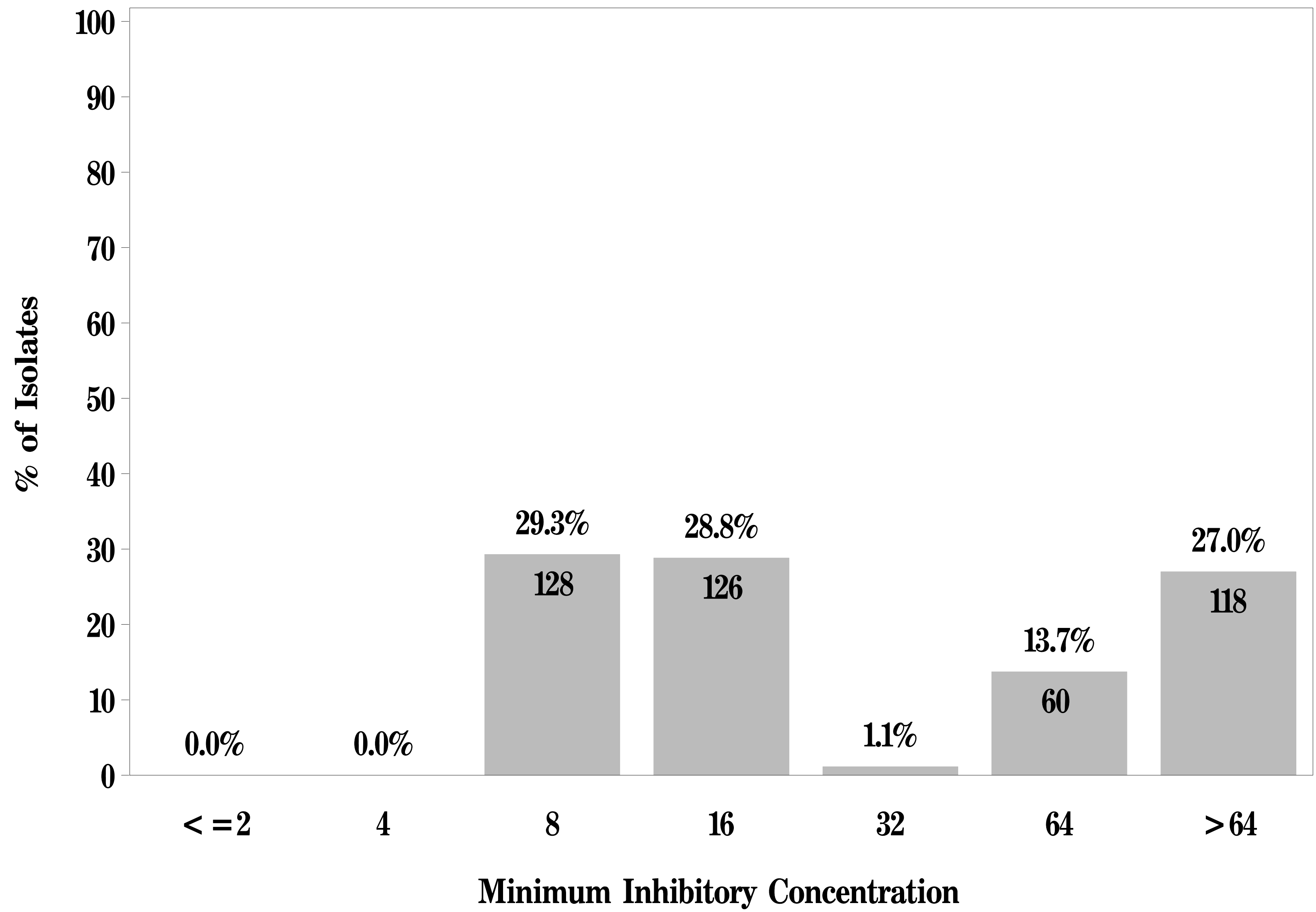
Breakpoints: Susceptible<=32 μg/mL Resistant>=128 μg/mL



NARMS

Figure 15k: Minimum Inhibitory Concentration of Nitrofurantoin for *Enterococcus* in Ground Turkey (N=437 Isolates)

Breakpoints: Susceptible <=32 µg/mL Resistant >=128 µg/mL



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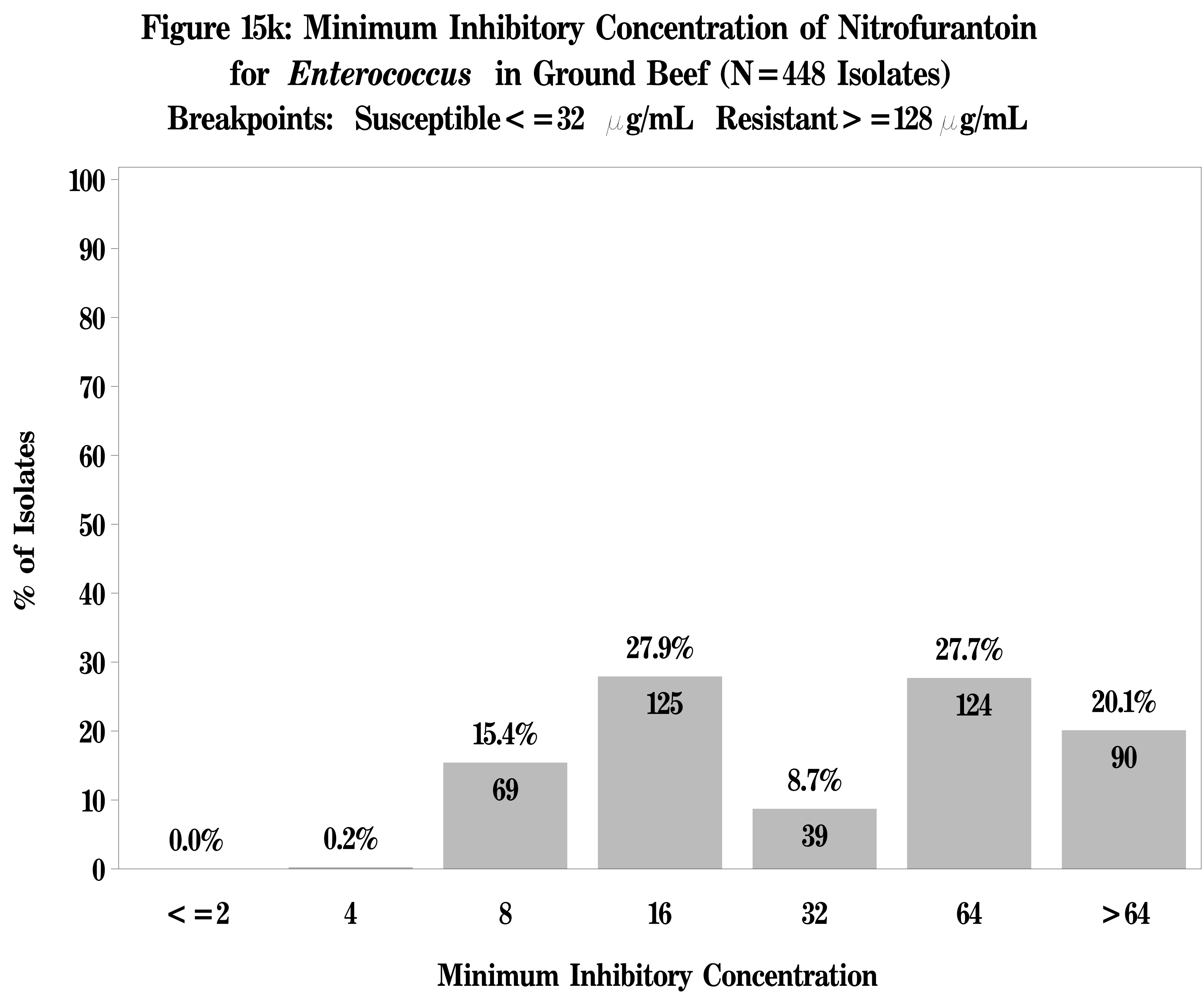
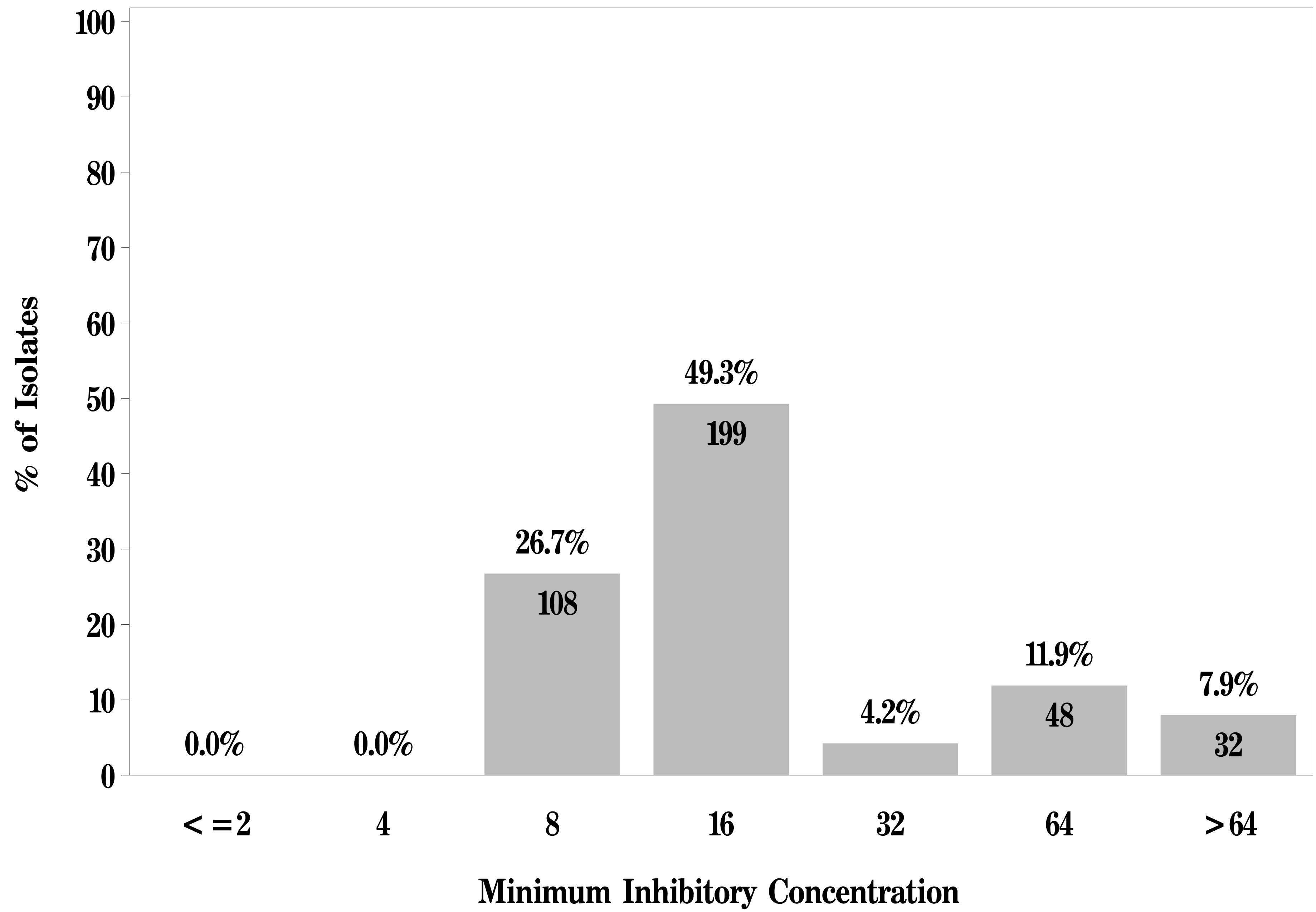


Figure 15k: Minimum Inhibitory Concentration of Nitrofurantoin
for *Enterococcus* in Ground Beef (N=448 Isolates)
Breakpoints: Susceptible<=32 μg/mL Resistant>=128 μg/mL
% of Isolates
100
90
80
70
60
50
40
30
20
10
0
0.0%
0.2%
15.4%
69
27.9%
125
8.7%
39
27.7%
124
20.1%
90
<=2
4
8
16
32
64
>64
Minimum Inhibitory Concentration

NARMS

Figure 15k: Minimum Inhibitory Concentration of Nitrofurantoin for *Enterococcus* in Pork Chop (N=404 Isolates)

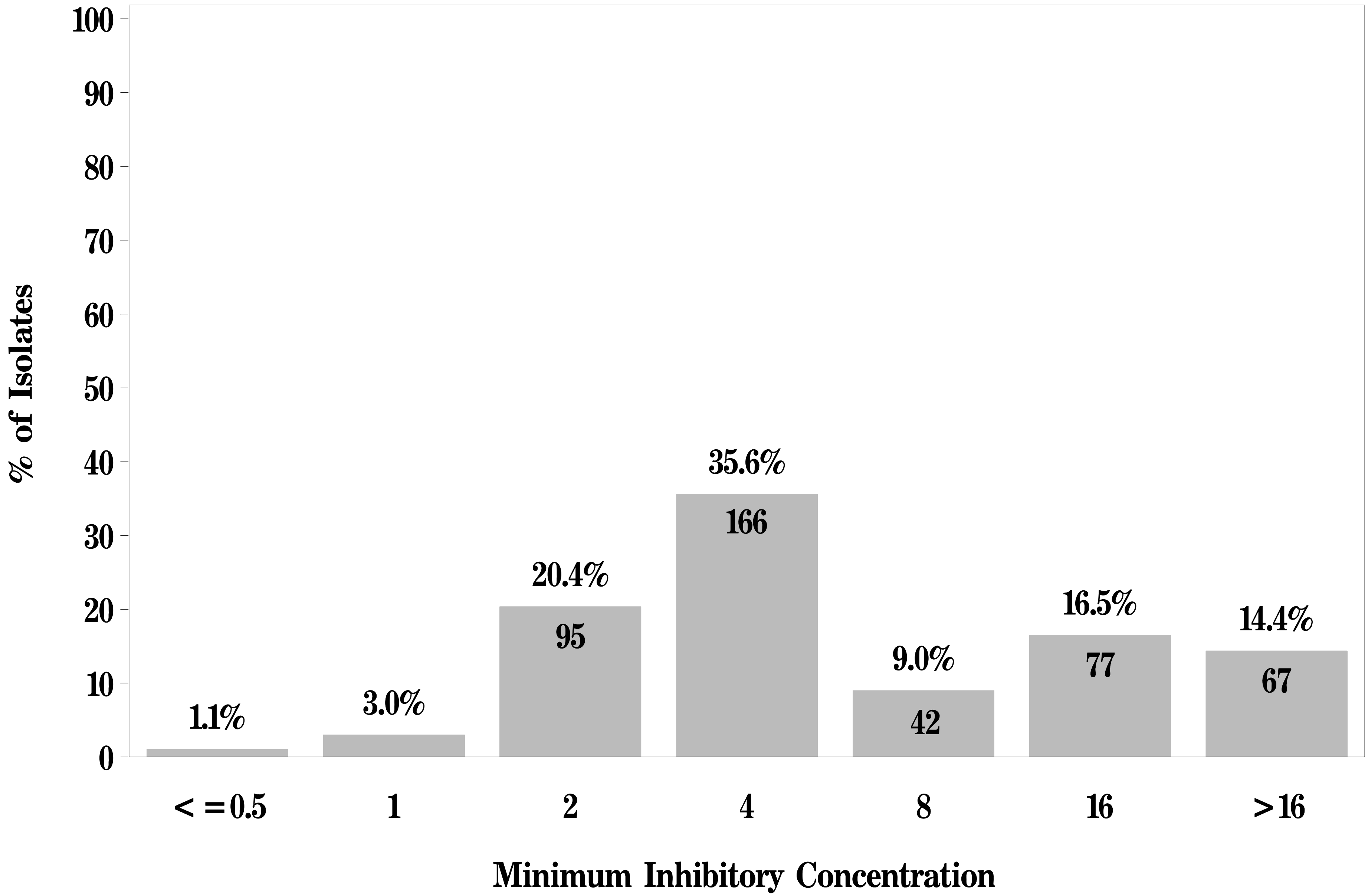
Breakpoints: Susceptible <=32 μg/mL Resistant >=128 μg/mL



NARMS

Figure 15l: Minimum Inhibitory Concentration of Penicillin for *Enterococcus* in Chicken Breast (N=466 Isolates)

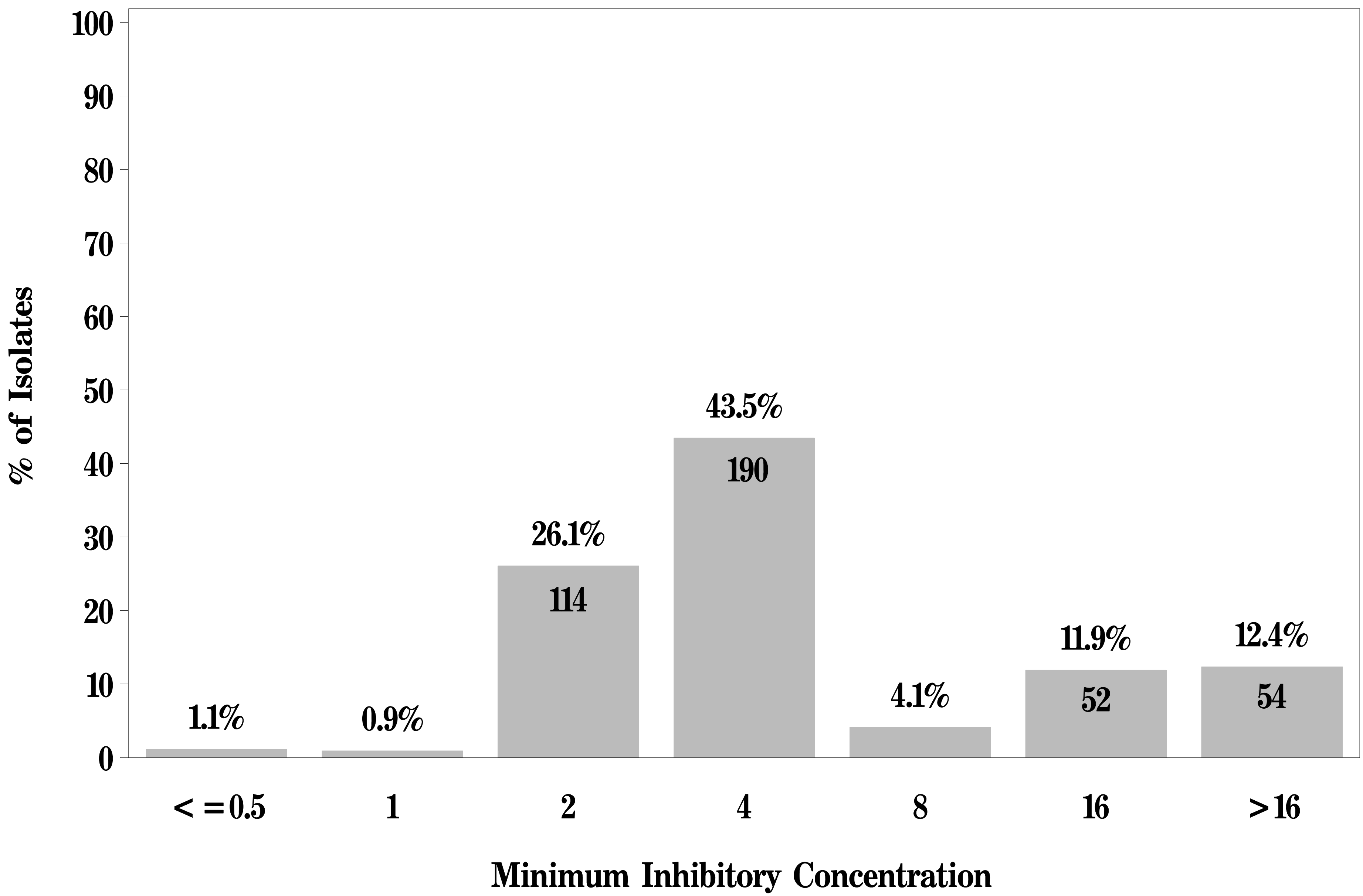
Breakpoints: Susceptible <=8 μg/mL Resistant >=16 μg/mL



NARMS

Figure 15l: Minimum Inhibitory Concentration of Penicillin for *Enterococcus* in Ground Turkey (N=437 Isolates)

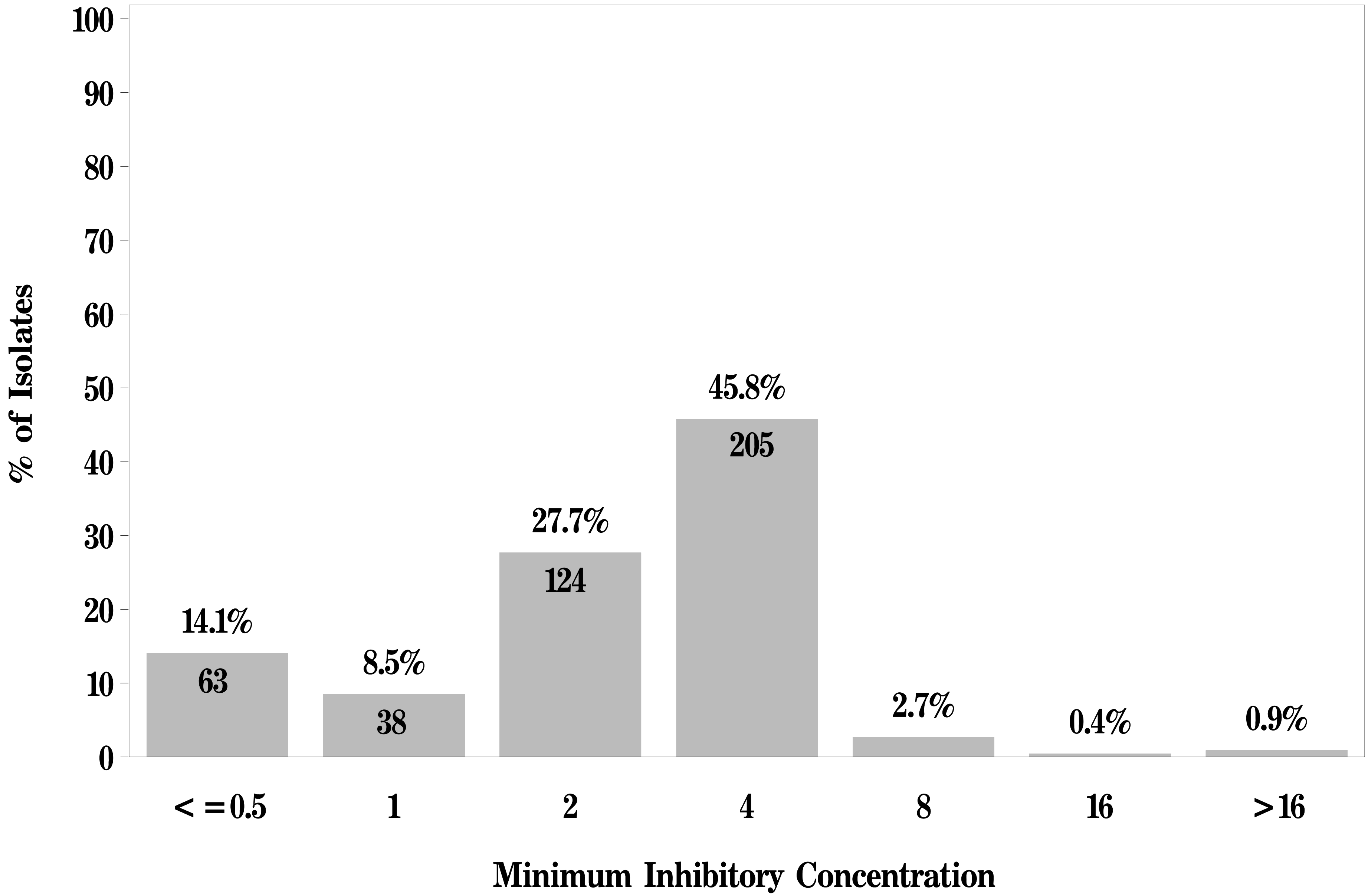
Breakpoints: Susceptible<=8 μg/mL Resistant>=16 μg/mL



NARMS

Figure 15l: Minimum Inhibitory Concentration of Penicillin for *Enterococcus* in Ground Beef (N=448 Isolates)

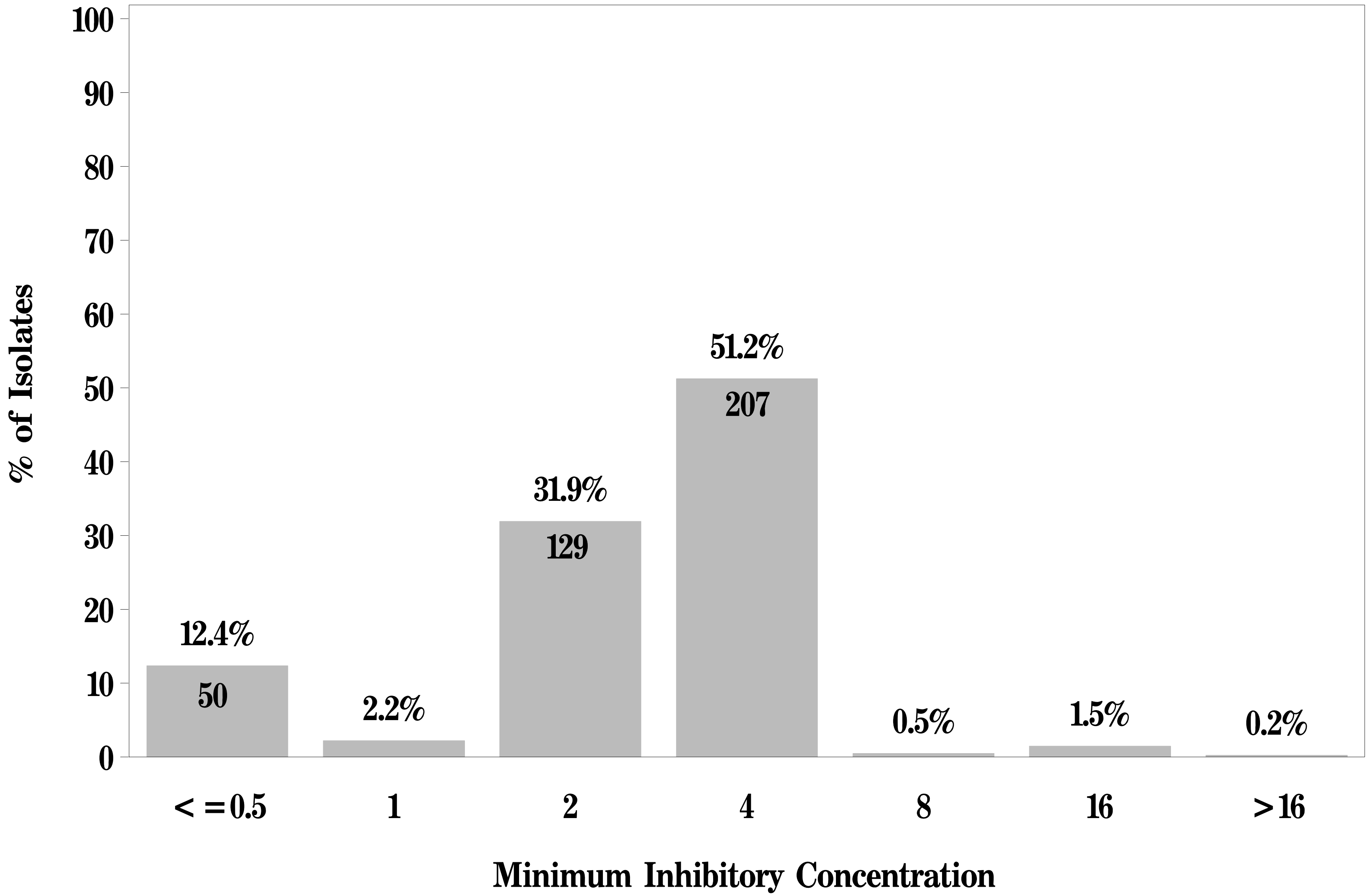
Breakpoints: Susceptible<=8 μg/mL Resistant>=16 μg/mL



NARMS

Figure 15l: Minimum Inhibitory Concentration of Penicillin for *Enterococcus* in Pork Chop (N=404 Isolates)

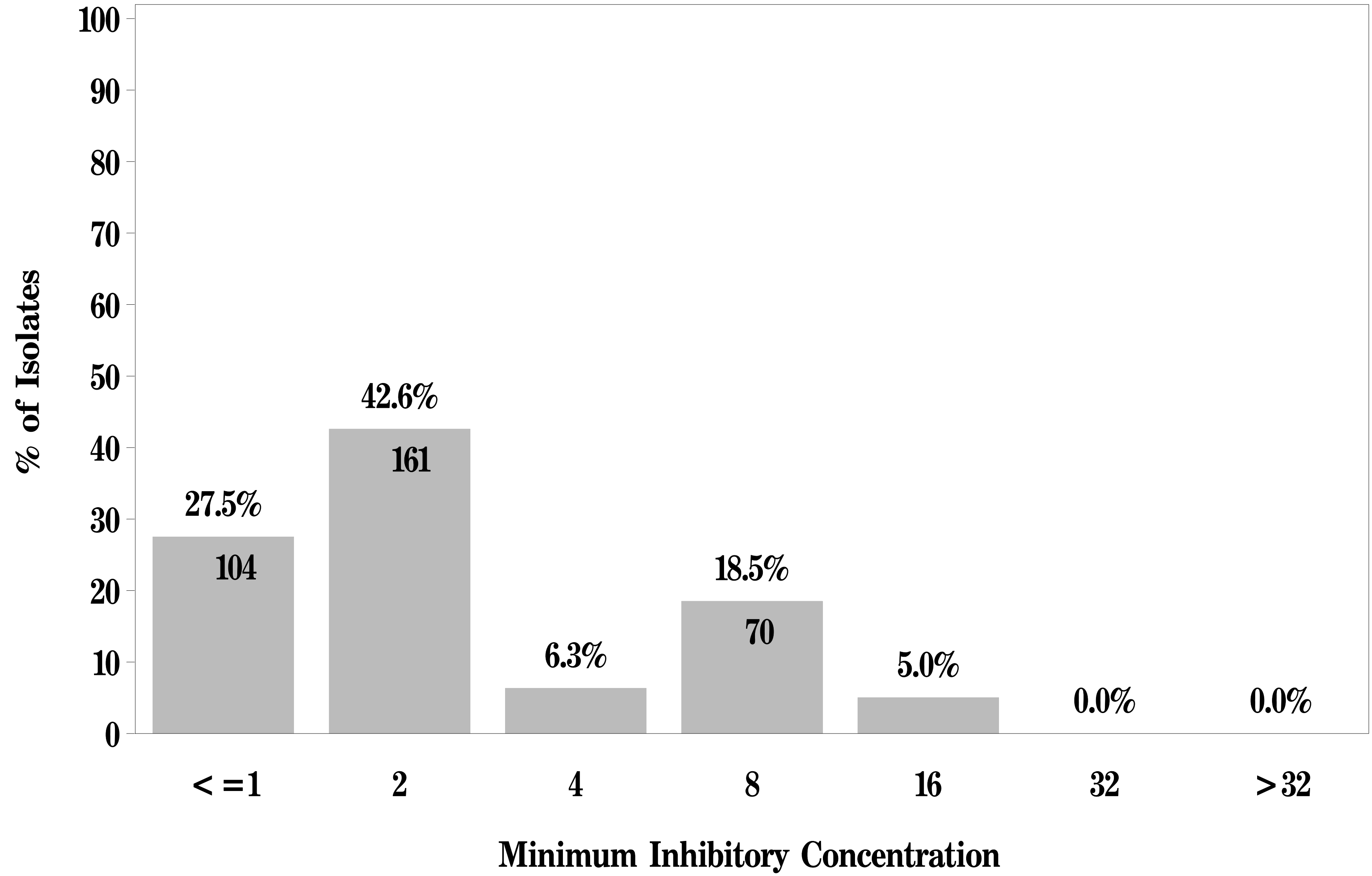
Breakpoints: Susceptible <=8 μg/mL Resistant >=16 μg/mL



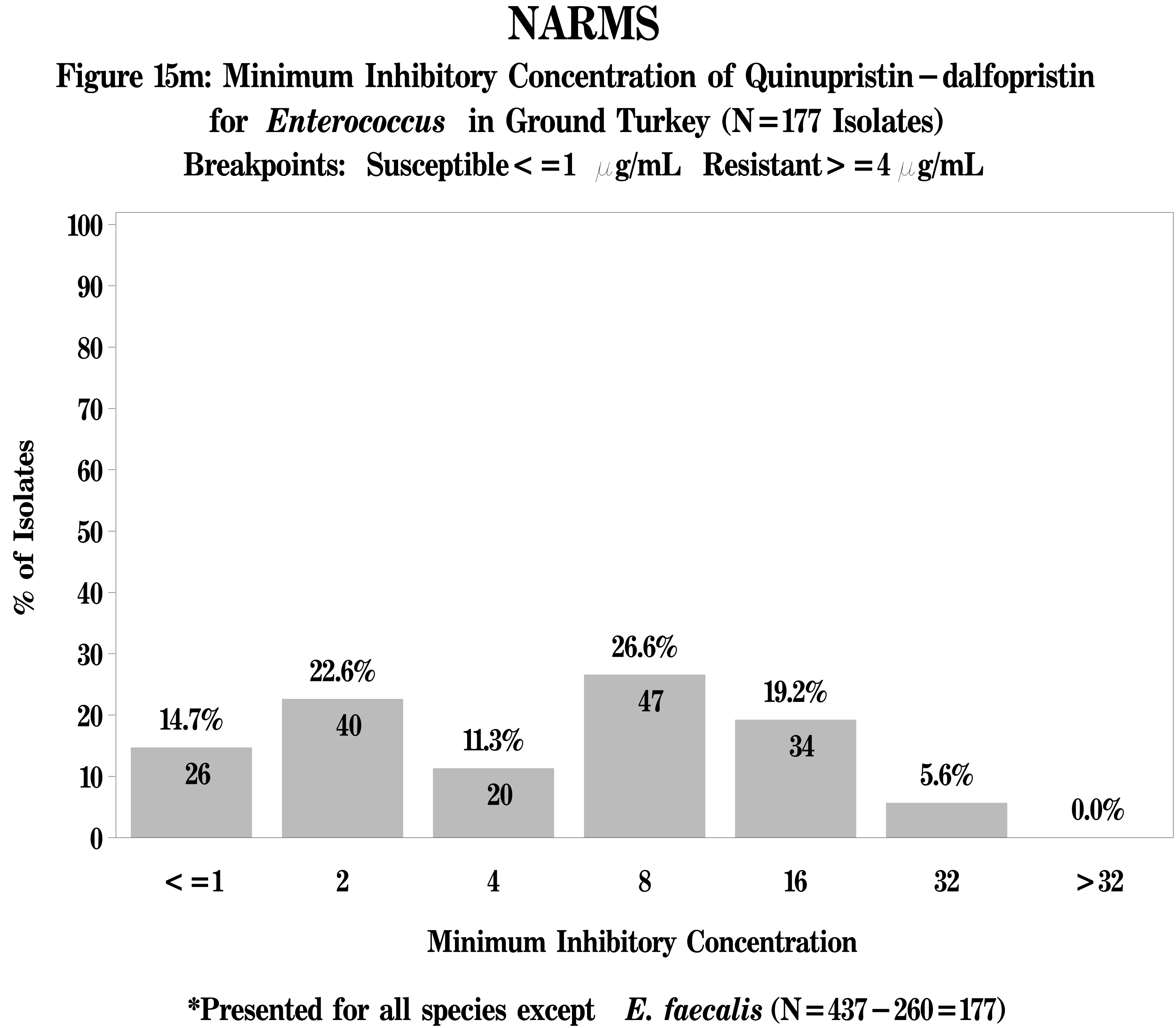
NARMS

Figure 15m: Minimum Inhibitory Concentration of Quinupristin–dalfopristin for *Enterococcus* in Chicken Breast (N=378 Isolates)

Breakpoints: Susceptible <=1 μg/mL Resistant >=4 μg/mL



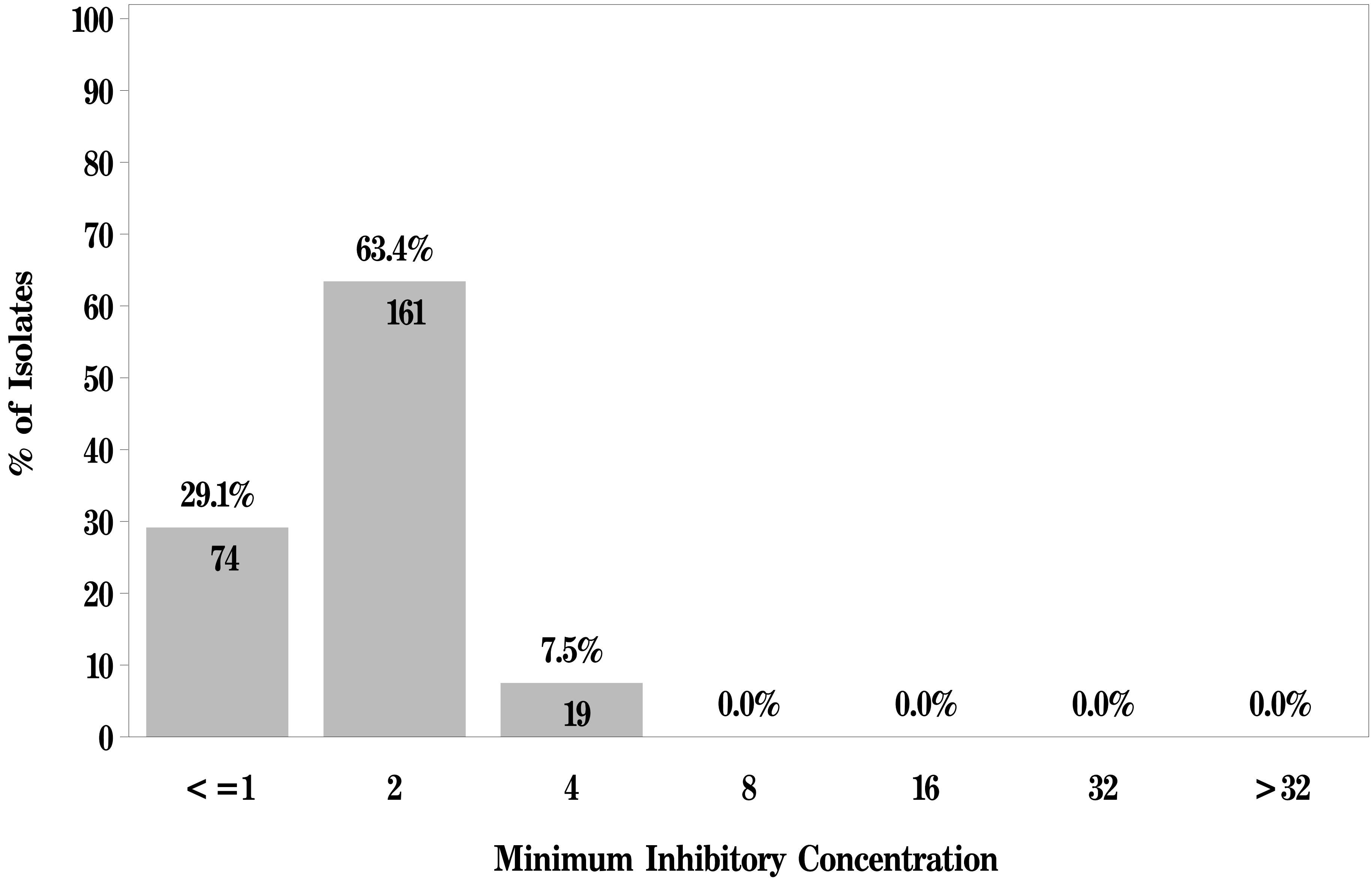
*Presented for all species except *E. faecalis* (N=466−88=378)


NARMS
Figure 15m: Minimum Inhibitory Concentration of Quinupristin−dalfopristin
for Enterococcus in Ground Turkey (N=177 Isolates)
Breakpoints: Susceptible<=1 µg/mL Resistant>=4 µg/mL
% of Isolates
0
10
20
30
40
50
60
70
80
90
100
14.7%
26
22.6%
40
11.3%
20
26.6%
47
19.2%
34
5.6%
0.0%
<=1
2
4
8
16
32
>32
Minimum Inhibitory Concentration
*Presented for all species except E. faecalis (N=437−260=177)

NARMS

Figure 15m: Minimum Inhibitory Concentration of Quinupristin−dalfopristin for *Enterococcus* in Ground Beef (N=254 Isolates)

Breakpoints: Susceptible < =1 μg/mL Resistant > =4 μg/mL

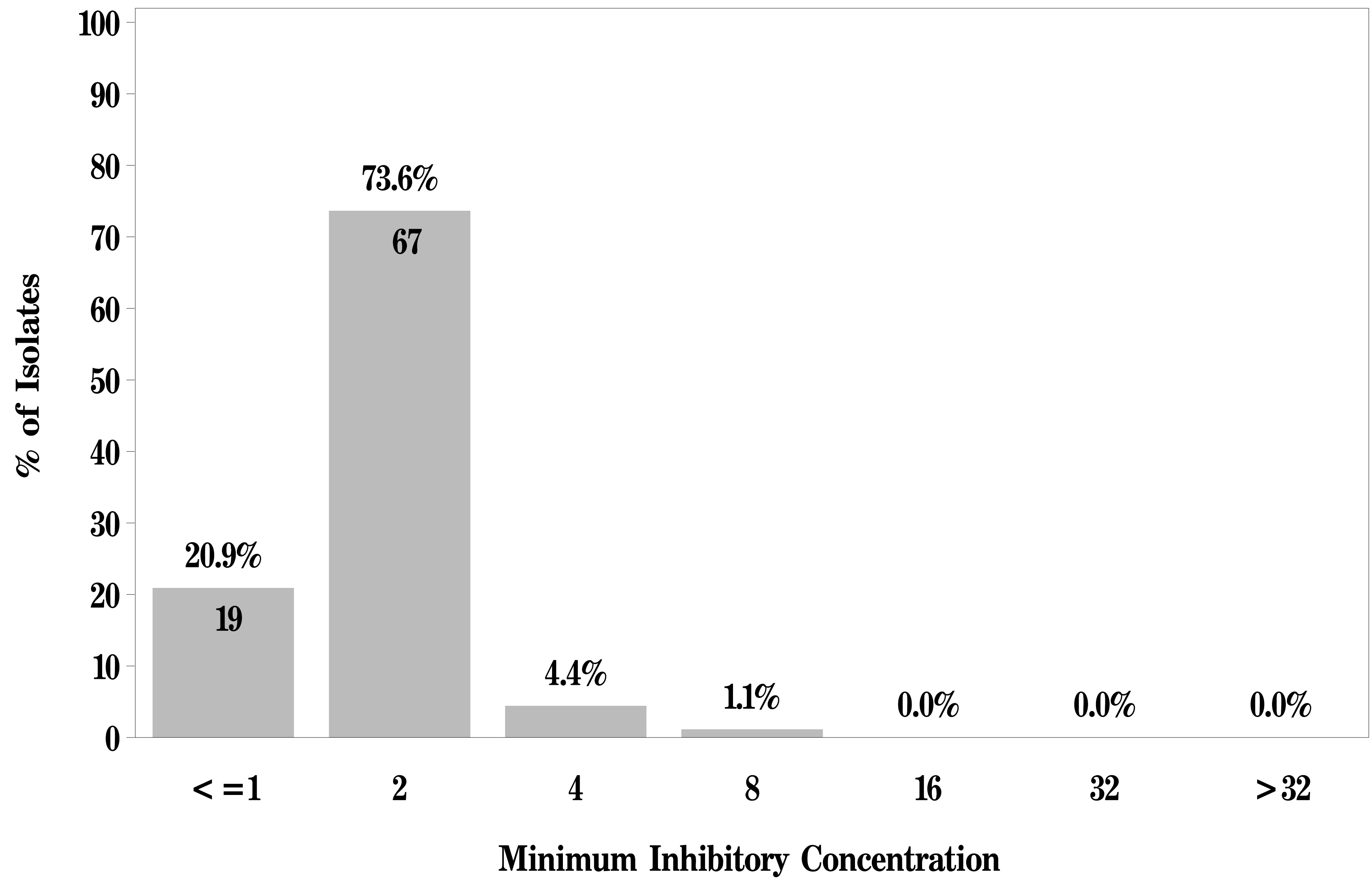


*Presented for all species except *E. faecalis* (N=488−194=254)

NARMS

Figure 15m: Minimum Inhibitory Concentration of Quinupristin–dalfopristin for *Enterococcus* in Pork Chop (N=91 Isolates)

Breakpoints: Susceptible <=1 µg/mL Resistant >=4 µg/mL

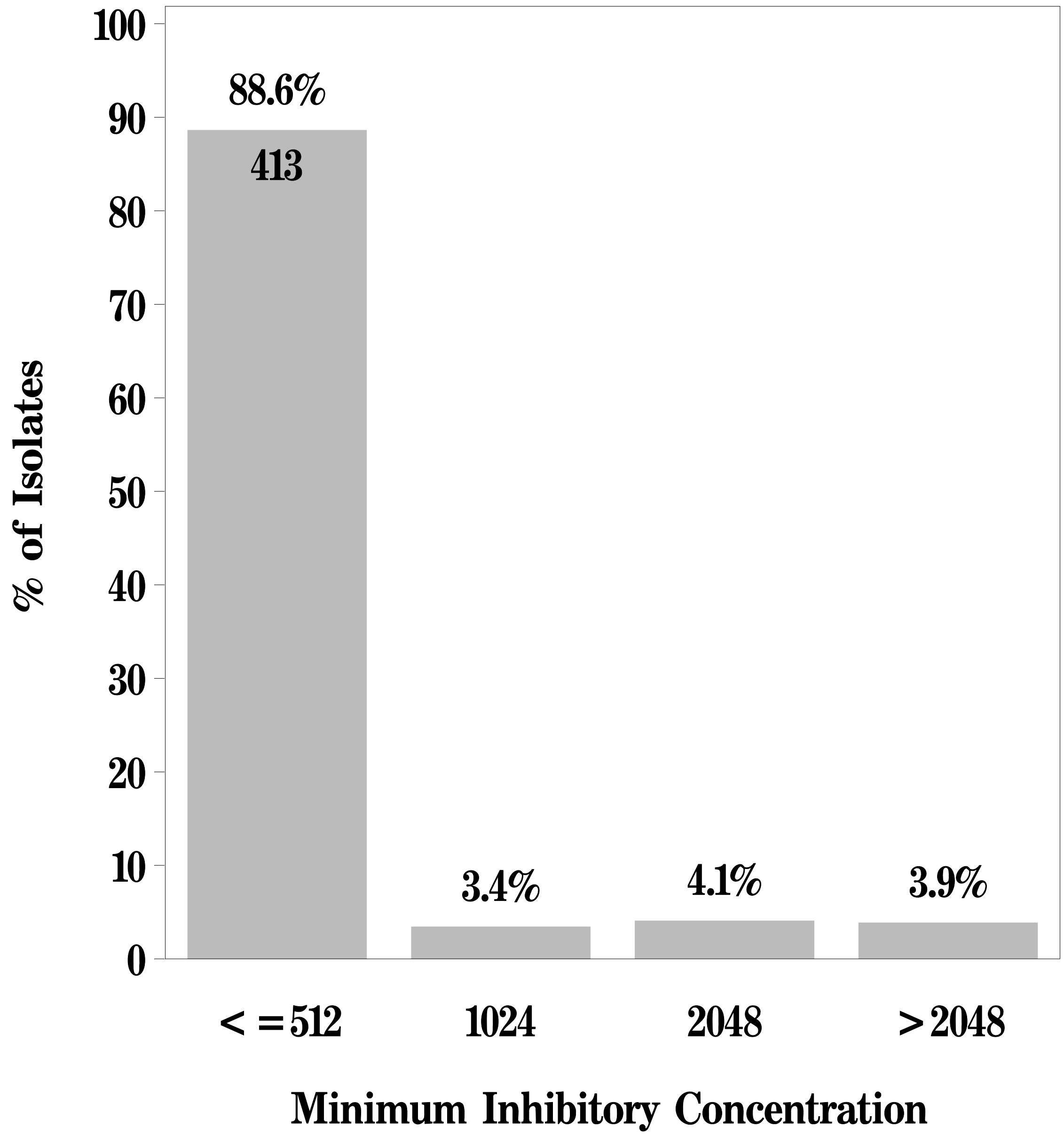


*Presented for all species except *E. faecalis* (N=404−313=91)

NARMS

Figure 15n: Minimum Inhibitory Concentration of Streptomycin for *Enterococcus* in Chicken Breast (N=466 Isolates)

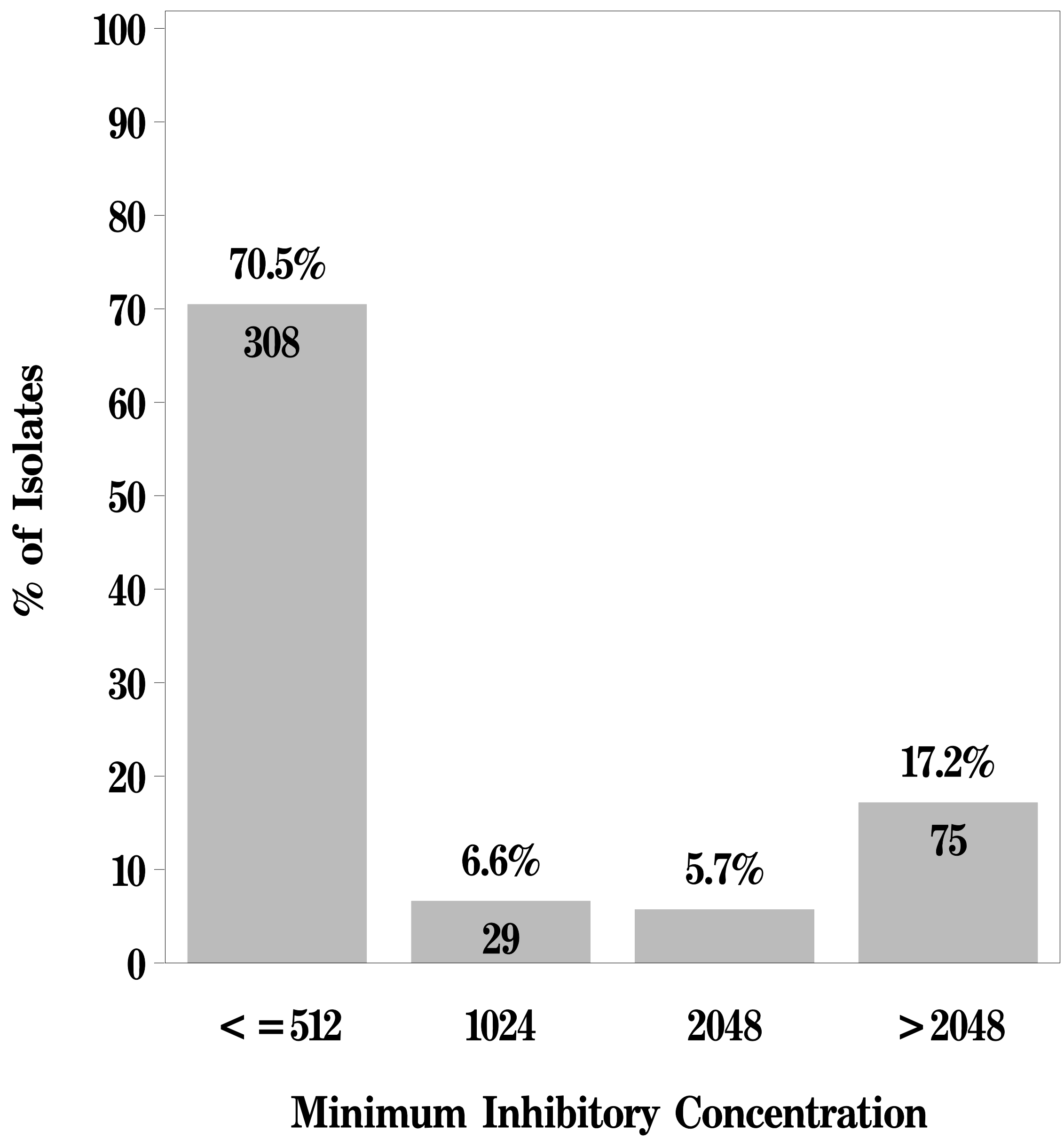
Breakpoints: Susceptible<=1000 μg/mL Resistant>=1000 μg/mL



NARMS

Figure 15n: Minimum Inhibitory Concentration of Streptomycin for *Enterococcus* in Ground Turkey (N=437 Isolates)

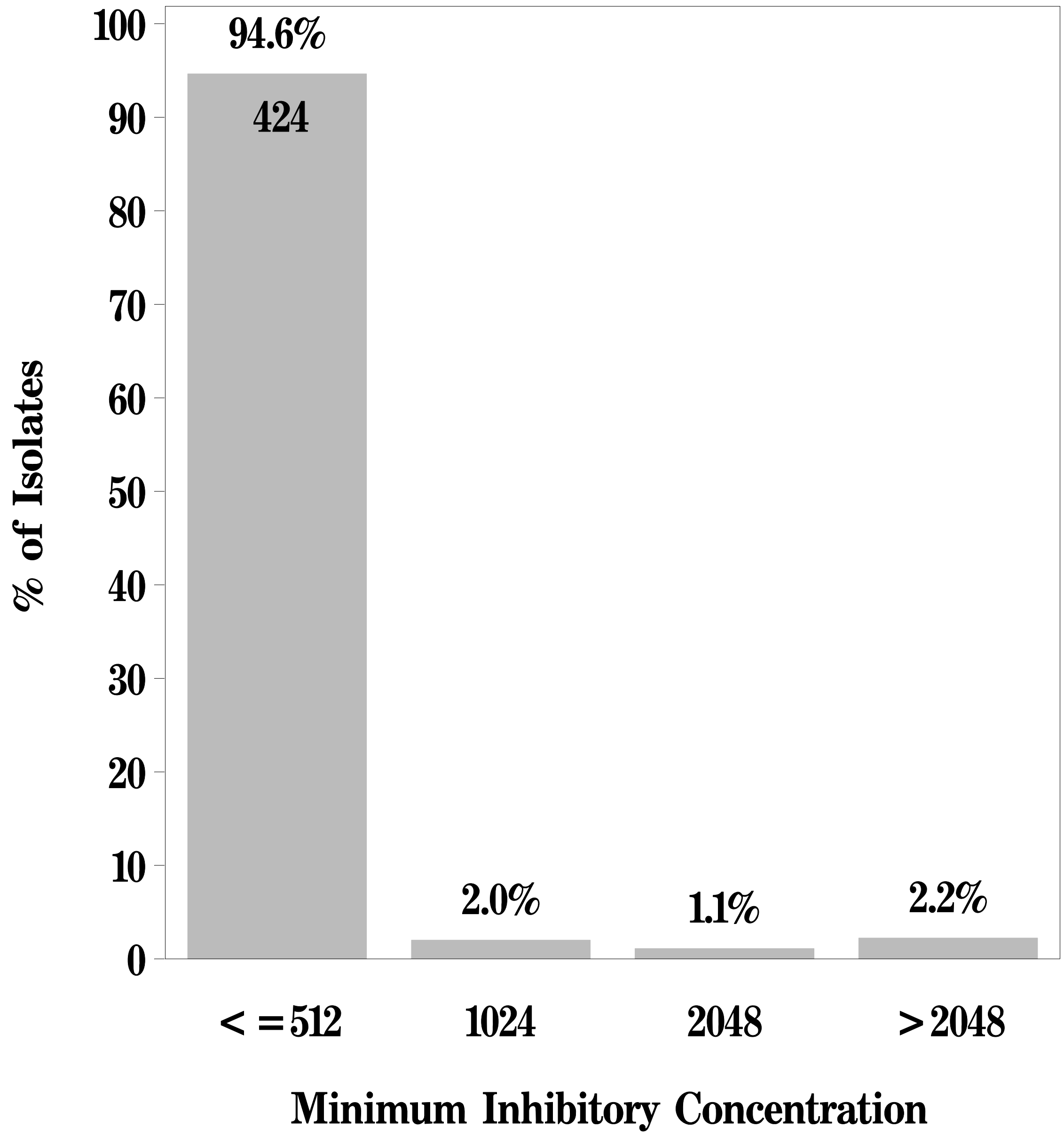
Breakpoints: Susceptible <=1000 μg/mL Resistant >=1000 μg/mL



NARMS

Figure 15n: Minimum Inhibitory Concentration of Streptomycin for *Enterococcus* in Ground Beef (N=448 Isolates)

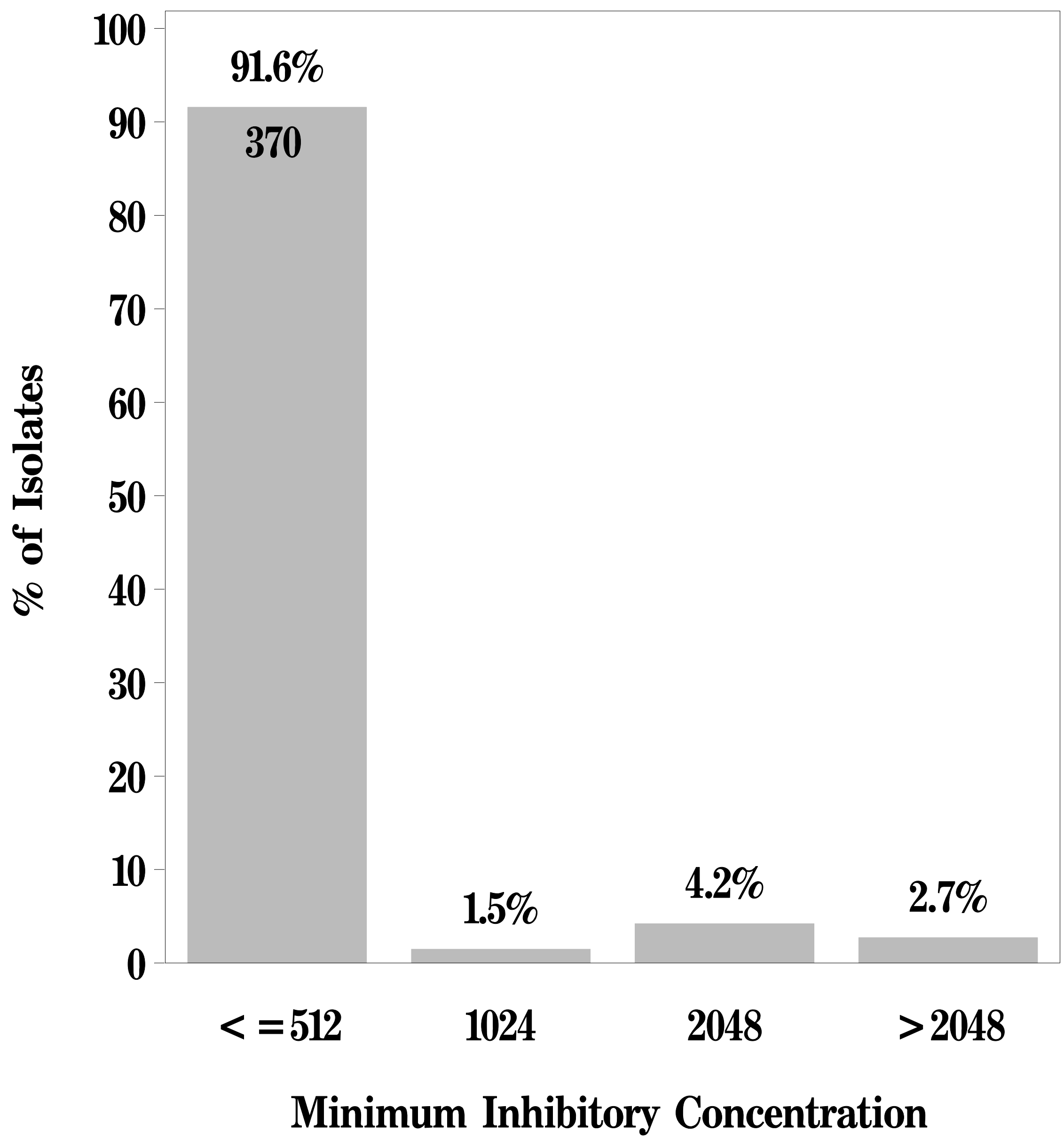
Breakpoints: Susceptible<=1000 μg/mL Resistant>=1000 μg/mL



NARMS

Figure 15n: Minimum Inhibitory Concentration of Streptomycin for *Enterococcus* in Pork Chop (N=404 Isolates)

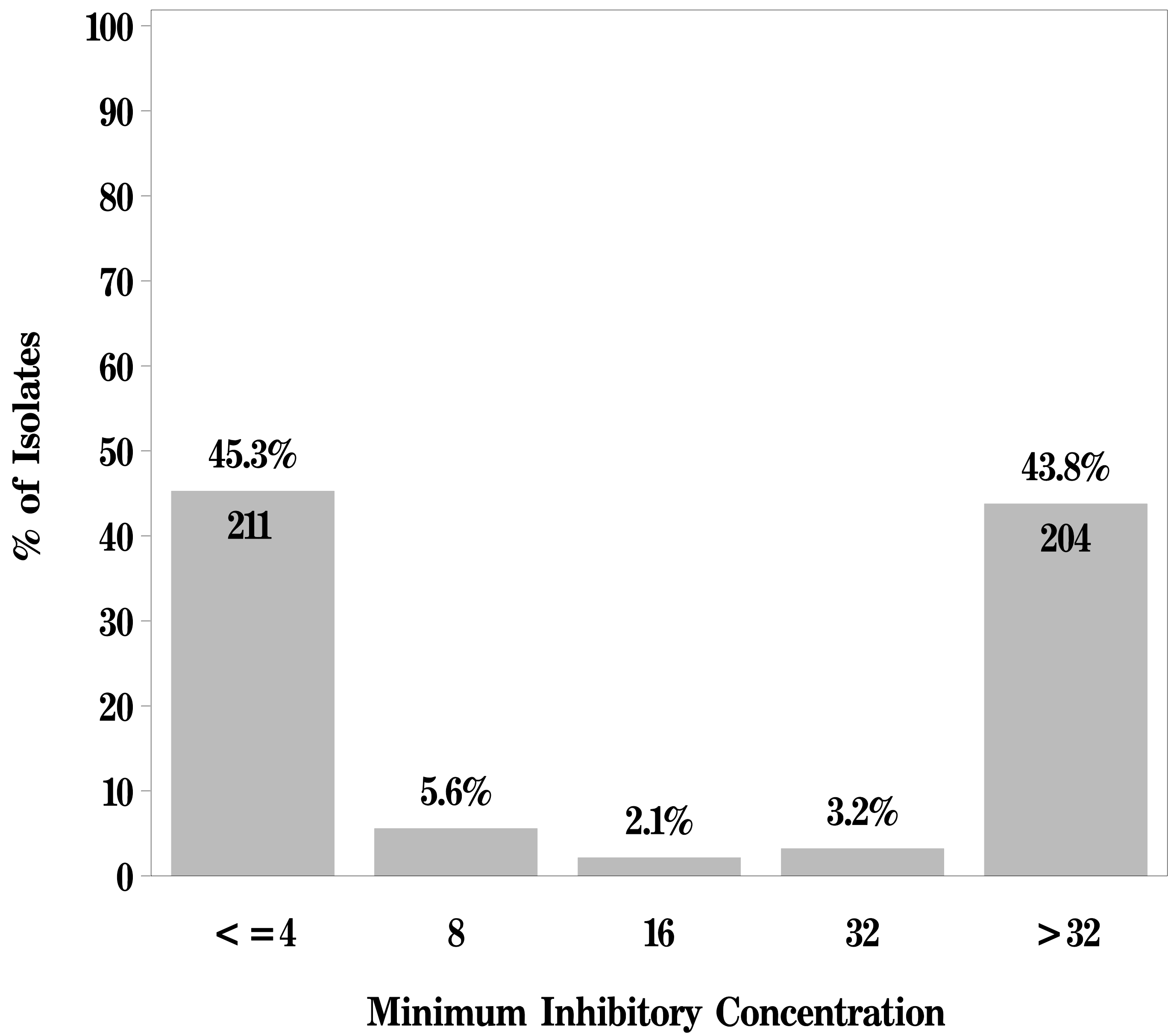
Breakpoints: Susceptible <=1000 μg/mL Resistant >=1000 μg/mL



NARMS

Figure 15o: Minimum Inhibitory Concentration of Tetracycline for *Enterococcus* in Chicken Breast (N=466 Isolates)

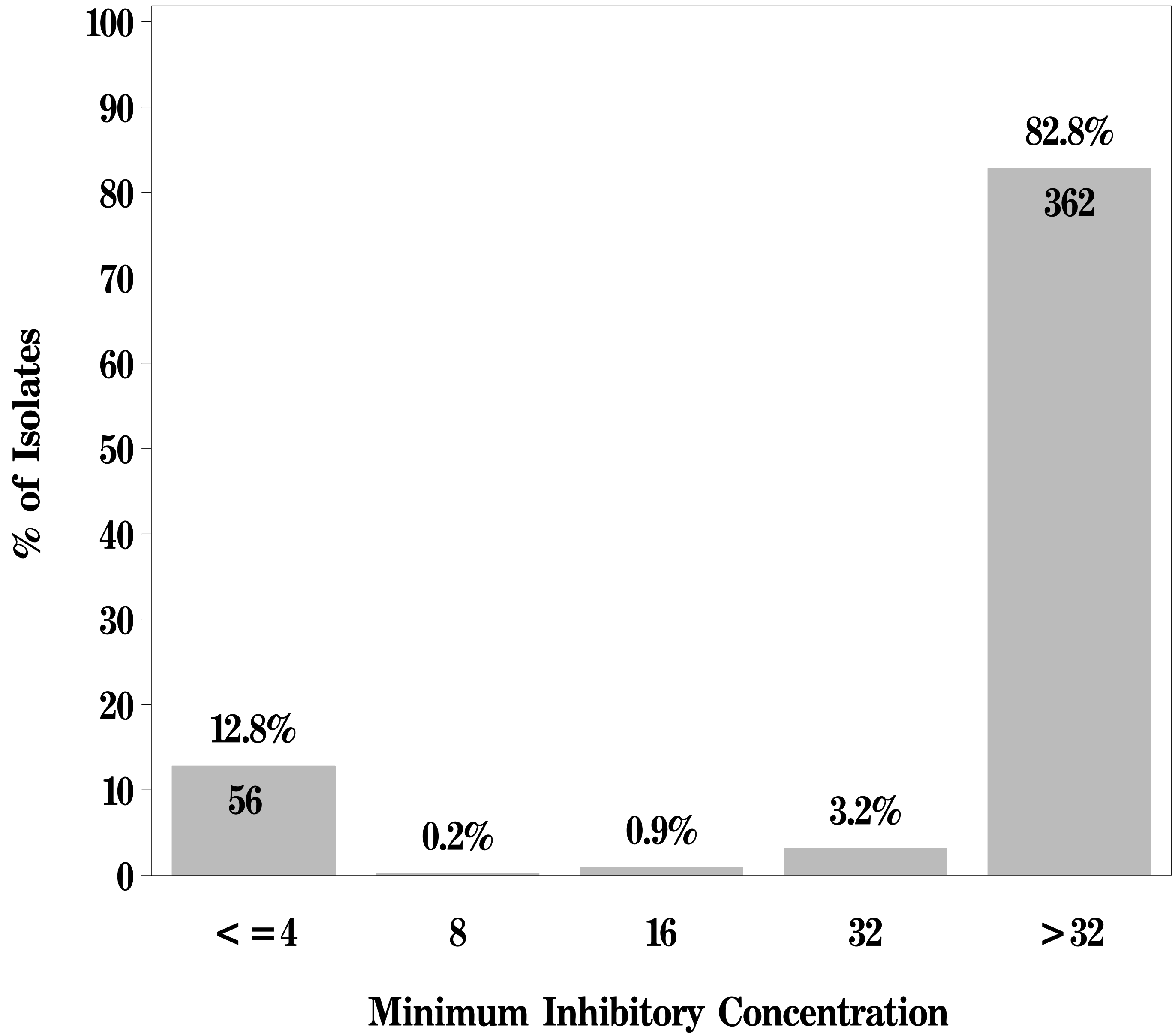
Breakpoints: Susceptible <=4 µg/mL Resistant >=16 µg/mL



NARMS

Figure 15o: Minimum Inhibitory Concentration of Tetracycline for *Enterococcus* in Ground Turkey (N=437 Isolates)

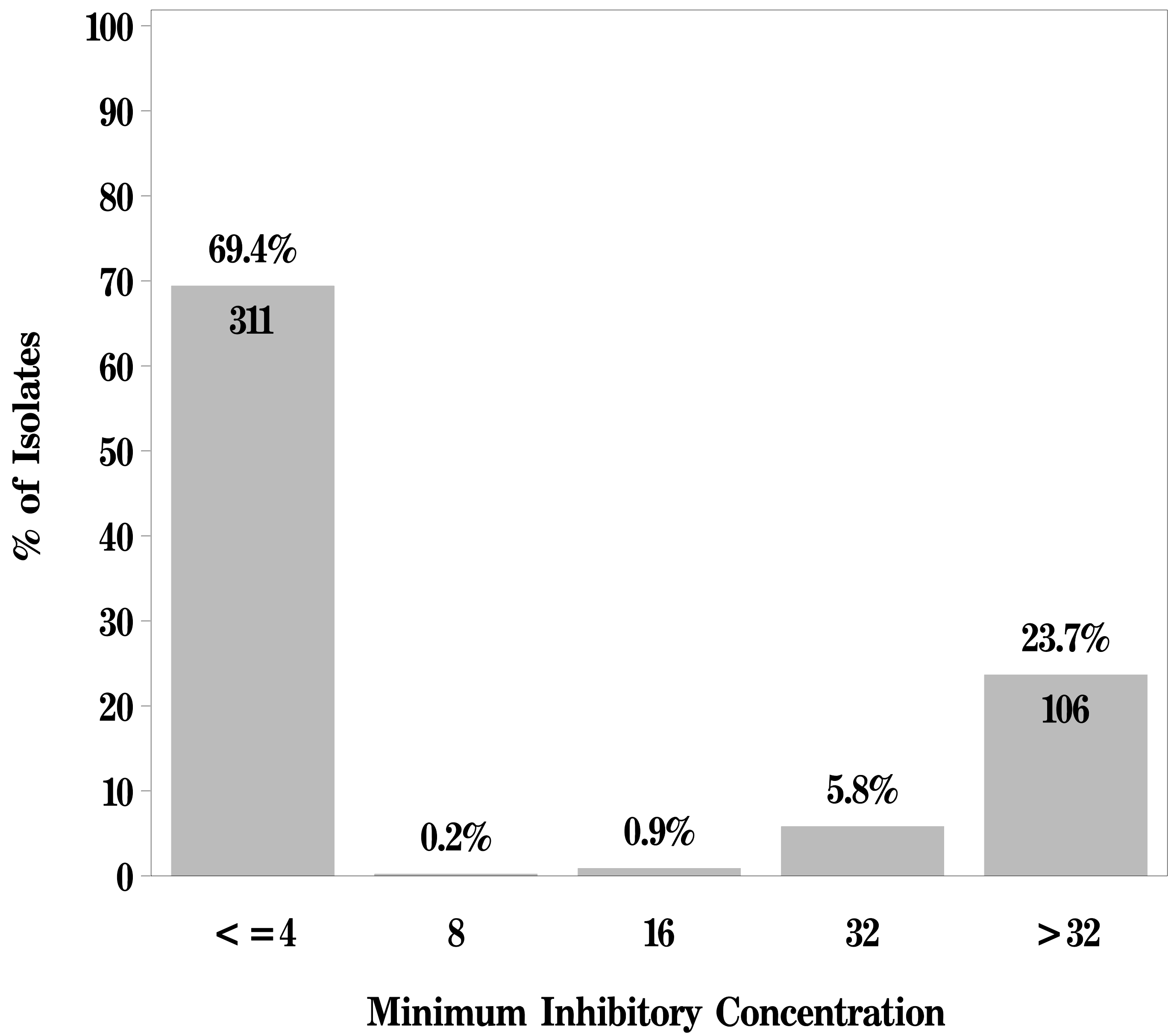
Breakpoints: Susceptible <=4 µg/mL Resistant >=16 µg/mL



NARMS

Figure 15o: Minimum Inhibitory Concentration of Tetracycline for *Enterococcus* in Ground Beef (N=448 Isolates)

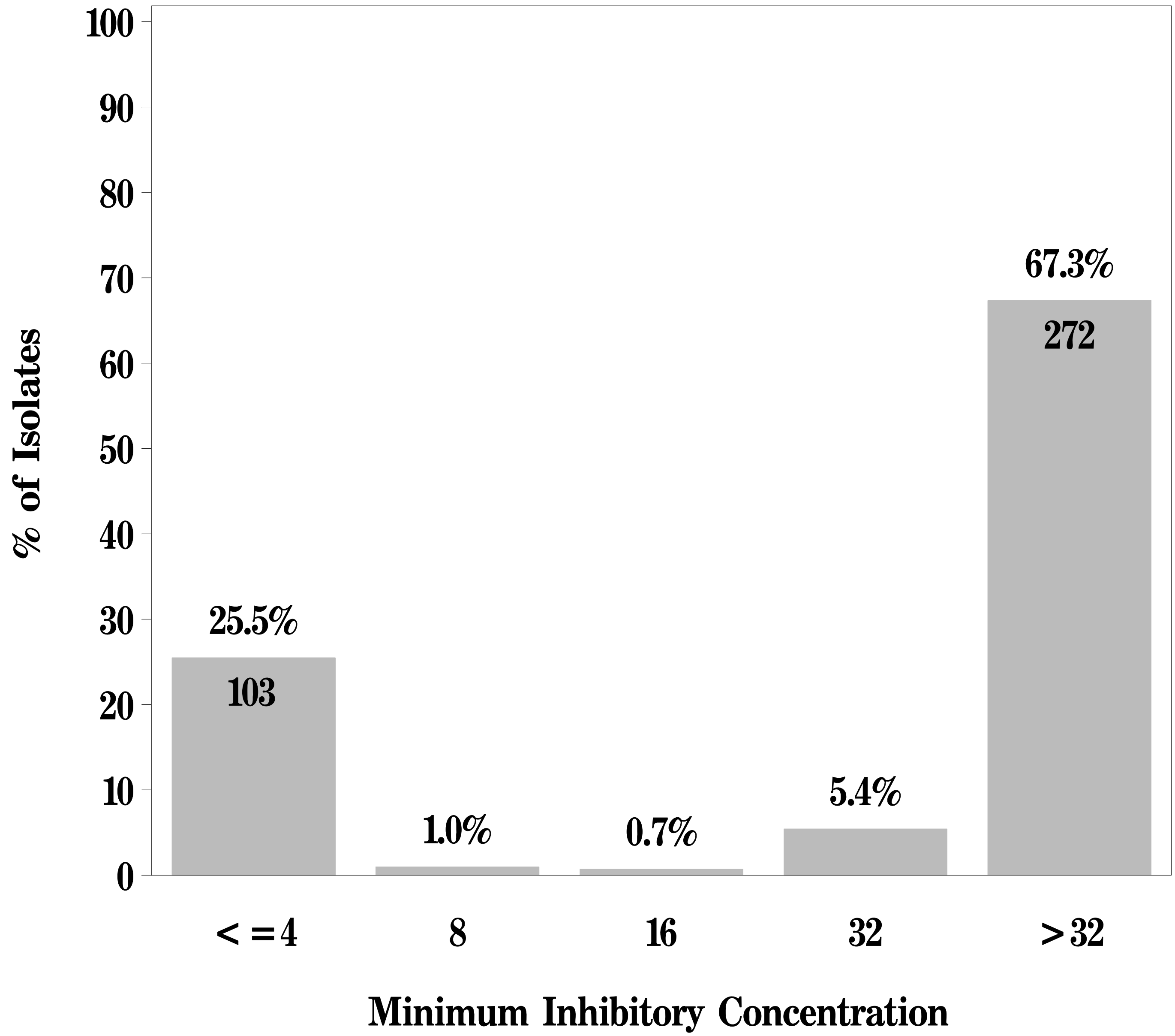
Breakpoints: Susceptible <=4 µg/mL Resistant >=16 µg/mL



NARMS

Figure 15o: Minimum Inhibitory Concentration of Tetracycline for *Enterococcus* in Pork Chop (N=404 Isolates)

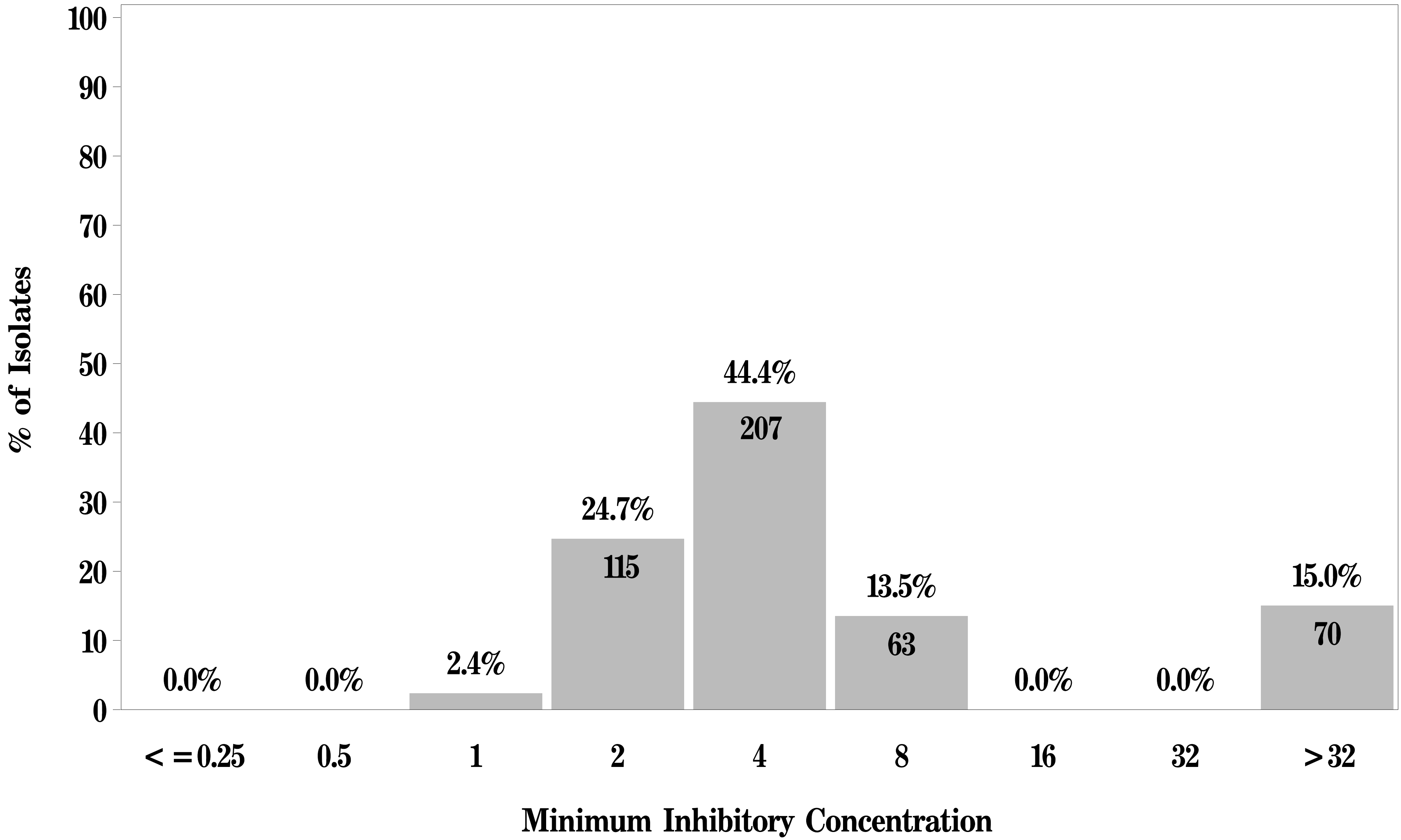
Breakpoints: Susceptible <=4 µg/mL Resistant >=16 µg/mL



NARMS

Figure 15p: Minimum Inhibitory Concentration of Tylosin for *Enterococcus* in Chicken Breast (N=466 Isolates)

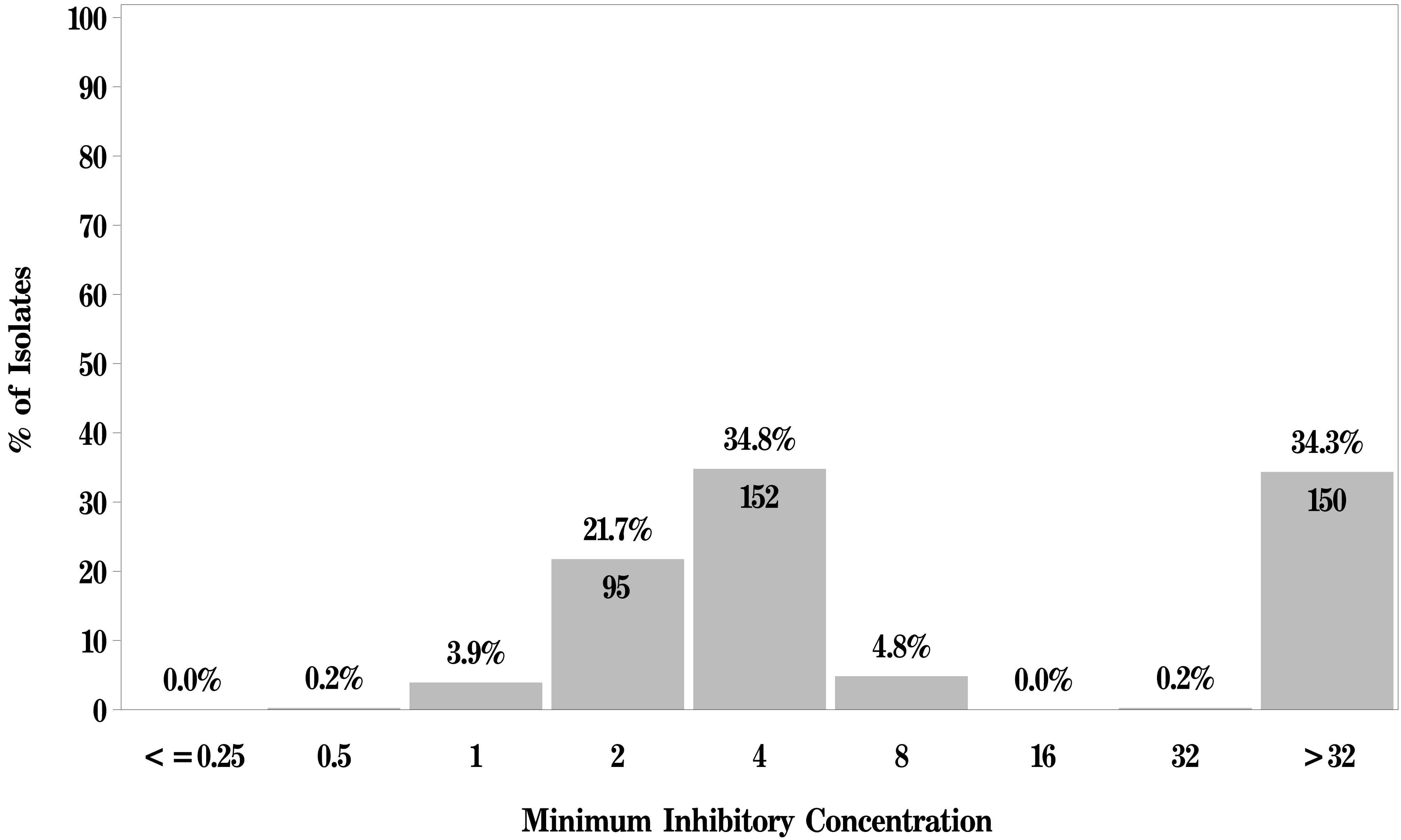
Breakpoints: Susceptible <=8 µg/mL Resistant >=32 µg/mL



NARMS

Figure 15p: Minimum Inhibitory Concentration of Tylosin for *Enterococcus* in Ground Turkey (N=437 Isolates)

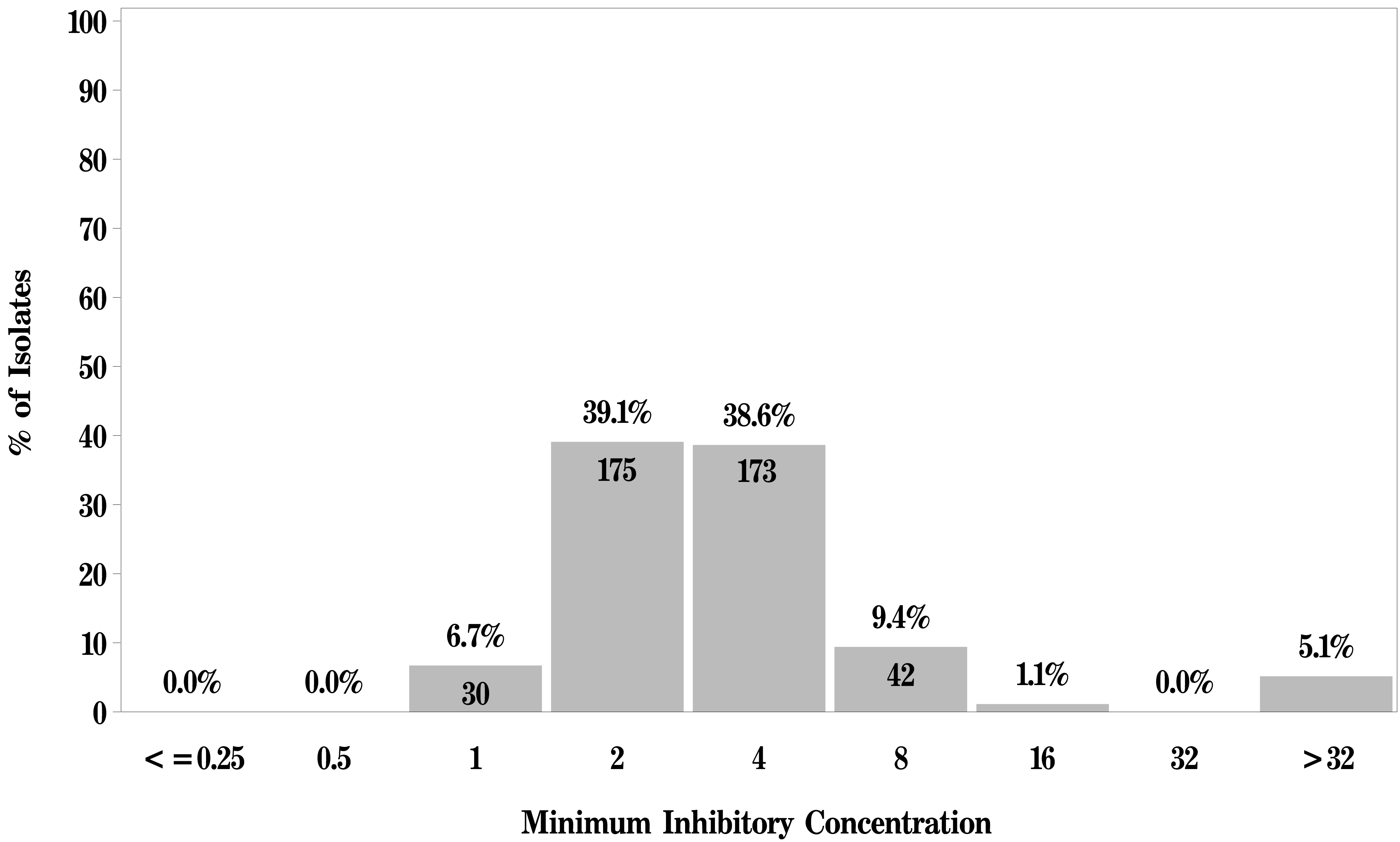
Breakpoints: Susceptible <=8 μg/mL Resistant >=32 μg/mL



NARMS

Figure 15p: Minimum Inhibitory Concentration of Tylosin for *Enterococcus* in Ground Beef (N=448 Isolates)

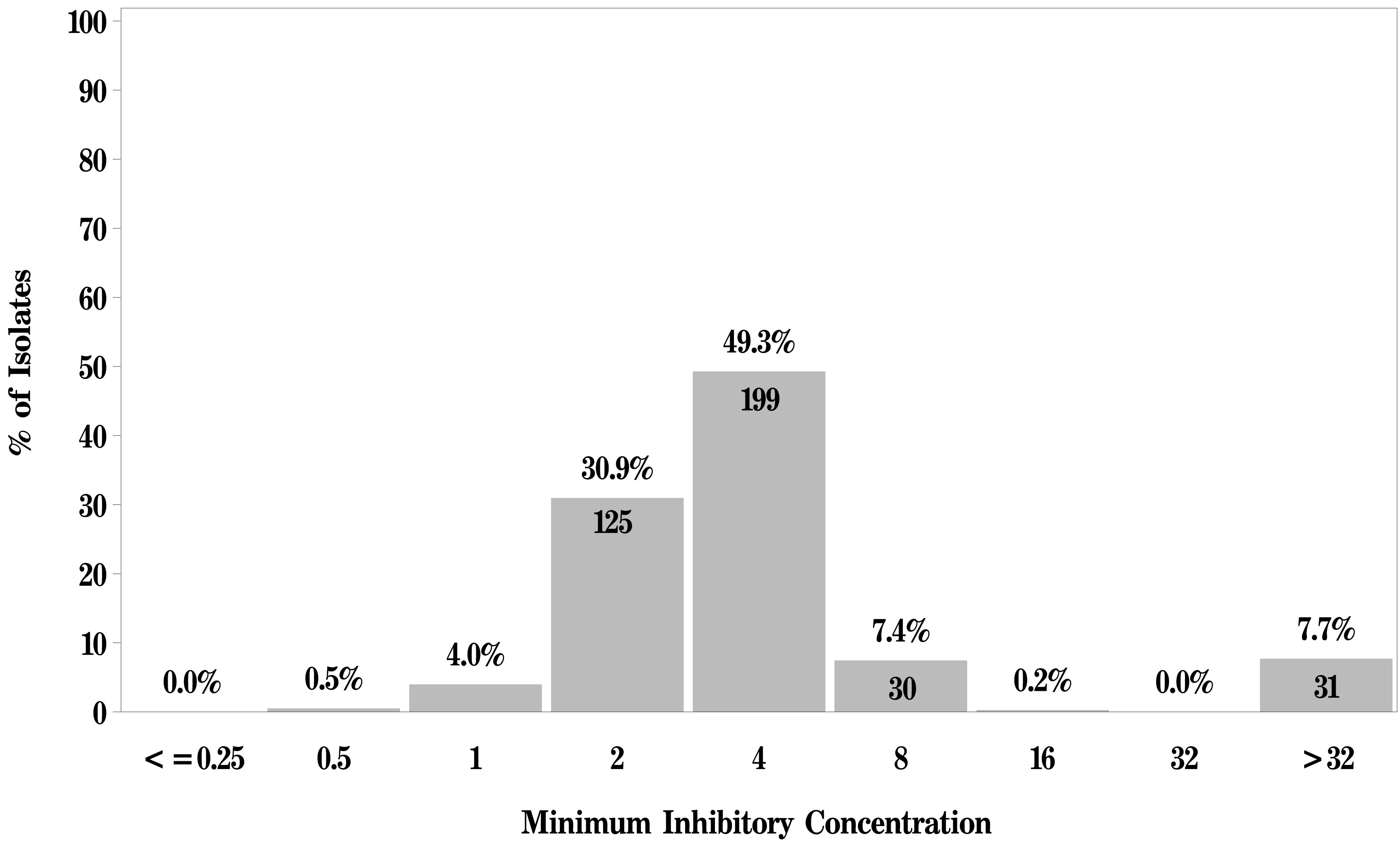
Breakpoints: Susceptible <=8 μg/mL Resistant >=32 μg/mL



NARMS

Figure 15p: Minimum Inhibitory Concentration of Tylosin for *Enterococcus* in Pork Chop (N=404 Isolates)

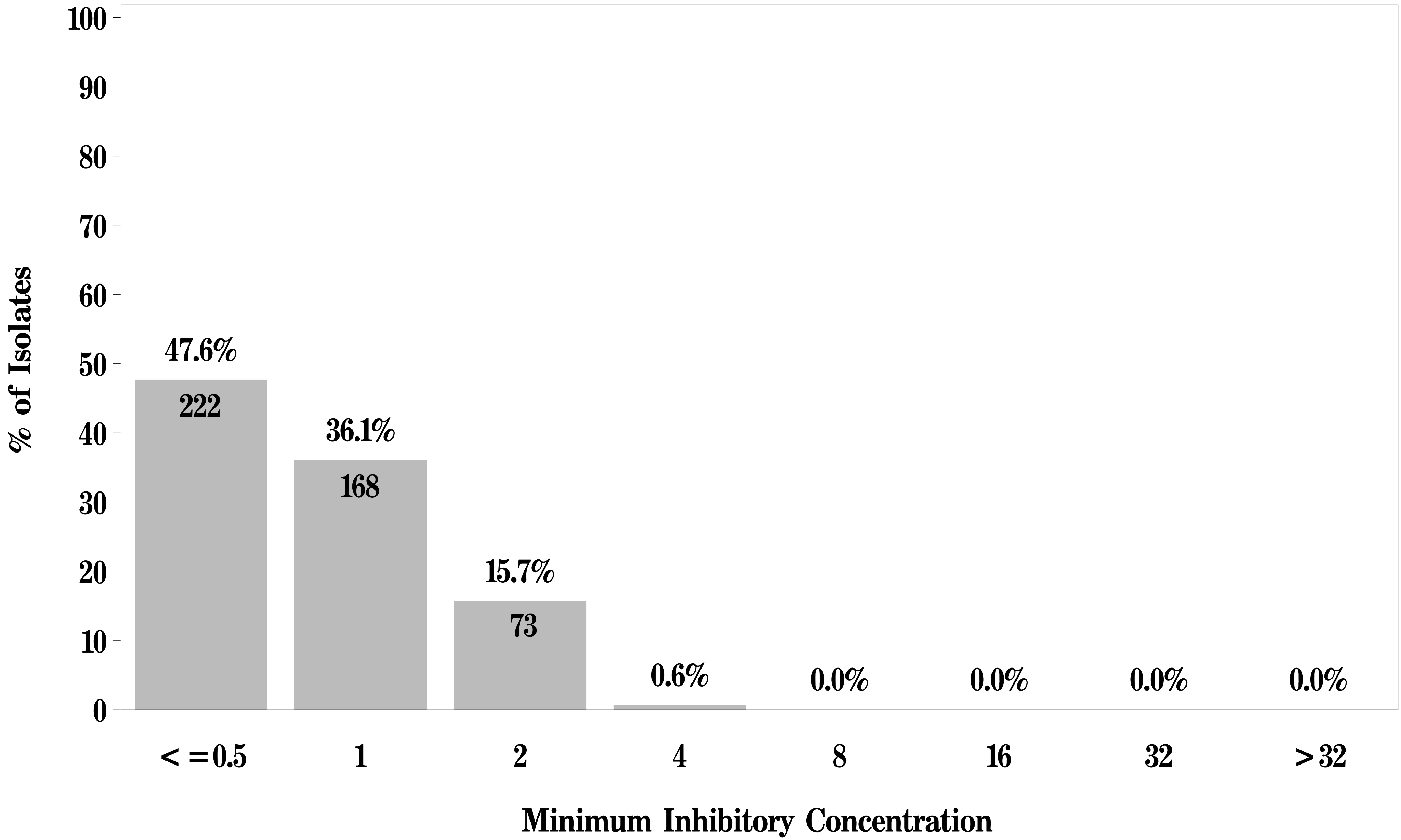
Breakpoints: Susceptible <=8 µg/mL Resistant >=32 µg/mL



NARMS

Figure 15q: Minimum Inhibitory Concentration of Vancomycin for *Enterococcus* in Chicken Breast (N=466 Isolates)

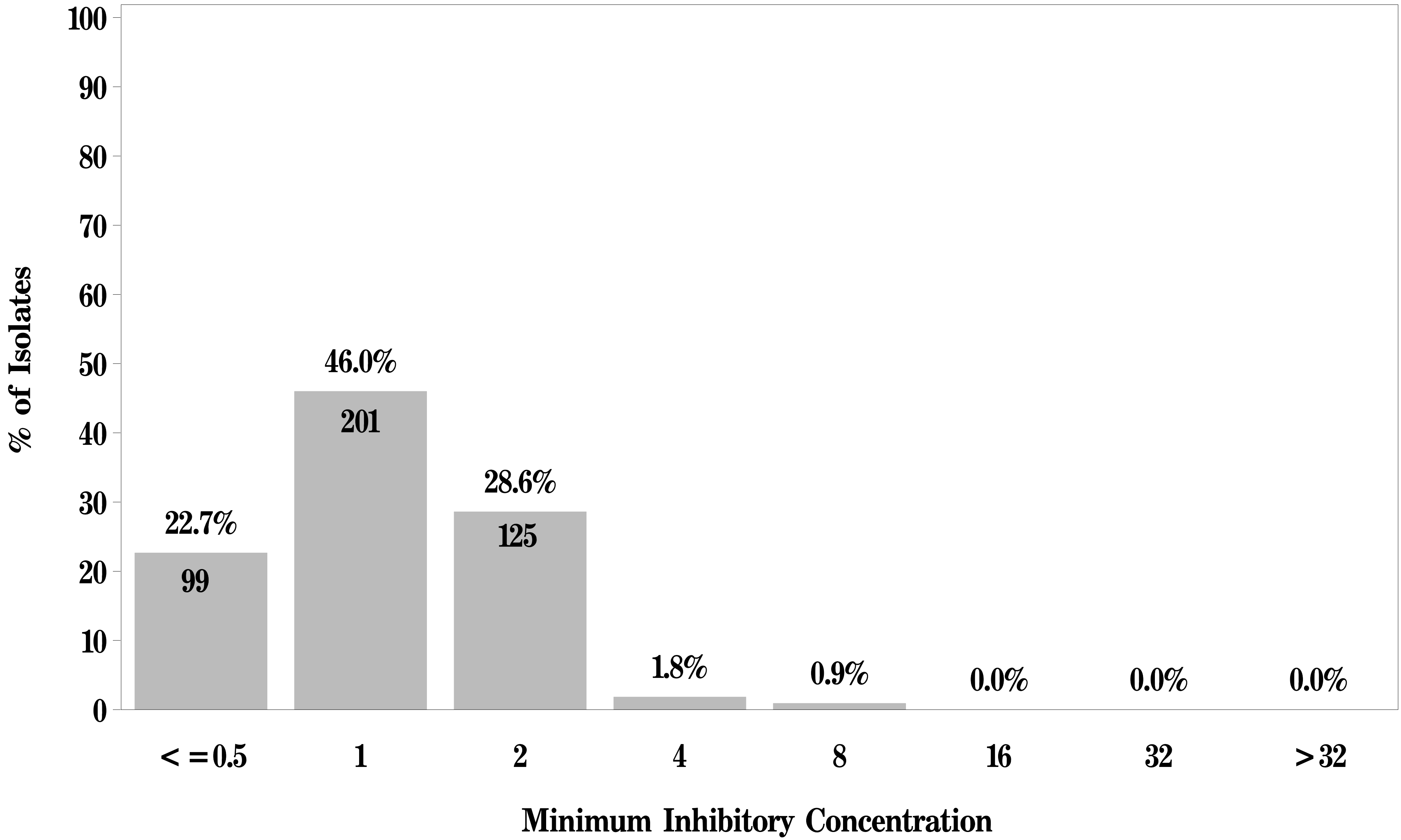
Breakpoints: Susceptible <=4 μg/mL Resistant >=32 μg/mL



NARMS

Figure 15q: Minimum Inhibitory Concentration of Vancomycin for *Enterococcus* in Ground Turkey (N=437 Isolates)

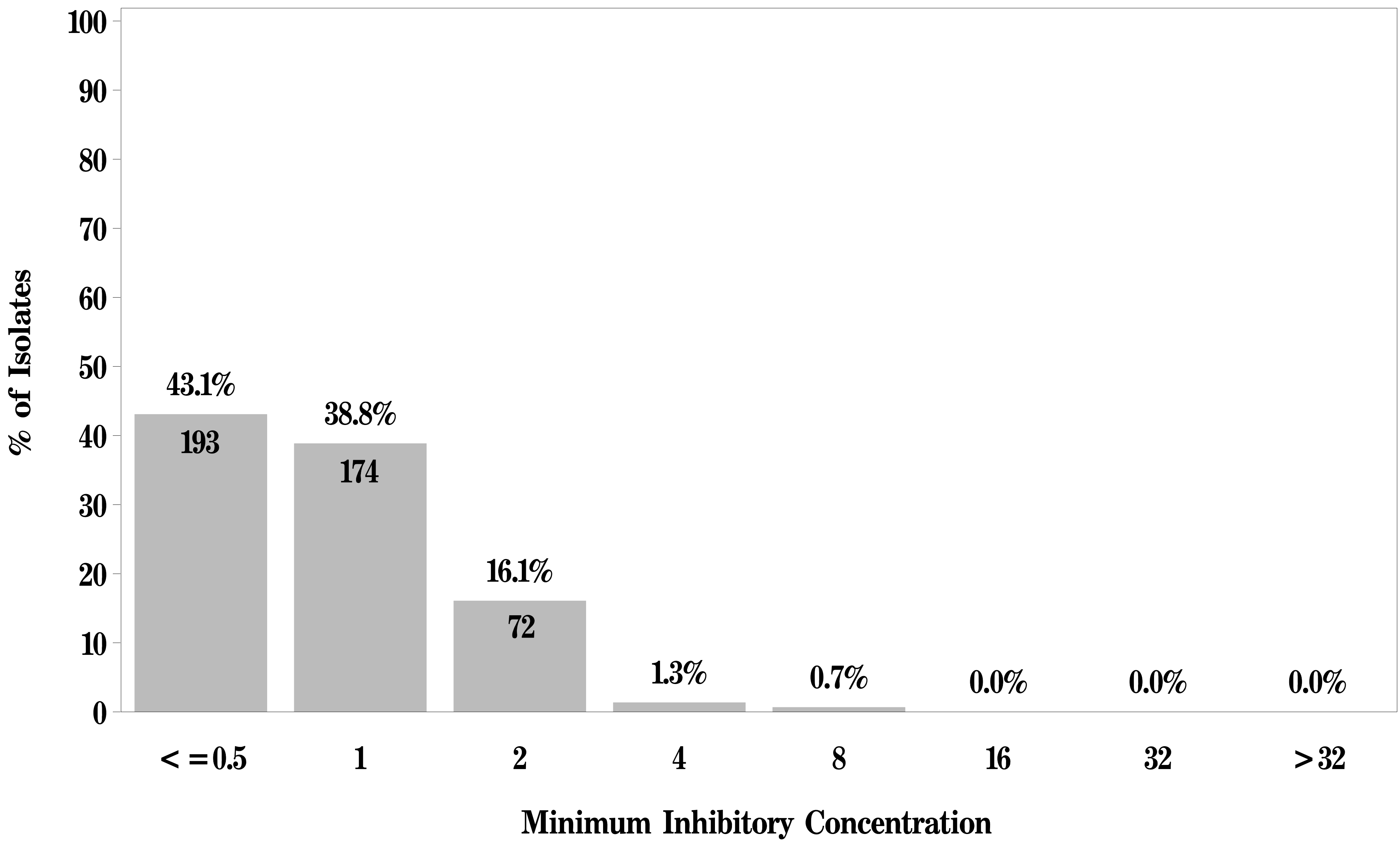
Breakpoints: Susceptible <=4 µg/mL Resistant >=32 µg/mL



NARMS

Figure 15q: Minimum Inhibitory Concentration of Vancomycin for *Enterococcus* in Ground Beef (N=448 Isolates)

Breakpoints: Susceptible <=4 μg/mL Resistant >=32 μg/mL



NARMS

Figure 15q: Minimum Inhibitory Concentration of Vancomycin for *Enterococcus* in Pork Chop (N=404 Isolates)

Breakpoints: Susceptible <=4 μg/mL Resistant >=32 μg/mL

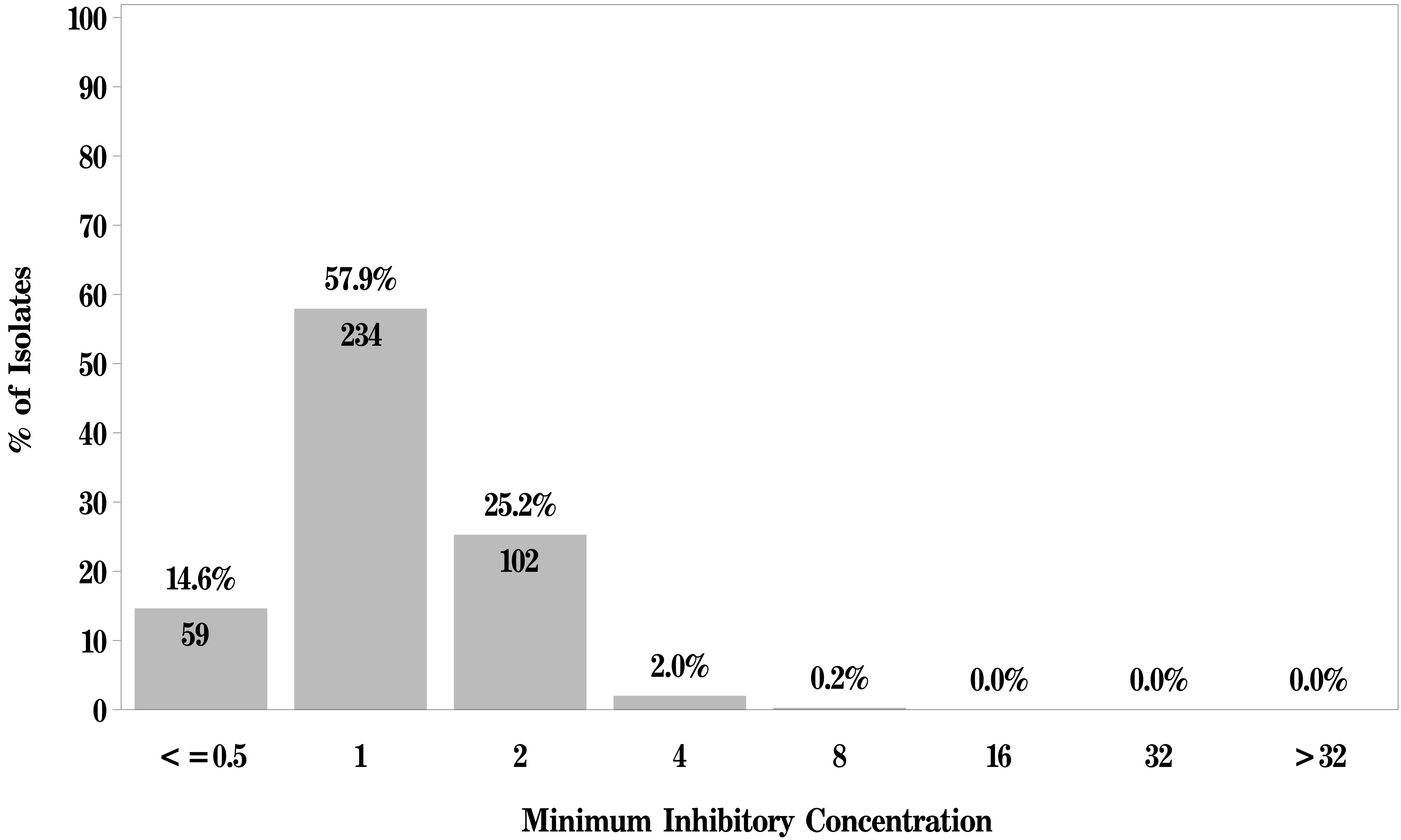


Table 32. Antimicrobial Resistance among *Enterococcus* by Species, 2004

Species	Antimicrobial Agent																
	LIN	QDA	TET	BAC	FLA	DAP	NIT	KAN	CIP	ERY	TYL	PEN	STR	GEN	CHL	LZD	VAN
E. casseliflavus (n=3)	-	-*	-	33.3%†	100.0%	-	-	-	-	-	-	-	-	-	-	-	-
E. durans (n=3)	66.7%	-	33.3%	66.7%	100.0%	-	66.7%	66.7%	-	-	-	33.3%	33.3%	-	-	-	-
E. faecalis (n=855)	86.3%	‡	66.8%	52.6%	-	-	0.6%	13.2%	7.7%	18.4%	18.5%	-	15.2%	10.4%	0.2%	-	-
E. faecium (n=757)	51.3%	31.2%	52.8%	69.0%	87.3%	3.7.%	69.2%	39.1%	43.7%	18.1%	14.0%	33.4%	13.5%	5.0%	0.3%	-	-
E. gallinarum (n=7)	14.3%	-	42.9%	57.1%	100.0%	-	-	14.3%	28.6%	-	-	-	-	14.3%	-	-	-
E. hirae (n=129)	45.0%	8.5%	51.2%	10.1%	98.4%	15.5%	10.1%	6.2%	2.3%	7.8%	7.8%	7.0%	4.7%	-	-	-	-
E. mundtii (n=1)	100.0%	100.0%	100.0%	100.0%	-	-	100.0%	100.0%	-	100.0%	100.0%	-	100.0%	100.0%	-	-	-
Total (N=1755)	67.7%	27.6%	59.4%	56.6%	45.6%	2.7%	31.1%	24.0%	22.9%	17.4%	15.7%	15.0%	13.7%	7.4%	0.2%	-	-

* Dashes indicate 0.0% resistance to antimicrobial.

† Where % Resistance = (# isolates per species resistant to antimicrobial) / (total # isolates per species).

‡ QDA resistance is not presented for *E. faecalis*.

Table 33. Antimicrobial Resistance among *Enterococcus faecalis* & *E. faecium* by Meat Type, 2004

		Antimicrobial Agent																
Meat Type	**Species**	**LIN**	**QDA**	**BAC**	**TET**	**FLA**	**DAP**	**NIT**	**KAN**	**CIP**	**ERY**	**TYL**	**PEN**	**STR**	**GEN**	**CHL**	**LZD**	**VAN**
Chicken Breast	***E. faecalis*** (n=88)	98.9%[*]	-[†]	78.4%	63.6%	-[‡]	-	1.1%	22.7%	8.0%	35.2%	34.1%	-	18.2%	19.3%	-	-	-
	E. faecium (n=348)	60.3%	31.6%	84.8%	45.1%	83.6%	4.0%	85.3%	39.7%	52.3%	12.6%	10.3%	39.1%	8.3%	4.3%	-	-	-
Ground Turkey	***E. faecalis*** (n=260)	94.2%	-[†]	72.7%	88.1%	-	-	1.2%	30.0%	5.8%	33.8%	34.6%	-	26.9%	24.6%	-	-	-
	E. faecium (n=172	75.0%	64.5%	90.7%	86.6%	87.8%	7.6%	66.9%	57.6%	53.5%	43.0%	35.5%	61.6%	34.3%	13.4%	-	-	-
Ground Beef	***E. faecalis*** (n=194)	79.4%	-[†]	45.9%	25.3%	-	-	-	3.1%	12.9%	3.6%	3.6%	-	7.7%	1.0%	-	-	-
	E. faecium (n=162)	24.7%	6.2%	35.2%	24.7%	91.4%	0.6%	51.9%	33.3%	27.2%	9.3%	5.6%	3.1%	5.6%	-	1.2%	-	-
Pork Chop	***E. faecalis*** (n=313)	80.5%	-[†]	32.9%	75.7%	-	-	0.3%	2.9%	6.1%	9.9%	9.9%	-	9.3%	1.9%	0.6%	-	-
	E. faecium (n=75)	12.0%	6.7%	18.7%	72.0%	94.7%	-	37.3%	6.7%	17.3%	5.3%	-	8.0%	6.7%	-	-	-	-
Total (N=1612)		69.9%	31.2%	60.3%	60.2%	41.0%	8.3%	32.8%	25.4%	24.6%	18.2%	16.4%	15.7%	14.4%	7.9%	0.2%	-	-

[*] Where % Resistance = (# isolates resistant to antimicrobial per meat type per site) / (total # isolates per meat type per site).

[†] QDA resistance is not presented for *E. faecalis*.

[‡] Dashes indicate 0.0% resistance to antimicrobial.

Table 34. Antimicrobial Resistance among *Enterococcus* by Site, Meat Type, and Antimicrobial Agent, 2004

Site	Meat Type	Antimicrobial Agent																
		LIN	QDA*	TET	BAC	FLA	DAP	NIT	KAN	CIP	ERY	TYL	PEN	STR	GEN	CHL	LZD	VAN
GA	CB (n=120)	77.5%†	40.9%	58.3%	79.2%	48.3%	4.2%	40.8%	30.0%	29.2%	29.2%	25.8%	14.2%	14.2%	13.3%	-‡	-	-
	GT (n=120)	96.7%	58.3%	80.8%	73.3%	9.2%	0.8%	9.2%	25.8%	8.3%	29.2%	30.0%	4.2%	18.3%	16.7%	-	-	-
	GB (n=117)	71.8%	10.3%	29.1%	40.2%	33.3%	1.7%	13.7%	9.4%	10.3%	8.5%	6.8%	-	8.5%	0.9%	-	-	-
	PC (n=116)	79.3%	10.0%	74.1%	37.1%	7.8%	-	6.9%	1.7%	3.4%	5.2%	5.2%	0.9%	9.5%	0.9%	0.9%	-	-
	Total (N=473)	81.4%	30.7%	60.7%	57.7%	24.7%	1.7%	17.8%	16.9%	12.9%	18.2%	17.1%	4.9%	12.7%	8.0%	0.2%	-	-
MD	CB (n=114)	71.1%	36.0%	53.5%	80.7%	77.2%	5.3%	83.3%	50.9%	52.6%	18.4%	14.9%	54.4%	7.9%	3.5%	-	-	-
	GT (n=106)	87.7%	69.7%	91.5%	78.3%	62.3%	6.6%	49.1%	60.4%	40.6%	46.2%	37.7%	52.8%	35.8%	25.5%	-	-	-
	GB (n=100)	29.0%	7.6%	37.0%	21.0%	75.0%	6.0%	29.0%	23.0%	21.0%	7.0%	5.0%	5.0%	9.0%	-	1.0%	-	-
	PC (n=77)	48.1%	-	68.8%	27.3%	37.7%	-	19.5%	7.8%	11.7%	3.9%	-	6.5%	5.2%	-	-	-	-
	Total (N=397)	60.5%	33.6%	62.5%	54.7%	65.0%	4.8%	48.1%	38.0%	33.5%	20.2%	15.6%	32.2%	15.1%	7.8%	0.3%	-	-
OR	CB (n=118)	74.6%	17.0%	46.6%	90.7%	71.2%	0.8%	66.9%	34.7%	41.5%	14.4%	13.6%	38.1%	10.2%	5.9%	-	-	-
	GT (n=105)	81.9%	60.5%	87.6%	88.6%	35.2%	1.0%	15.2%	39.0%	17.1%	41.9%	41.0%	15.2%	37.1%	25.7%	-	-	-
	GB (n=115)	47.8%	3.8%	28.7%	35.7%	67.0%	9.6%	13.0%	11.3%	9.6%	5.2%	4.3%	-	0.9%	-	-	-	-
	PC (n=108)	60.2%	13.8%	69.4%	29.6%	25.0%	-	2.8%	2.8%	4.6%	7.4%	7.4%	0.9%	6.5%	1.9%	0.9%	-	-
	Total (N=446)	65.9%	19.2%	57.2%	61.2%	50.4%	2.9%	25.3%	22.0%	18.6%	16.8%	16.1%	13.9%	13.2%	8.1%	0.2%	-	-
TN	CB (n=114)	44.7%	28.7%	37.7%	71.9%	78.1%	1.8%	71.9%	23.7%	40.4%	5.3%	5.3%	17.5%	13.2%	5.3%	-	-	-
	GT (n=106)	76.4%	54.9%	88.7%	81.1%	39.6%	3.8%	36.8%	40.6%	34.9%	32.1%	30.2%	27.4%	28.3%	13.2%	-	-	-
	GB (n=116)	56.9%	10.3%	27.6%	34.5%	41.4%	1.7%	25.9%	12.1%	23.3%	5.2%	4.3%	0.9%	3.4%	0.9%	0.9%	-	-
	PC (n=103)	68.9%	-	80.6%	21.4%	21.4%	-	5.8%	7.8%	14.6%	17.5%	16.5%	-	11.7%	2.9%	-	-	-
	Total (N=439)	61.3%	27.0%	57.4%	52.4%	45.8%	1.8%	35.8%	21.0%	28.5%	14.6%	13.7%	11.4%	13.9%	5.5%	0.2%	-	-
Total (N=1755)		67.7%	27.6%	59.4%	56.6%	45.6%	2.7%	31.1%	24.0%	22.9%	17.4%	15.7%	15.0%	13.7%	7.4%	0.2%	-	-

* Data does not include *E. faecalis* in QDA, as it is considered intrinsically resistant.

† Where % Resistance = (# isolates resistant to antimicrobial per meat type per site) / (total # isolates per meat type per site).

‡ Dashes indicate 0.0% resistance to antimicrobial.

Table 35. Number of *Enterococcus faecalis* (N=855) Resistant to Multiple Antimicrobial Agents,[*] 2004

Meat Type	Number of Antimicrobials				
	0	**1**	**2-4**	**5-7**	**≥8**
Chicken Breast	0	9	50	28	1
Ground Turkey	3	13	153	91	0
Ground Beef	25	56	108	5	0
Pork Chop	19	72	209	11	2
Total	**47**	**150**	**520**	**135**	**3**

[*] Data does not include QDA, as *E. faecalis* is considered intrinsically resistant.

Table 36. Number of *Enterococcus faecium* (N=757) Resistant to Multiple Antimicrobial Agents, 2004

Meat Type	Number of Antimicrobials				
	0	1	2-4	5-7	≥8
Chicken Breast	1	12	152	152	31
Ground Turkey	0	1	29	70	72
Ground Beef	6	53	84	13	6
Pork Chop	0	10	58	7	0
Total	**7**	**76**	**323**	**242**	**109**

Table 37. *Escherichia coli* by Meat Type, 2004

Meat Type	N*	n†	% ‡
Chicken Breast	476	400	84.0%
Ground Turkey	466	376	80.7%
Ground Beef	480	338	70.4%
Pork Chop	478	232	48.5%
Total	**1900**	**1346**	**70.8%**

* Where N = Number of retail meat samples.
† Where n = number of *E. coli* positive samples.
‡ Where % = (n / N).

Table 38. *Escherichia coli* by Site and Meat Type, 2004

Site	Chicken Breast		Ground Turkey		Ground Beef		Pork Chop	
	n	%*	n	%	n	%	n	%
Georgia (n=389)	115	29.6%	119	30.6%	91	23.4%	64	16.5%
Maryland (n=364)	110	30.2%	109	29.9%	83	22.8%	62	17.0%
Oregon (n=276)	73	26.4%	53	19.2%	99	35.9%	51	18.5%
Tennessee (n=317)	102	32.1%	95	29.9%	65	20.4%	55	17.3%
Total (N=1346)	400	29.7%	376	27.9%	338	25.1%	232	17.2%

*Where % Positive = (# isolates per meat type per site) / (total # isolates for that site).

Table 39. *Escherichia coli* Isolates by Month for All Sites, 2004

Month	n	%*
January	117	8.7%
February	106	7.9%
March	107	7.9%
April	115	8.5%
May	127	9.4%
June	96	7.1%
July	107	7.9%
August	117	8.7%
September	111	8.2%
October	118	8.8%
November	113	8.4%
December	112	8.3%
Total	**1346**	**100%**

*Where % Positive = (# isolates per month) / (total # isolates).

Table 40. Antimicrobial Resistance among *E. coli* Isolates (N=1346), 2004

Antimicrobial Agent	n	%R*
Tetracycline	678	50.4%
Streptomycin	501	37.2%
Sulfisoxazole	436	32.4%
Ampicillin	246	18.3%
Gentamicin	235	17.5%
Kanamycin	114	8.5%
Amoxicillin/Clavulanic Acid	86	6.4%
Nalidixic Acid	73	5.4%
Cefoxitin	59	4.4%
Trimethoprim/Sulfamethoxazole	42	3.1%
Chloramphenicol	32	2.4%
Ceftiofur	31	2.3%
Ciprofloxacin	3	0.2%
Amikacin	0	0.0%
Ceftriaxone	0	0.0%

*

*Where % R = (n / N).

Figure 16. Antimicrobial Resistance among *E. coli* isolates (n =1346), 2004

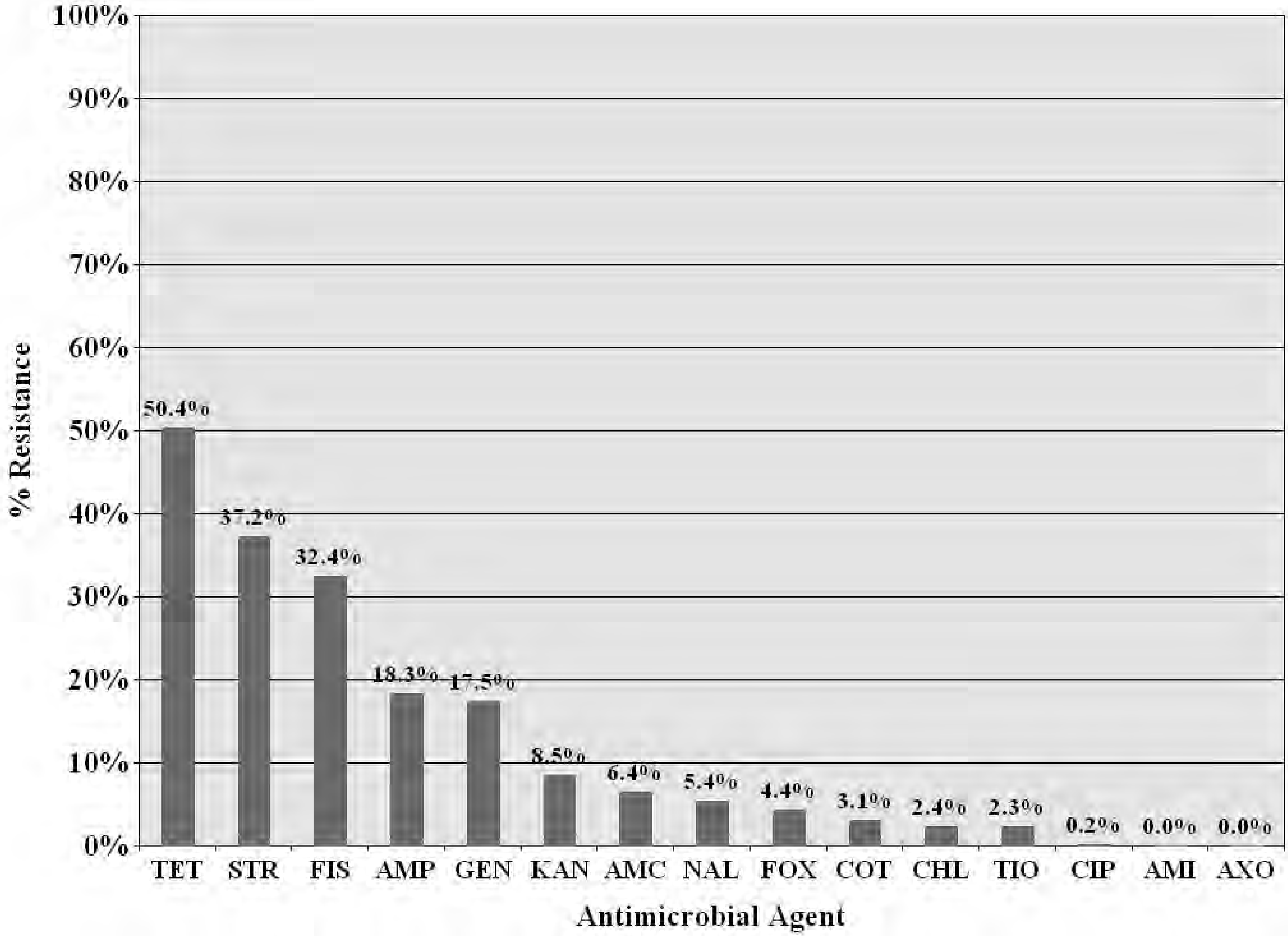


Figure 17. MIC Distribution among all Antimicrobial Agents

E. coli **from All Meats Types (N=1346)**		**Distribution (%) of MICs (in µg/ml)**																
Antimicrobial Agent	**%R**	**0.015**	**0.03**	**0.06**	**0.125**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**>512**
Ampicillin	**18.3**							8.2	40.5	31.4	1.0	0.5	**0.5**	**17.8**				
Amoxicillin/Clavulanic Acid	**6.4**							2.7	22.7	50.2	16.7	1.3	**5.1**	**1.3**				
Cefoxitin	**4.4**						0.1	1.8	23.0	55.2	14.1	1.4	**2.2**	**2.2**				
Ceftiofur	**2.3**				4.5	49.7	40.4	2.2	0.4	0.5	**1.5**	**0.8**						
Ceftriaxone	**0.0**					94.2	1.5	1.4	0.1		1.3	0.9	0.5					
Nalidixic Acid	**5.4**							5.4	64.8	23.0	1.0	0.3	**0.4**	**5.0**				
Ciprofloxacin	**0.2**	90.9	2.7	0.4	1.6	3.6	0.5				**0.2**							
Sulfisoxazole	**32.4**											60.1	3.3	4.1	0.1	0.1	**32.4**	
Trimethoprim/Sulfamethoxazole	**3.1**				89.2	5.6	1.6	0.4	0.1		**3.1**							
Amikacin	**0.0**						0.1	15.9	65.1	16.6	2.1	0.3						
Gentamicin	**17.5**					7.1	51.7	19.5	2.4	0.3	1.5	**6.5**	**11.0**					
Kanamycin	**8.5**										84.6	6.0	0.9	**0.1**	**8.4**			
Streptomycin*	**37.2**												62.8	**11.7**	**25.5**			
Chloramphenicol	**2.4**								1.6	33.1	61.6	1.3	**0.4**	**2.0**				
Tetracycline	**50.4**									47.3	2.4	**0.8**	**4.2**	**45.3**				

Vertical bars show the CLSI/NCCLS Susceptible/Resistant breakpoints for each drug where appropriate.

*Currently no CLSI/NCCLS breakpoints have been established for this organism/antimicrobial combination. Indicated breakpoints were established by NARMS.

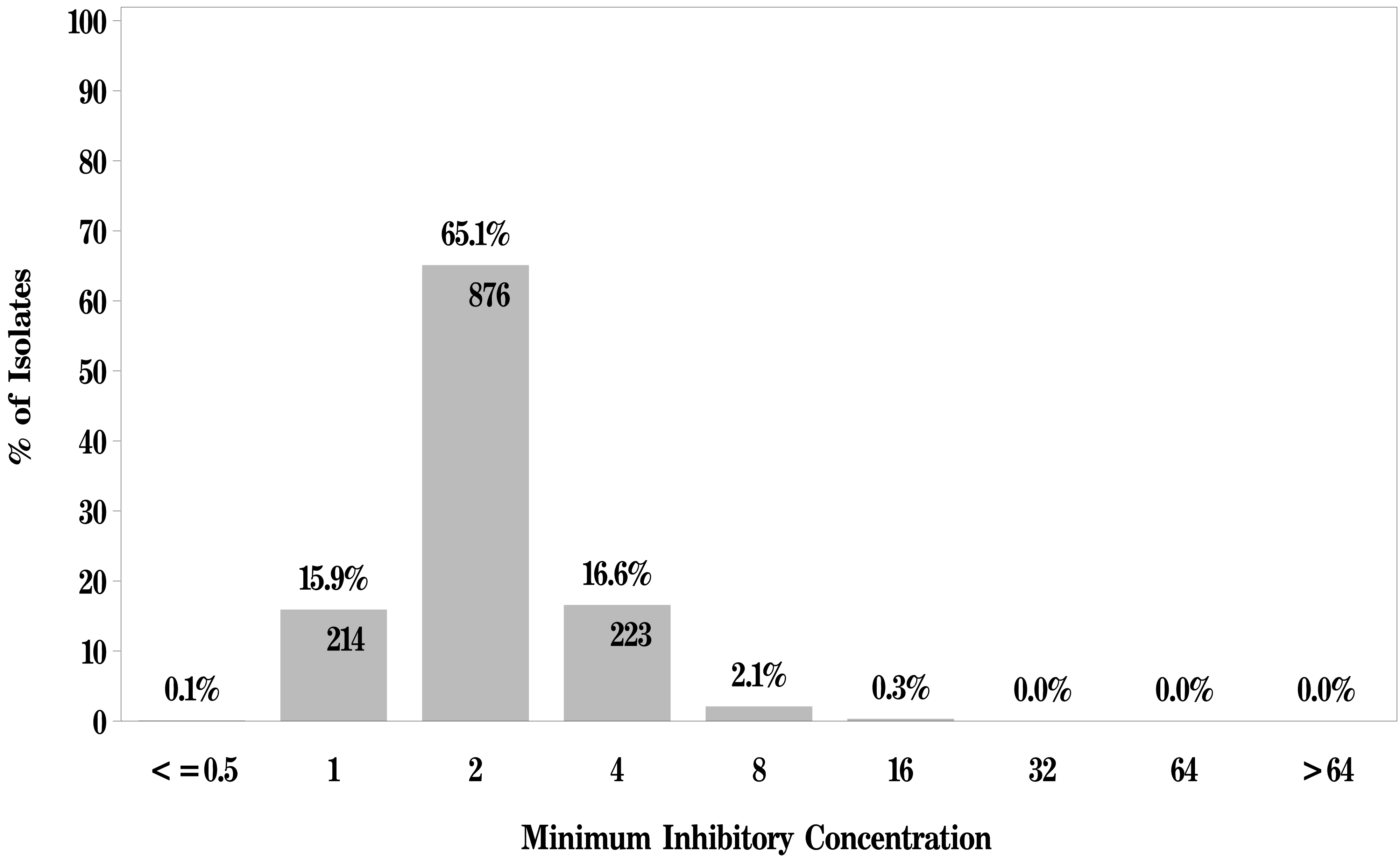
†Discrepancies between %R and sums of distribution %s are due to rounding.

Unshaded areas indicate the dilution ranges of the Sensititre plate used to test the 2004 isolates.

NARMS

Figure 17a: Minimum Inhibitory Concentration of Amikacin for *Escherichia coli* (N=1346 Isolates)

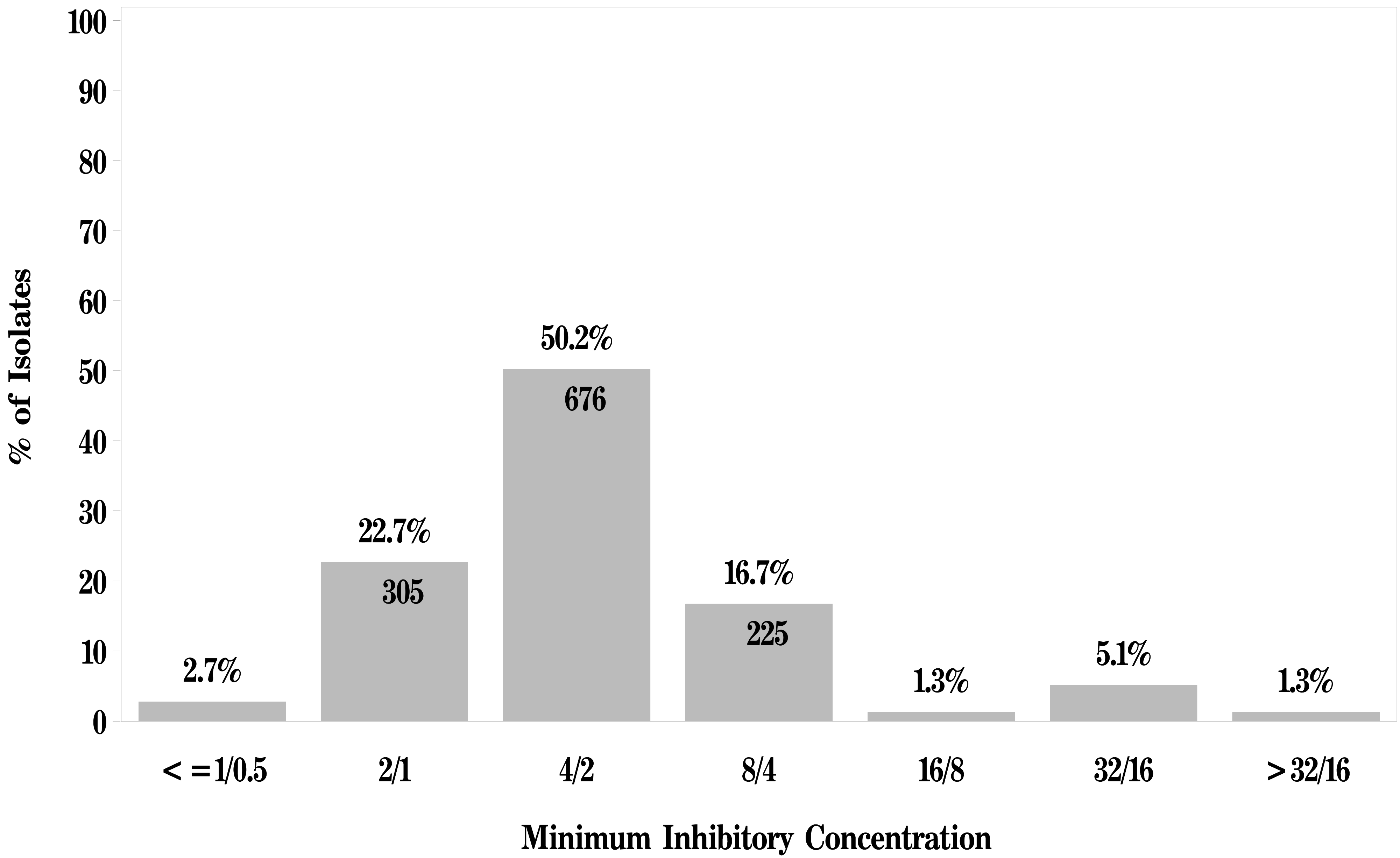
Breakpoints: Susceptible<=16 μg/mL Resistant>=64 μg/mL



NARMS

Figure 17b: Minimum Inhibitory Concentration of Amoxicillin/Clavulanic acid for *Escherichia coli* (N=1346 Isolates)

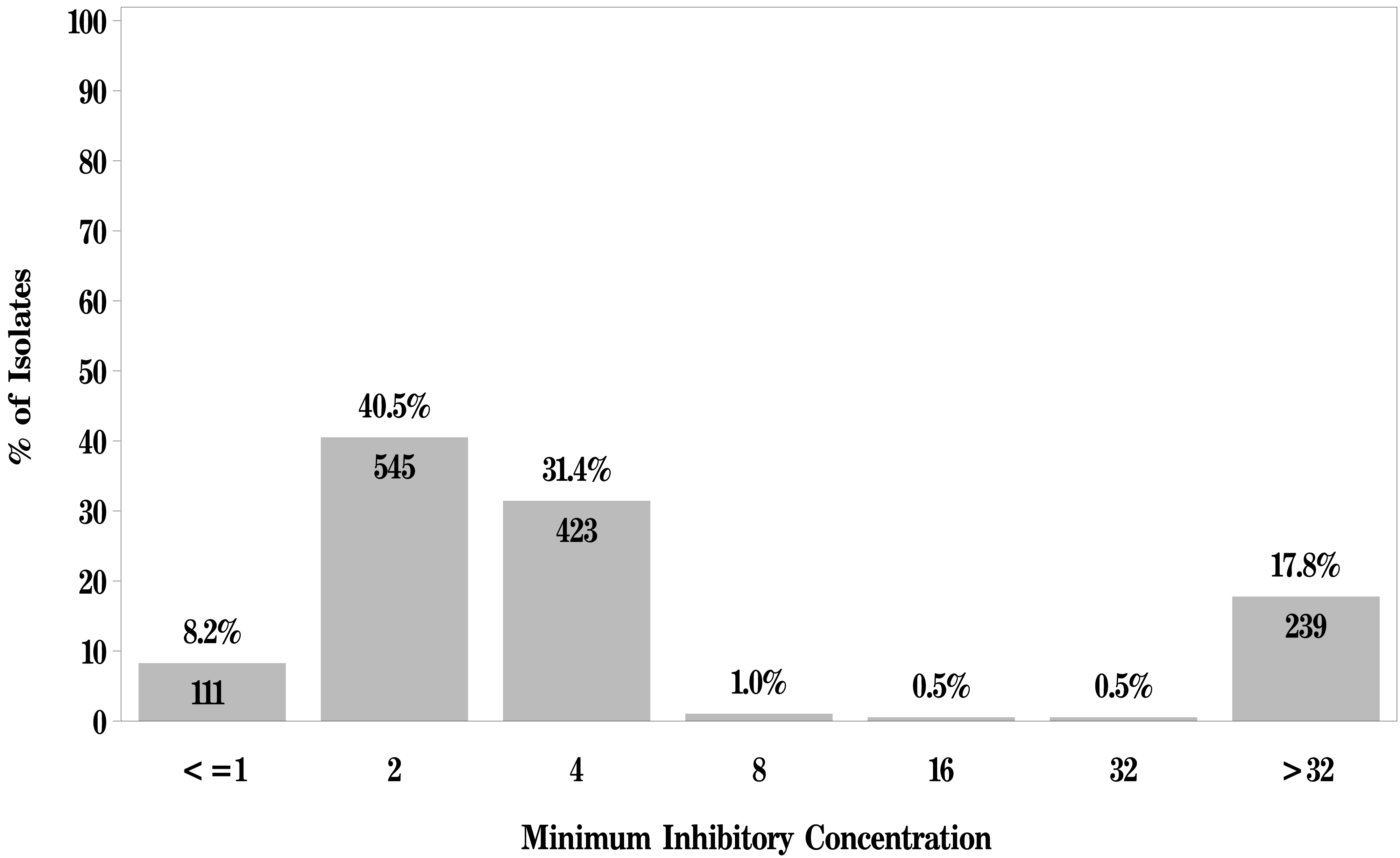
Breakpoints: Susceptible <=8 μg/mL Resistant >=32 μg/mL



NARMS

Figure 17c: Minimum Inhibitory Concentration of Ampicillin for *Escherichia coli* (N=1346 Isolates)

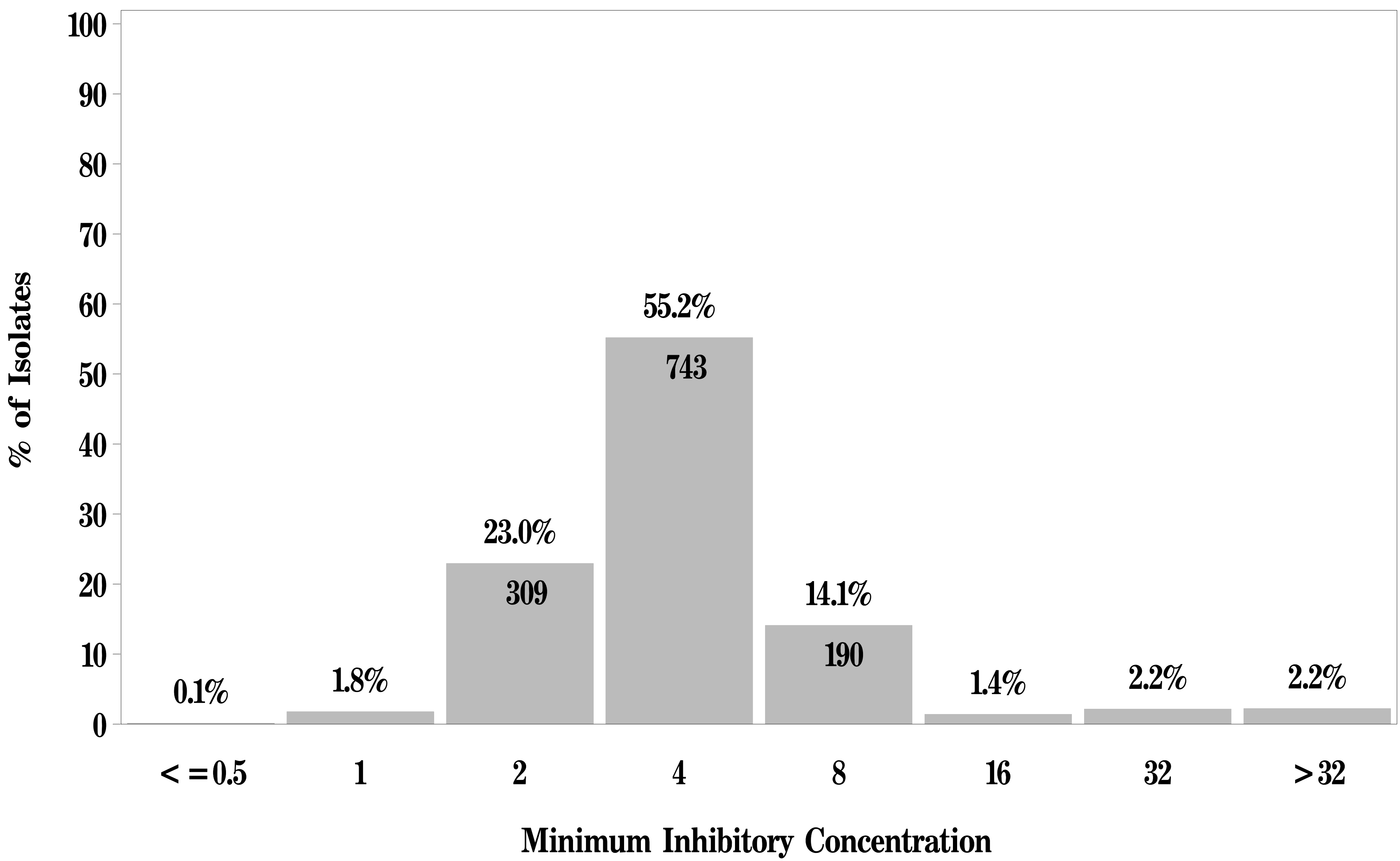
Breakpoints: Susceptible <=8 μg/mL Resistant >=32 μg/mL



NARMS

Figure 17d: Minimum Inhibitory Concentration of Cefoxitin for *Escherichia* (N=1346 Isolates)

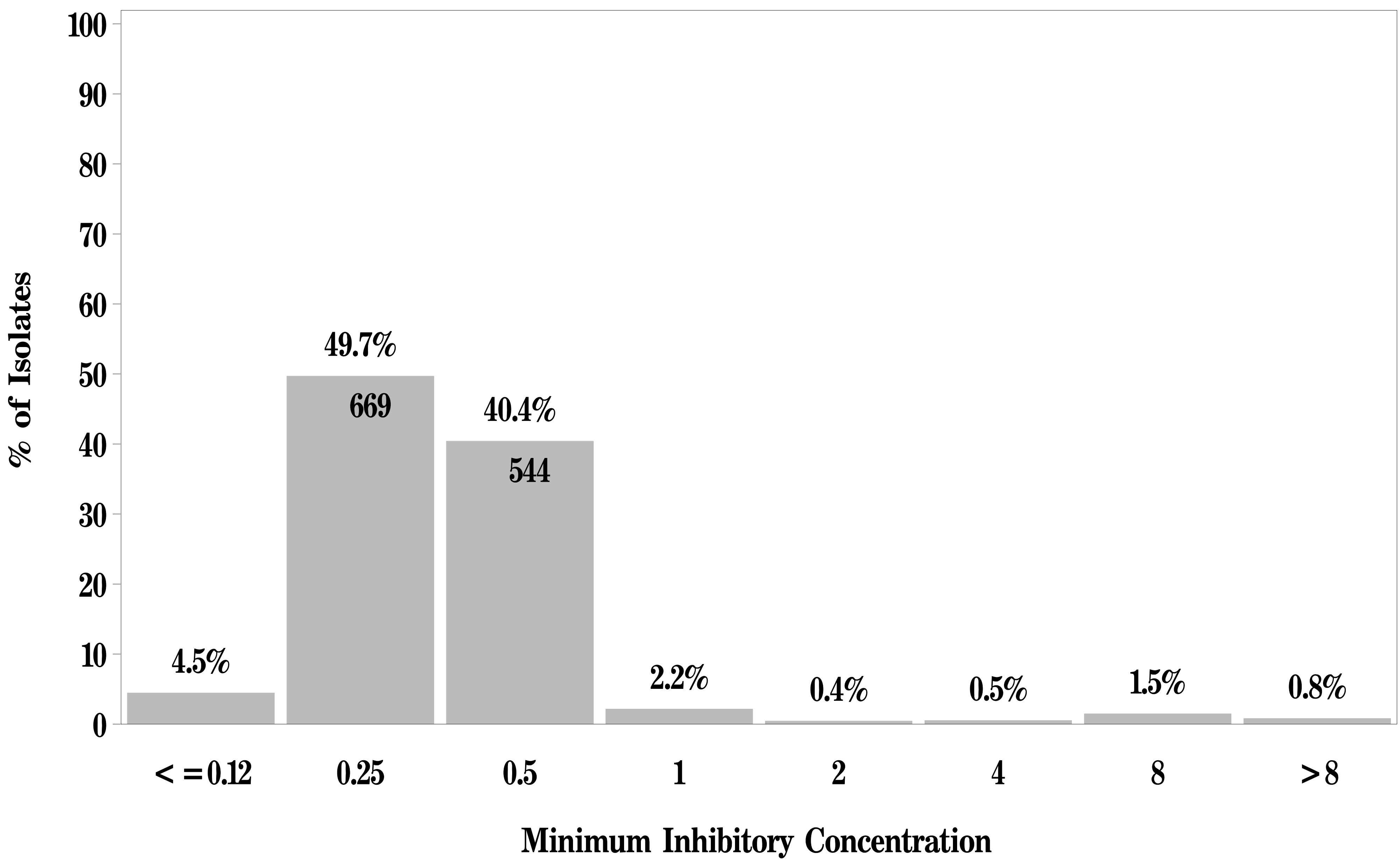
Breakpoints: Susceptible <=8 µg/mL Resistant >=32 µg/mL



NARMS

Figure 17e: Minimum Inhibitory Concentration of Ceftiofur for *Escherichia coli* (N=1346 Isolates)

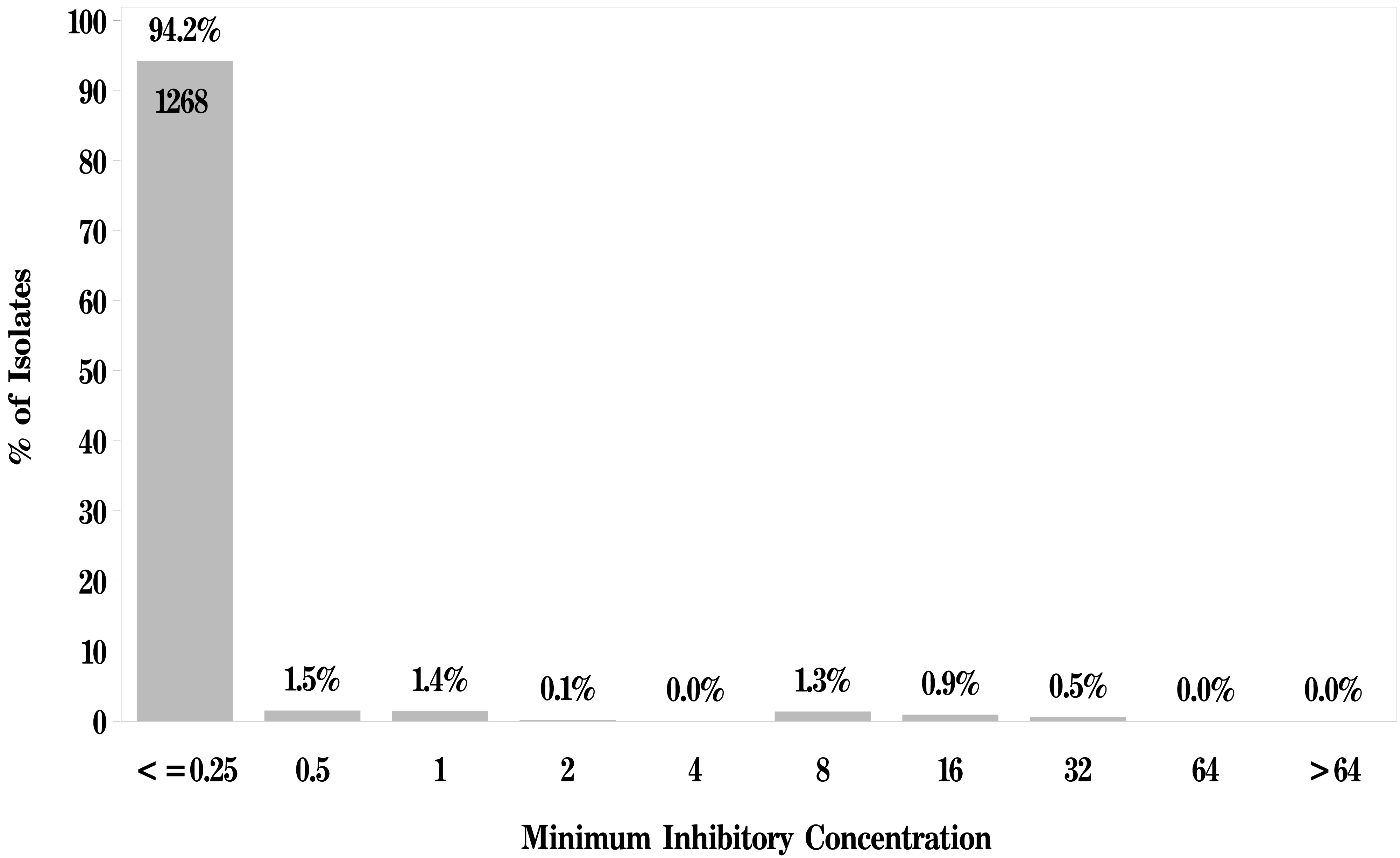
Breakpoints: Susceptible<=2 μg/mL Resistant>=8 μg/mL



NARMS

Figure 17f: Minimum Inhibitory Concentration of Ceftriaxone for *Escherichia* (N=1346 Isolates)

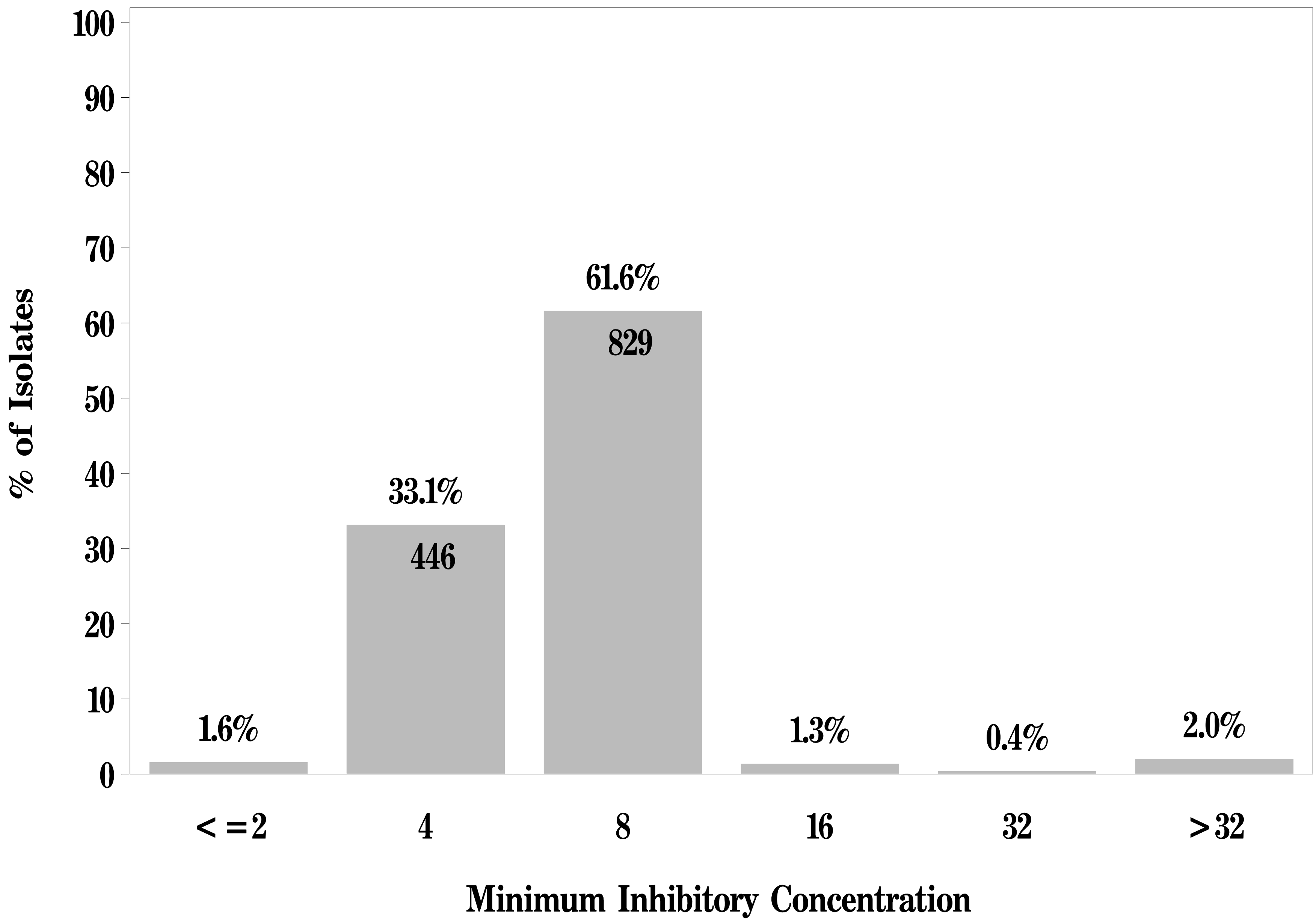
Breakpoints: Susceptible <=8 μg/mL Resistant >=64 μg/mL



NARMS

Figure 17g: Minimum Inhibitory Concentration of Chloramphenicol for *Escherichia coli* (N=1346 Isolates)

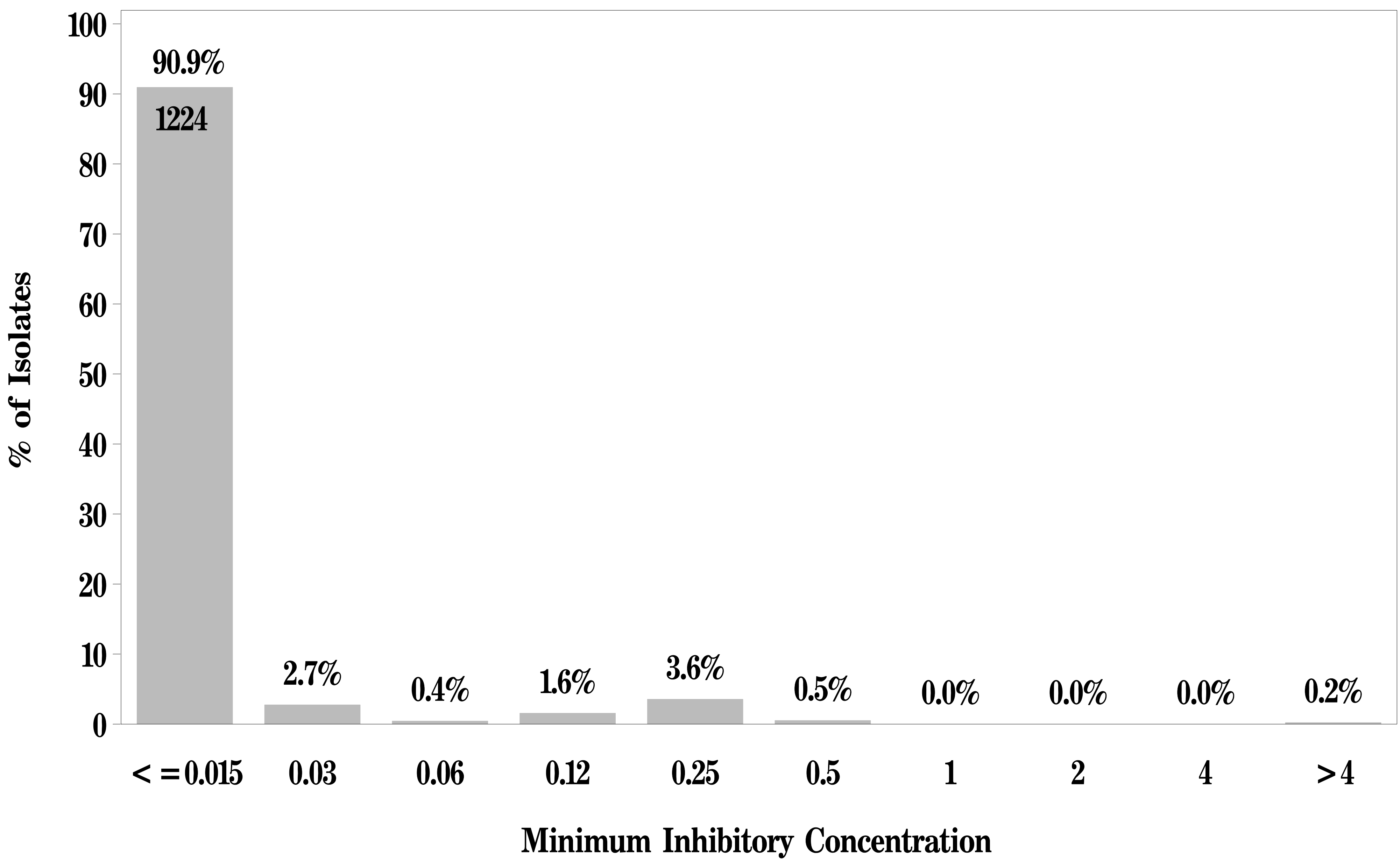
Breakpoints: Susceptible <=8 μg/mL Resistant >=32 μg/mL



NARMS

Figure 17h: Minimum Inhibitory Concentration of Ciprofloxacin for *Escherichia coli* (N=1346 Isolates)

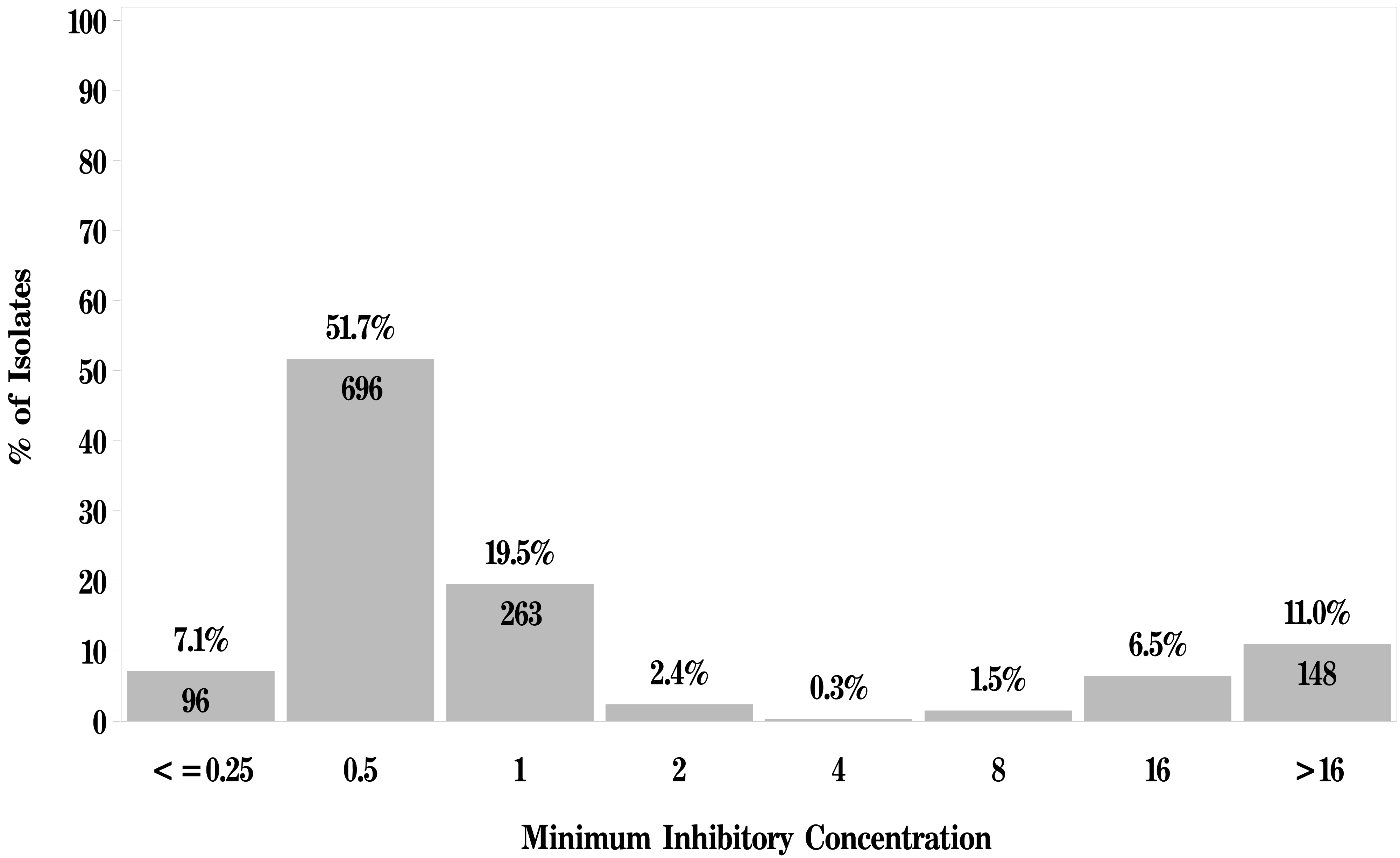
Breakpoints: Susceptible <=1 μg/mL Resistant >=4 μg/mL



NARMS

Figure 17i: Minimum Inhibitory Concentration of Gentamicin for *Escherichia coli* (N=1346 Isolates)

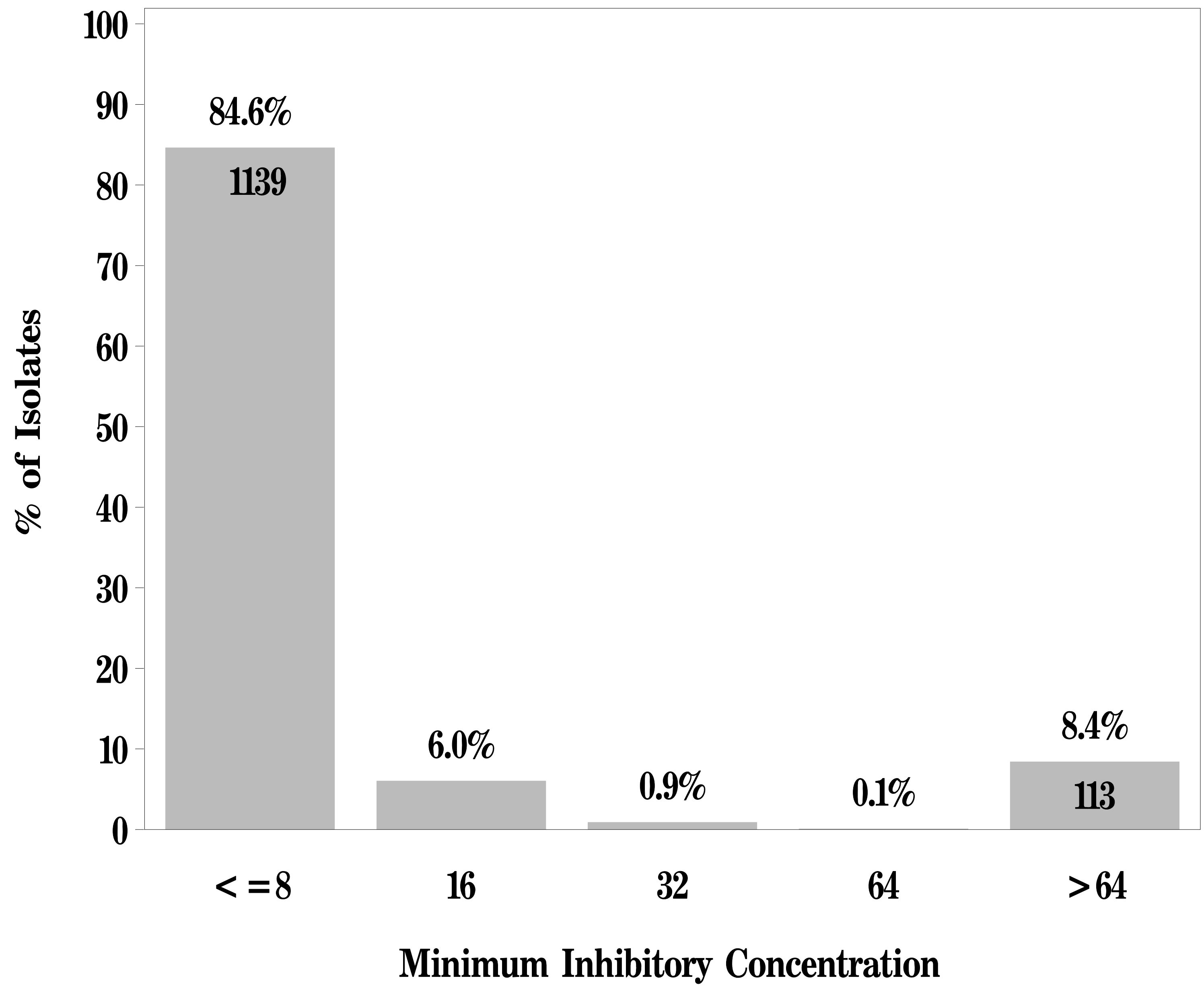
Breakpoints: Susceptible <=4 μg/mL Resistant >=16 μg/mL



NARMS

Figure 17j: Minimum Inhibitory Concentration of Kanamycin for *Escherichia coli* (N=1346 Isolates)

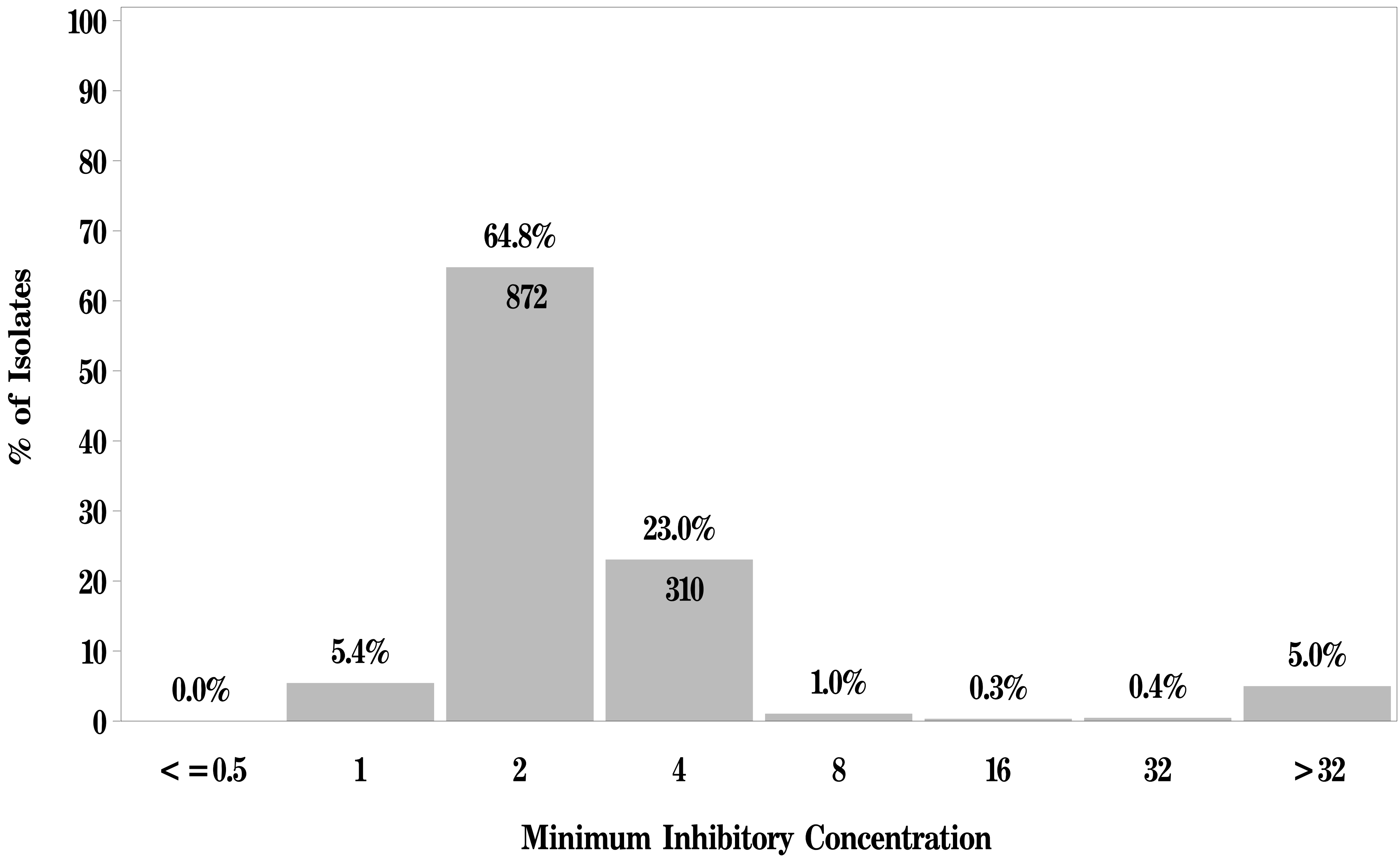
Breakpoints: Susceptible <=16 μg/mL Resistant >=64 μg/mL



NARMS

Figure 17k: Minimum Inhibitory Concentration of Nalidixic acid for *Escherichia coli* (N=1346 Isolates)

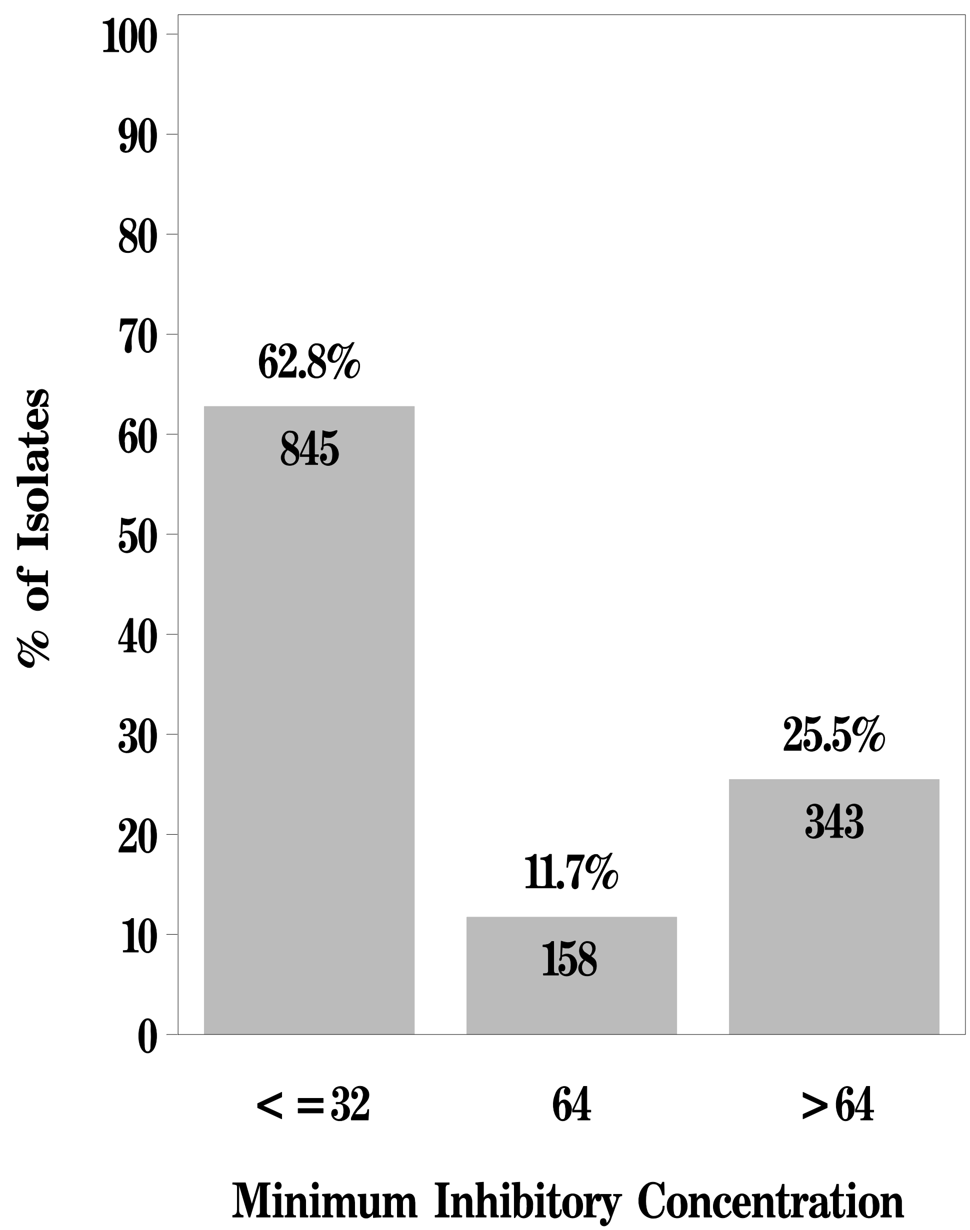
Breakpoints: Susceptible <=16 μg/mL Resistant >=32 μg/mL



NARMS

Figure 17l: Minimum Inhibitory Concentration of Streptomycin for *Escherichia coli* (N=1346 Isolates)

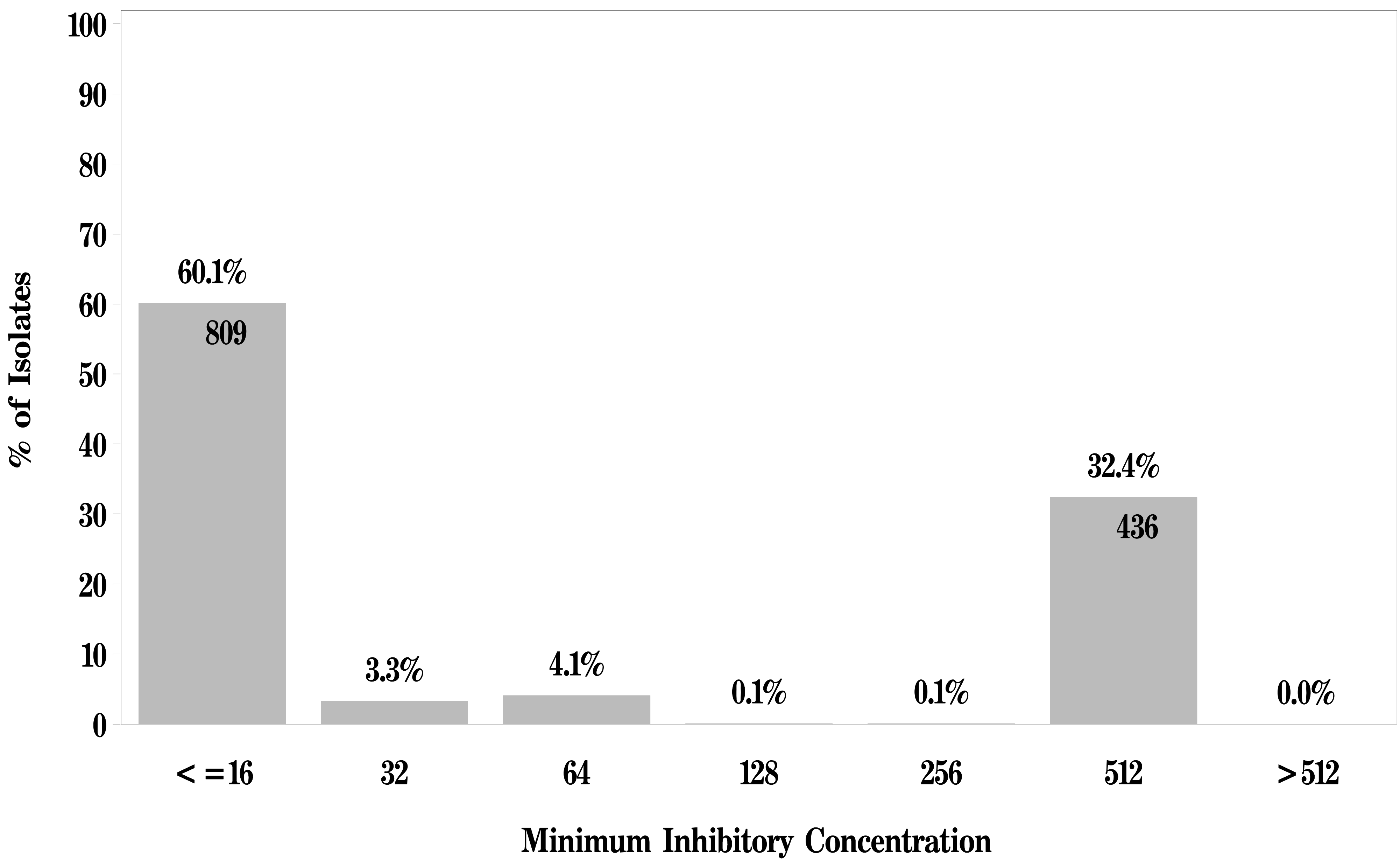
Breakpoints: Susceptible<=32 µg/mL Resistant>=64 µg/mL



NARMS

Figure 17m: Minimum Inhibitory Concentration of Sulfisoxazole for *Escherichia coli* (N=1346 Isolates)

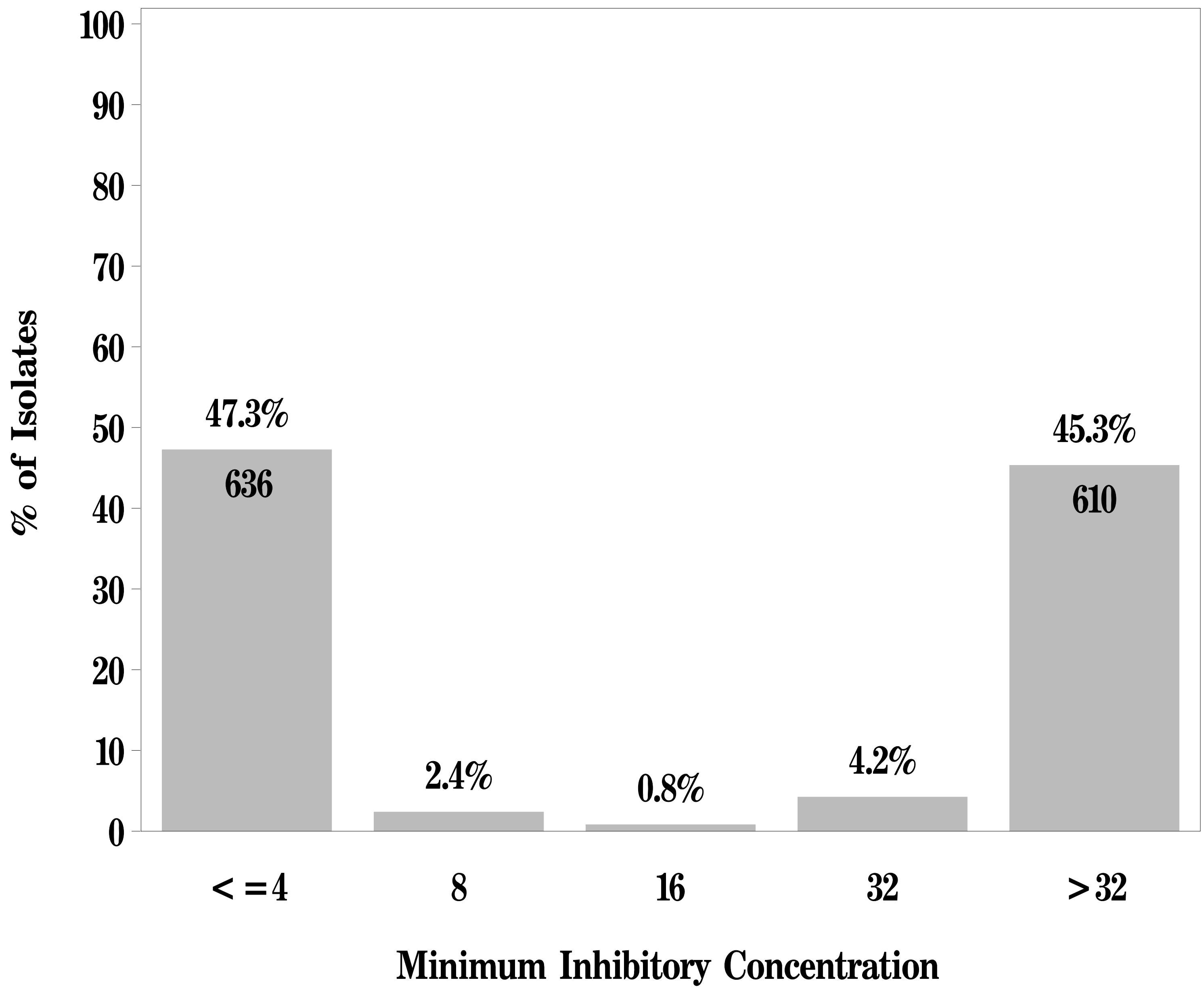
Breakpoints: Susceptible<=256 μg/mL Resistant>=512 μg/mL



NARMS

Figure 17n: Minimum Inhibitory Concentration of Tetracycline for *Escherichia coli* (N=1346 Isolates)

Breakpoints: Susceptible <=4 µg/mL Resistant >=16 µg/mL



NARMS

Figure 17o: Minimum Inhibitory Concentration of Trimethoprim/sulfamethoxazole for *Escherichia coli* (N=1346 Isolates)

Breakpoints: Susceptible <=2 μg/mL Resistant >=4 μg/mL

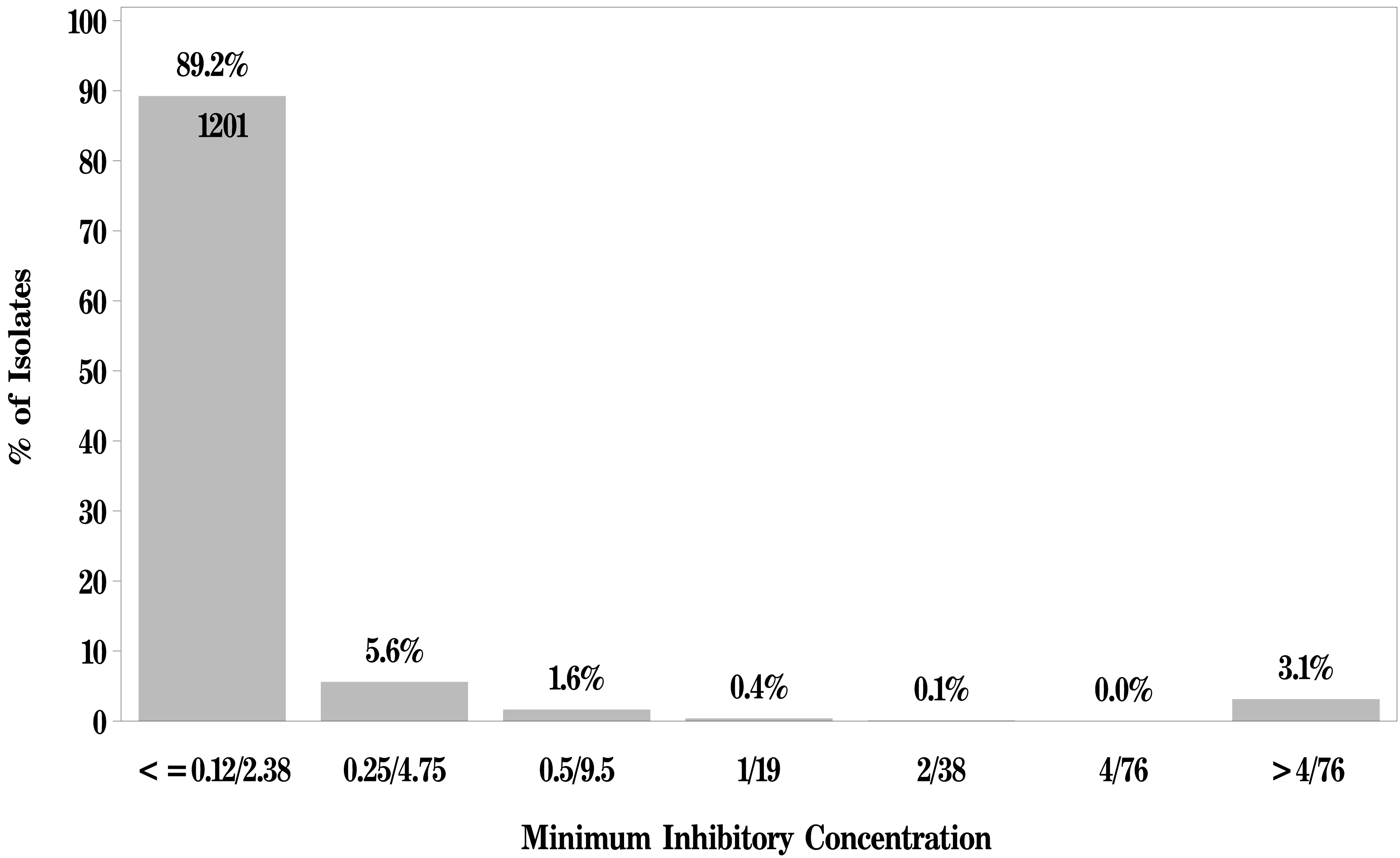


Figure 18a. MIC Distribution among *E. coli* from Chicken Breast

E. coli from **Chicken Breast (N=400)**		**Distribution (%) of MICs (in µg/ml)**																
Antimicrobial Agent	**%R**	**0.015**	**0.03**	**0.06**	**0.125**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**>512**
Ampicillin	**17.0**							6.8	40.3	34.0	1.8	0.3	**0.3**	**16.8**				
Amoxicillin/Clavulanic Acid	**10.0**							1.8	21.8	51.3	14.8	0.5	**7.3**	**2.8**				
Cefoxitin	**8.3**							0.3	15.5	53.0	20.8	2.3	**3.8**	**4.5**				
Ceftiofur	**5.8**				4.8	50.5	35.3	2.8		1.0	**4.3**	**1.5**						
Ceftriaxone	**0.0**					90.0	1.3	2.0	0.3		3.5	2.0	1.0					
Nalidixic Acid	**7.0**							6.5	63.0	23.3	0.3		**0.3**	**6.8**				
Ciprofloxacin	**0.0**	90.3	2.3	0.5	1.8	4.0	1.3											
Sulfisoxazole	**41.3**											48.5	6.3	4.0			**41.3**	
Trimethoprim/Sulfamethoxazole	**4.3**				85.5	7.0	2.5	0.5	0.3		**4.3**							
Amikacin	**0.0**							15.0	65.0	17.0	2.5	0.5						
Gentamicin	**30.0**					5.8	43.3	14.8	2.5	1.0	2.8	**10.0**	**20.0**					
Kanamycin	**6.8**										81.8	10.5	1.0		**6.8**			
Streptomycin*	**56.8**												43.3	**13.0**	**43.8**			
Chloramphenicol	**1.8**								3.3	34.5	58.0	2.5	0.3	**1.5**				
Tetracycline	**48.0**									51.3	0.8	**0.5**	**3.3**	**44.3**				

Vertical bars show the CLSI Susceptible/Resistant breakpoints for each drug where appropriate.

*Currently no CLSI breakpoints have been established for this organism/antimicrobial combination. Indicated breakpoints were established by NARMS.

†Discrepancies between %R and sums of distribution %s are due to rounding.

Unshaded areas indicate the dilution ranges of the Sensititre plate used to test the 2004 isolates.

Figure 18b. MIC Distribution among *E. coli* from Ground Turkey

E. coli from **Ground Turkey (N=376)**		Distribution (%) of MICs (in µg/ml)																
Antimicrobial Agent	**%R**	**0.015**	**0.03**	**0.06**	**0.125**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**>512**
Ampicillin	**33.2**							6.4	33.2	26.9		0.3	**0.8**	**32.4**				
Amoxicillin/Clavulanic Acid	**5.3**							1.3	19.9	41.8	28.2	3.5	**4.5**	**0.8**				
Cefoxitin	**4.5**							0.8	22.1	55.9	16.0	0.8	**2.7**	**1.9**				
Ceftiofur	**1.1**				1.9	47.9	45.2	2.4	1.3	0.3	**0.5**	**0.5**						
Ceftriaxone	**0.0**					95.5	1.3	1.9			0.8	0.3	0.3					
Nalidixic Acid	**10.6**							3.7	62.0	21.5	1.6	0.5	0.5	**10.1**				
Ciprofloxacin	**0.8**	84.3	3.5	0.8	2.9	7.4	0.3				**0.8**							
Sulfisoxazole	**48.4**											44.4	3.2	4.0			**48.4**	
Trimethoprim/Sulfamethoxazole	**3.7**				83.8	9.3	2.7	0.5			**3.7**							
Amikacin	**0.0**							17.3	66.5	13.8	2.4							
Gentamicin	**29.3**					4.8	42.6	19.1	2.1		2.1	**12.5**	**16.8**					
Kanamycin	**16.0**										75.0	6.9	2.1	**0.3**	**15.7**			
Streptomycin*	**49.2**												50.8	**18.6**	**30.6**			
Chloramphenicol	**0.8**								1.3	36.7	60.4	0.8		**0.8**				
Tetracycline	**74.2**									25.3	0.5		**6.9**	**67.3**				

Vertical bars show the CLSI/ Susceptible/Resistant breakpoints for each drug where appropriate.

*Currently no CLSI breakpoints have been established for this organism/antimicrobial combination. Indicated breakpoints were established by NARMS.

†Discrepancies between %R and sums of distribution %s are due to rounding.

Unshaded areas indicate the dilution ranges of the Sensititre plate used to test the 2004 isolates.

Figure 18c. MIC Distribution among *E. coli* from Ground Beef

***E coli* from Ground Beef (N=338)**		**Distribution (%) of MICs (in µg/ml)**																
Antimicrobial Agent	**%R**	**0.015**	**0.03**	**0.06**	**0.125**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**>512**
Ampicillin	**5.3**							8.9	46.2	37.9	0.9	0.9	**0.3**	**5.0**				
Amoxicillin/Clavulanic Acid	**3.8**							4.4	23.4	60.9	7.1	0.3	**3.6**	**0.3**				
Cefoxitin	**1.2**							4.1	30.2	53.8	8.9	1.8	**0.3**	**0.9**				
Ceftiofur	**0.9**				5.0	49.4	41.7	2.1	0.3	0.6		**0.9**						
Ceftriaxone	**0.0**					95.9	1.8	0.6	0.3		0.3	0.6	0.6					
Nalidixic Acid	**1.5**							3.0	67.5	26.9	1.2		**0.9**	**0.6**				
Ciprofloxacin	**0.0**	94.4	3.8		0.6	0.9	0.3											
Sulfisoxazole	**13.0**											84.6		2.4			**13.0**	
Trimethoprim/Sulfamethoxazole	**0.6**				97.0	2.1		0.3			**0.6**							
Amikacin	**0.0**							15.7	69.8	12.4	1.8	0.3						
Gentamicin	**0.6**					9.2	67.8	20.7	1.8				**0.6**					
Kanamycin	**2.4**										95.6	2.1			**2.4**			
Streptomycin*	**11.8**												88.2	**4.7**	**7.1**			
Chloramphenicol	**3.6**								0.3	26.9	68.3	0.9	**0.3**	**3.3**				
Tetracycline	**22.8**									70.7	6.5	**2.7**	**1.2**	**18.9**				

Vertical bars show the CLSI Susceptible/Resistant breakpoints for each drug where appropriate.

*Currently no CLSI/ breakpoints have been established for this organism/antimicrobial combination. Indicated breakpoints were established by NARMS.

†Discrepancies between %R and sums of distribution %s are due to rounding.

Unshaded areas indicate the dilution ranges of the Sensititre plate used to test the 2004 isolates.

Figure 18d. MIC Distribution among *E. coli* from Pork Chop

E. coli from Pork Chop (N=232)		Distribution (%) of MICs (in µg/ml)															
Antimicrobial Agent	**%R**	**0.015**	**0.03**	**0.06**	**0.125**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**>512**
Ampicillin	**15.1**							12.9	44.4	25.0	1.7	0.9	0.9	**14.2**				
Amoxicillin/Clavulanic Acid	**5.6**							4.3	27.6	46.6	15.5	0.4	**4.7**	**0.9**				
Cefoxitin	**2.2**						0.9	2.6	26.7	59.9	7.3	0.4	**1.3**	**0.9**				
Ceftiofur	**0.4**				7.3	51.7	39.7	0.9			**0.4**							
Ceftriaxone	**0.0**					97.0	1.7	0.9				0.4						
Nalidixic Acid	**0.0**							9.9	68.5	19.4	1.3	0.9						
Ciprofloxacin	**0.0**	97.8	0.9	0.4	0.4	0.4												
Sulfisoxazole	**19.4**											69.8	3.0	6.9	0.4	0.4	**19.4**	
Trimethoprim/Sulfamethoxazole	**3.9**				93.1	2.2	0.9				**3.9**							
Amikacin	**0.0**						0.4	15.5	56.0	26.3	1.3	0.4						
Gentamicin	**1.3**					10.3	57.8	26.7	3.4		0.4		**1.3**					
Kanamycin	**8.2**										89.2	2.6			**8.2**			
Streptomycin*	**21.1**												78.9	**8.6**	**12.5**			
Chloramphenicol	**4.3**								0.9	34.1	59.9	0.9	**1.3**	**3.0**				
Tetracycline	**56.0**									41.8	2.2		**6.0**	**50.0**				

Vertical bars show the CLSI Susceptible/Resistant breakpoints for each drug where appropriate.

*Currently no CLSI breakpoints have been established for this organism/antimicrobial combination. Indicated breakpoints were established by NARMS.

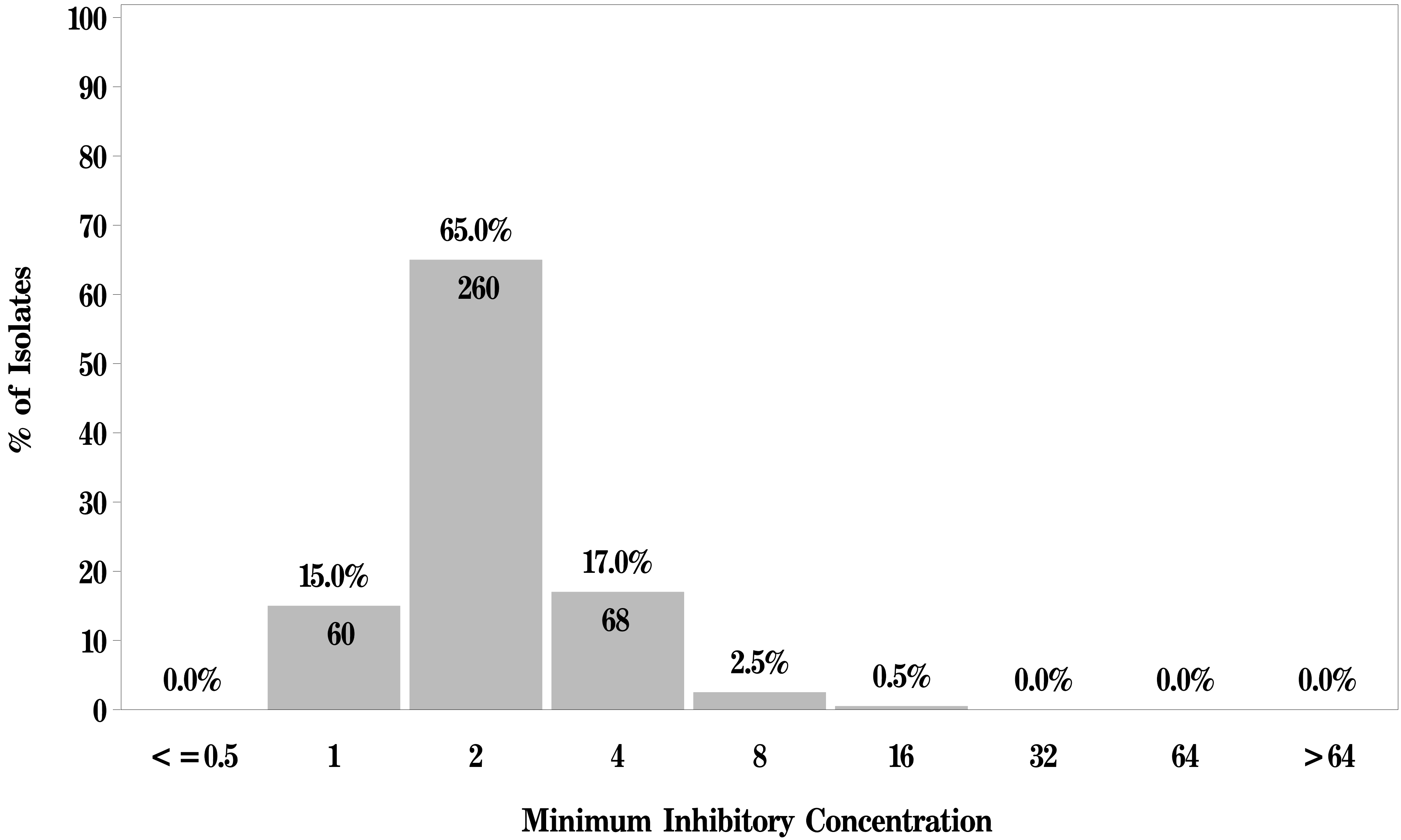
†Discrepancies between %R and sums of distribution %s are due to rounding.

Unshaded areas indicate the dilution ranges of the Sensititre plate used to test the 2004 isolates.

NARMS

Figure 19a: Minimum Inhibitory Concentration of Amikacin for *Escherichia coli* in Chicken Breast (N=400 Isolates)

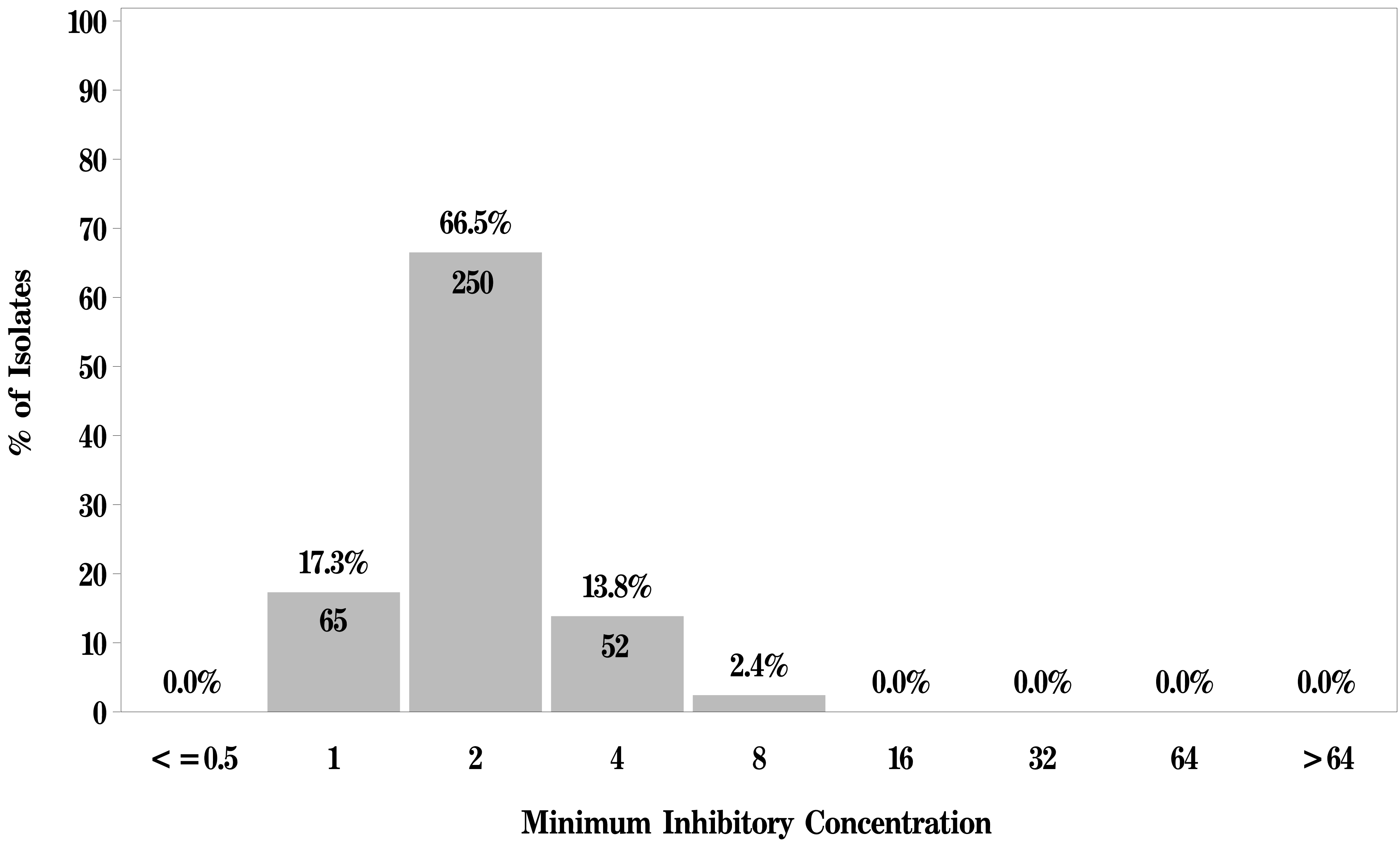
Breakpoints: Susceptible <=16 µg/mL Resistant >=64 µg/mL



NARMS

Figure 19a: Minimum Inhibitory Concentration of Amikacin for *Escherichia coli* in Ground Turkey (N=376 Isolates)

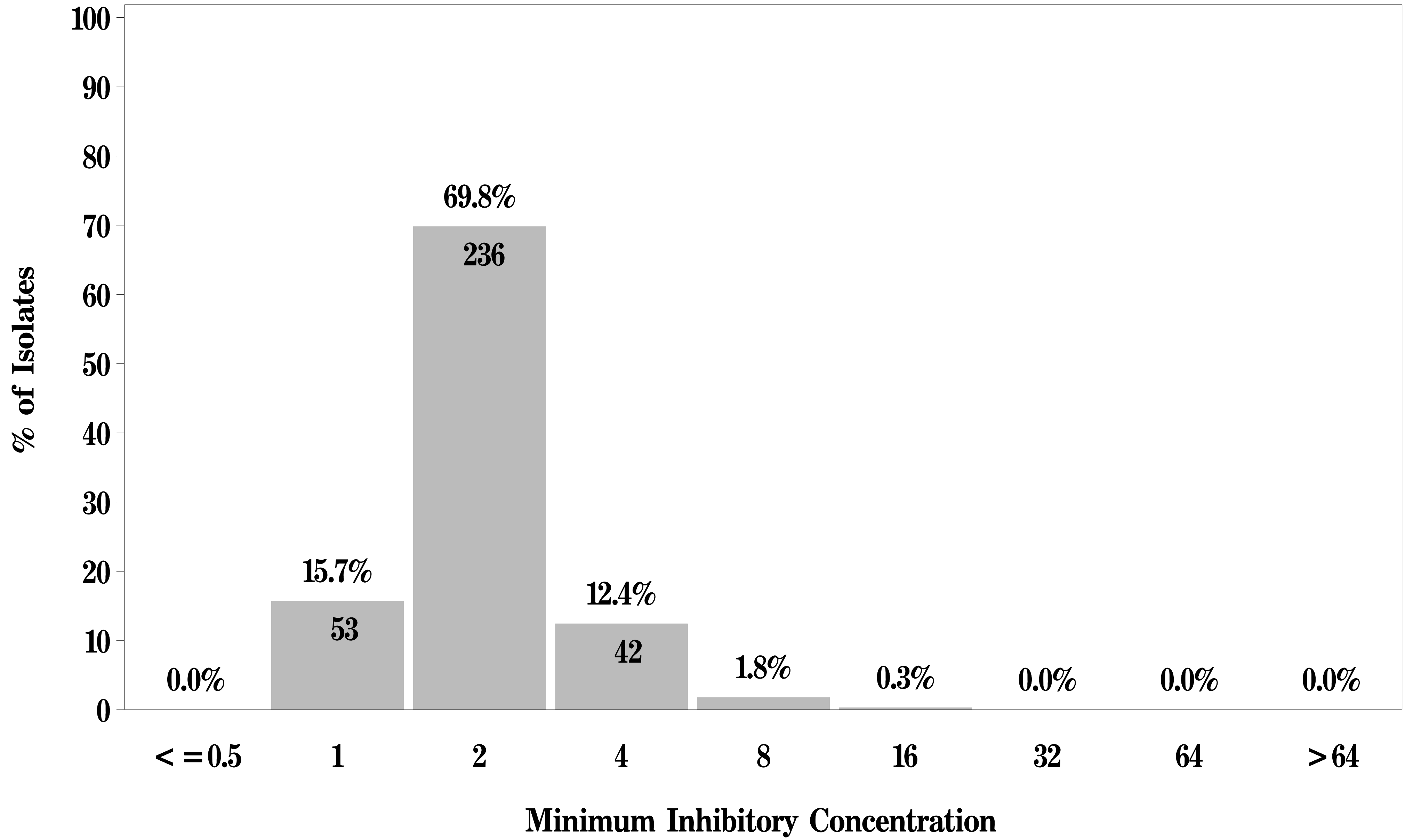
Breakpoints: Susceptible <=16 µg/mL Resistant >=64 µg/mL



NARMS

Figure 19a: Minimum Inhibitory Concentration of Amikacin for *Escherichia coli* in Ground Beef (N=338 Isolates)

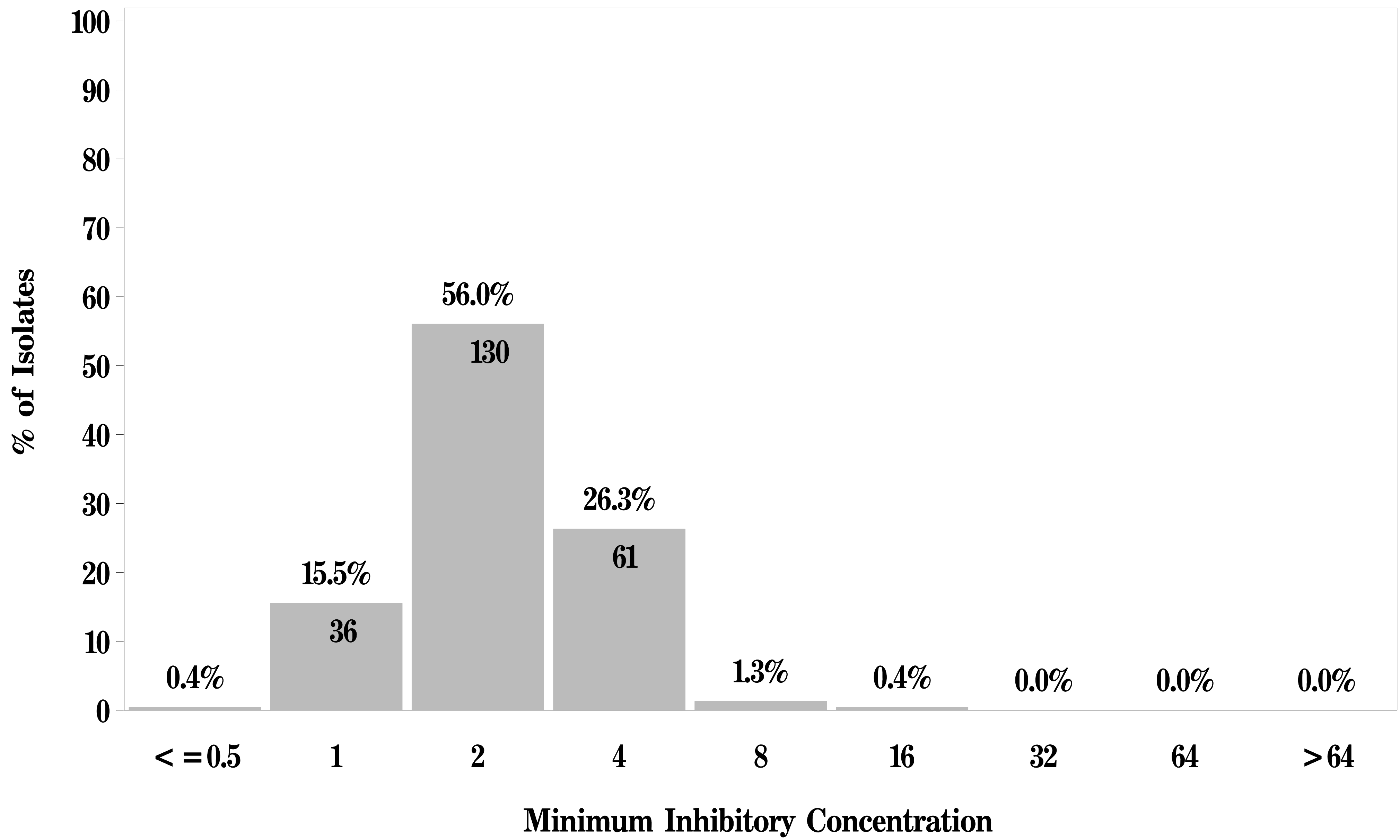
Breakpoints: Susceptible <=16 μg/mL Resistant >=64 μg/mL



NARMS

Figure 19a: Minimum Inhibitory Concentration of Amikacin for *Escherichia coli* in Pork Chop (N=232 Isolates)

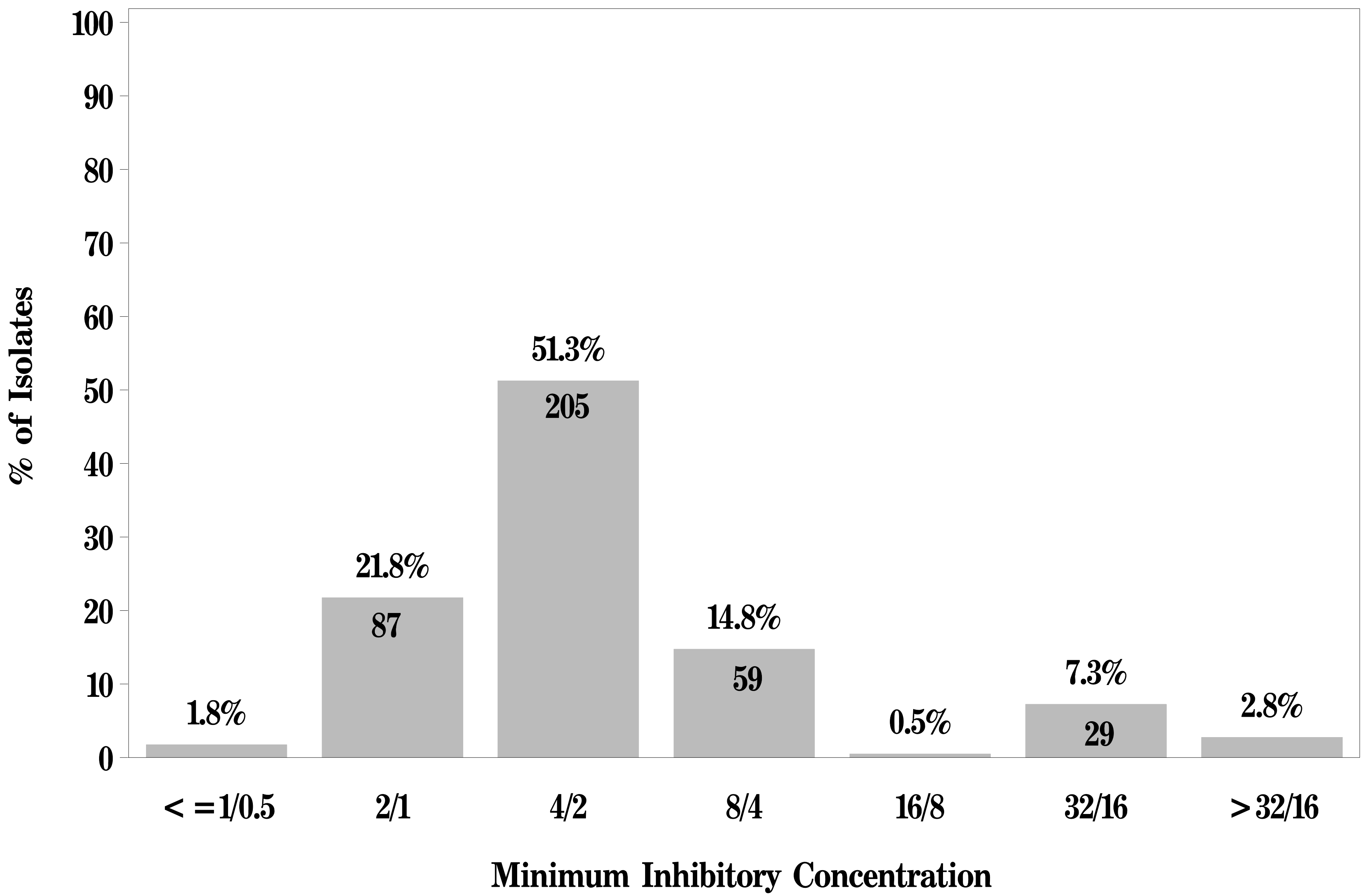
Breakpoints: Susceptible<=16 μg/mL Resistant>=64 μg/mL



NARMS

Figure 19b: Minimum Inhibitory Concentration of Amoxicillin/Clavulanic acid for *Escherichia coli* in Chicken Breast (N=400 Isolates)

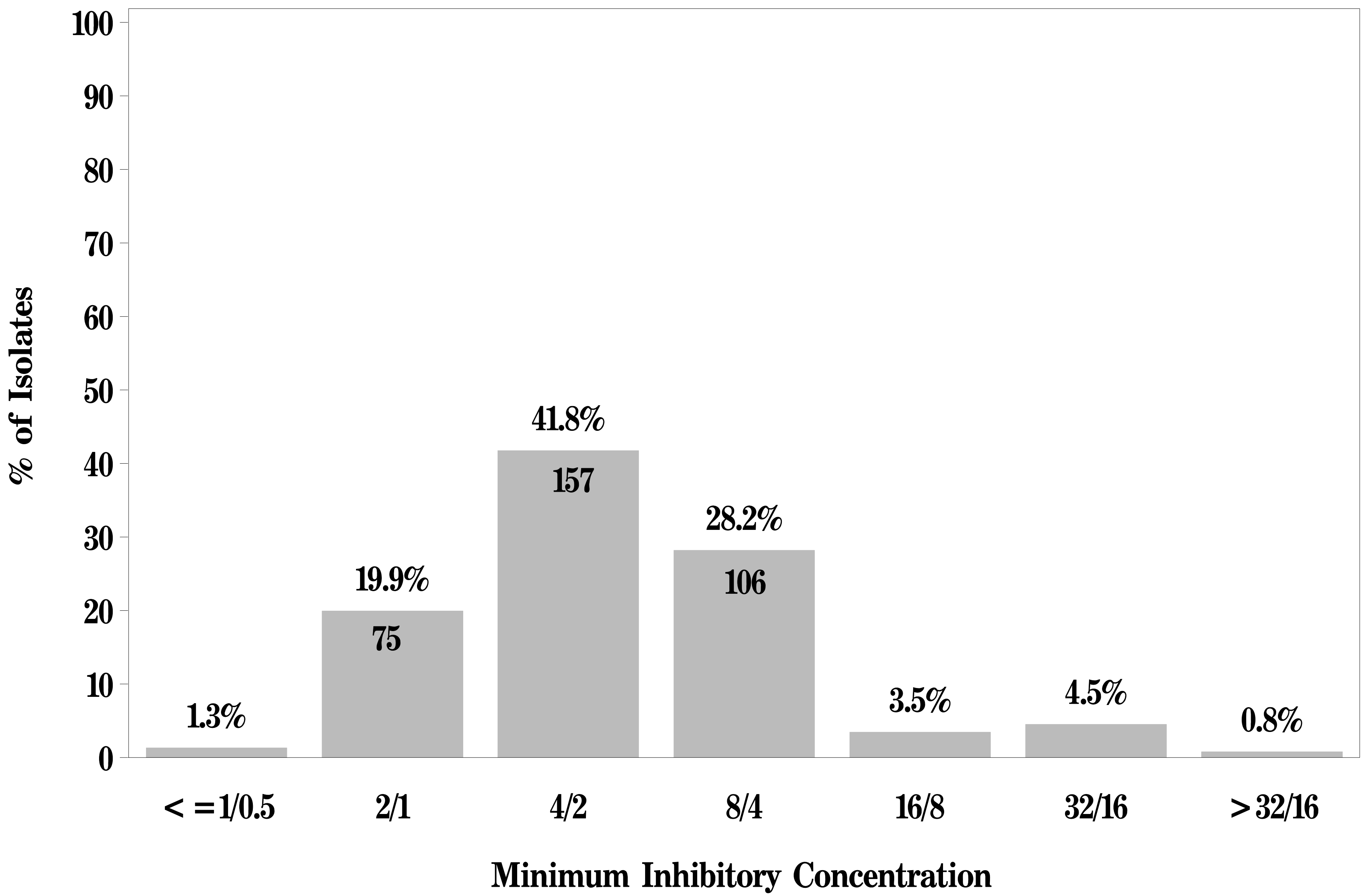
Breakpoints: Susceptible <=8 μg/mL Resistant >=32 μg/mL



NARMS

Figure 19b: Minimum Inhibitory Concentration of Amoxicillin/Clavulanic acid for *Escherichia coli* in Ground Turkey (N=376 Isolates)

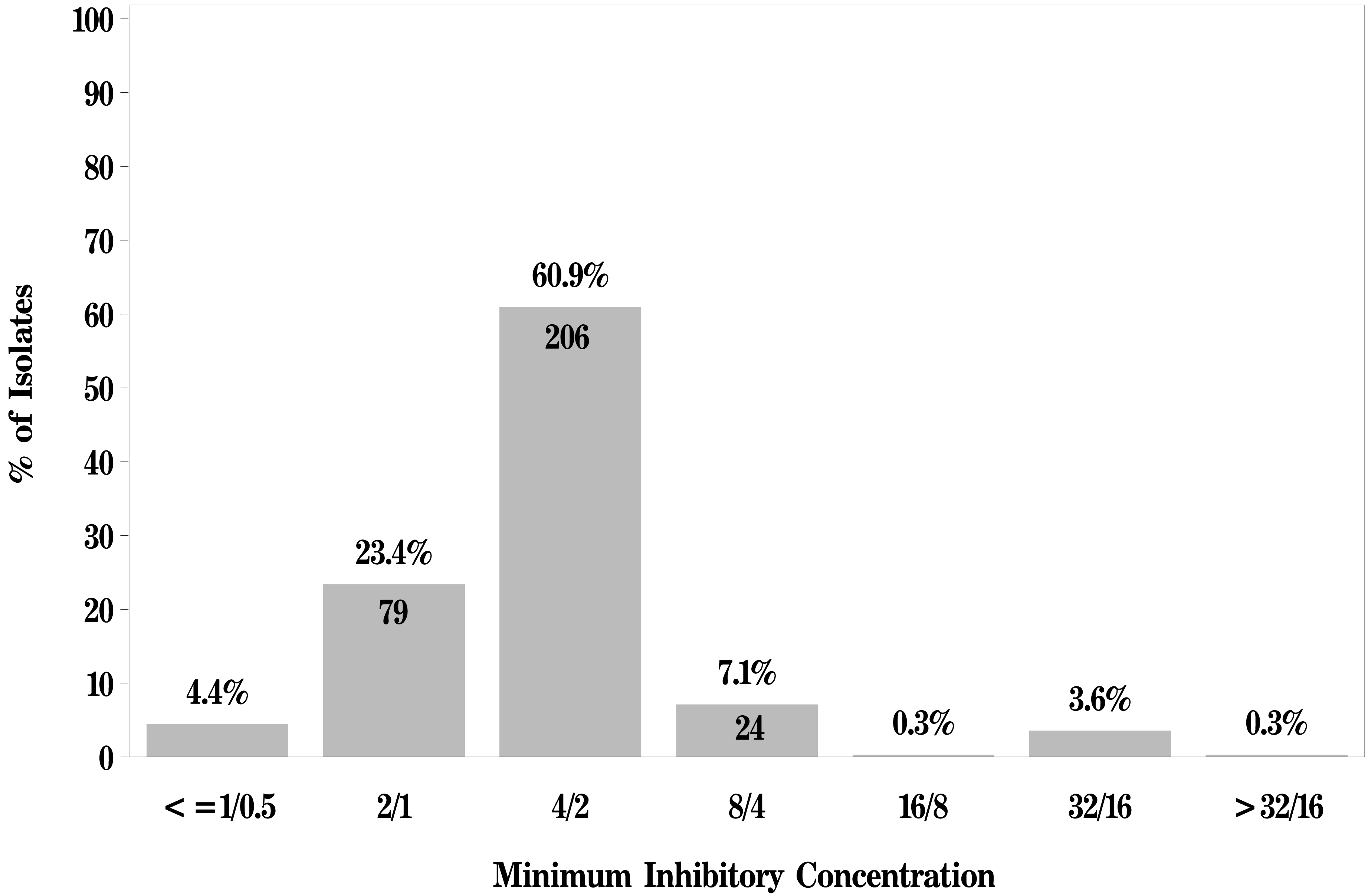
Breakpoints: Susceptible <=8 μg/mL Resistant >=32 μg/mL



NARMS

Figure 19b: Minimum Inhibitory Concentration of Amoxicillin/Clavulanic acid for *Escherichia coli* in Ground Beef (N=338 Isolates)

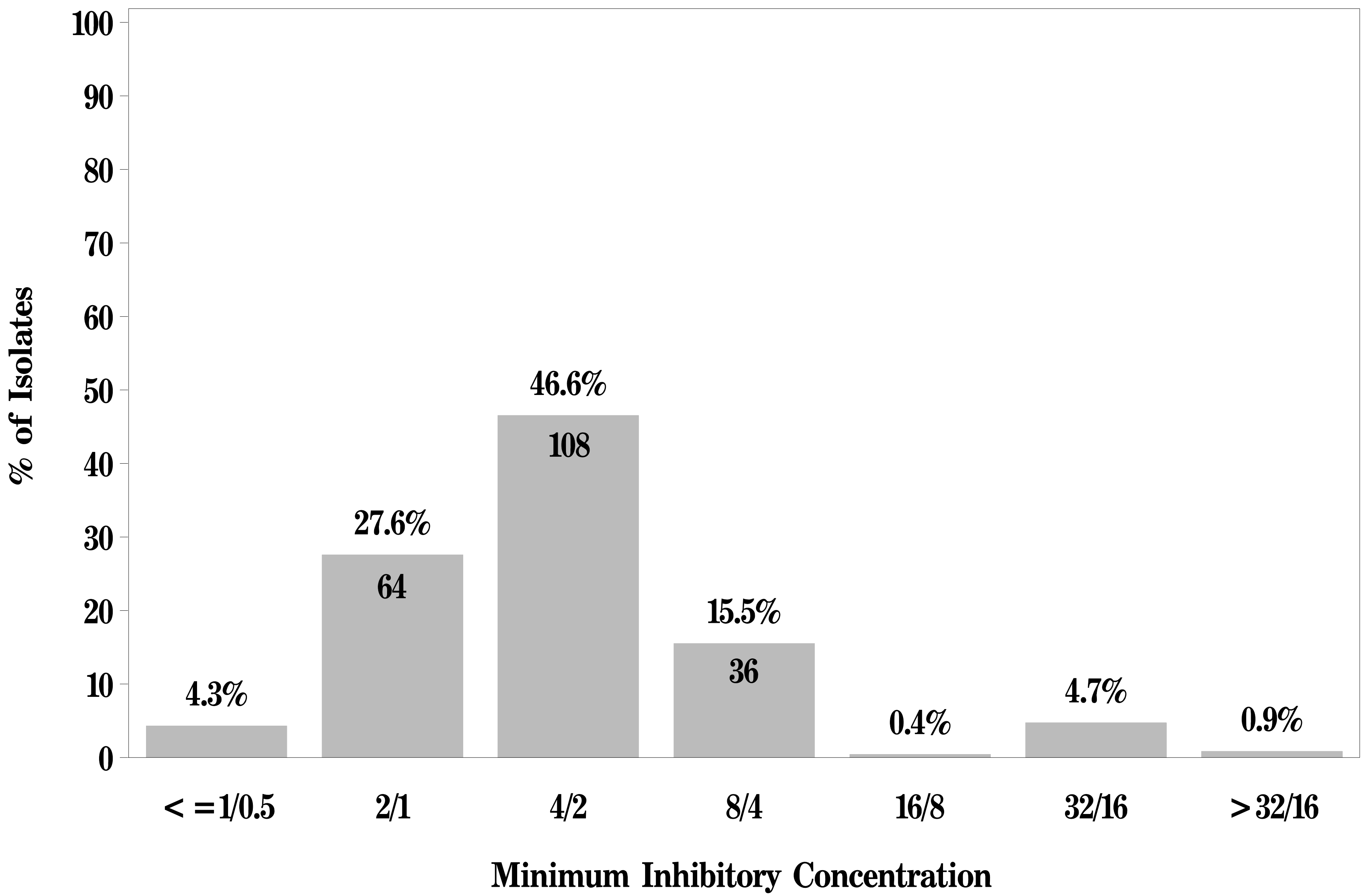
Breakpoints: Susceptible<=8 μg/mL Resistant>=32 μg/mL



NARMS

Figure 19b: Minimum Inhibitory Concentration of Amoxicillin/Clavulanic acid for *Escherichia coli* in Pork Chop (N=232 Isolates)

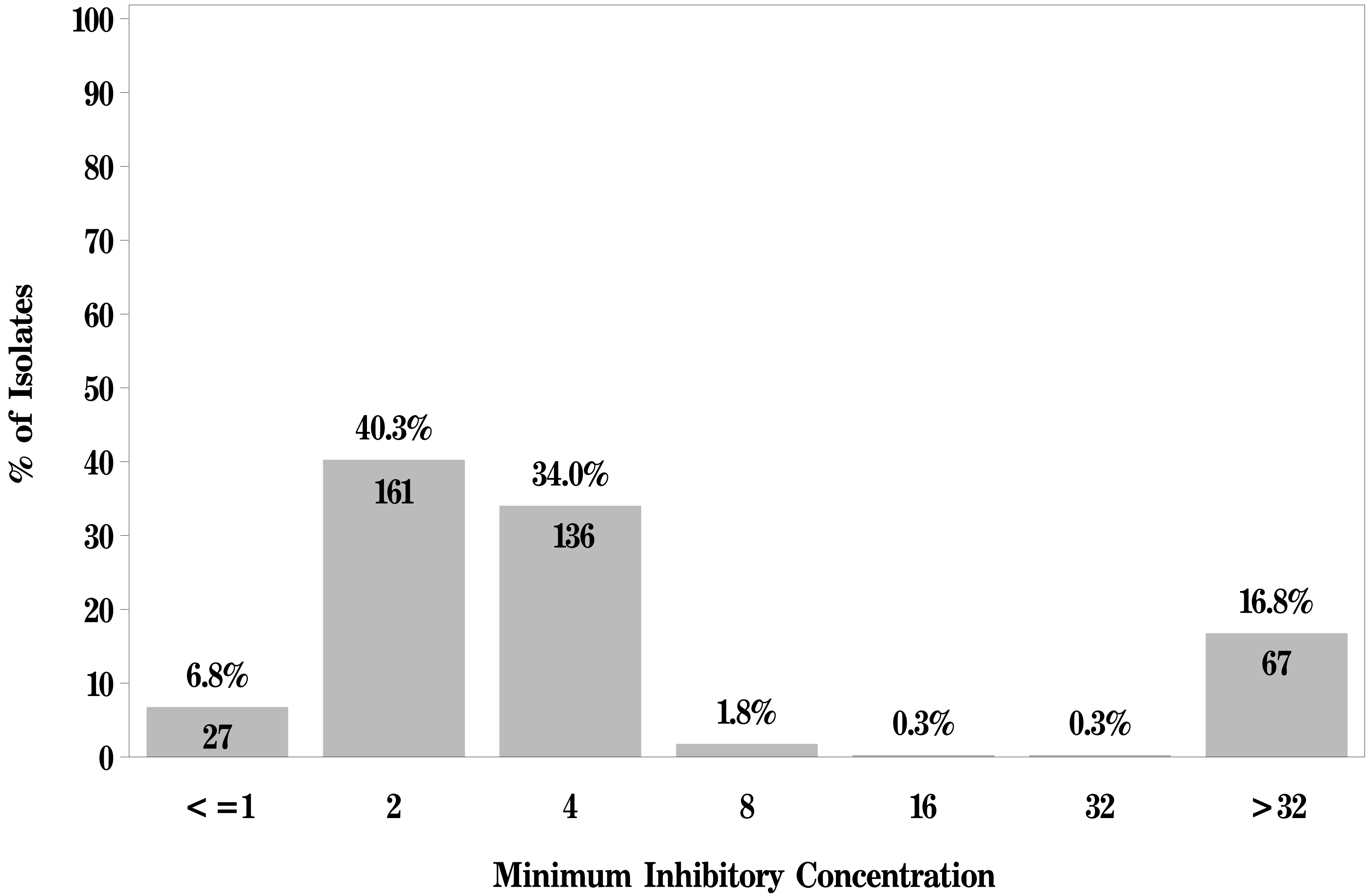
Breakpoints: Susceptible <=8 μg/mL Resistant >=32 μg/mL



NARMS

Figure 19c: Minimum Inhibitory Concentration of Ampicillin for *Escherichia coli* in Chicken Breast (N=400 Isolates)

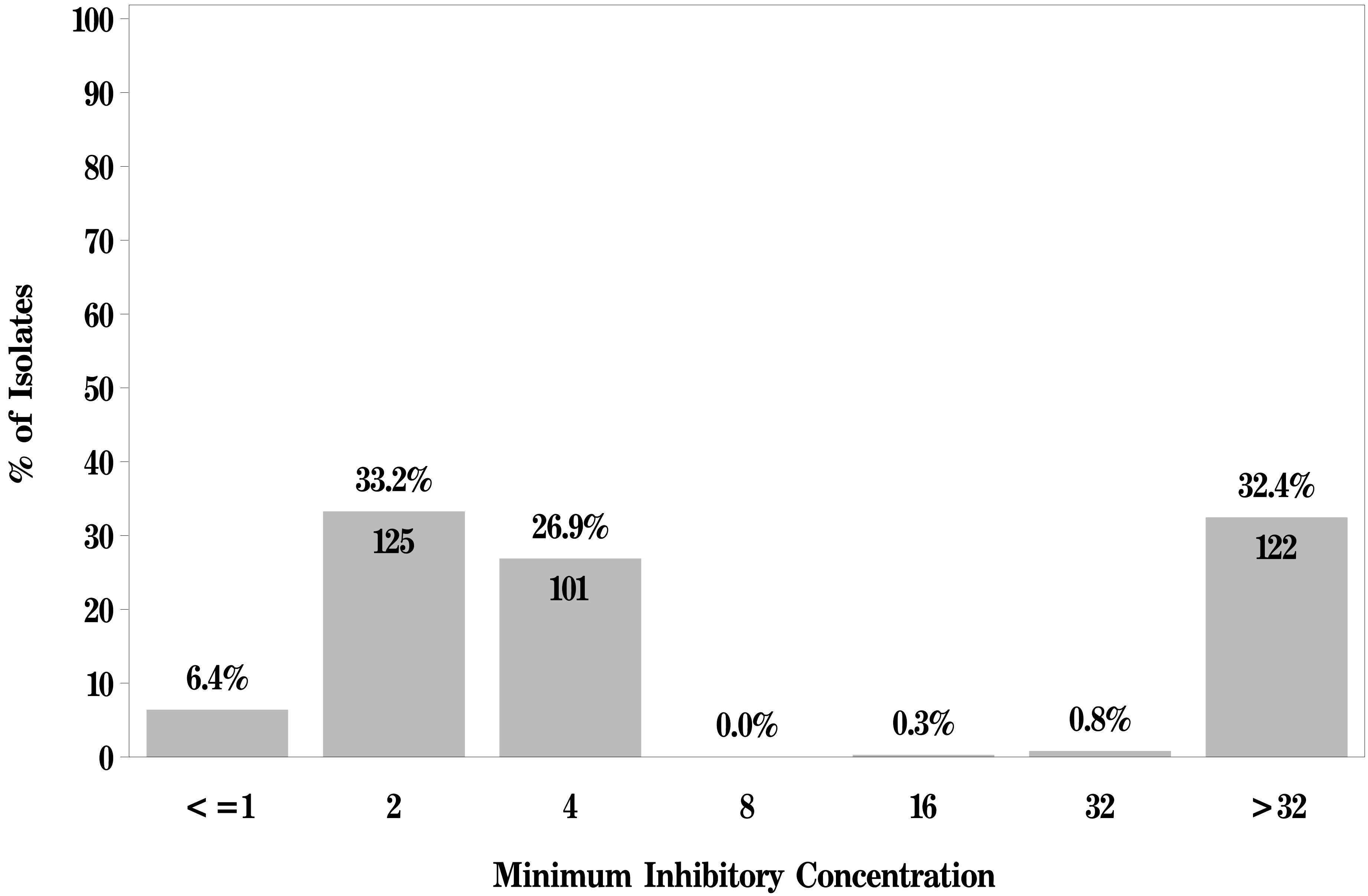
Breakpoints: Susceptible <=8 µg/mL Resistant >=32 µg/mL



NARMS

Figure 19c: Minimum Inhibitory Concentration of Ampicillin for *Escherichia coli* in Ground Turkey (N=376 Isolates)

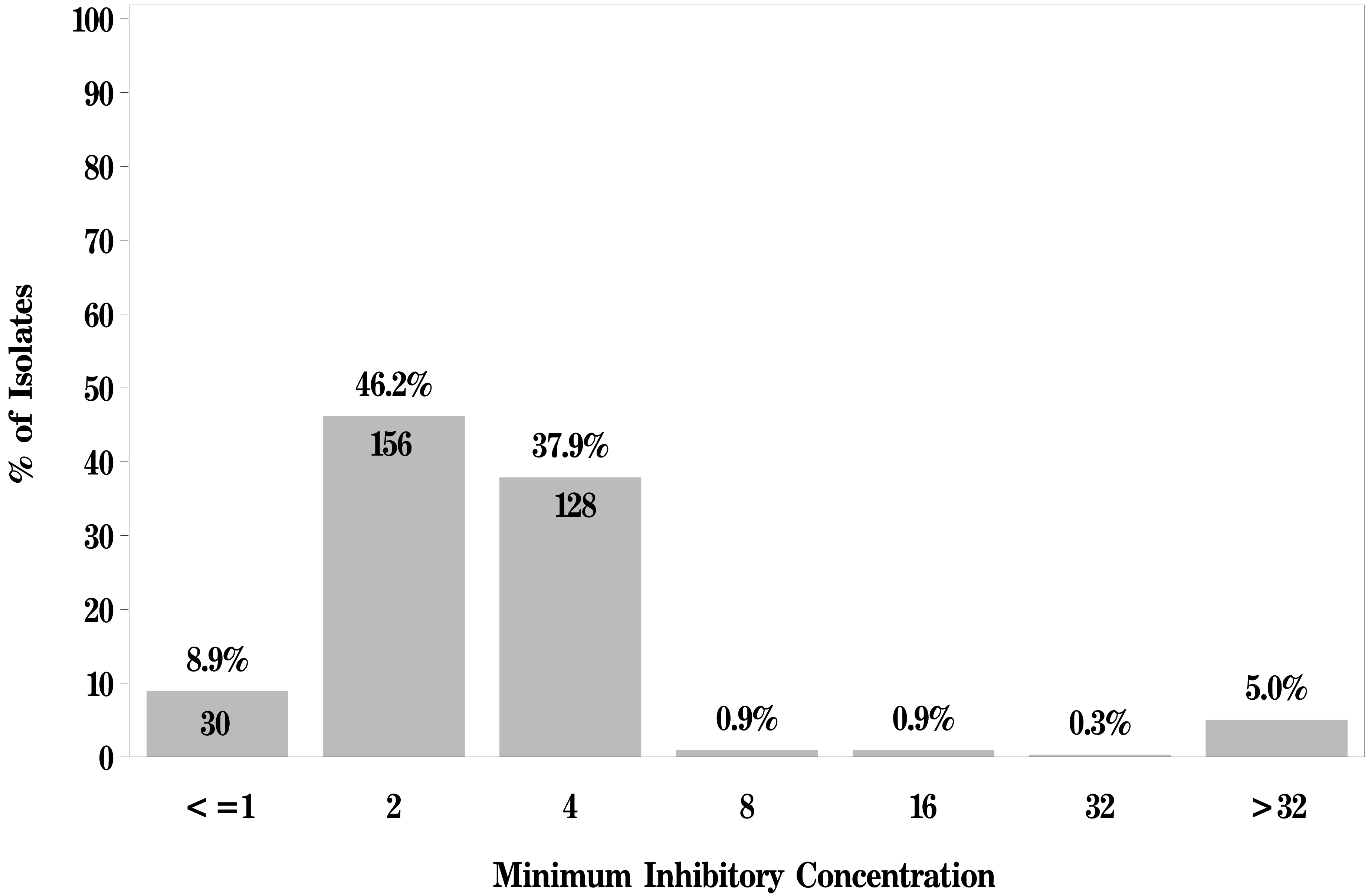
Breakpoints: Susceptible <=8 μg/mL Resistant >=32 μg/mL



NARMS

Figure 19c: Minimum Inhibitory Concentration of Ampicillin for *Escherichia coli* in Ground Beef (N=338 Isolates)

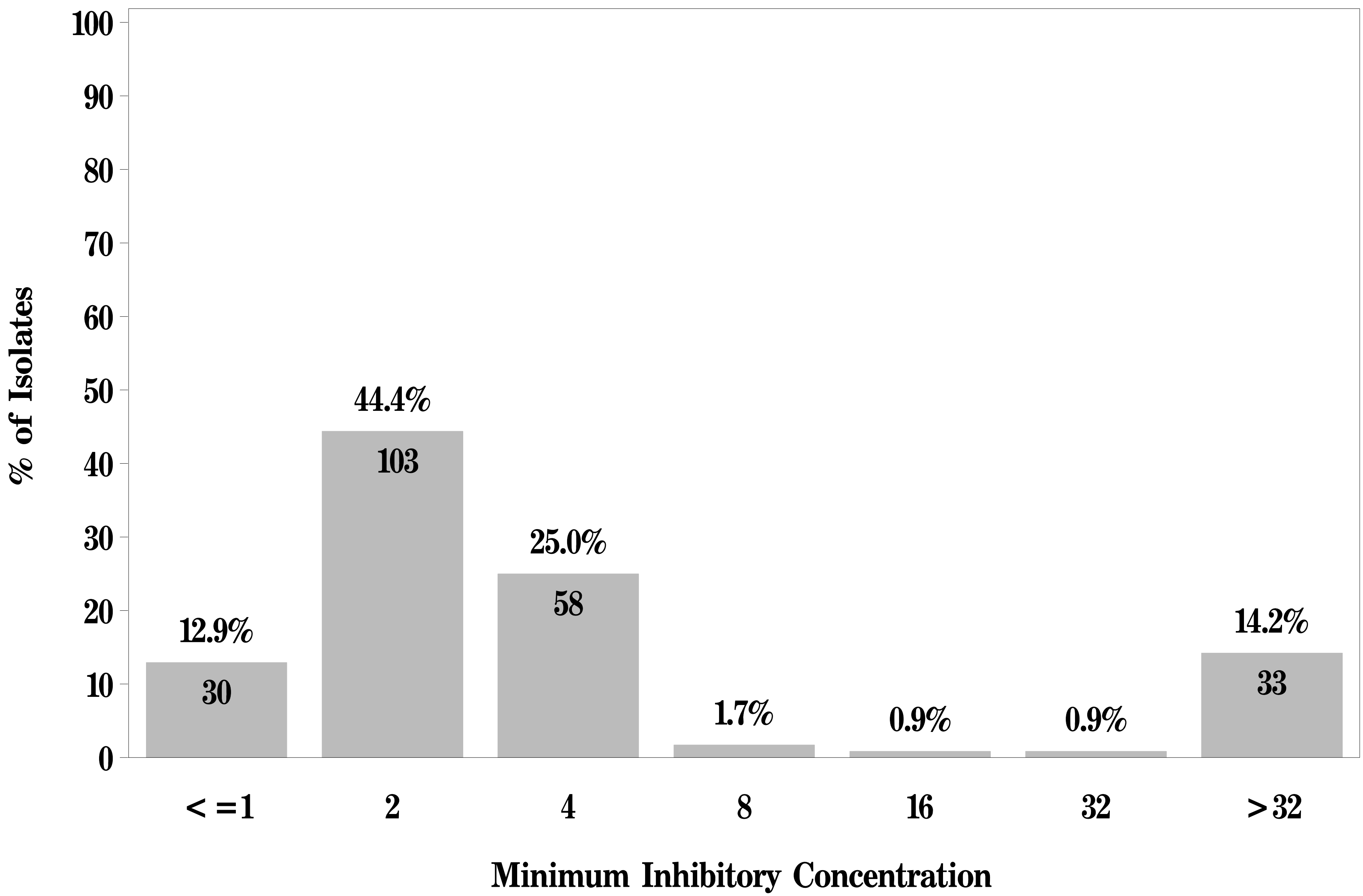
Breakpoints: Susceptible <=8 μg/mL Resistant >=32 μg/mL



NARMS

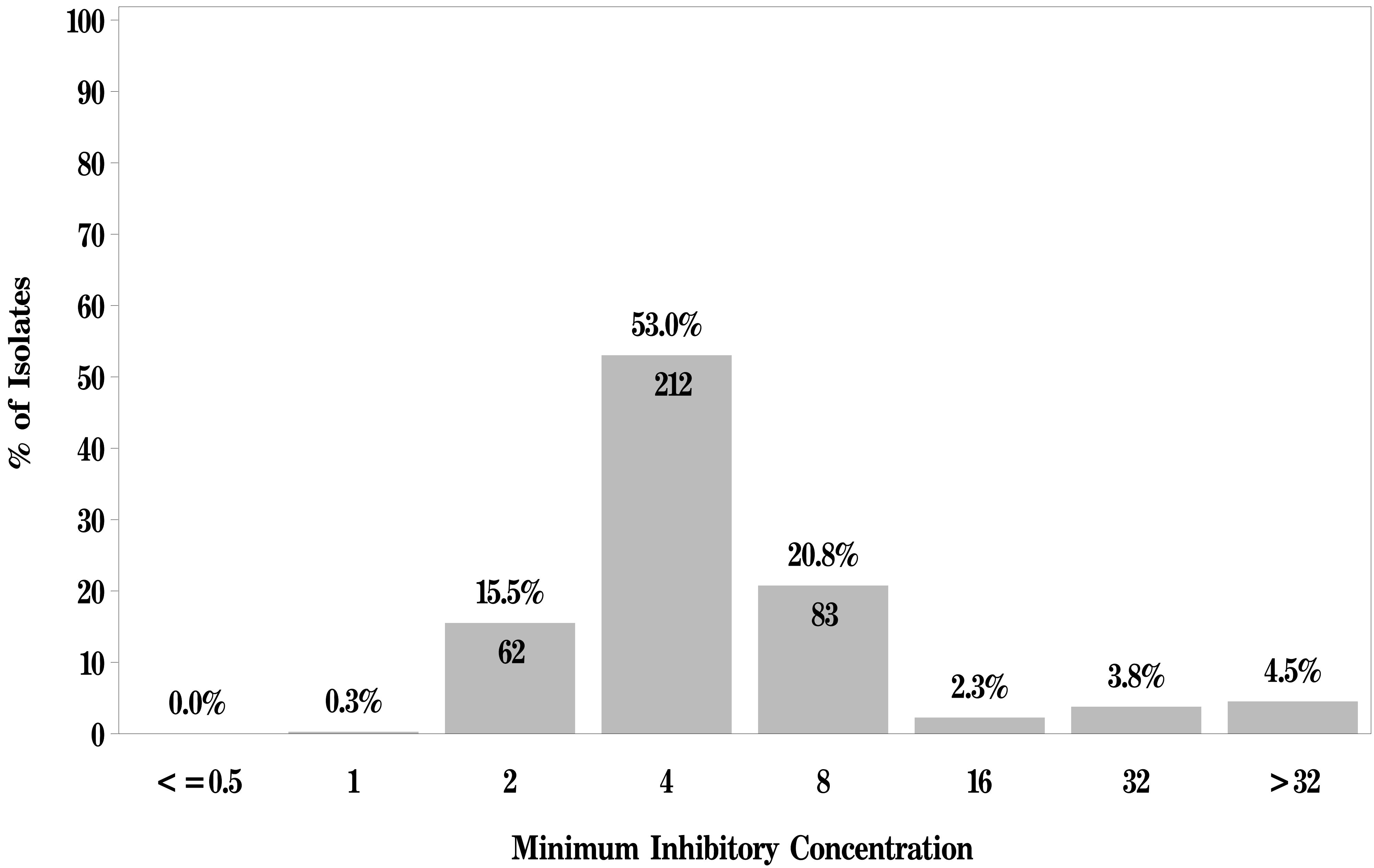
Figure 19c: Minimum Inhibitory Concentration of Ampicillin for *Escherichia coli* in Pork Chop (N=232 Isolates)

Breakpoints: Susceptible <=8 μg/mL Resistant >=32 μg/mL



NARMS

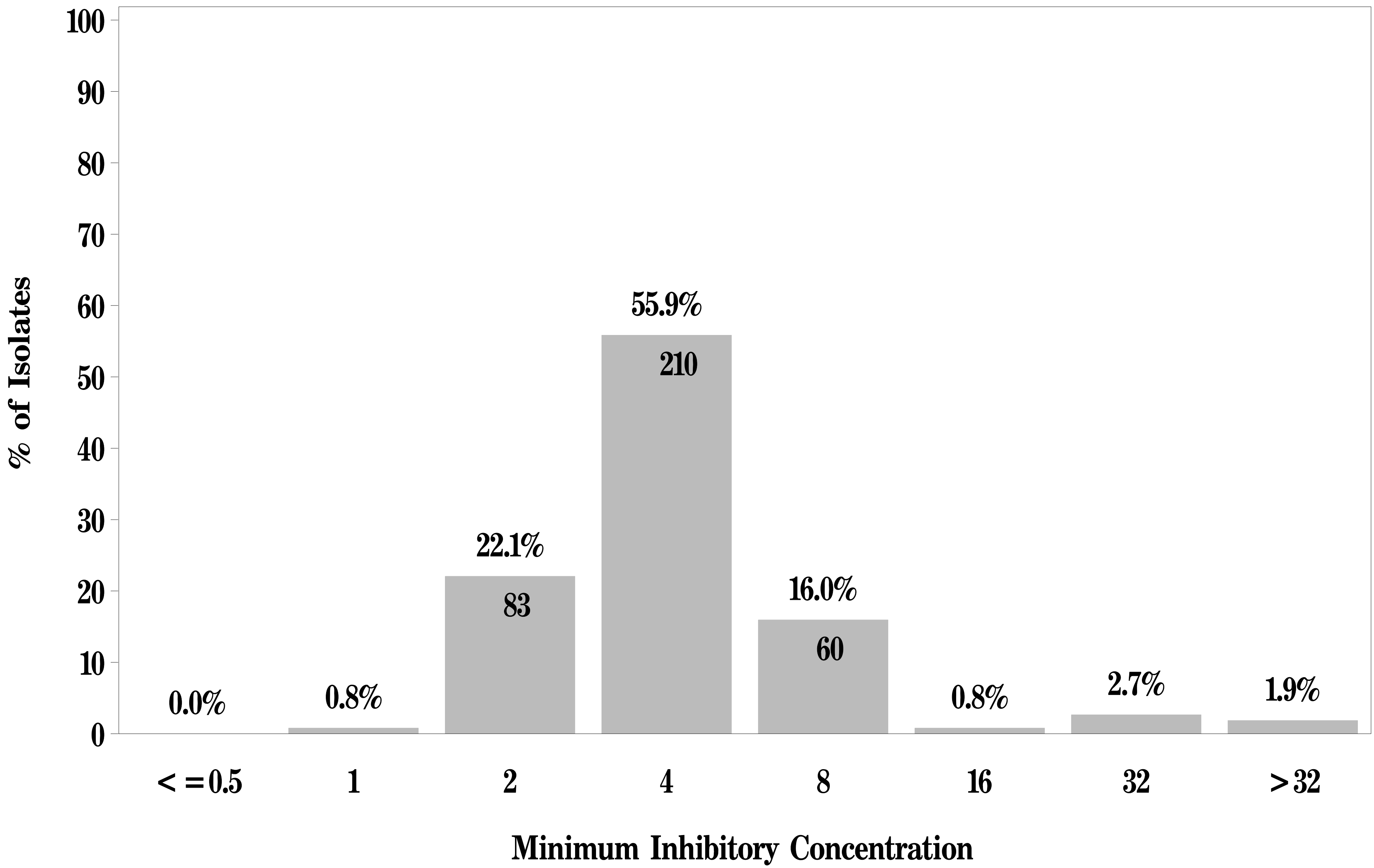
Figure 19d: Minimum Inhibitory Concentration of Cefoxitin for *Escherichia* in Chicken Breast (N=400 Isolates)
Breakpoints: Susceptible<=8 μg/mL Resistant>=32 μg/mL



NARMS

Figure 19d: Minimum Inhibitory Concentration of Cefoxitin for *Escherichia* in Ground Turkey (N=376 Isolates)

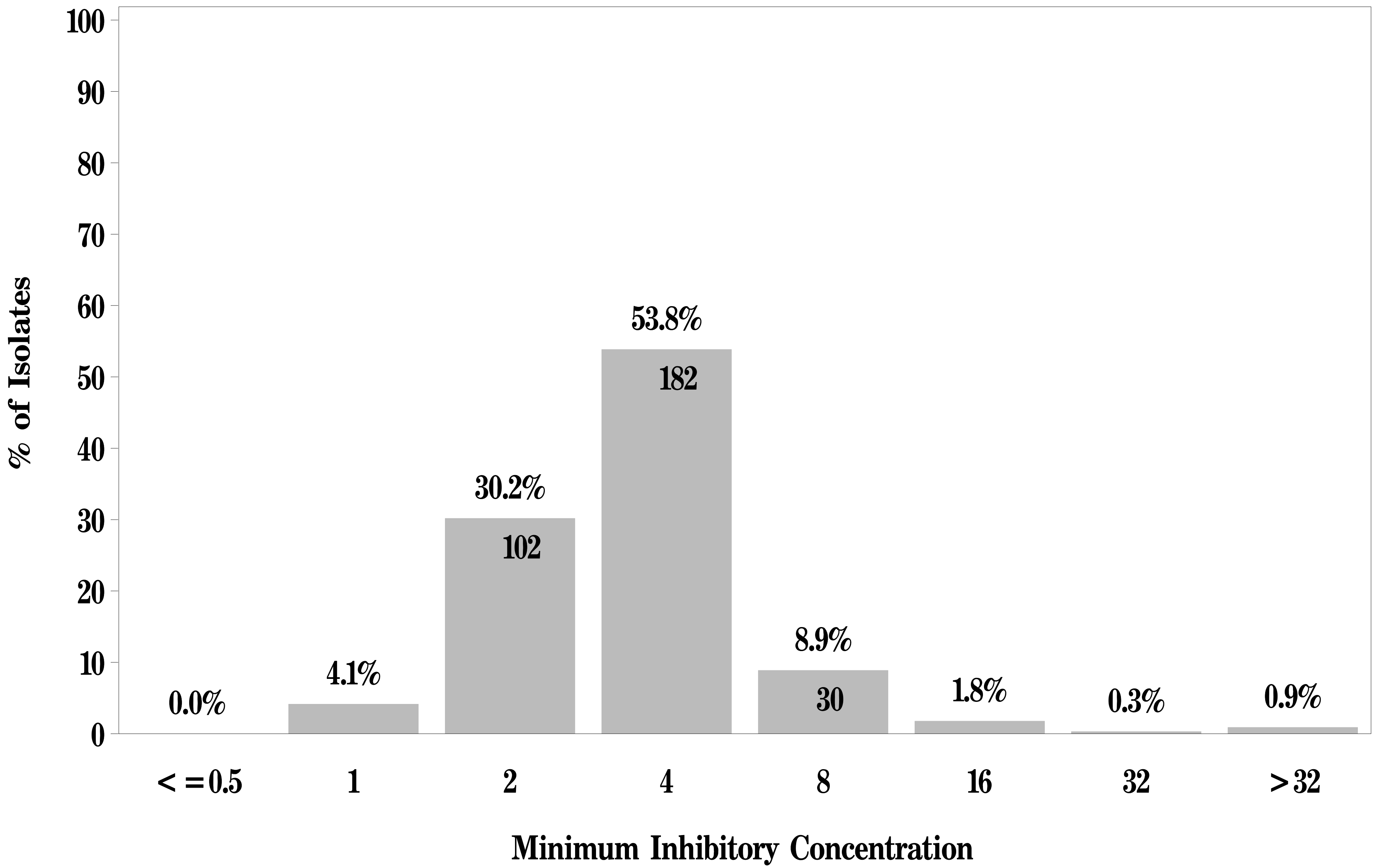
Breakpoints: Susceptible<=8 µg/mL Resistant>=32 µg/mL



NARMS

Figure 19d: Minimum Inhibitory Concentration of Cefoxitin for *Escherichia* in Ground Beef (N=338 Isolates)

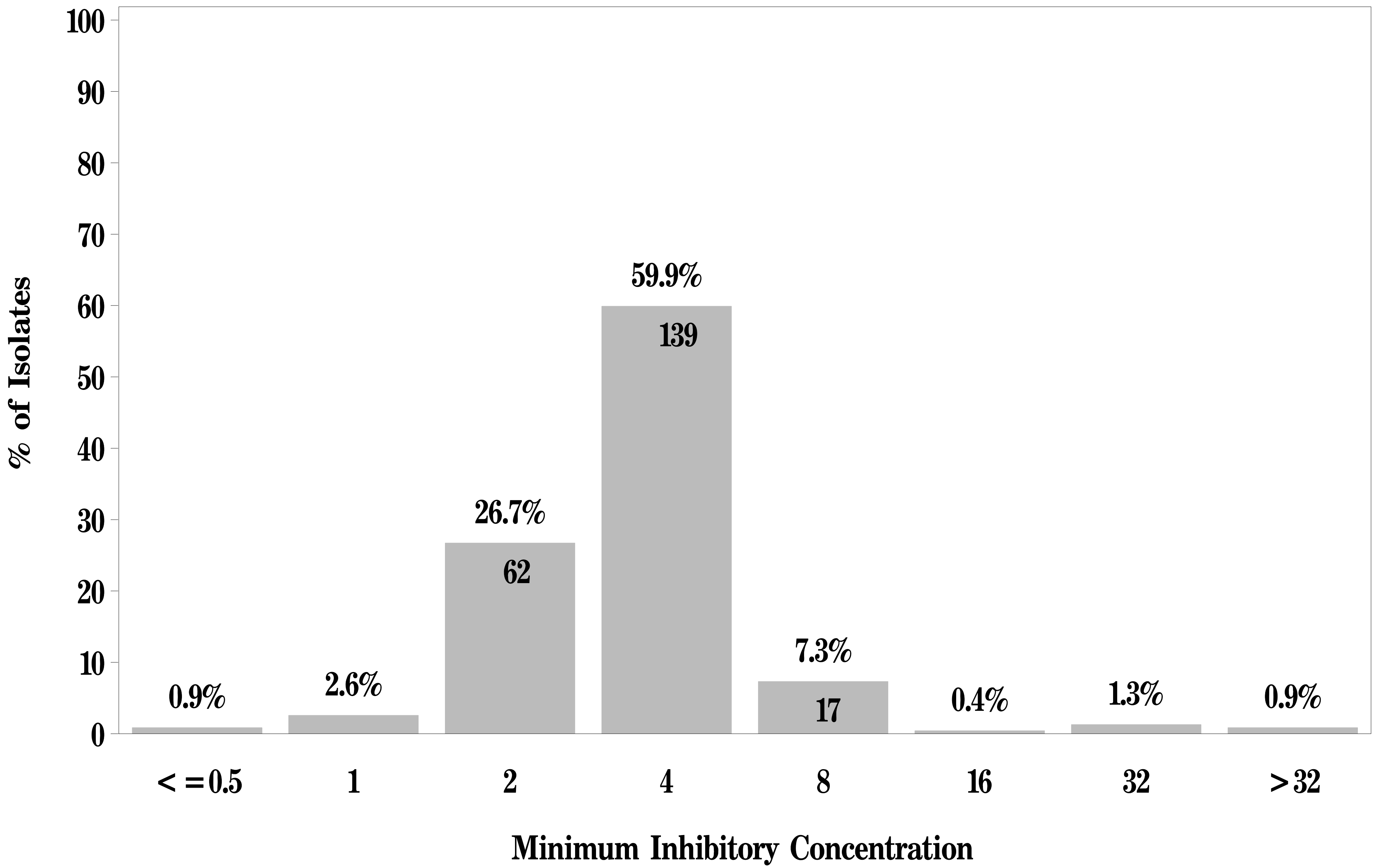
Breakpoints: Susceptible <=8 µg/mL Resistant >=32 µg/mL



NARMS

Figure 19d: Minimum Inhibitory Concentration of Cefoxitin for *Escherichia* in Pork Chop (N=232 Isolates)

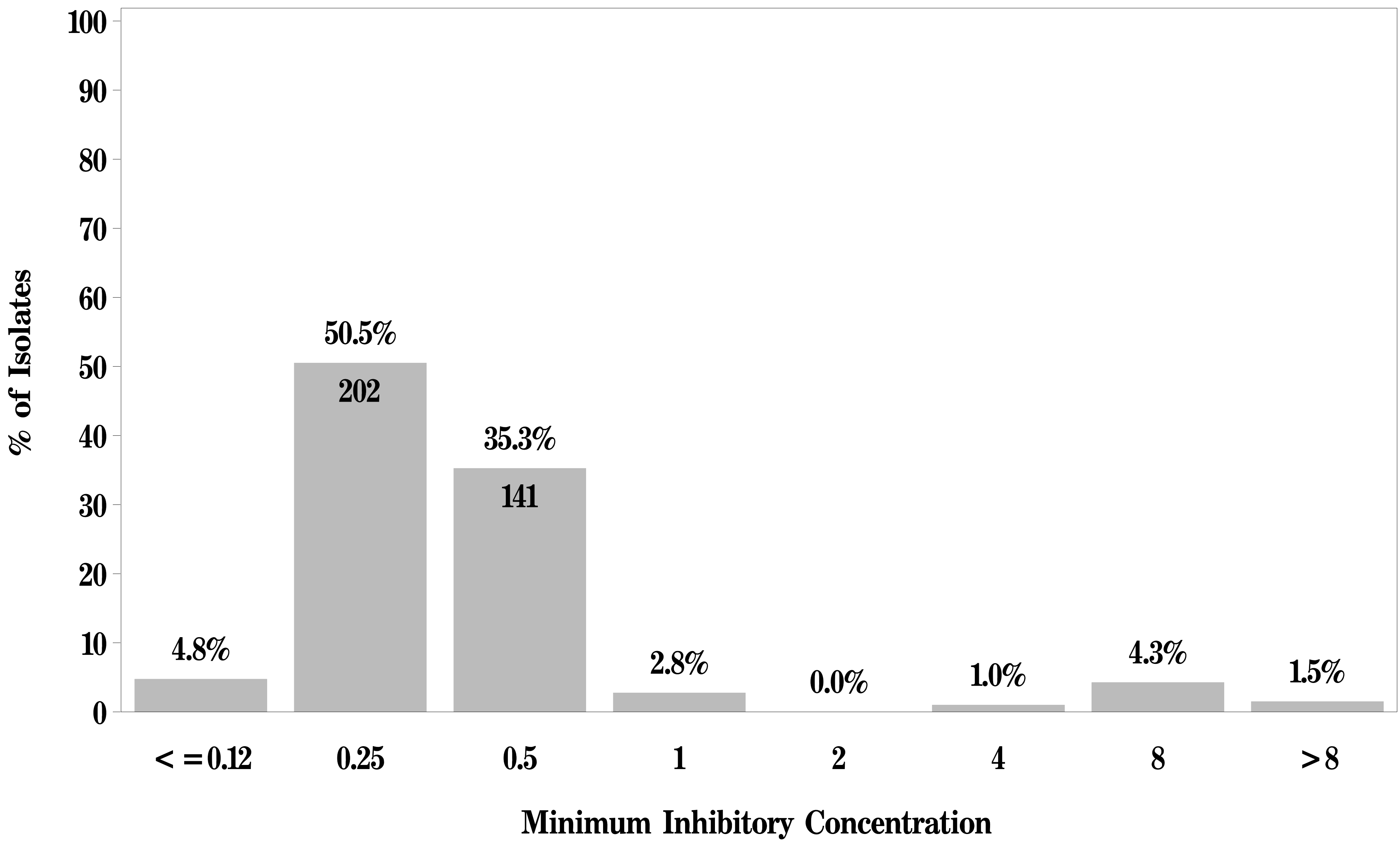
Breakpoints: Susceptible <=8 µg/mL Resistant >=32 µg/mL



NARMS

Figure 19e: Minimum Inhibitory Concentration of Ceftiofur for *Escherichia coli* in Chicken Breast (N=400 Isolates)

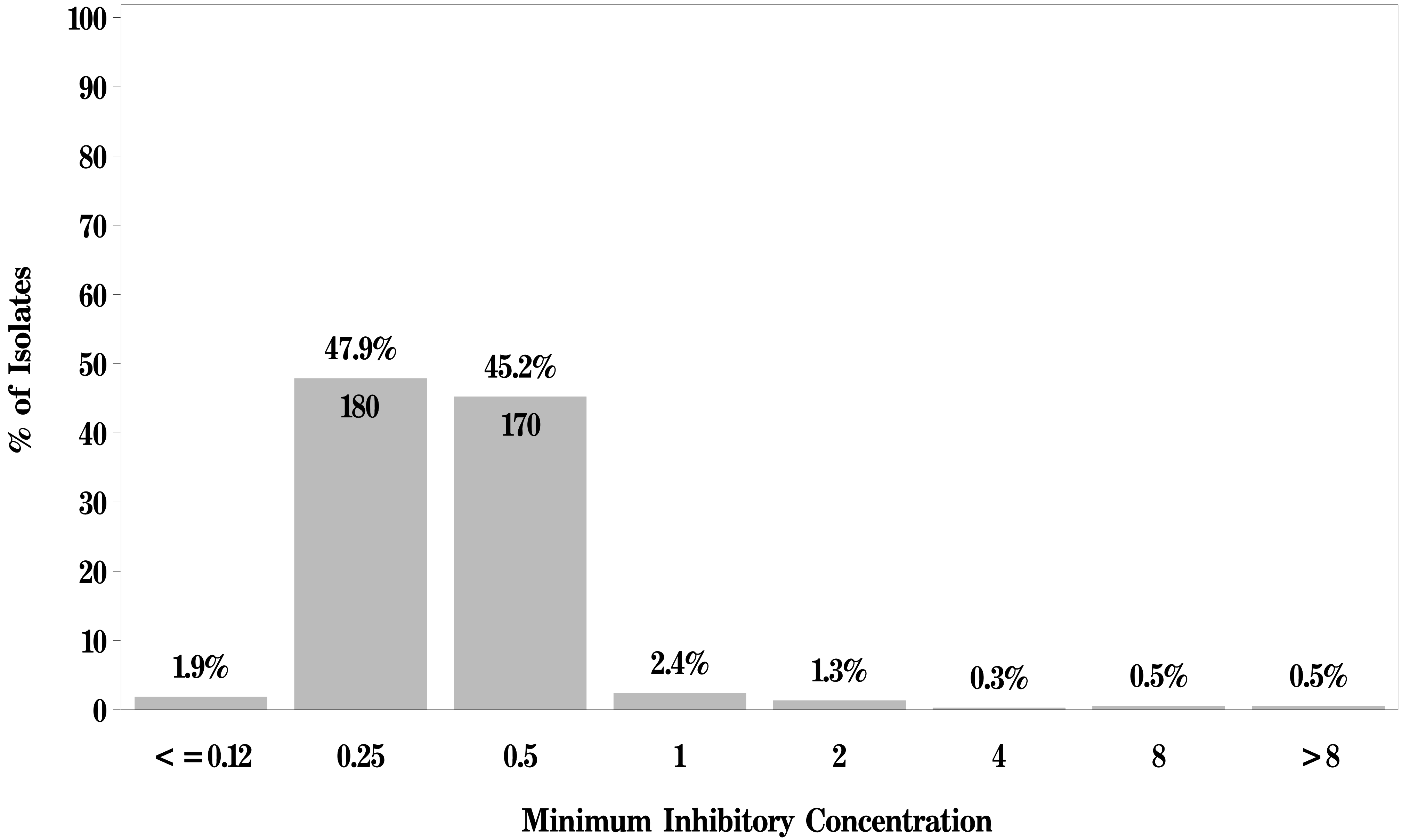
Breakpoints: Susceptible<=2 μg/mL Resistant>=8 μg/mL



NARMS

Figure 19e: Minimum Inhibitory Concentration of Ceftiofur for *Escherichia coli* in Ground Turkey (N=376 Isolates)

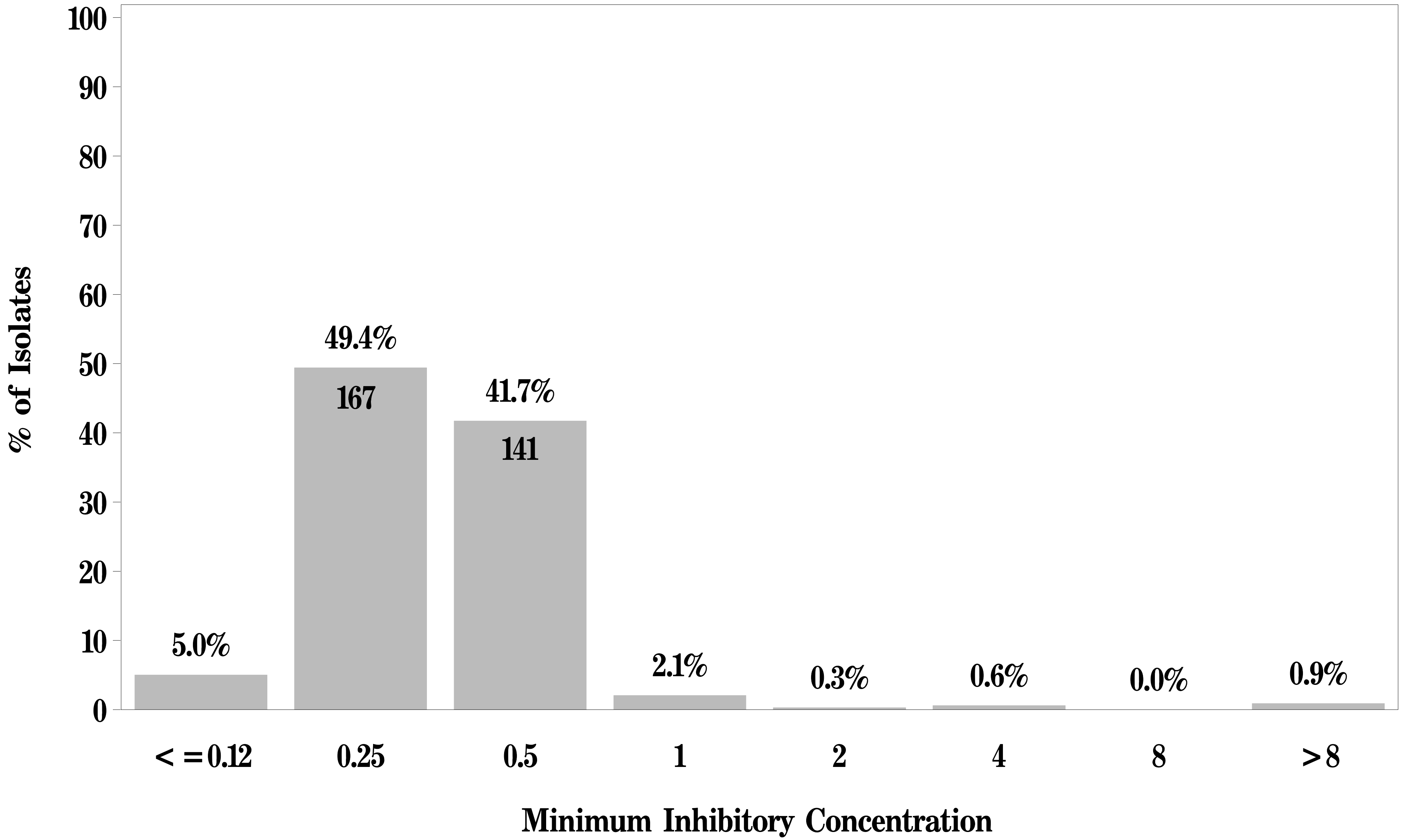
Breakpoints: Susceptible<=2 µg/mL Resistant>=8 µg/mL

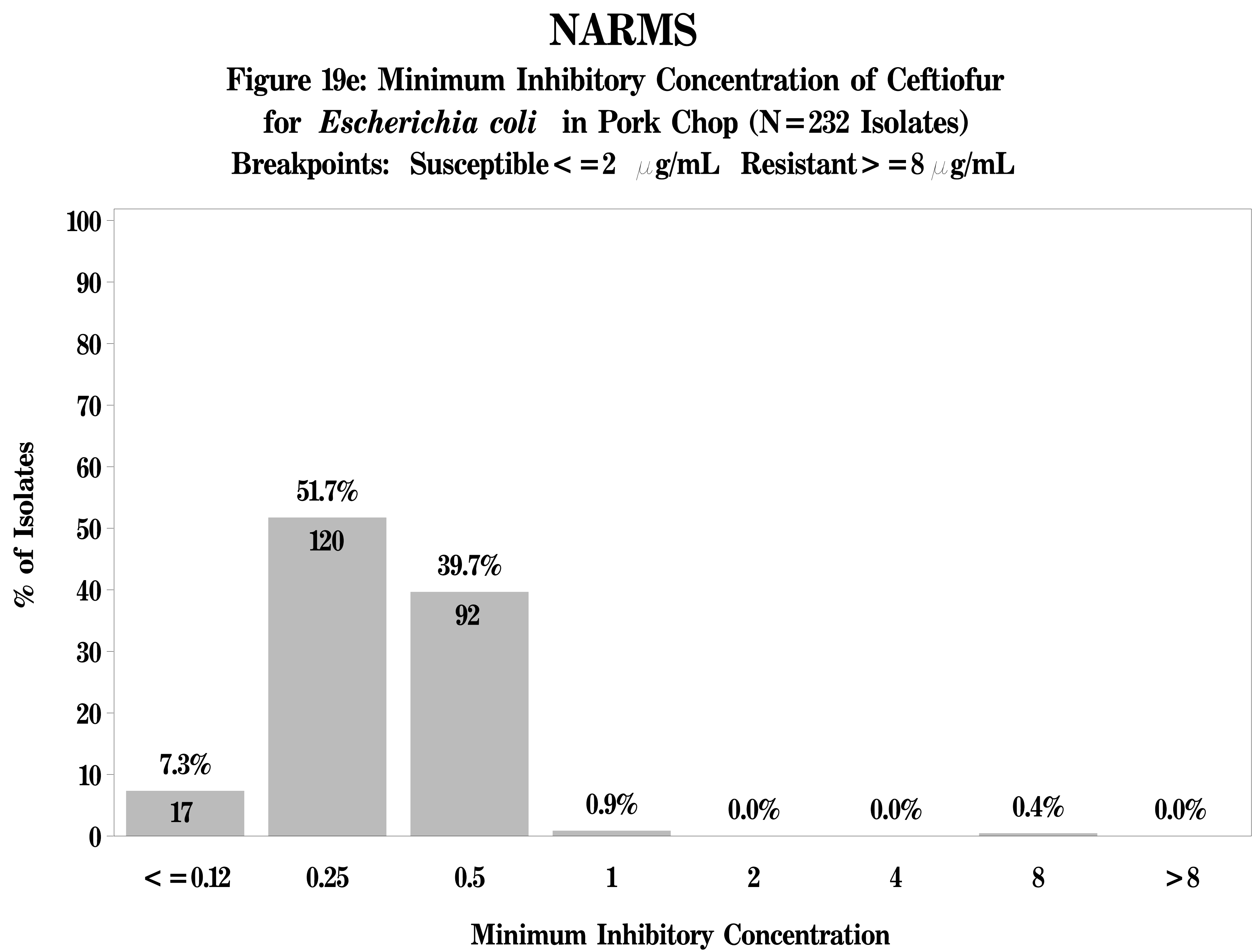


NARMS

Figure 19e: Minimum Inhibitory Concentration of Ceftiofur for *Escherichia coli* in Ground Beef (N=338 Isolates)

Breakpoints: Susceptible <=2 µg/mL Resistant >=8 µg/mL

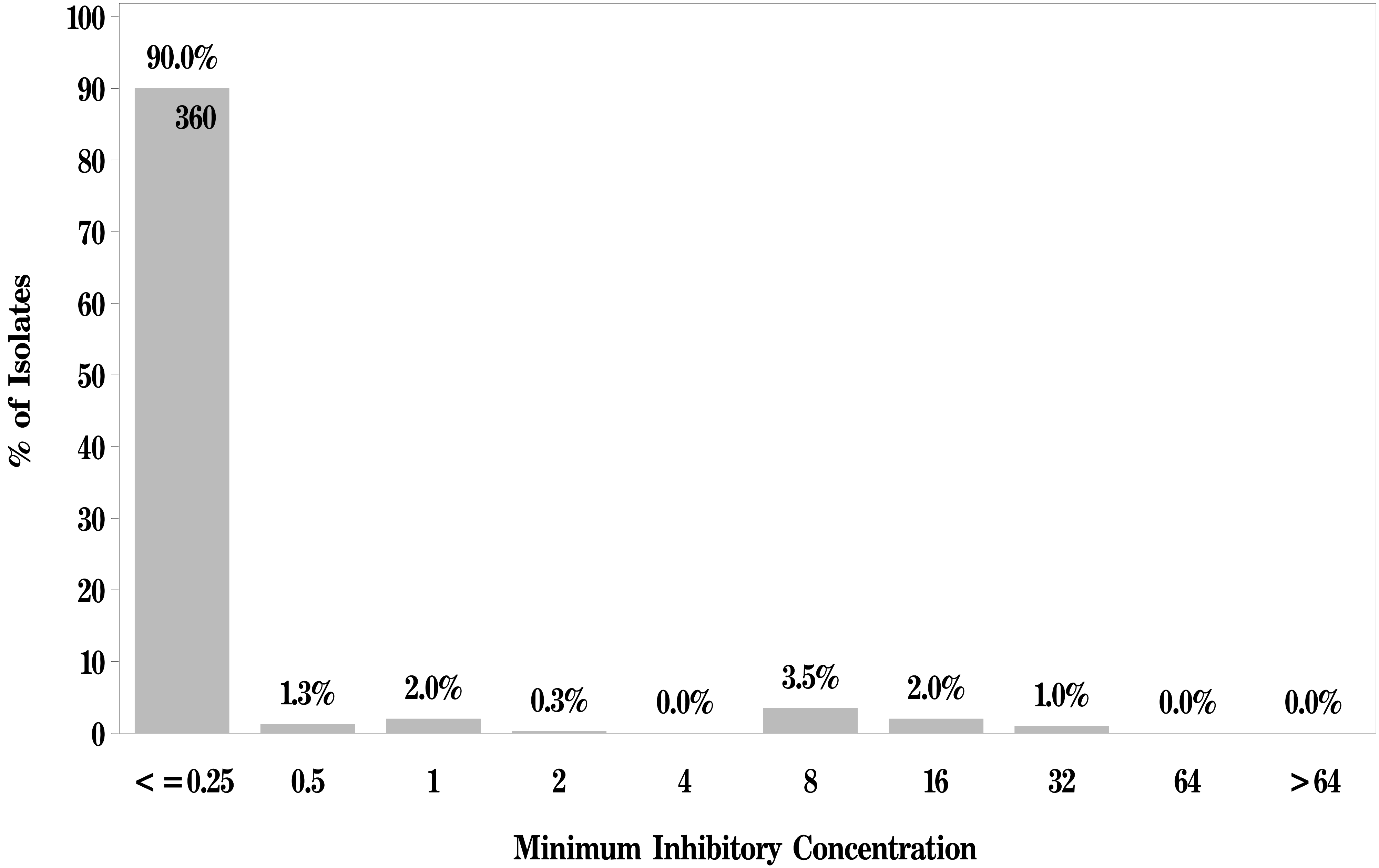



NARMS
Figure 19e: Minimum Inhibitory Concentration of Ceftiofur
for Escherichia coli in Pork Chop (N=232 Isolates)
Breakpoints: Susceptible<=2 μg/mL Resistant>=8 μg/mL
% of Isolates
100
90
80
70
60
50
40
30
20
10
0
7.3%
17
51.7%
120
39.7%
92
0.9%
0.0%
0.0%
0.4%
0.0%
<=0.12
0.25
0.5
1
2
4
8
>8
Minimum Inhibitory Concentration

NARMS

Figure 19f: Minimum Inhibitory Concentration of Ceftriaxone for *Escherichia* in Chicken Breast (N=400 Isolates)

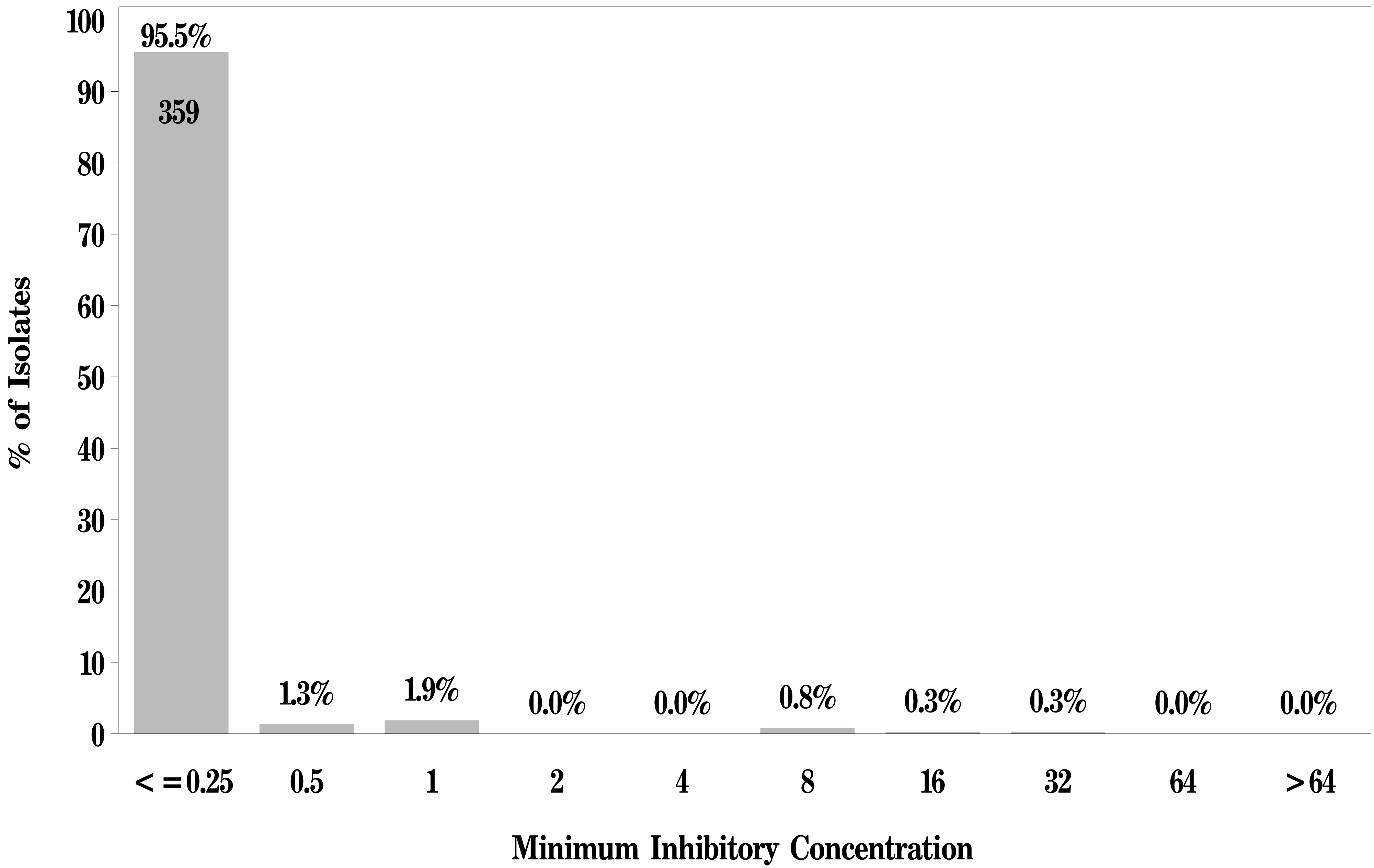
Breakpoints: Susceptible <=8 μg/mL Resistant >=64 μg/mL



NARMS

Figure 19f: Minimum Inhibitory Concentration of Ceftriaxone for *Escherichia* in Ground Turkey (N=376 Isolates)

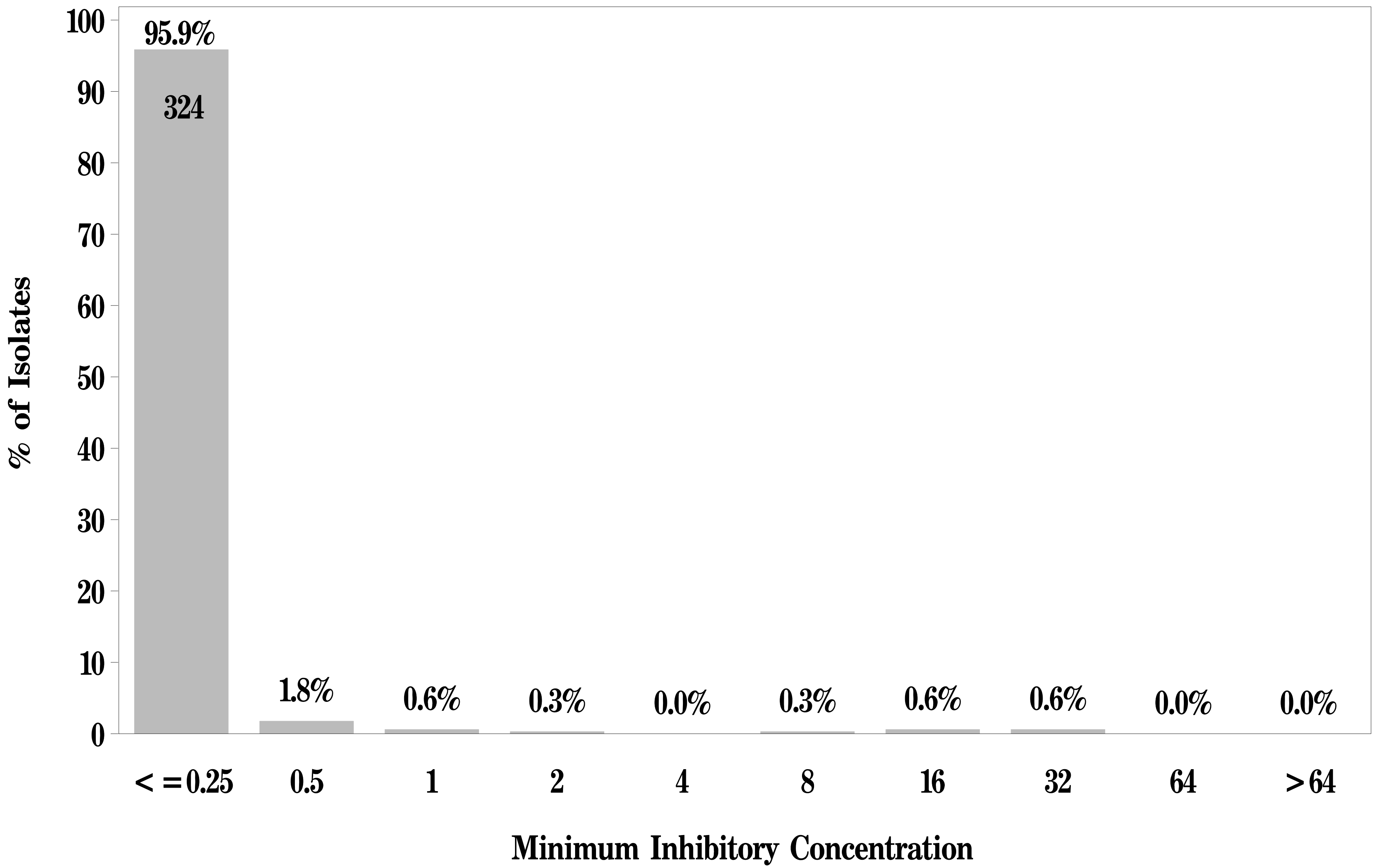
Breakpoints: Susceptible <=8 μg/mL Resistant >=64 μg/mL



NARMS

Figure 19f: Minimum Inhibitory Concentration of Ceftriaxone for *Escherichia* in Ground Beef (N=338 Isolates)

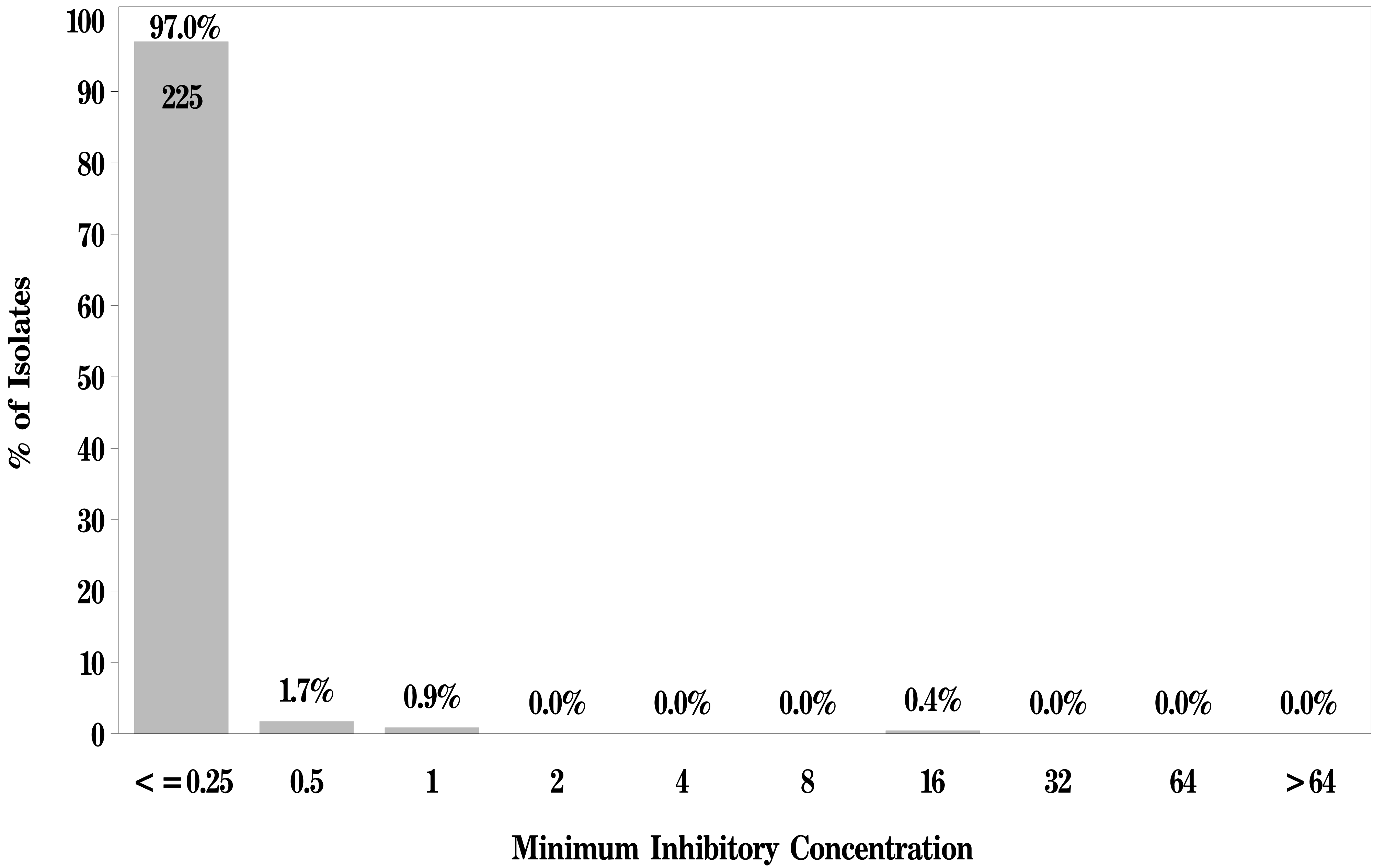
Breakpoints: Susceptible <=8 μg/mL Resistant >=64 μg/mL



NARMS

Figure 19f: Minimum Inhibitory Concentration of Ceftriaxone for *Escherichia* in Pork Chop (N=232 Isolates)

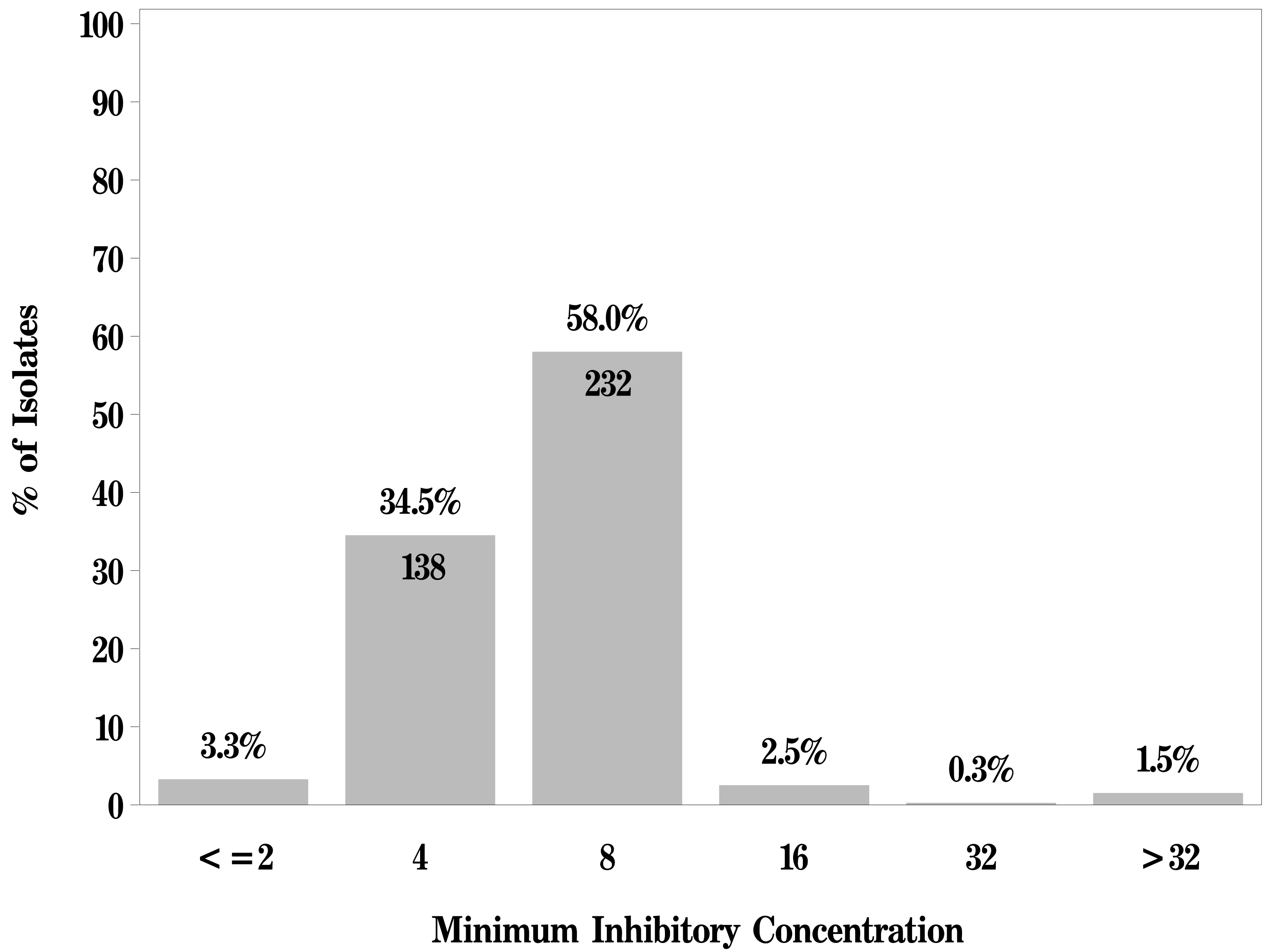
Breakpoints: Susceptible <=8 μg/mL Resistant >=64 μg/mL



NARMS

Figure 19g: Minimum Inhibitory Concentration of Chloramphenicol for *Escherichia coli* in Chicken Breast (N=400 Isolates)

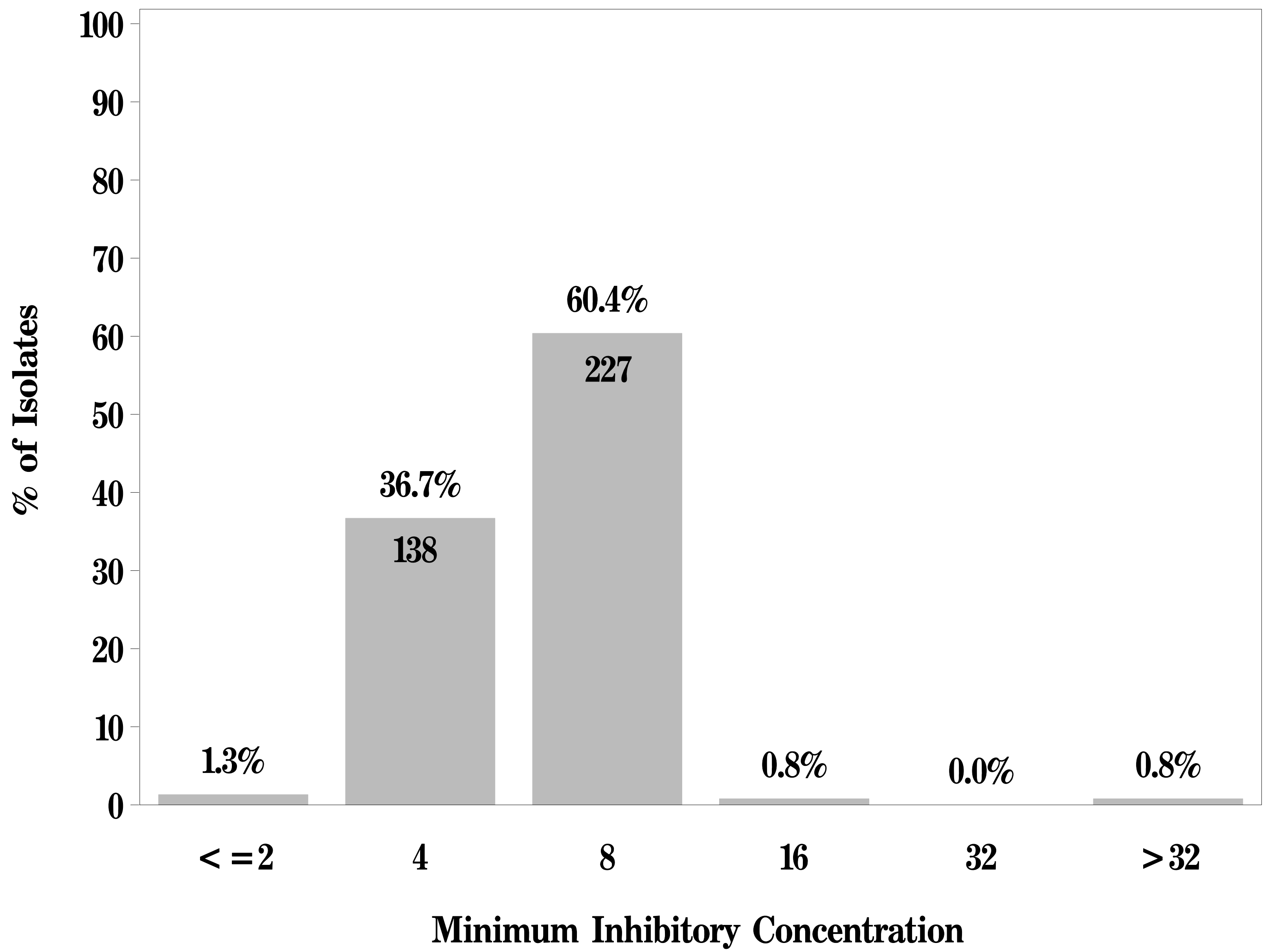
Breakpoints: Susceptible <=8 μg/mL Resistant >=32 μg/mL



NARMS

Figure 19g: Minimum Inhibitory Concentration of Chloramphenicol for *Escherichia coli* in Ground Turkey (N=376 Isolates)

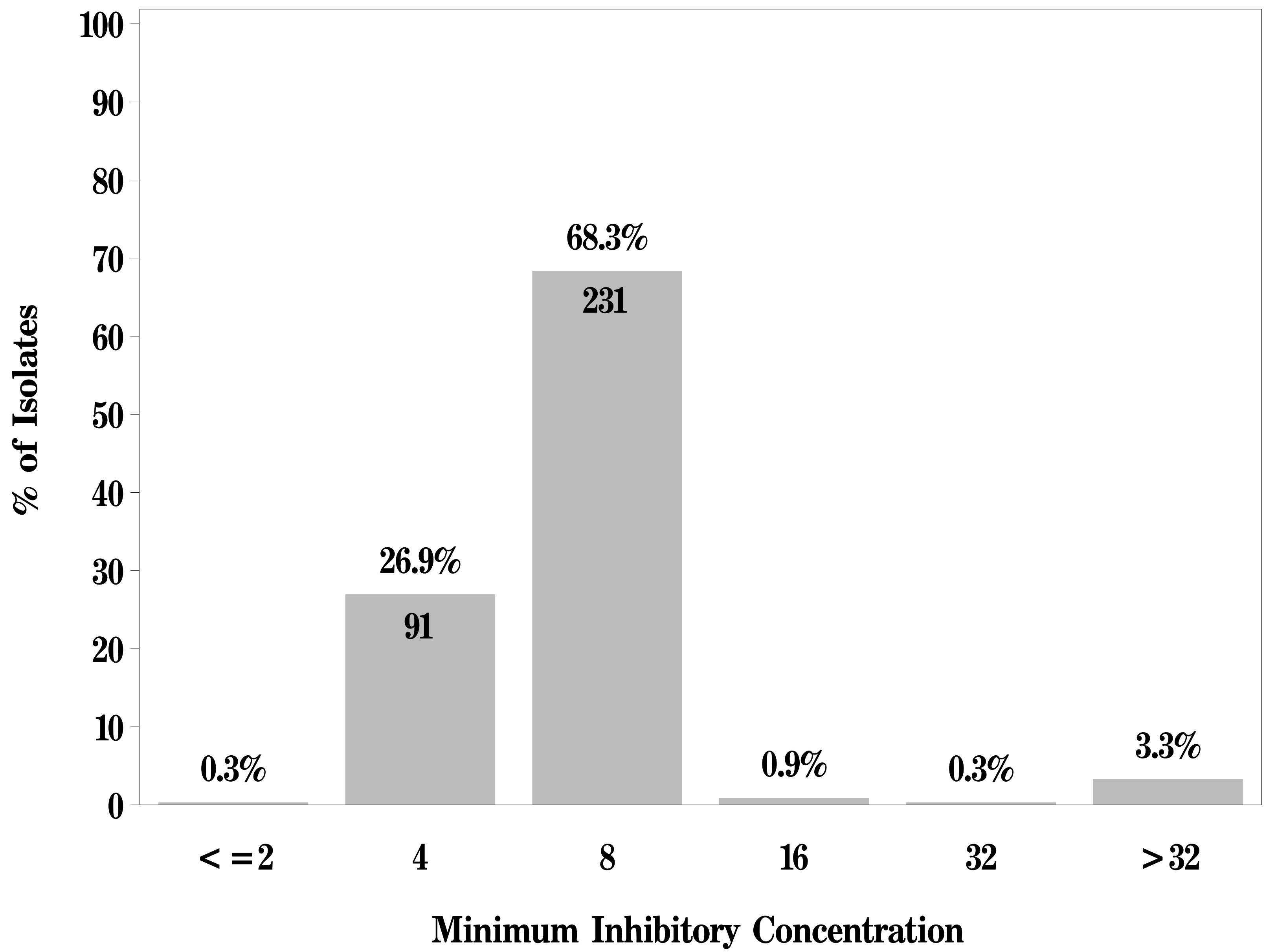
Breakpoints: Susceptible <=8 µg/mL Resistant >=32 µg/mL



NARMS

Figure 19g: Minimum Inhibitory Concentration of Chloramphenicol for *Escherichia coli* in Ground Beef (N=338 Isolates)

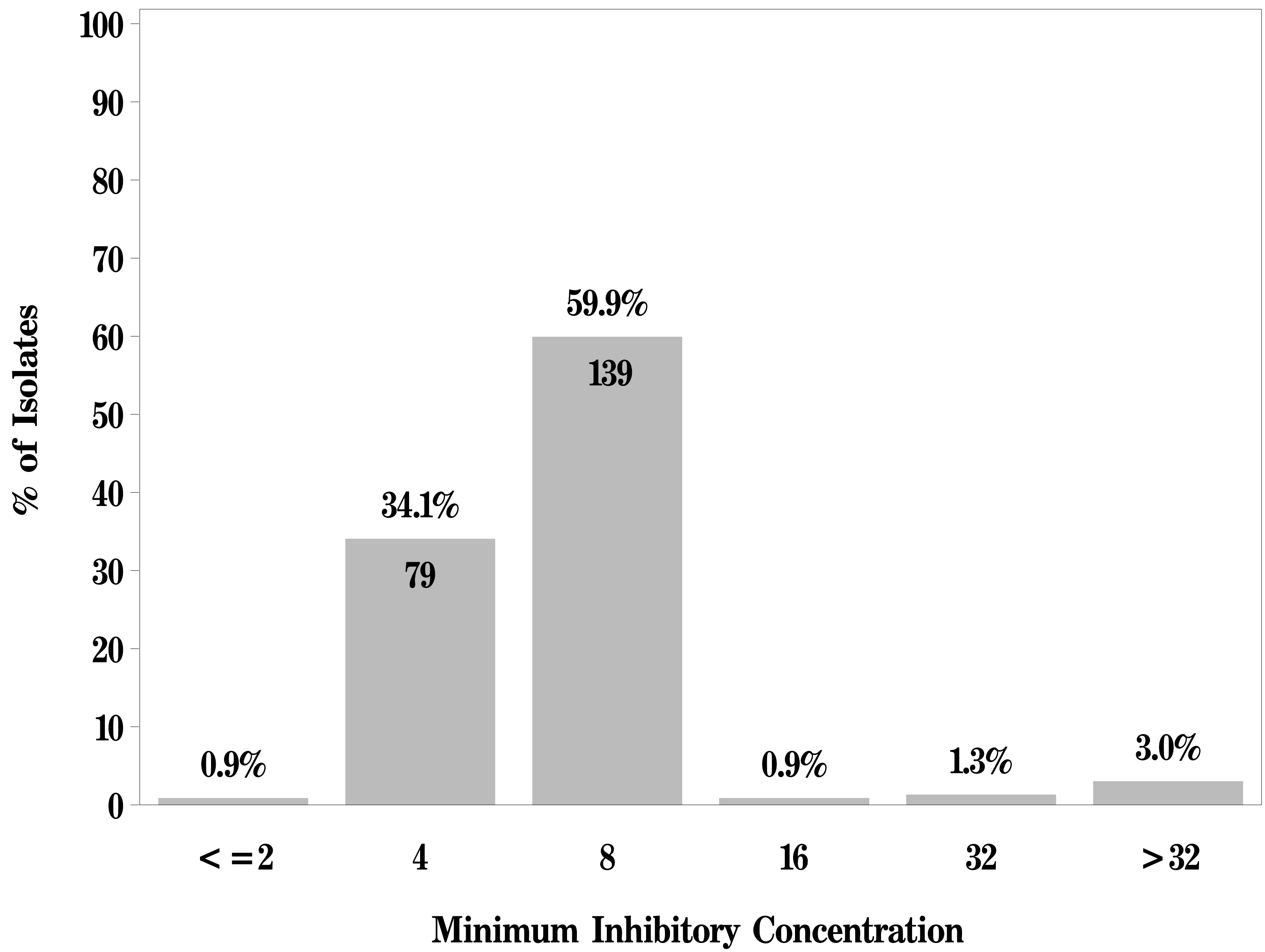
Breakpoints: Susceptible <=8 μg/mL Resistant >=32 μg/mL



NARMS

Figure 19g: Minimum Inhibitory Concentration of Chloramphenicol for *Escherichia coli* in Pork Chop (N=232 Isolates)

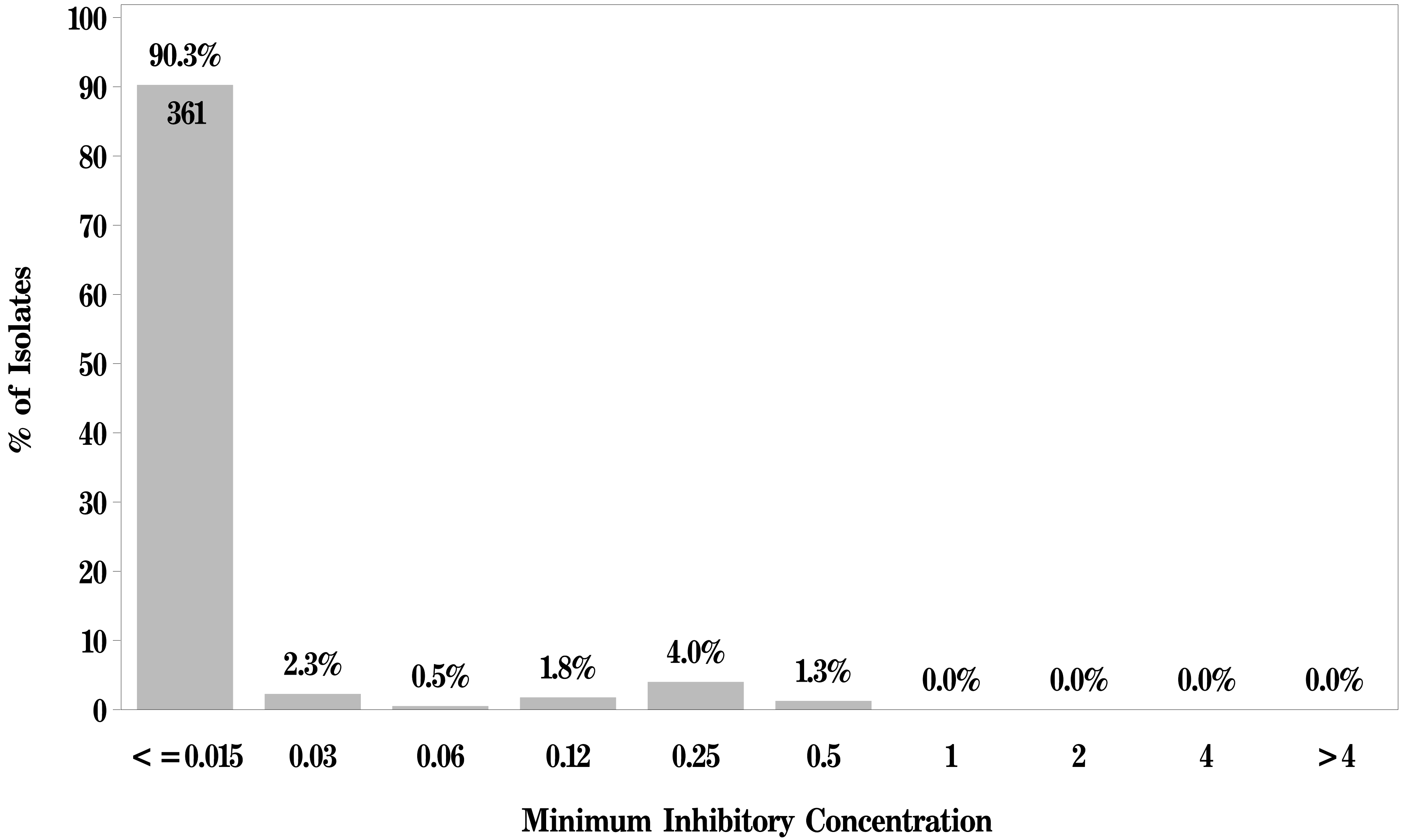
Breakpoints: Susceptible <=8 μg/mL Resistant >=32 μg/mL



NARMS

Figure 19h: Minimum Inhibitory Concentration of Ciprofloxacin for *Escherichia coli* in Chicken Breast (N=400 Isolates)

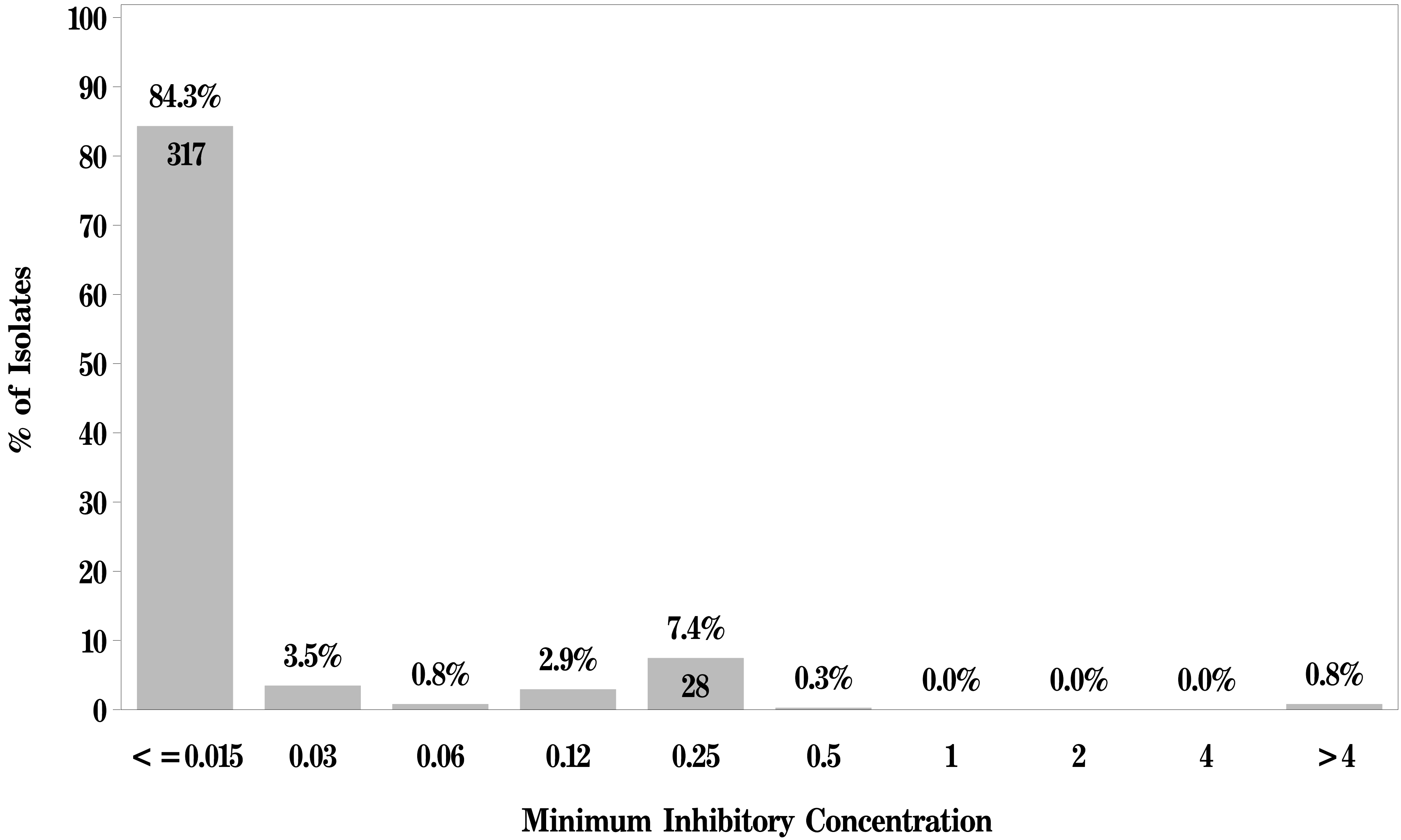
Breakpoints: Susceptible<=1 μg/mL Resistant>=4 μg/mL



NARMS

Figure 19h: Minimum Inhibitory Concentration of Ciprofloxacin for *Escherichia coli* in Ground Turkey (N=376 Isolates)

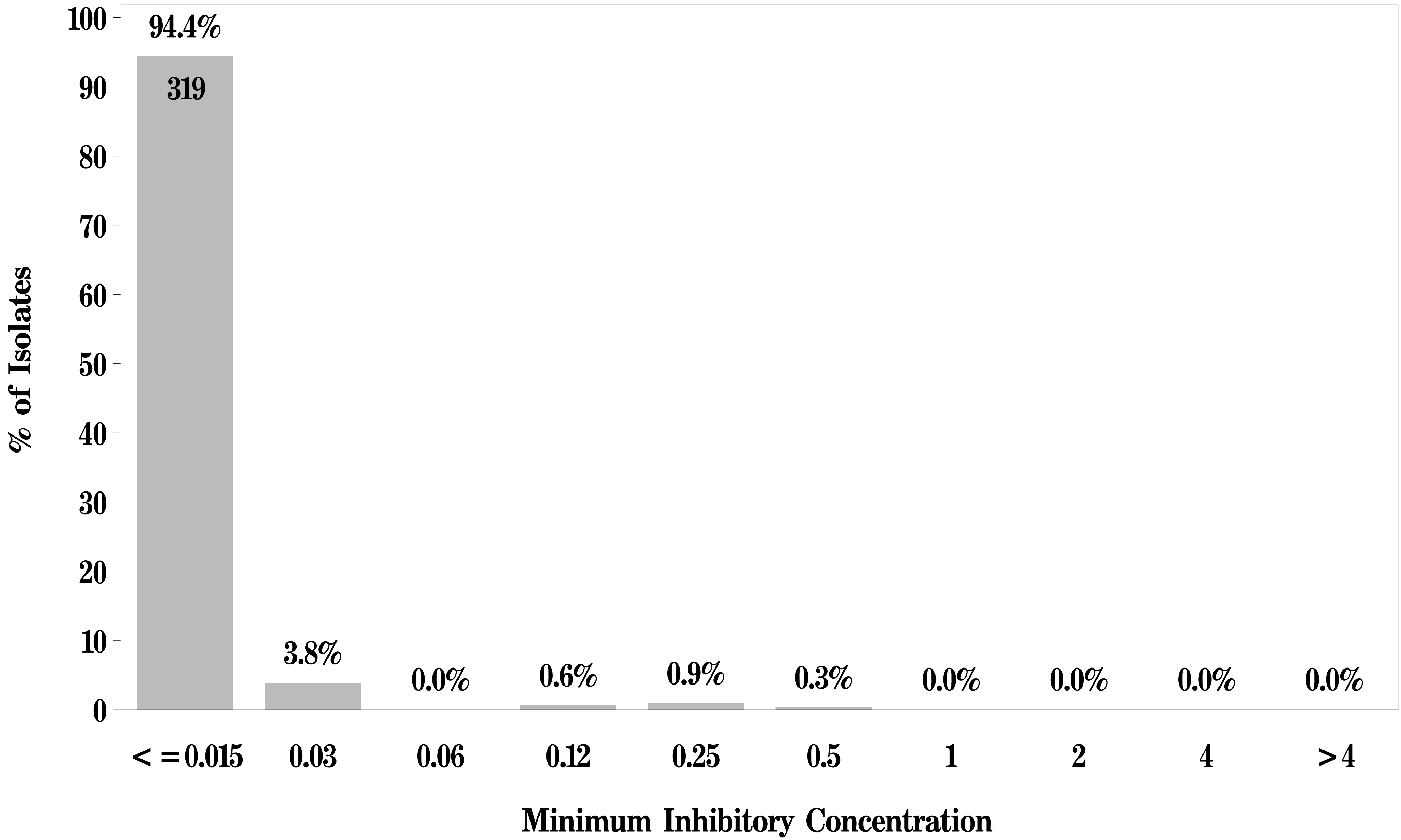
Breakpoints: Susceptible <=1 µg/mL Resistant >=4 µg/mL



NARMS

Figure 19h: Minimum Inhibitory Concentration of Ciprofloxacin for *Escherichia coli* in Ground Beef (N=338 Isolates)

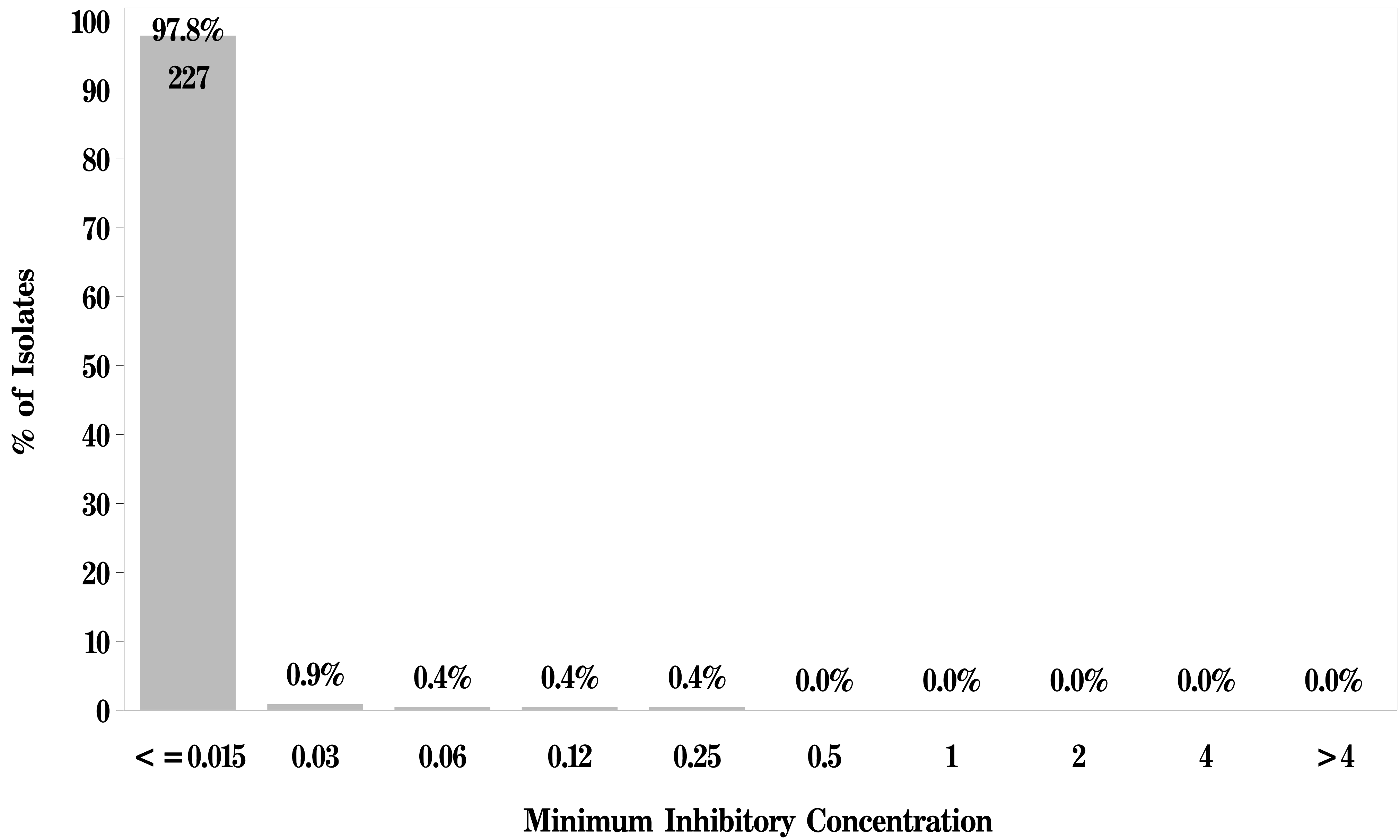
Breakpoints: Susceptible<=1 μg/mL Resistant>=4 μg/mL



NARMS

Figure 19h: Minimum Inhibitory Concentration of Ciprofloxacin for *Escherichia coli* in Pork Chop (N=232 Isolates)

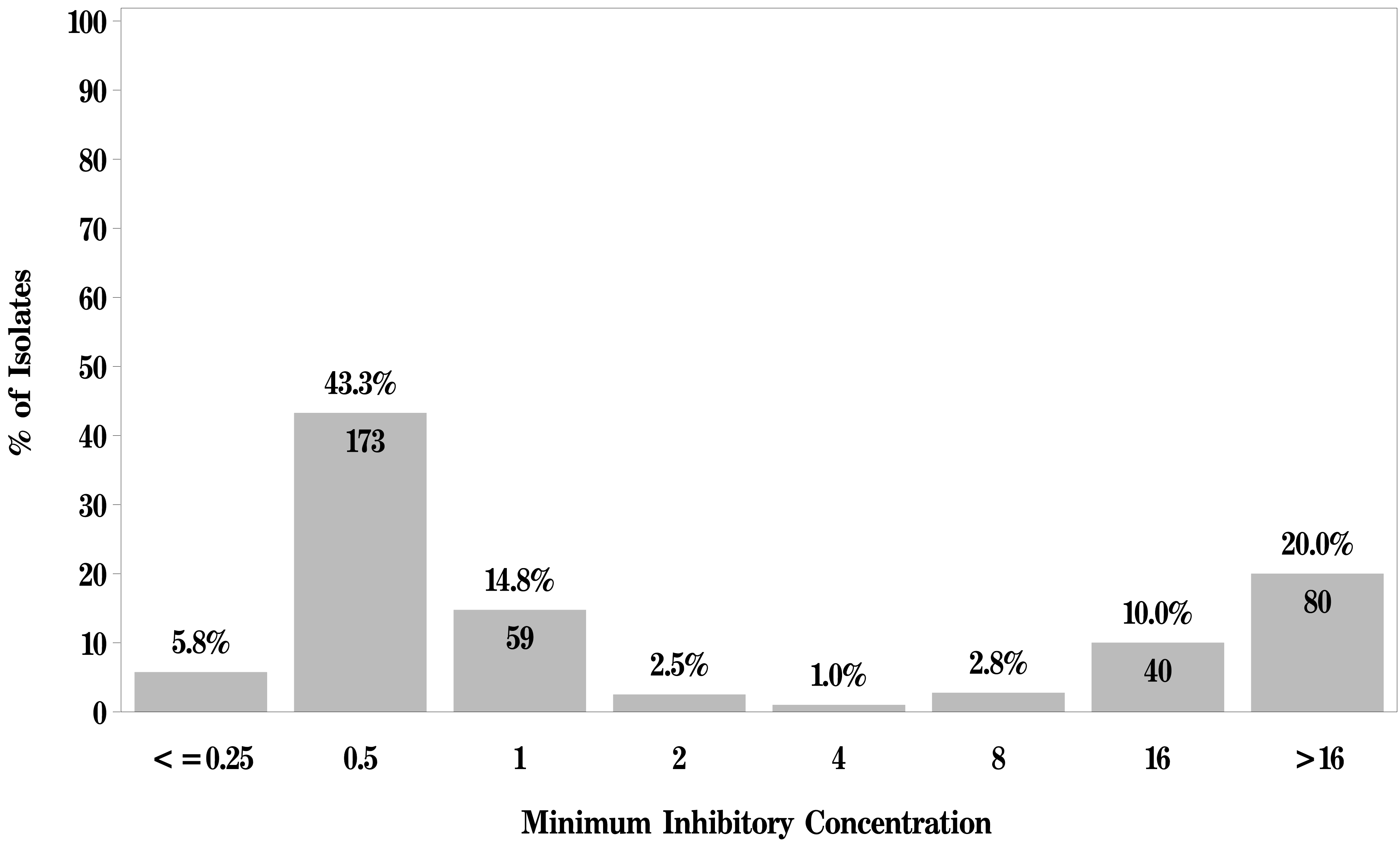
Breakpoints: Susceptible <=1 μg/mL Resistant >=4 μg/mL



NARMS

Figure 19i: Minimum Inhibitory Concentration of Gentamicin for *Escherichia coli* in Chicken Breast (N=400 Isolates)

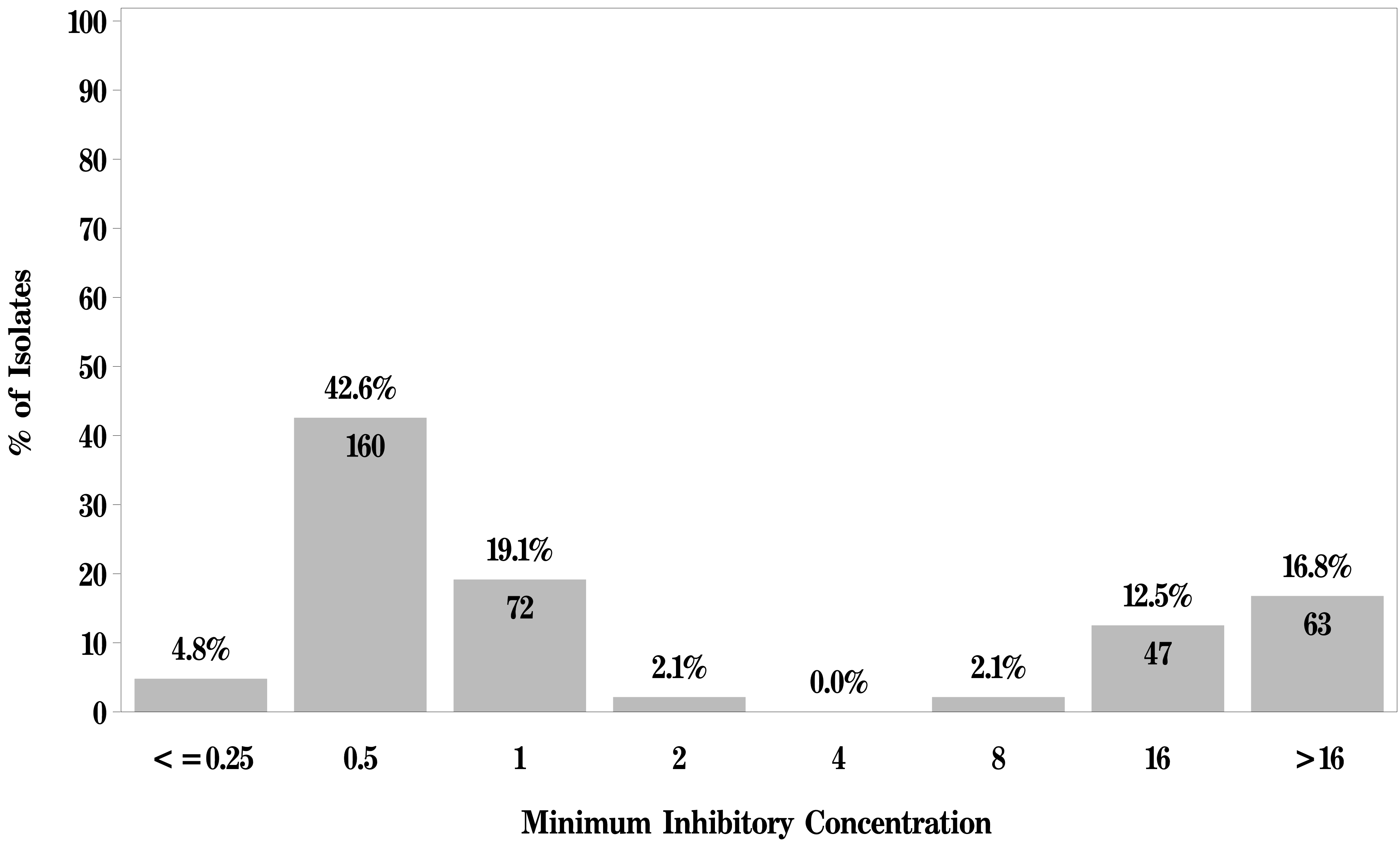
Breakpoints: Susceptible <=4 μg/mL Resistant >=16 μg/mL



NARMS

Figure 19i: Minimum Inhibitory Concentration of Gentamicin for *Escherichia coli* in Ground Turkey (N=376 Isolates)

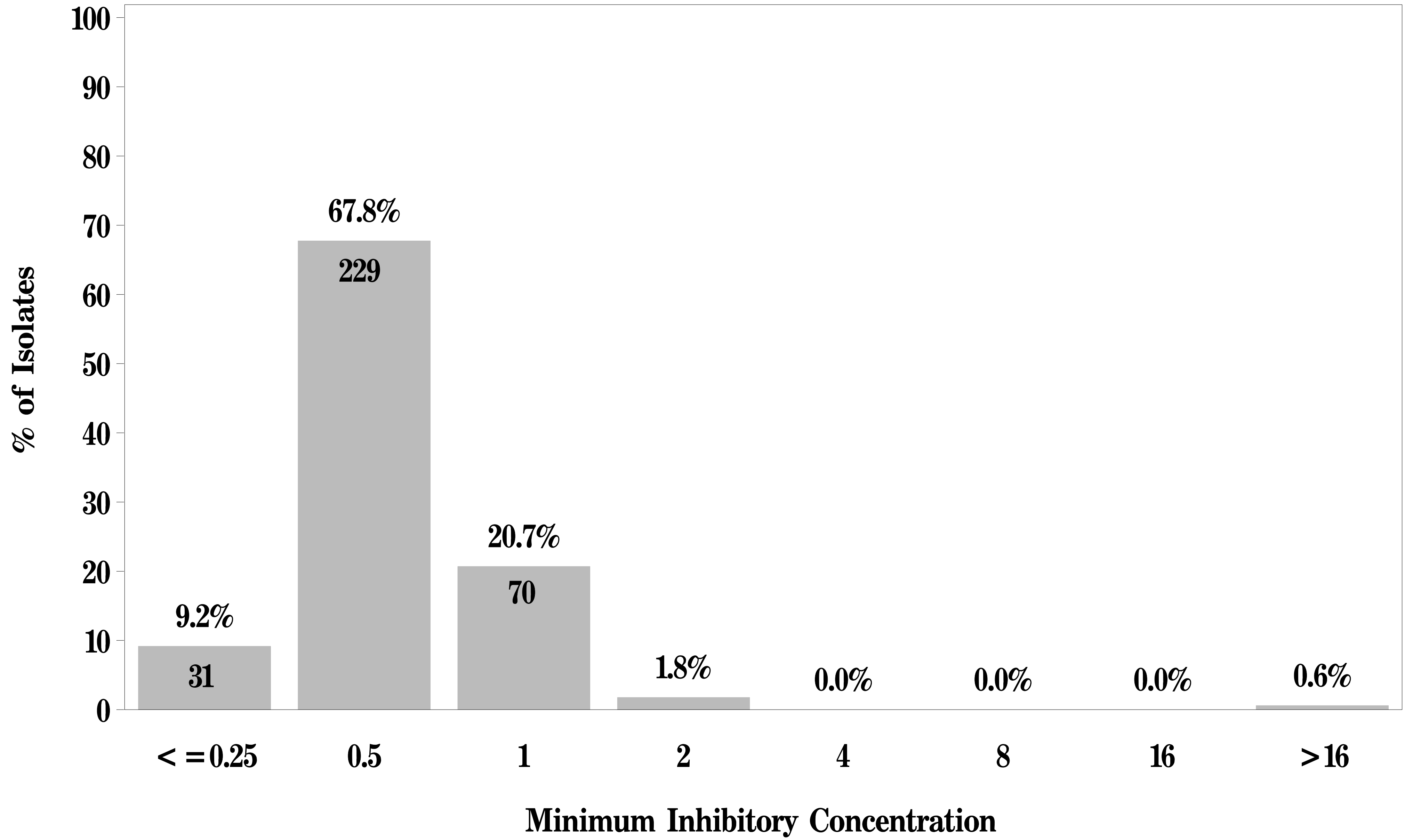
Breakpoints: Susceptible <=4 μg/mL Resistant >=16 μg/mL



NARMS

Figure 19i: Minimum Inhibitory Concentration of Gentamicin for *Escherichia coli* in Ground Beef (N=338 Isolates)

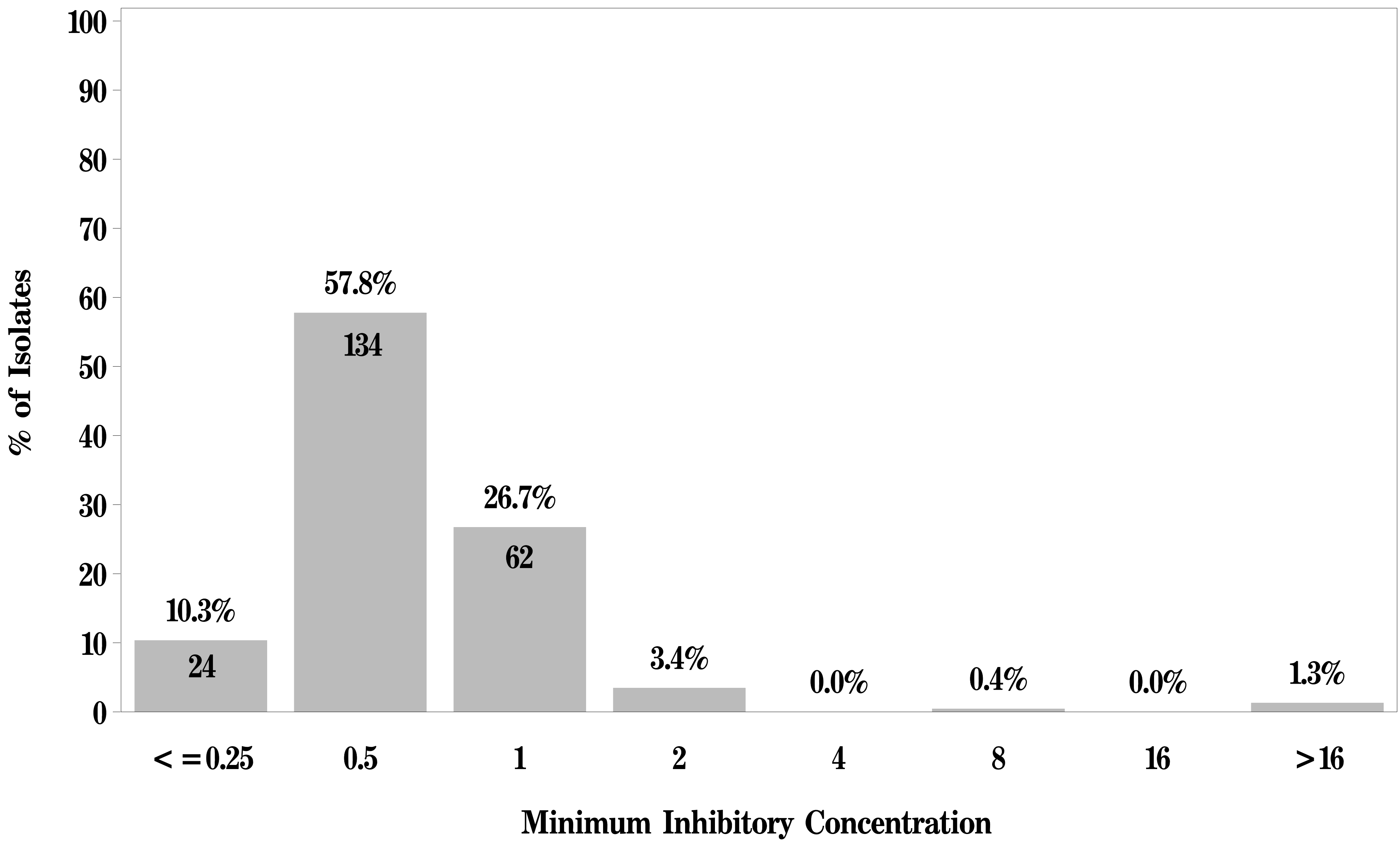
Breakpoints: Susceptible <=4 µg/mL Resistant >=16 µg/mL



NARMS

Figure 19i: Minimum Inhibitory Concentration of Gentamicin for *Escherichia coli* in Pork Chop (N=232 Isolates)

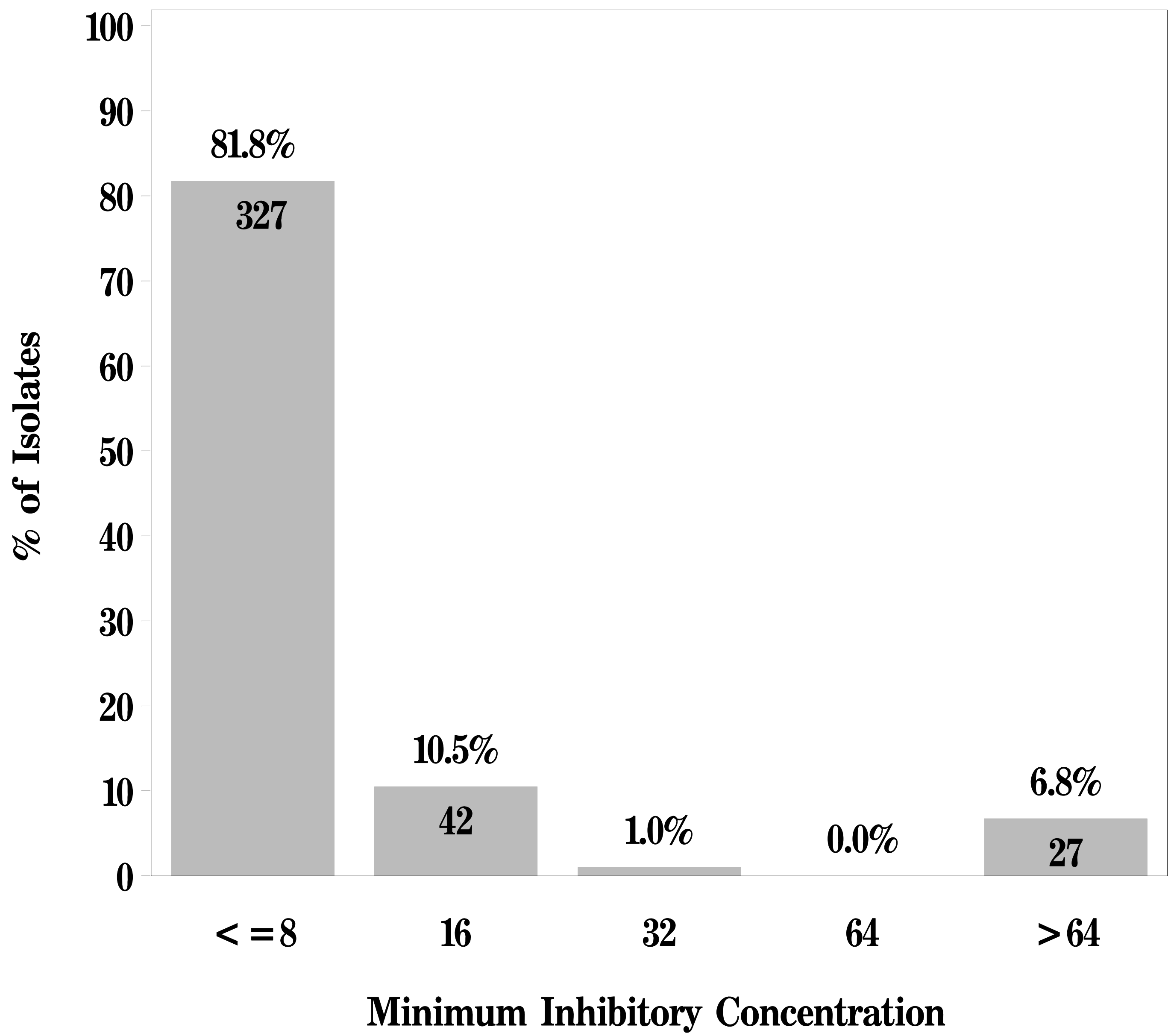
Breakpoints: Susceptible <=4 μg/mL Resistant >=16 μg/mL



NARMS

Figure 19j: Minimum Inhibitory Concentration of Kanamycin for *Escherichia coli* in Chicken Breast (N=400 Isolates)

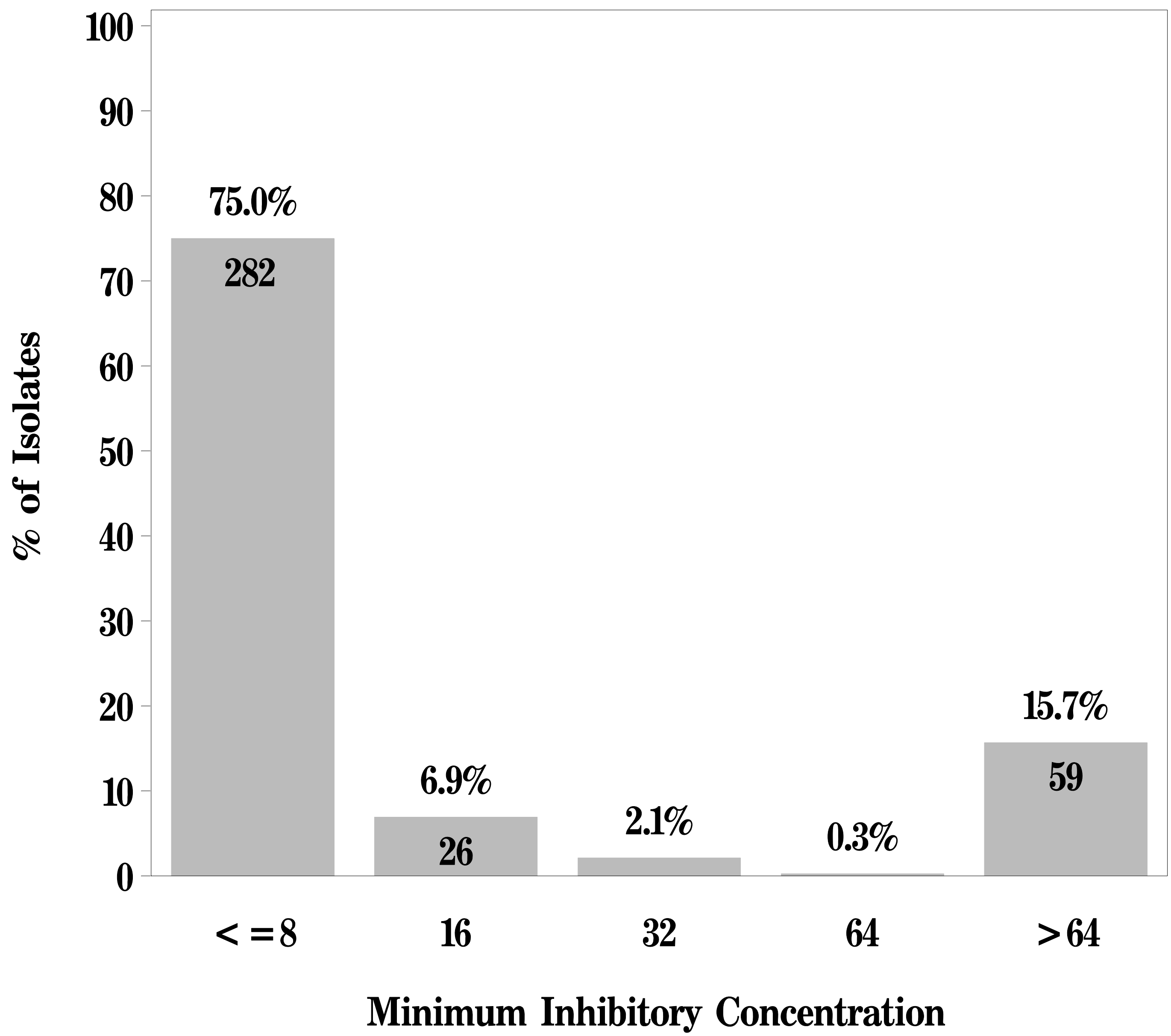
Breakpoints: Susceptible <=16 µg/mL Resistant >=64 µg/mL



NARMS

Figure 19j: Minimum Inhibitory Concentration of Kanamycin for *Escherichia coli* in Ground Turkey (N=376 Isolates)

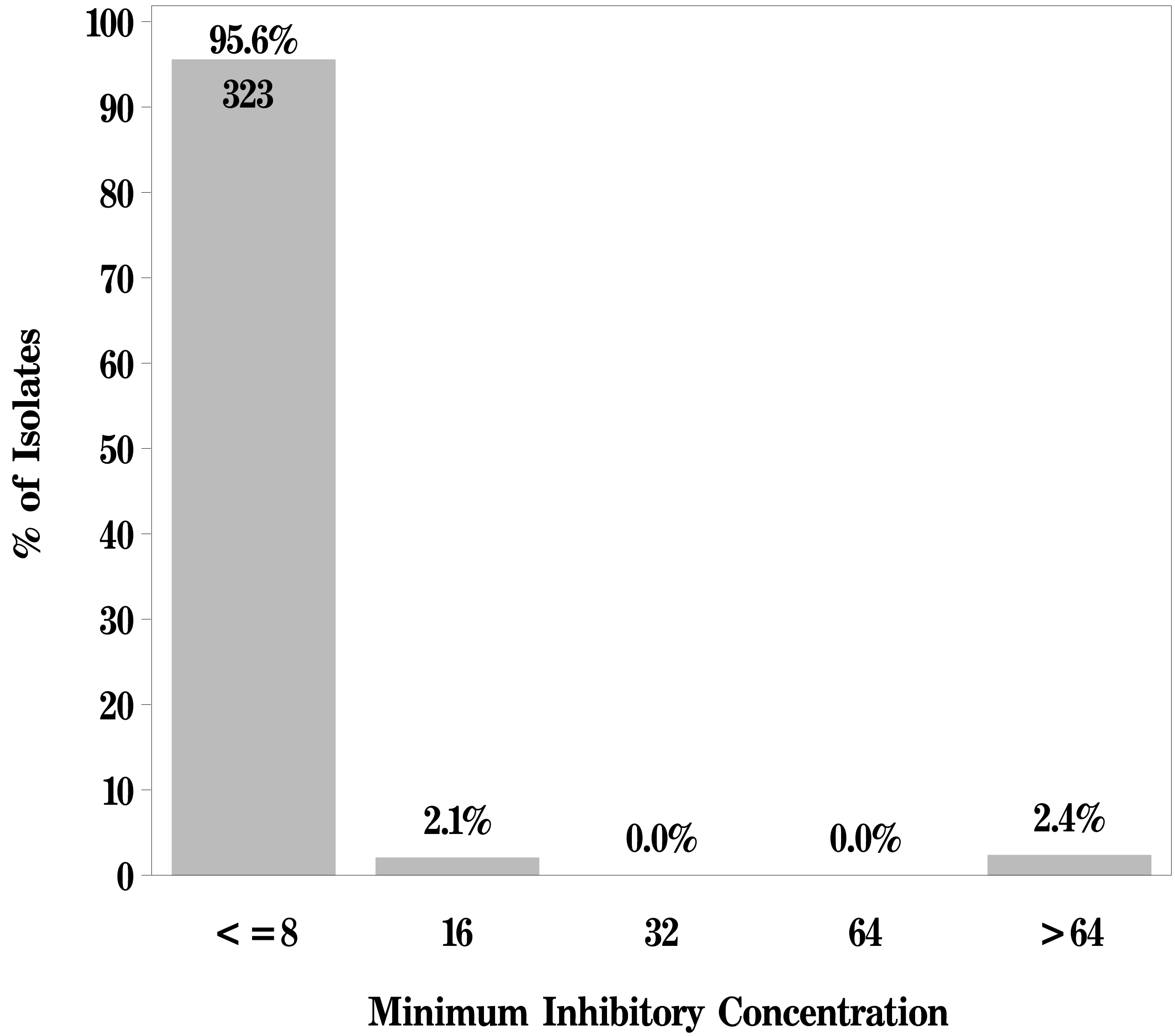
Breakpoints: Susceptible<=16 μg/mL Resistant>=64 μg/mL



NARMS

Figure 19j: Minimum Inhibitory Concentration of Kanamycin for *Escherichia coli* in Ground Beef (N=338 Isolates)

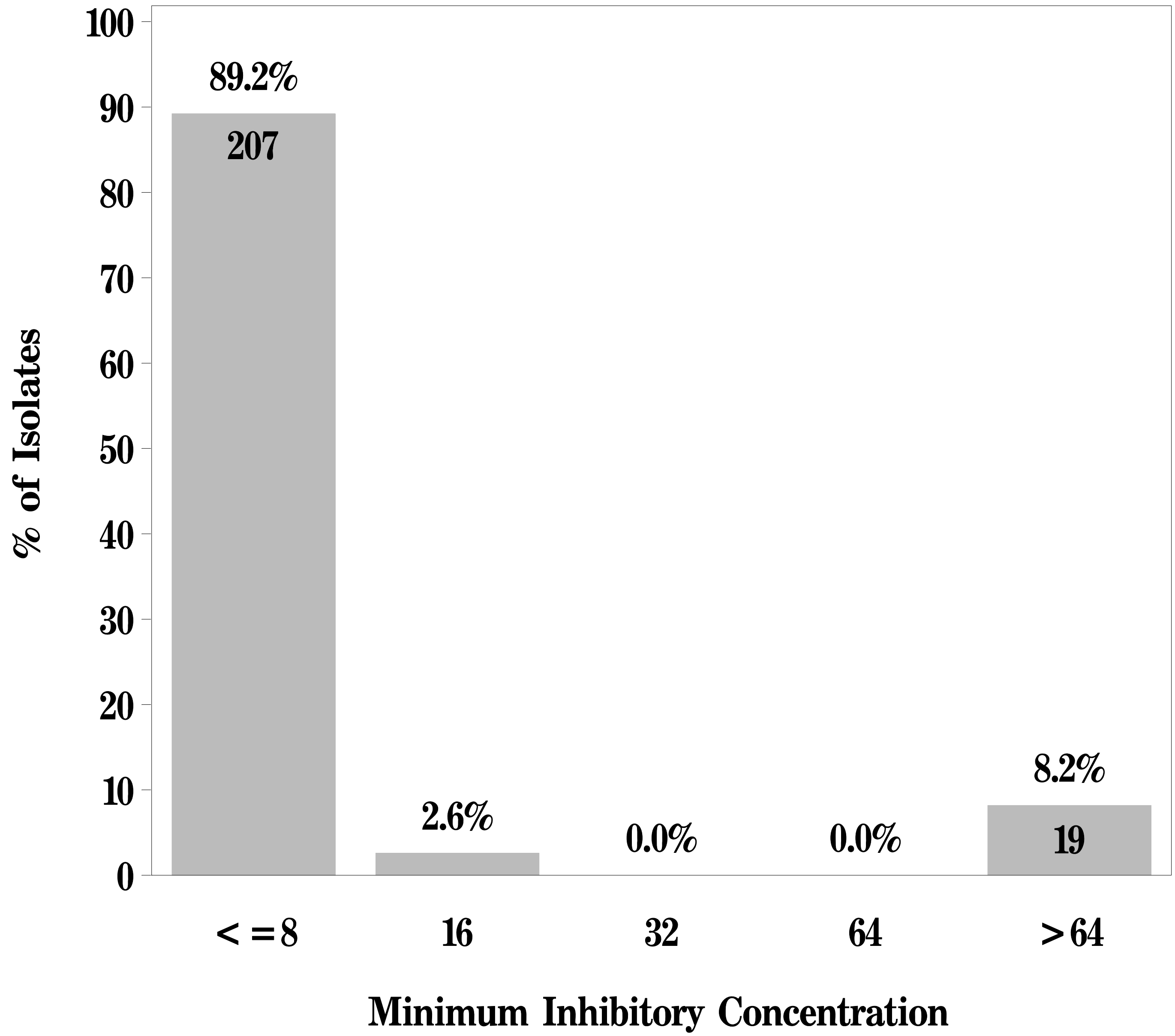
Breakpoints: Susceptible <=16 µg/mL Resistant >=64 µg/mL



NARMS

Figure 19j: Minimum Inhibitory Concentration of Kanamycin for *Escherichia coli* in Pork Chop (N=232 Isolates)

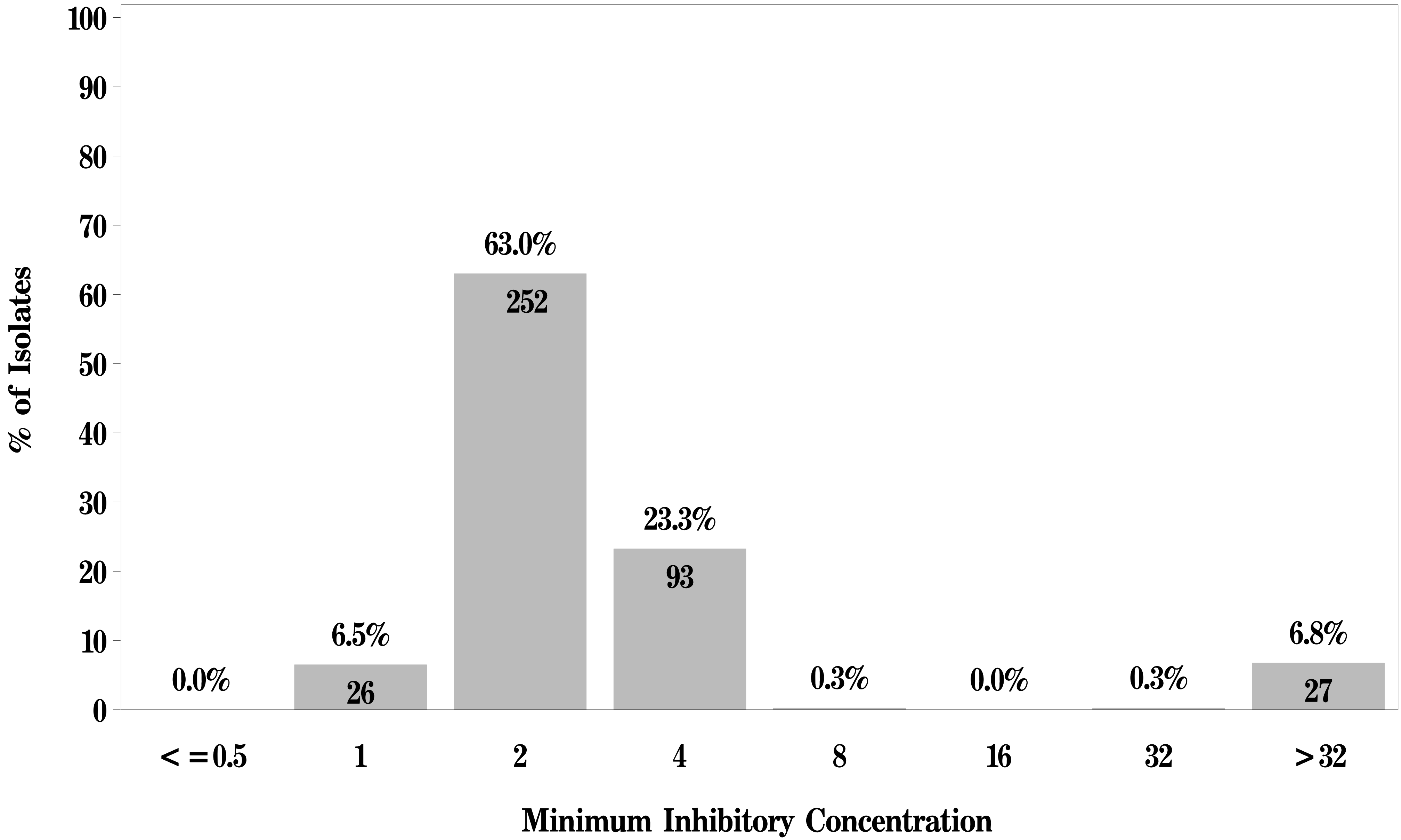
Breakpoints: Susceptible <=16 μg/mL Resistant >=64 μg/mL



NARMS

Figure 19k: Minimum Inhibitory Concentration of Nalidixic acid for *Escherichia coli* in Chicken Breast (N=400 Isolates)

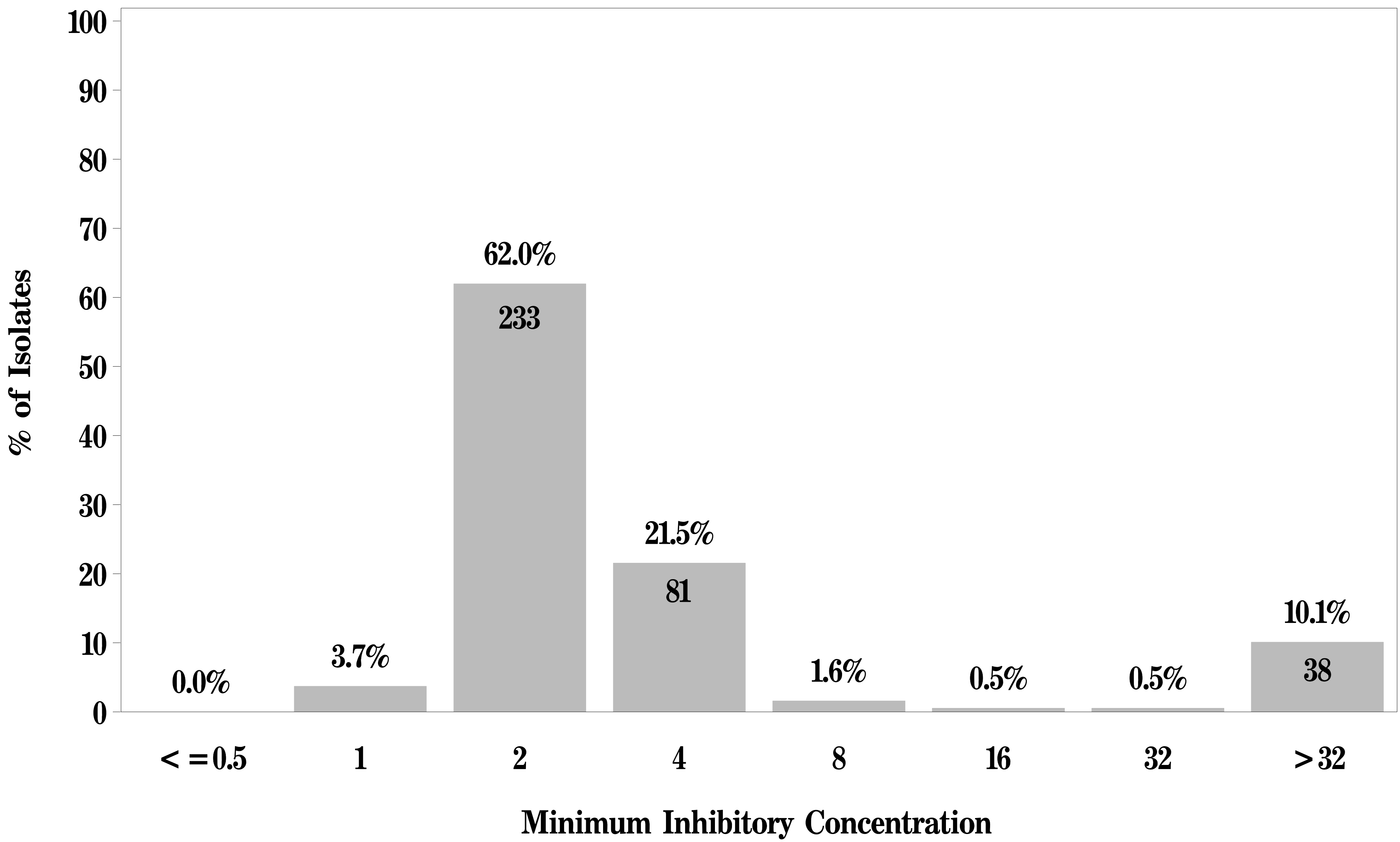
Breakpoints: Susceptible <=16 µg/mL Resistant >=32 µg/mL



NARMS

Figure 19k: Minimum Inhibitory Concentration of Nalidixic acid for *Escherichia coli* in Ground Turkey (N=376 Isolates)

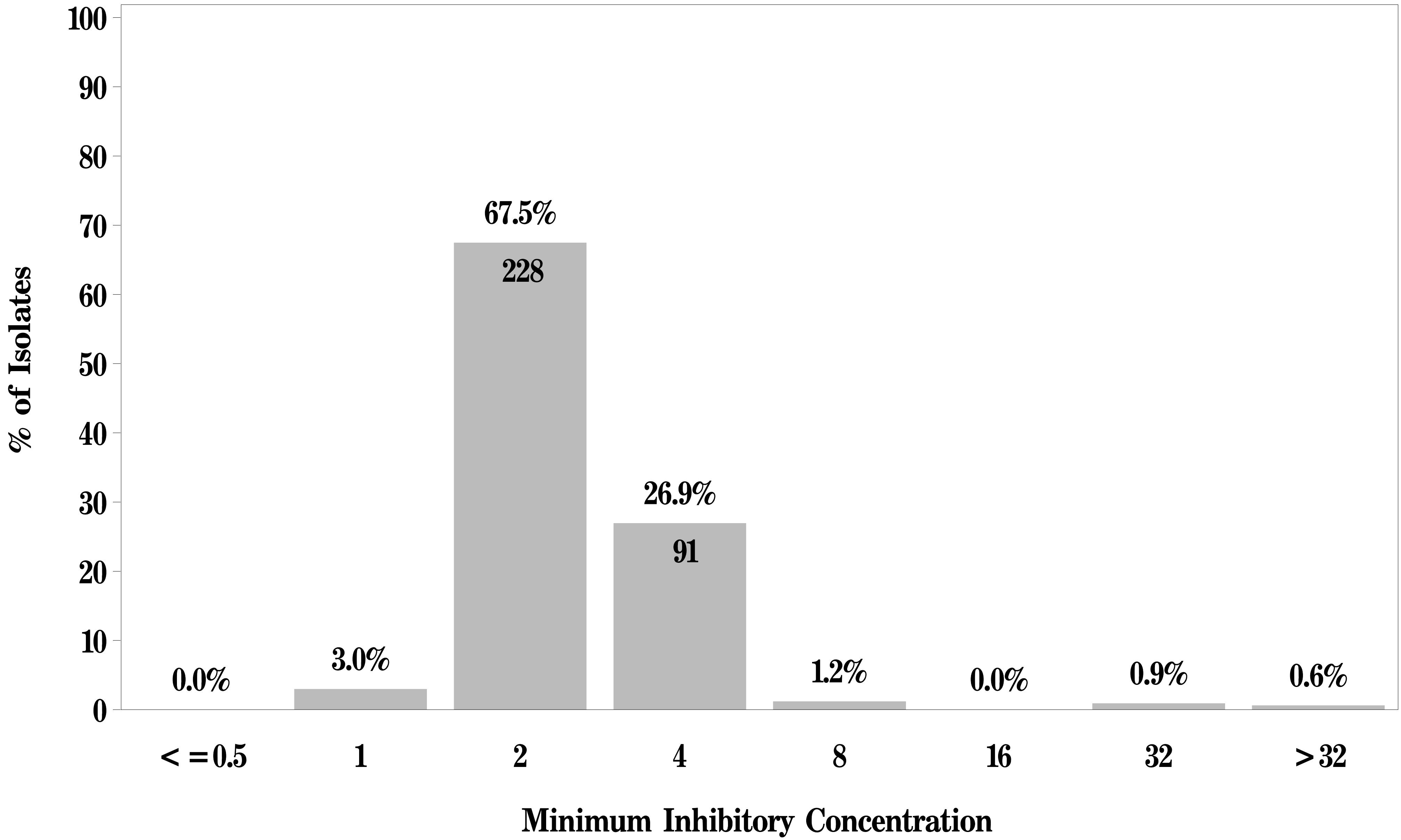
Breakpoints: Susceptible <=16 µg/mL Resistant >=32 µg/mL



NARMS

Figure 19k: Minimum Inhibitory Concentration of Nalidixic acid for *Escherichia coli* in Ground Beef (N=338 Isolates)

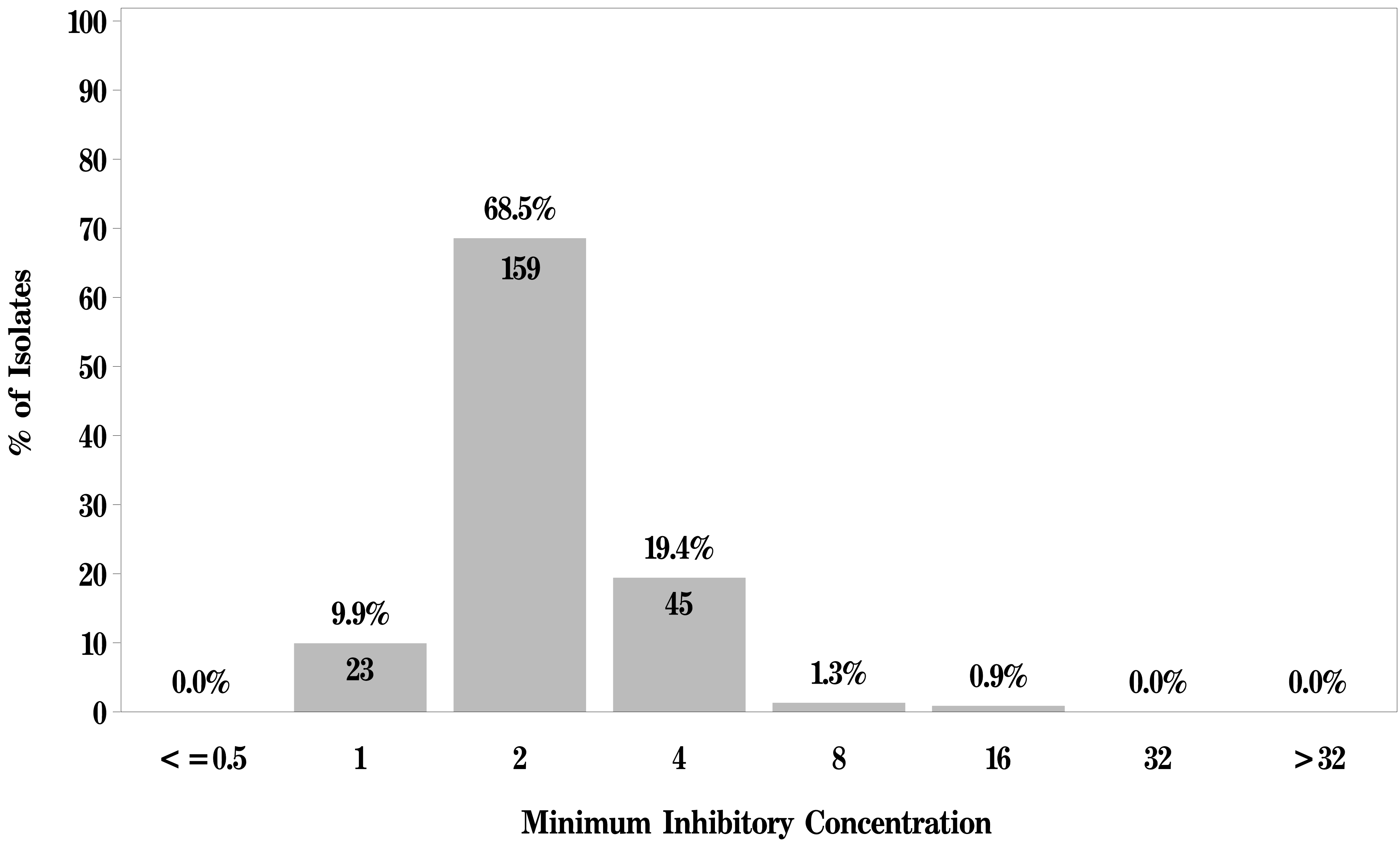
Breakpoints: Susceptible <=16 μg/mL Resistant >=32 μg/mL



NARMS

Figure 19k: Minimum Inhibitory Concentration of Nalidixic acid for *Escherichia coli* in Pork Chop (N=232 Isolates)

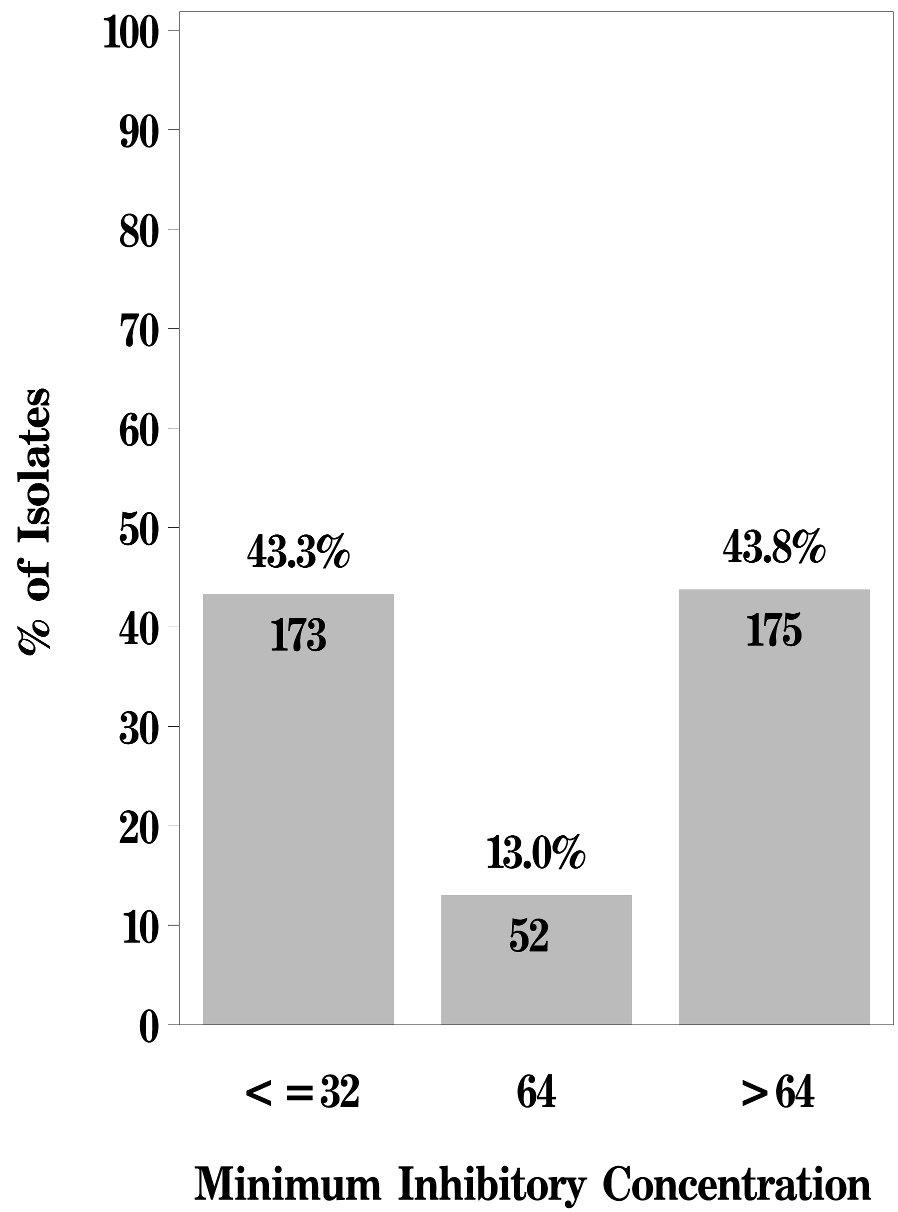
Breakpoints: Susceptible <=16 μg/mL Resistant >=32 μg/mL



NARMS

Figure 19l: Minimum Inhibitory Concentration of Streptomycin for *Escherichia coli* in Chicken Breast (N=400 Isolates)

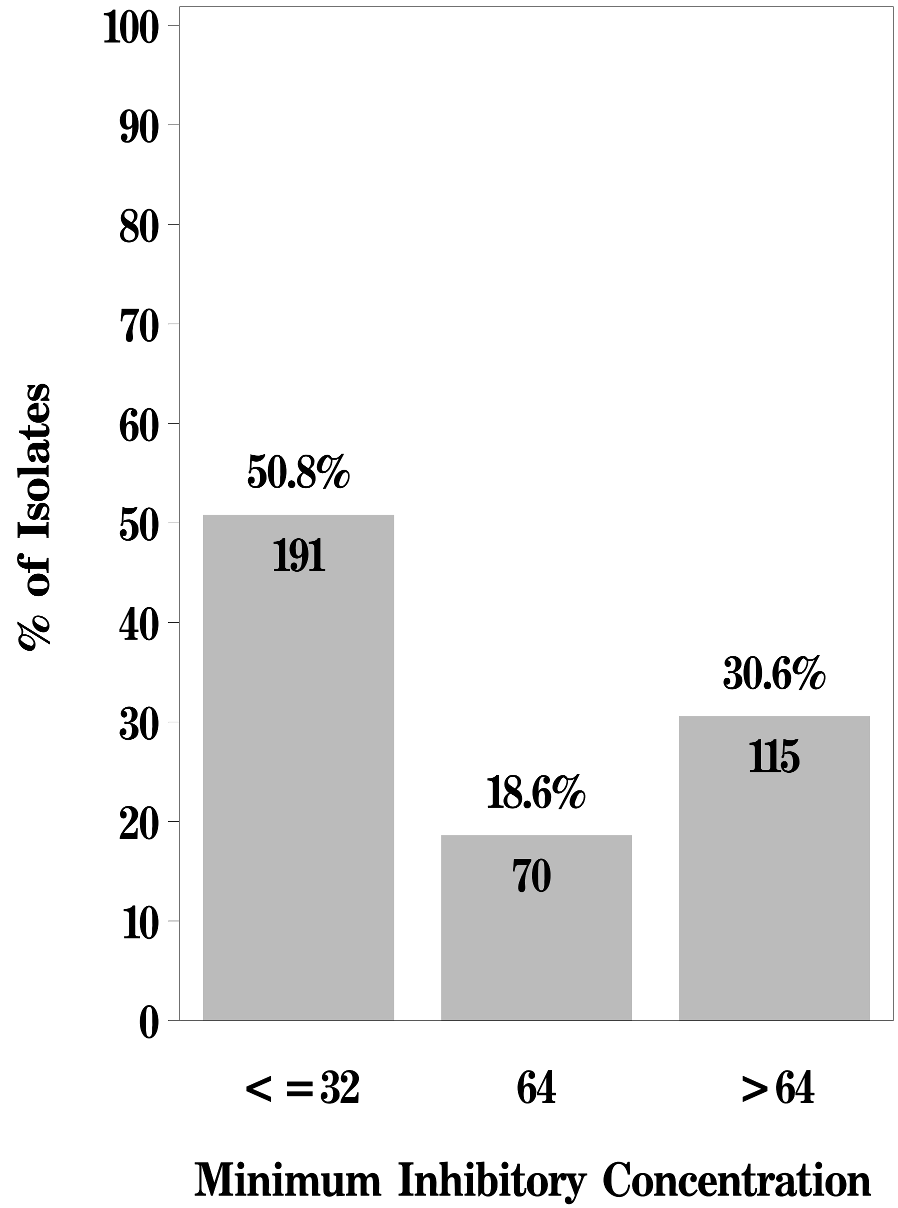
Breakpoints: Susceptible <=32 µg/mL Resistant >=64 µg/mL



NARMS

Figure 19l: Minimum Inhibitory Concentration of Streptomycin for *Escherichia coli* in Ground Turkey (N=376 Isolates)

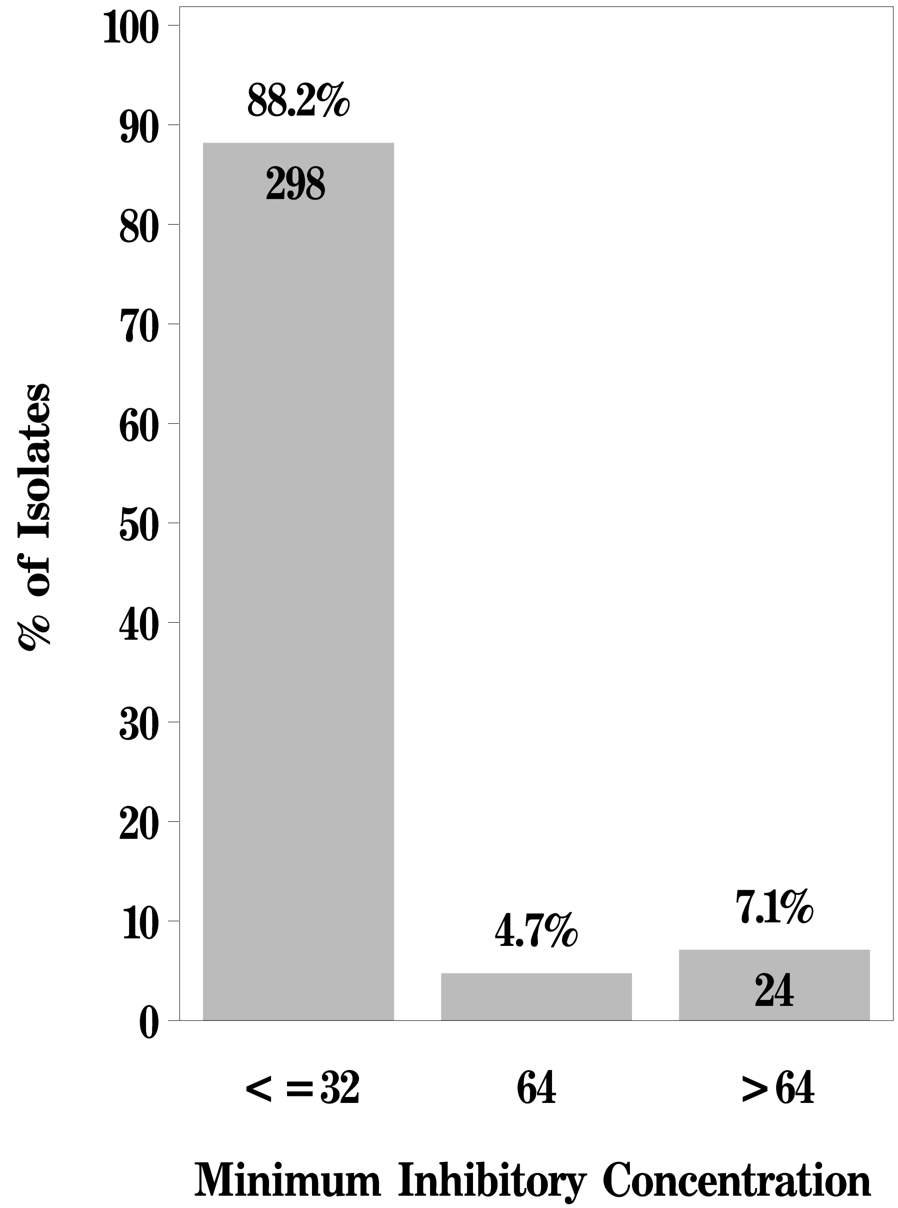
Breakpoints: Susceptible <=32 µg/mL Resistant >=64 µg/mL



NARMS

Figure 19l: Minimum Inhibitory Concentration of Streptomycin for *Escherichia coli* in Ground Beef (N=338 Isolates)

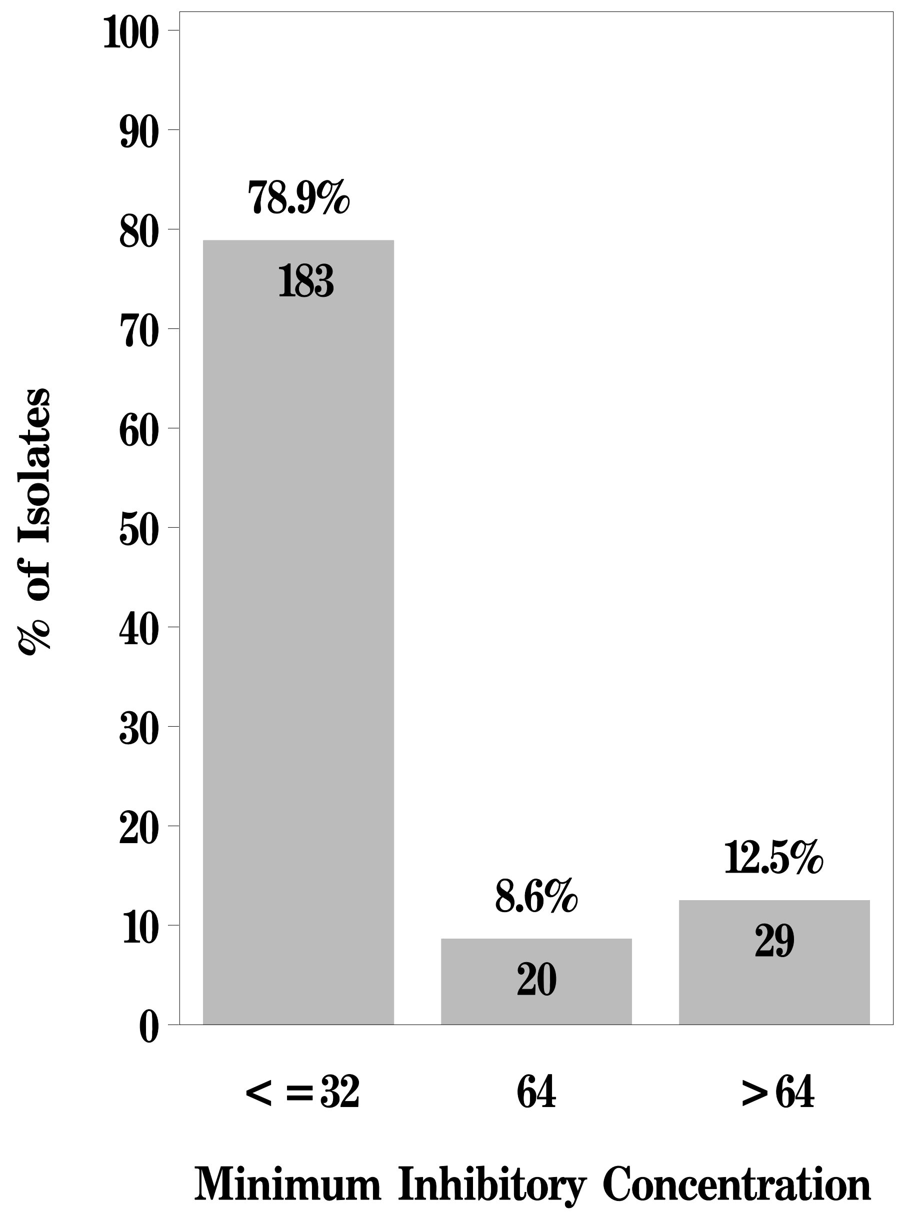
Breakpoints: Susceptible <=32 μg/mL Resistant >=64 μg/mL



NARMS

Figure 19l: Minimum Inhibitory Concentration of Streptomycin for *Escherichia coli* in Pork Chop (N=232 Isolates)

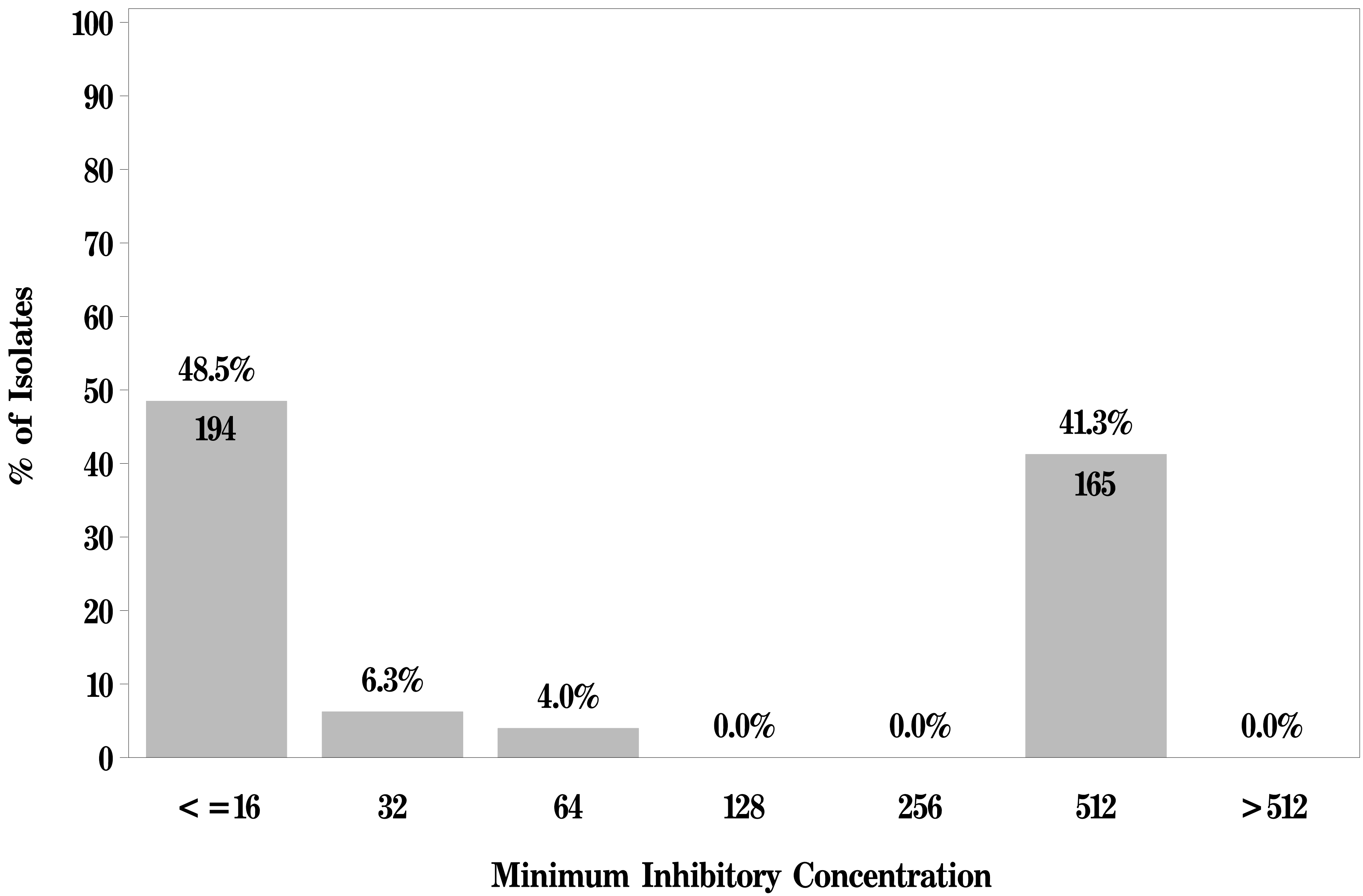
Breakpoints: Susceptible <=32 µg/mL Resistant >=64 µg/mL



NARMS

Figure 19m: Minimum Inhibitory Concentration of Sulfisoxazole for *Escherichia coli* in Chicken Breast (N=400 Isolates)

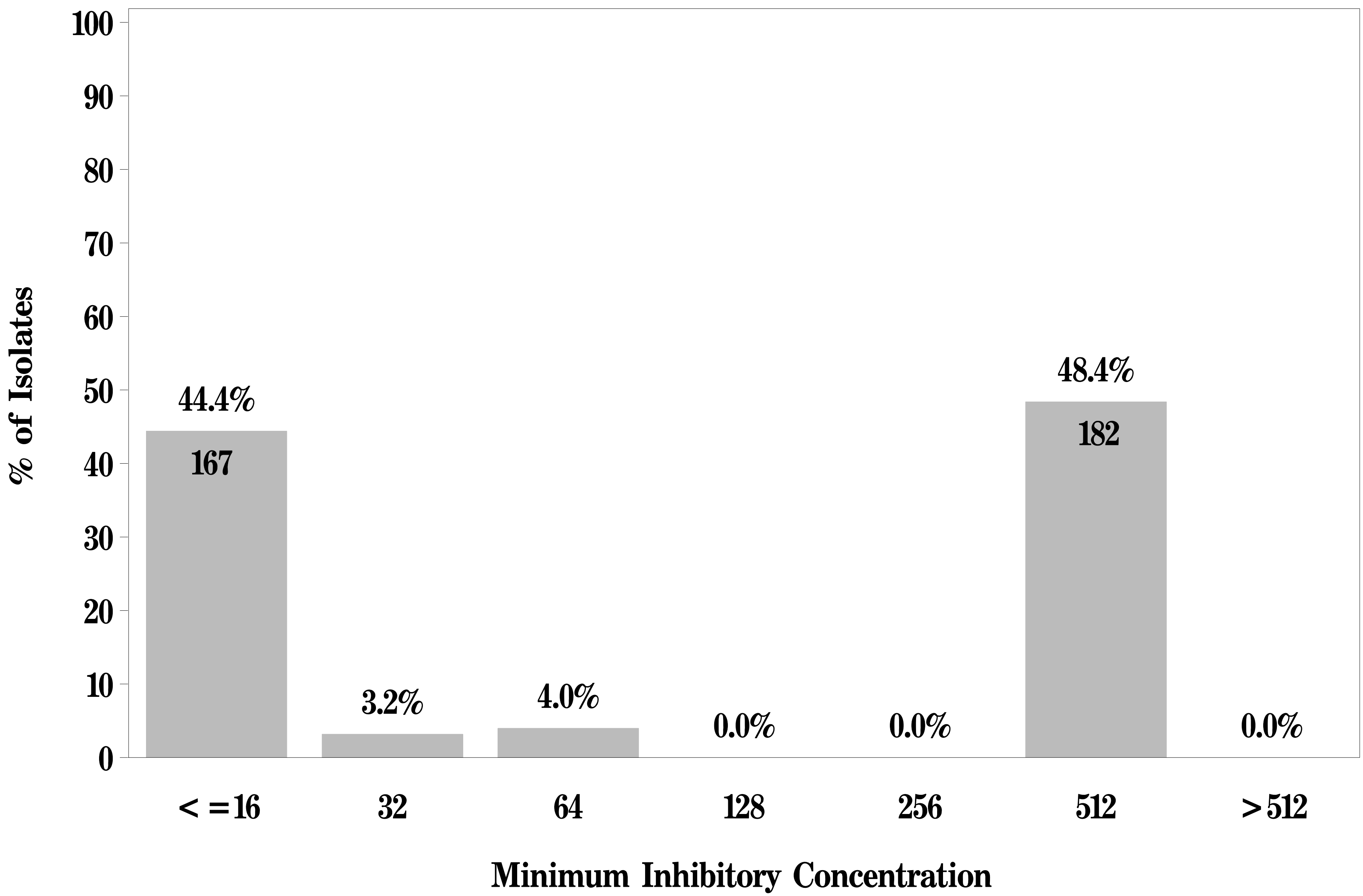
Breakpoints: Susceptible <=256 µg/mL Resistant >=512 µg/mL



NARMS

Figure 19m: Minimum Inhibitory Concentration of Sulfisoxazole for *Escherichia coli* in Ground Turkey (N=376 Isolates)

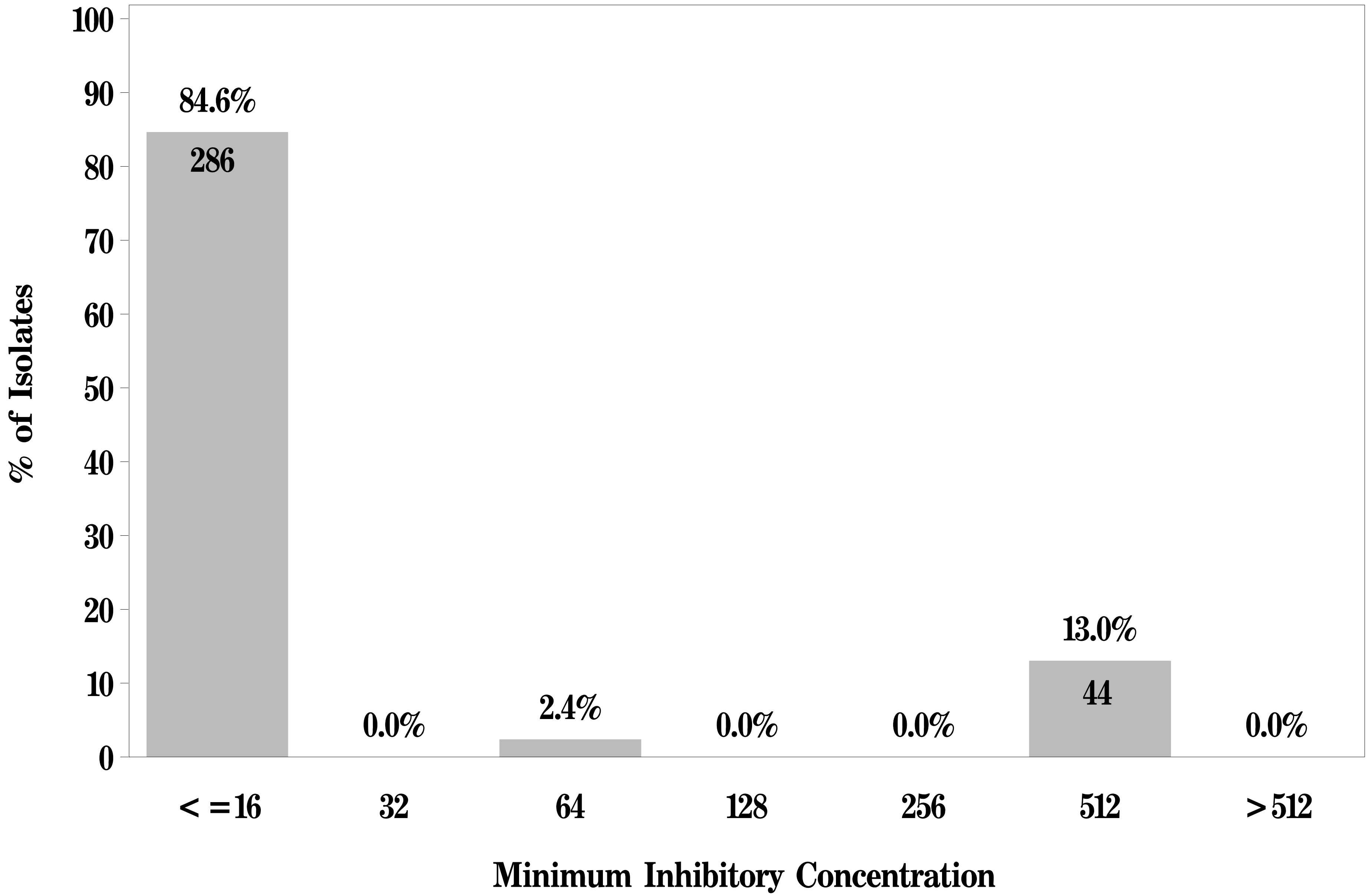
Breakpoints: Susceptible<=256 µg/mL Resistant>=512 µg/mL



NARMS

Figure 19m: Minimum Inhibitory Concentration of Sulfisoxazole for *Escherichia coli* in Ground Beef (N=338 Isolates)

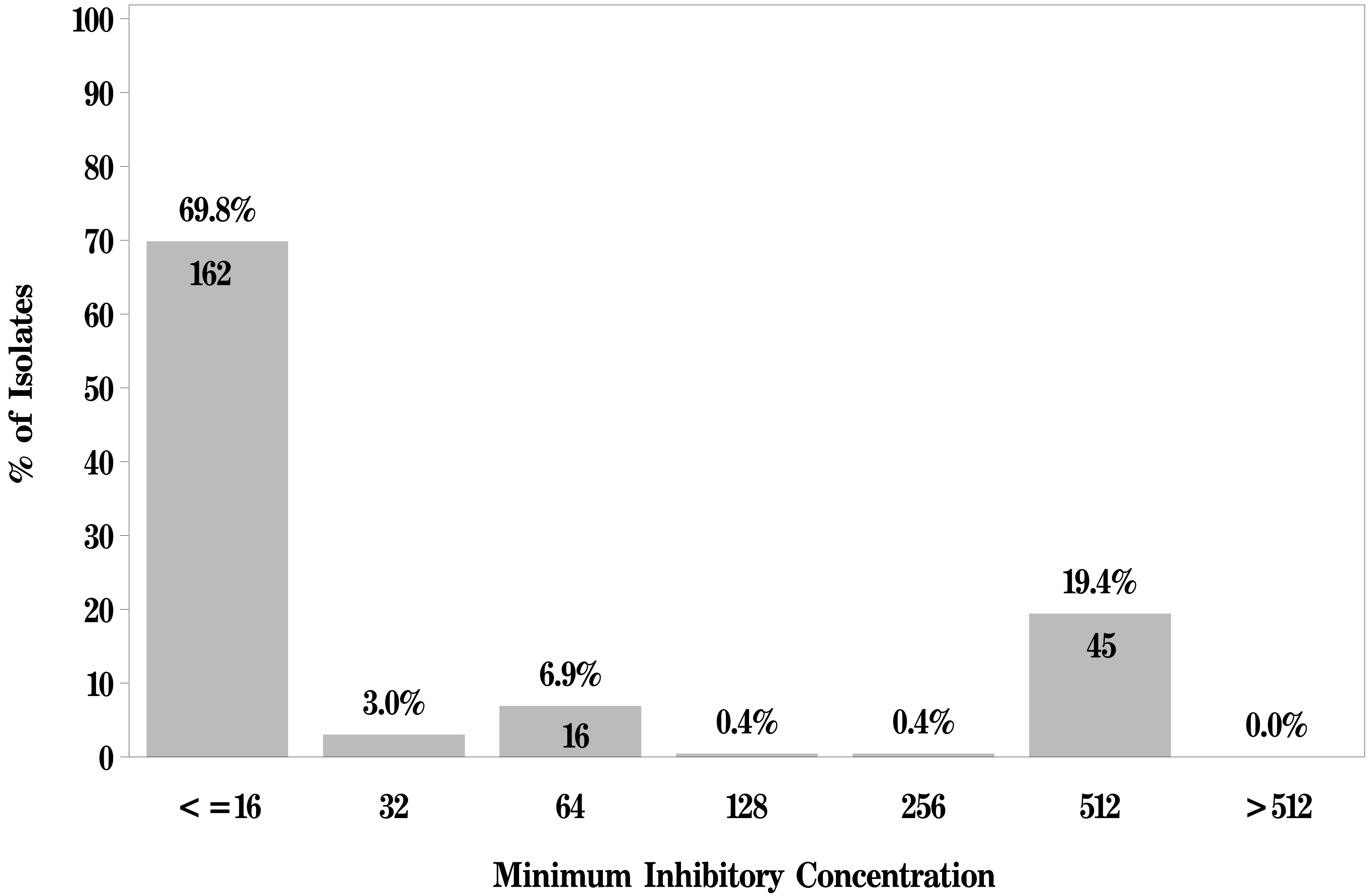
Breakpoints: Susceptible <=256 μg/mL Resistant >=512 μg/mL



NARMS

Figure 19m: Minimum Inhibitory Concentration of Sulfisoxazole for *Escherichia coli* in Pork Chop (N=232 Isolates)

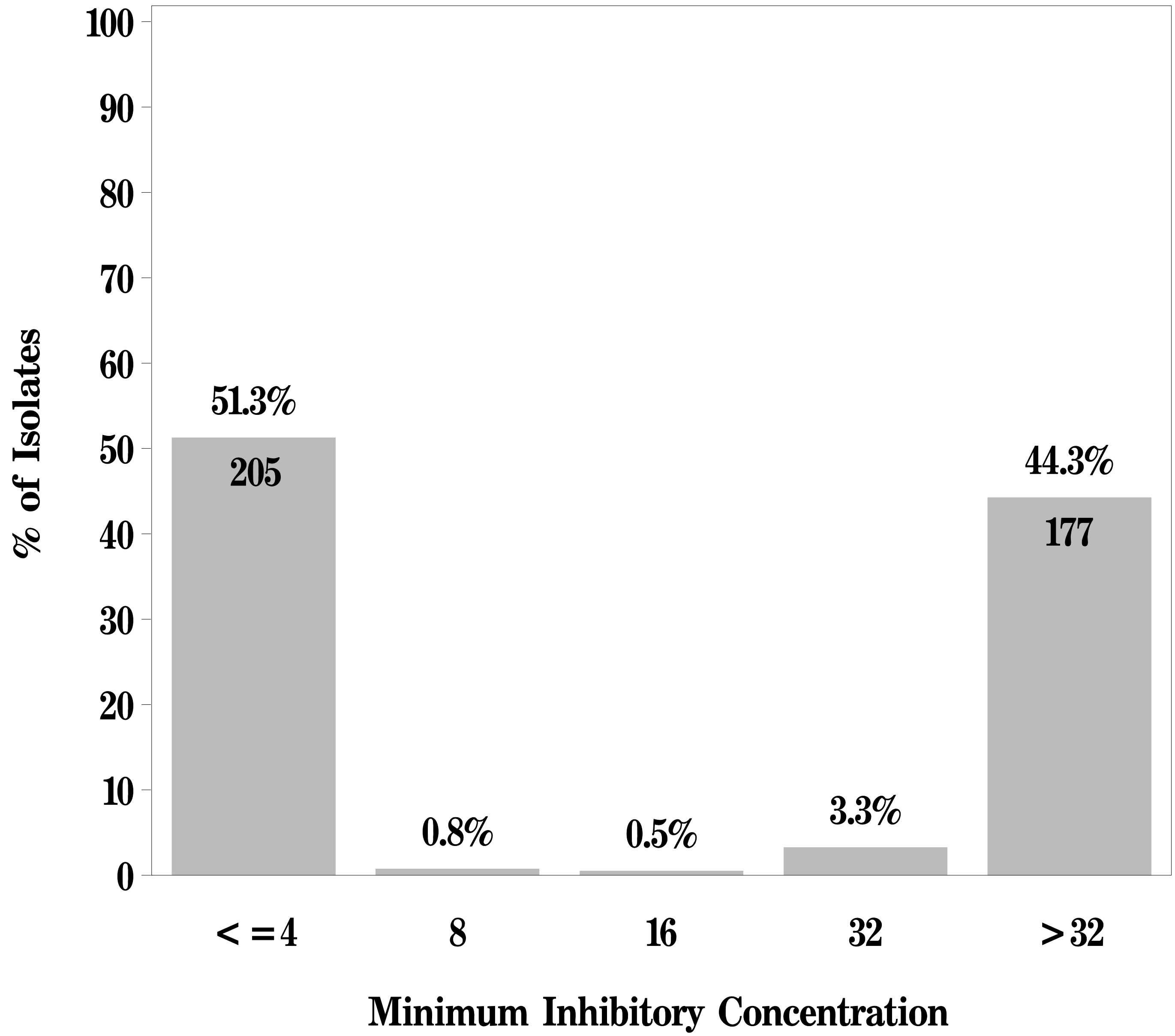
Breakpoints: Susceptible <=256 μg/mL Resistant >=512 μg/mL



NARMS

Figure 19n: Minimum Inhibitory Concentration of Tetracycline for *Escherichia coli* in Chicken Breast (N=400 Isolates)

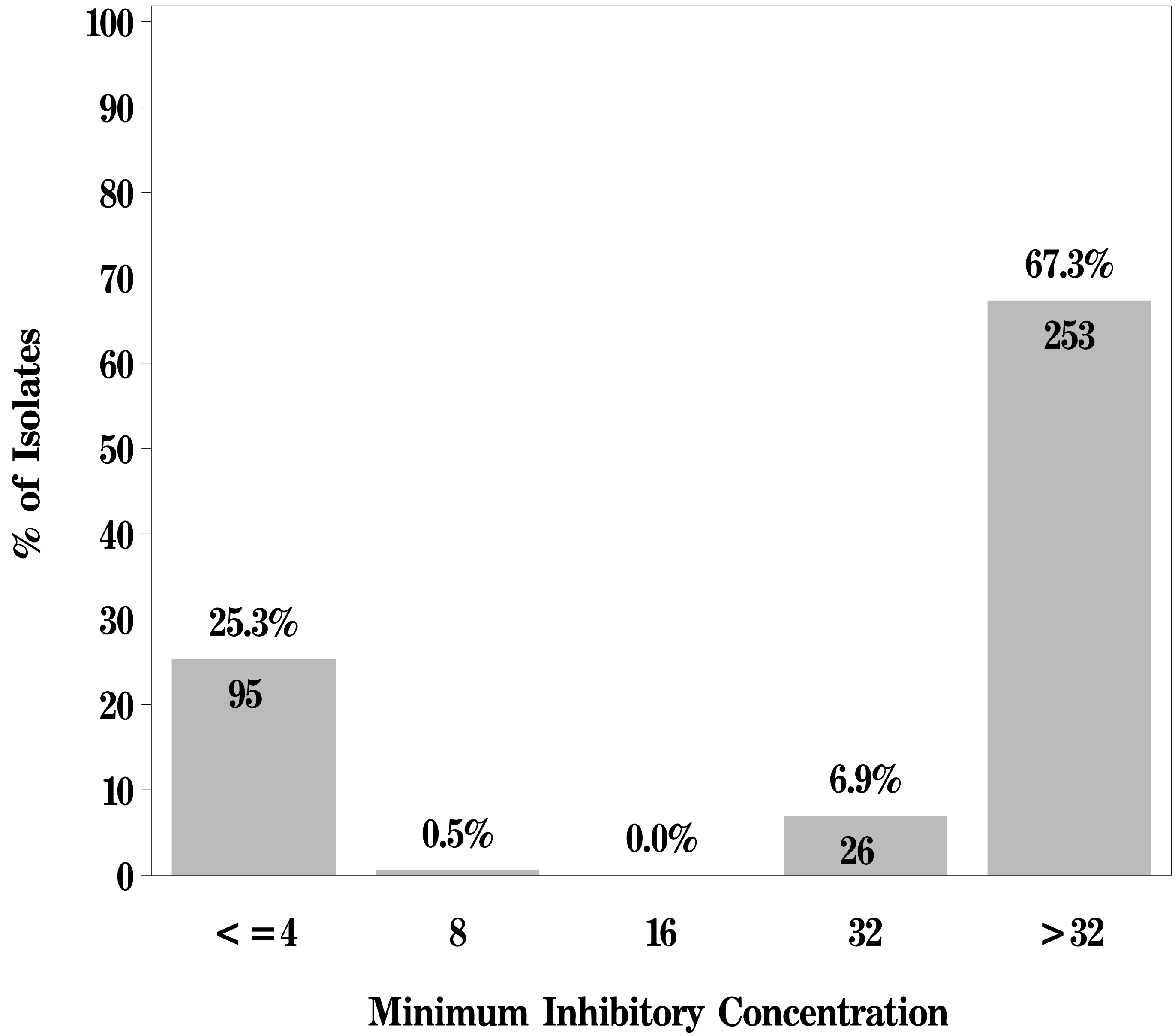
Breakpoints: Susceptible <=4 µg/mL Resistant >=16 µg/mL



NARMS

Figure 19n: Minimum Inhibitory Concentration of Tetracycline for *Escherichia coli* in Ground Turkey (N=376 Isolates)

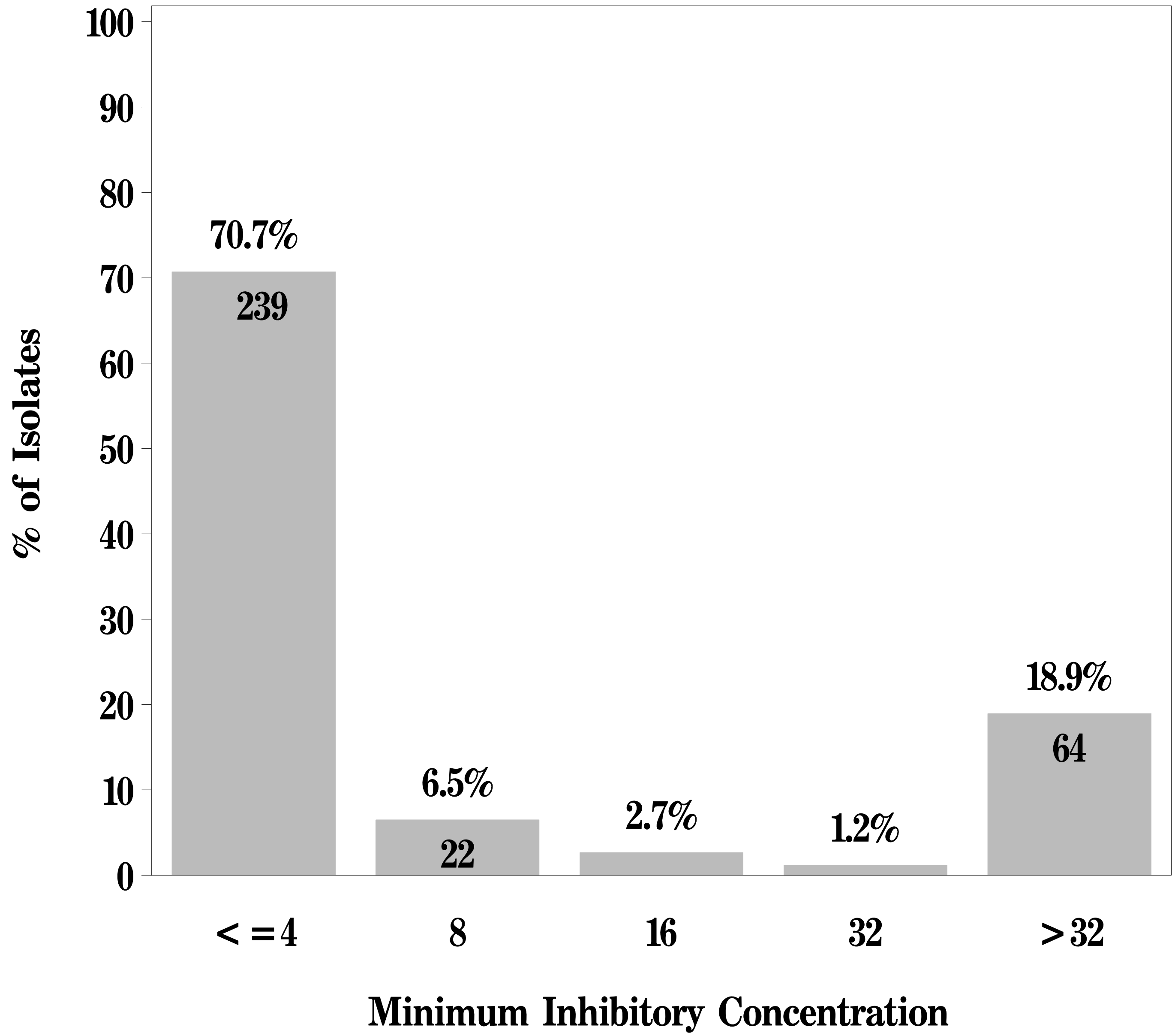
Breakpoints: Susceptible <=4 µg/mL Resistant >=16 µg/mL



NARMS

Figure 19n: Minimum Inhibitory Concentration of Tetracycline for *Escherichia coli* in Ground Beef (N=338 Isolates)

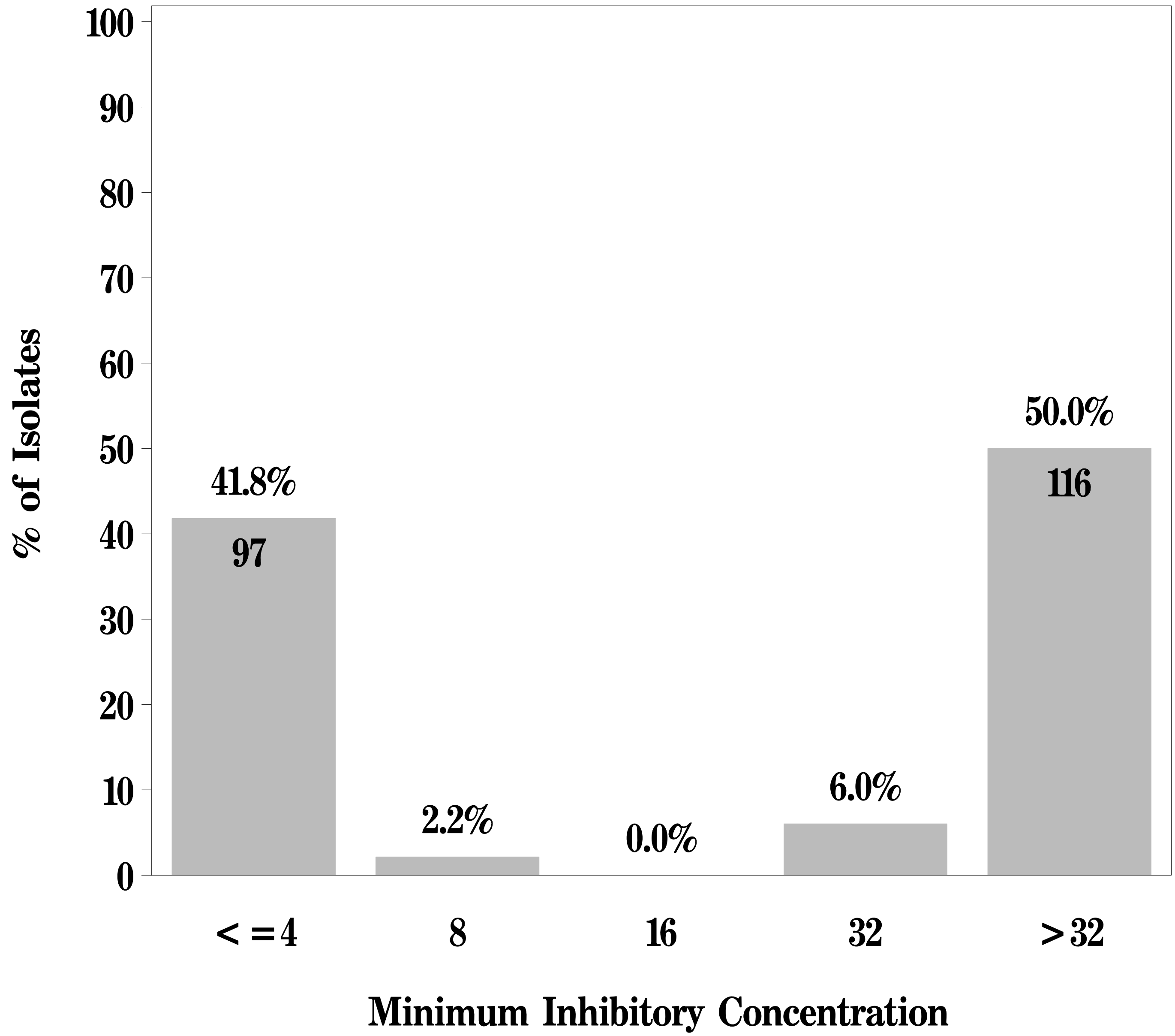
Breakpoints: Susceptible <=4 μg/mL Resistant >=16 μg/mL



NARMS

Figure 19n: Minimum Inhibitory Concentration of Tetracycline for *Escherichia coli* in Pork Chop (N=232 Isolates)

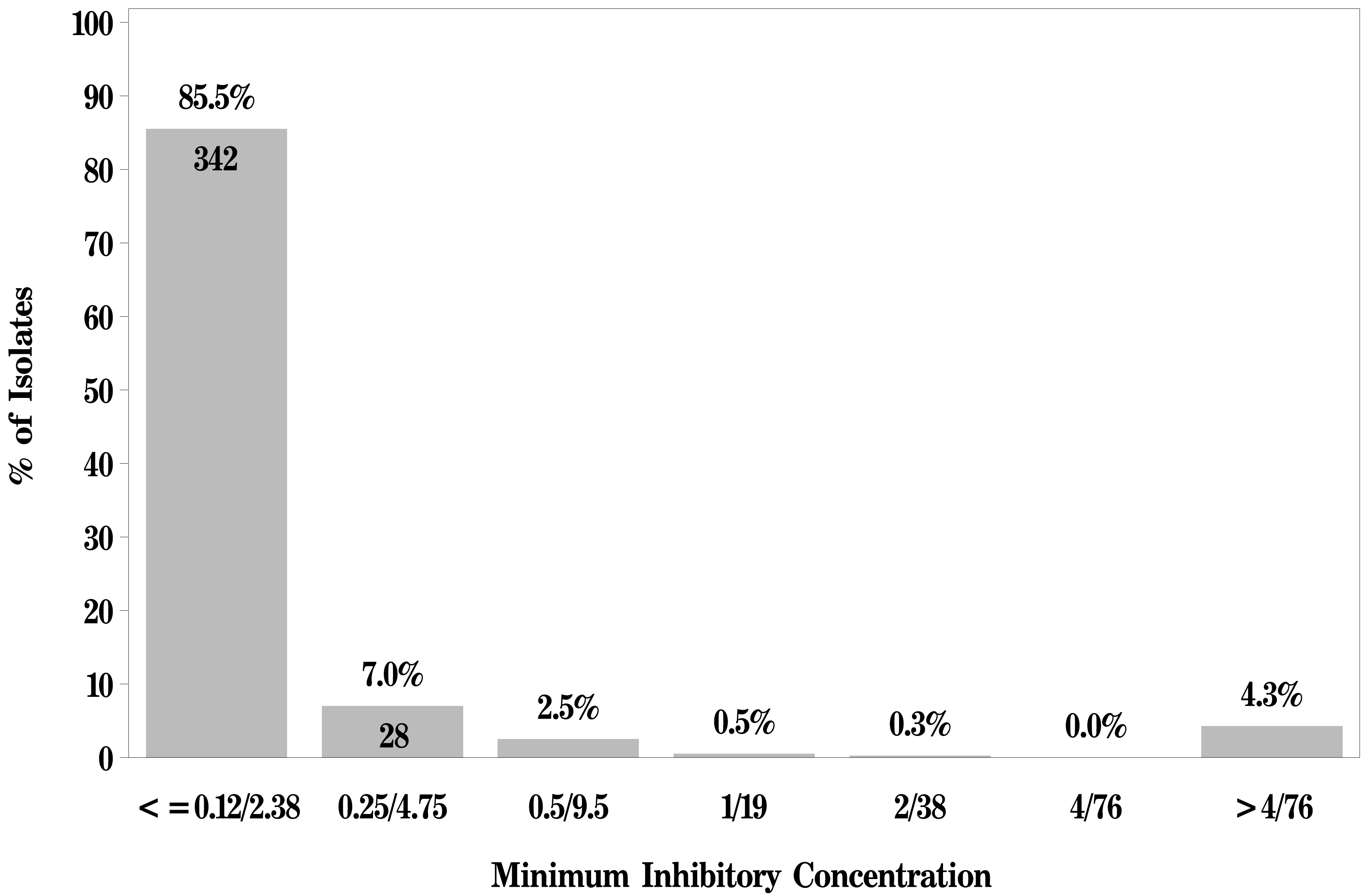
Breakpoints: Susceptible <=4 μg/mL Resistant >=16 μg/mL



NARMS

Figure 19o: Minimum Inhibitory Concentration of Trimethoprim/sulfamethoxazole for *Escherichia coli* in Chicken Breast (N=400 Isolates)

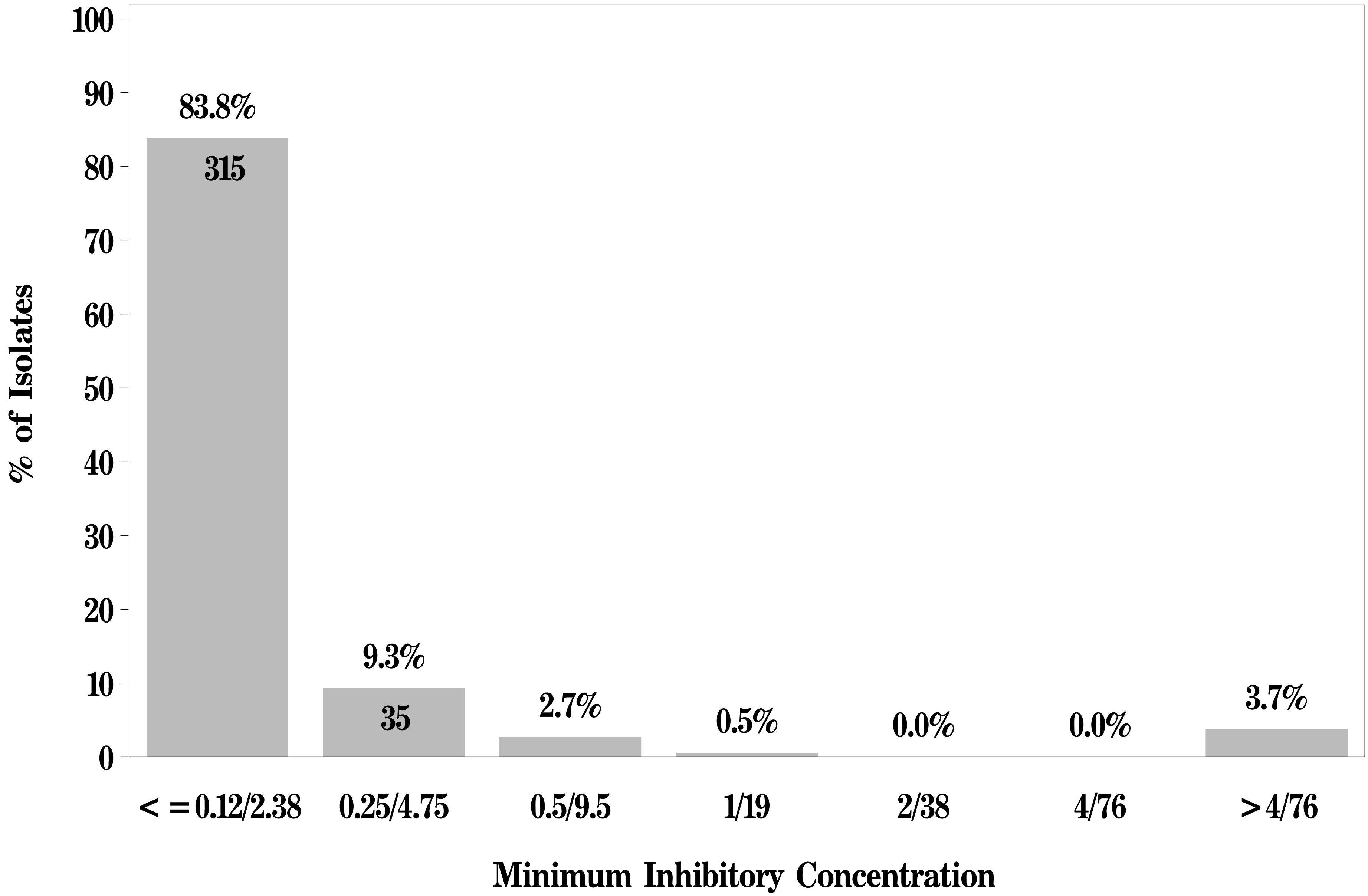
Breakpoints: Susceptible <=2 μg/mL Resistant >=4 μg/mL



NARMS

Figure 19o: Minimum Inhibitory Concentration of Trimethoprim/sulfamethoxazole for *Escherichia coli* in Ground Turkey (N=376 Isolates)

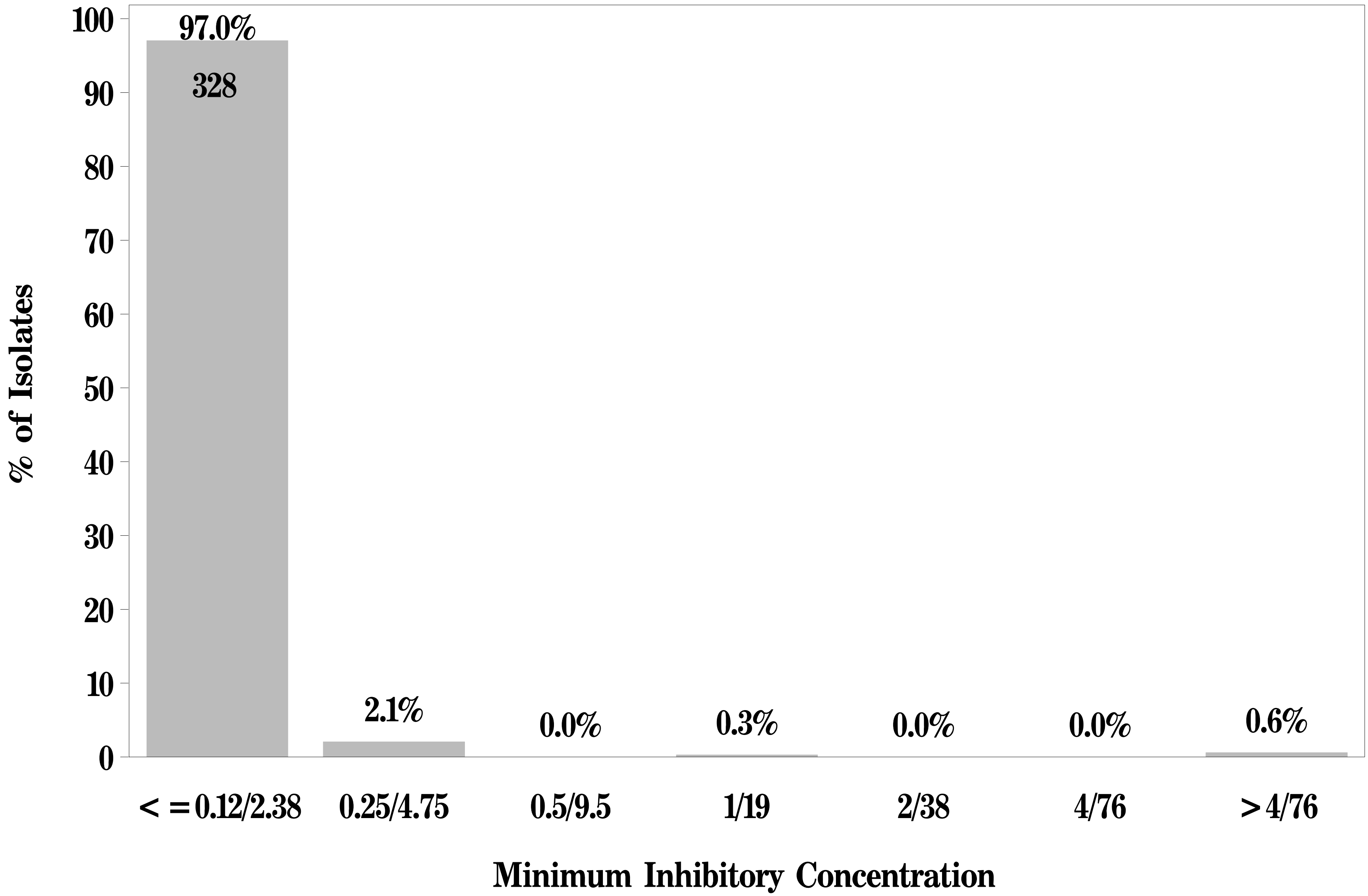
Breakpoints: Susceptible<=2 μg/mL Resistant>=4 μg/mL



NARMS

Figure 19o: Minimum Inhibitory Concentration of Trimethoprim/sulfamethoxazole for *Escherichia coli* in Ground Beef (N=338 Isolates)

Breakpoints: Susceptible <=2 μg/mL Resistant >=4 μg/mL



NARMS

Figure 19o: Minimum Inhibitory Concentration of Trimethoprim/sulfamethoxazole for *Escherichia coli* in Pork Chop (N=232 Isolates)

Breakpoints: Susceptible <=2 μg/mL Resistant >=4 μg/mL

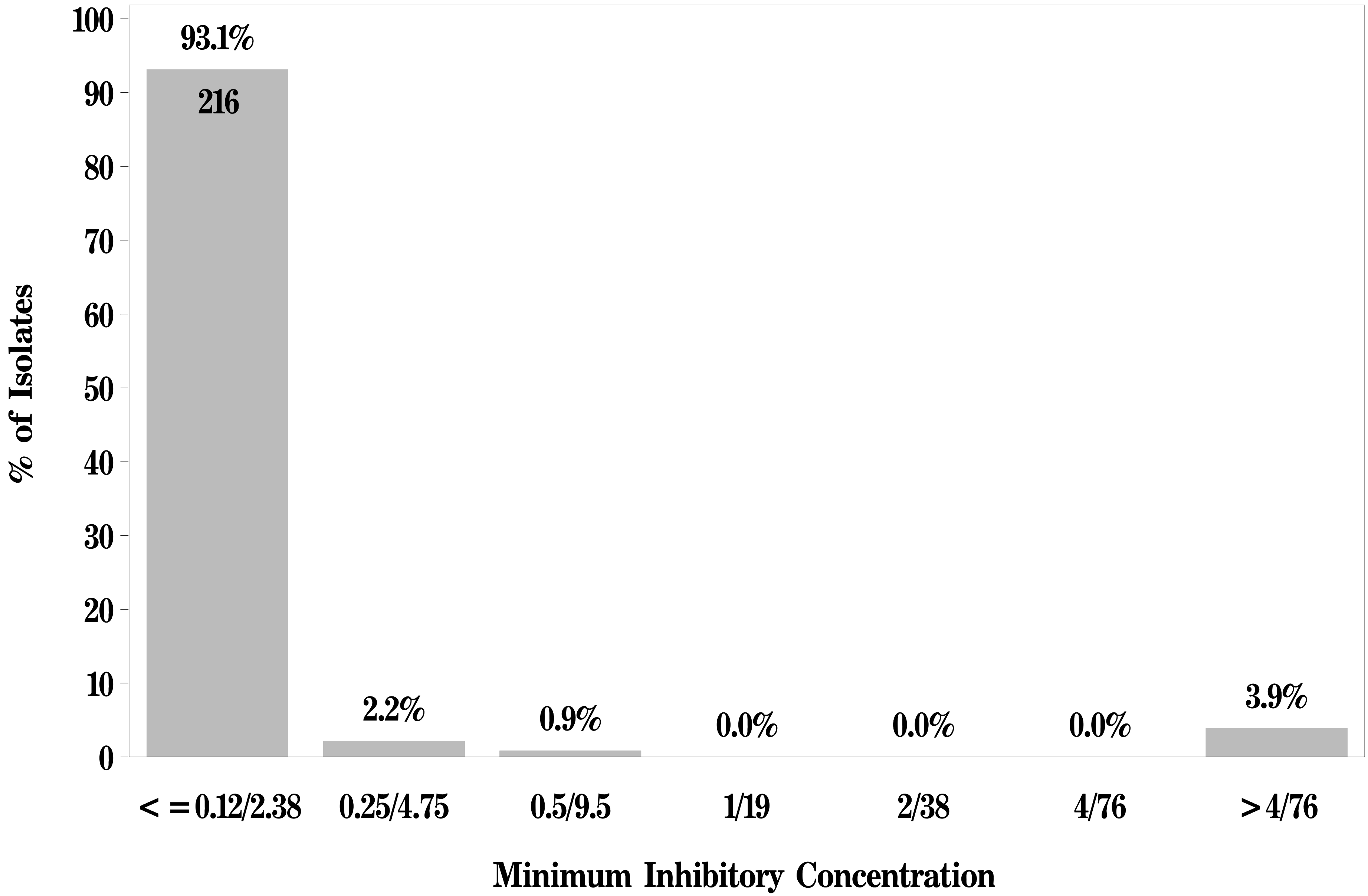


Table 41. Antimicrobial Resistance among *Escherichia coli* by Meat Type, 2004

Meat Type	Antimicrobial Agent														
	TET	STR	FIS	AMP	GEN	KAN	AMC	NAL	FOX	COT	CHL	TIO	CIP	AMI	AXO
Chicken Breast (n=400)	48.0%*	56.8%	41.3%	17.0%	30.0%	6.8%	10.0%	7.0%	8.3%	4.3%	1.8%	5.8%	-†	-	-
Ground Turkey (n=376)	74.2%	49.2%	48.4%	33.2%	29.3%	16.0%	5.3%	10.6%	4.5%	3.7%	0.8%	1.1%	0.8%	-	-
Ground Beef (n=338)	22.8%	11.8%	13.0%	5.3%	0.6%	2.4%	3.8%	1.5%	1.2%	0.6%	3.6%	0.9%	-	-	-
Pork Chop (n=232)	56.0%	21.1%	19.4%	15.1%	1.3%	8.2%	5.6%	-	2.2%	3.9%	4.3%	0.4%	-	-	-
Total (N=1346)	50.4%	37.2%	32.4%	18.3%	17.5%	8.5%	6.4%	5.4%	4.4%	3.1%	2.4%	2.3%	0.2%	-	-

* Where % Resistance = (# *E. coli* isolates resistant to antimicrobial) / (total # *E. coli* isolates).

† Dashes indicate 0.0% resistance to antimicrobial.

Table 42. Antimicrobial Resistance among *Escherichia coli* by Site, Meat Type, and Antimicrobial Agent, 2004

Site	Meat Type	Antimicrobial Agent														
		TET	**STR**	**FIS**	**AMP**	**GEN**	**KAN**	**AMC**	**NAL**	**FOX**	**COT**	**CHL**	**TIO**	**CIP**	**AMI**	**AXO**
GA	CB (n=115)	44.3%*	50.4%	54.8%	12.2%	46.1%	5.2%	7.8%	4.3%	6.1%	5.2%	0.9%	4.3%	-†	-	-
	GT (n=119)	74.8%	54.6%	46.2%	36.1%	29.4%	15.1%	3.4%	6.7%	3.4%	-	0.8%	0.8%	-	-	-
	GB (n=91)	18.7%	13.2%	14.3%	6.6%	1.1%	6.6%	4.4%	-	3.3%	-	2.2%	2.2%	-	-	-
	PC (n=64)	46.9%	12.5%	10.9%	10.9%	-	10.9%	-	-	1.6%	3.1%	1.6%	-	-	-	-
	Total (n=389)	48.1%	36.8%	35.5%	18.0%	22.9%	9.5%	4.4%	3.3%	3.9%	2.1%	1.3%	2.1%	-	-	-
MD	CB (n=110)	39.1%	58.2%	32.7%	20.0%	20.0%	3.6%	15.5%	10.9%	13.6%	3.6%	-	7.3%	-	-	-
	GT (n=109)	69.7%	40.4%	43.1%	36.7%	27.5%	14.7%	7.3%	16.5%	4.6%	5.5%	-	-	0.9%	-	-
	GB (n=83)	21.7%	10.8%	8.4%	2.4%	-	-	1.2%	1.2%	-	-	2.4%	-	-	-	-
	PC (n=62)	54.8%	14.5%	11.3%	17.7%	3.2%	4.8%	6.5%	-	1.6%	1.6%	4.8%	-	-	-	-
	Total (n=364)	47.0%	34.6%	26.6%	20.6%	14.8%	6.3%	8.2%	8.5%	5.8%	3.0%	1.4%	2.2%	0.3%	-	-
OR	CB (n=73)	57.5%	54.8%	30.1%	20.5%	15.1%	5.5%	9.6%	8.2%	6.8%	4.1%	4.1%	5.5%	-	-	-
	GT (n=53)	73.6%	49.1%	41.5%	17.0%	15.1%	18.9%	1.9%	11.3%	1.9%	3.8%	1.9%	-	-	-	-
	GB (n=99)	25.3%	11.1%	15.2%	7.1%	1.0%	1.0%	7.1%	-	1.0%	1.0%	8.1%	1.0%	-	-	-
	PC (n=51)	64.7%	35.3%	29.4%	25.5%	-	5.9%	5.9%	-	3.9%	7.8%	5.9%	2.0%	-	-	-
	Total (n=276)	50.4%	34.4%	26.8%	15.9%	7.2%	6.5%	6.5%	4.3%	3.3%	3.6%	5.4%	2.2%	-	-	-
TN	CB (n=102)	54.9%	63.7%	43.1%	16.7%	33.3%	12.7%	6.9%	4.9%	5.9%	3.9%	2.9%	5.9%	-	-	-
	GT (n=95)	78.9%	52.6%	61.1%	34.7%	38.9%	16.8%	7.4%	8.4%	7.4%	6.3%	1.1%	3.2%	2.1%	-	-
	GB (n=65)	26.2%	12.3%	13.8%	4.6%	-	1.5%	1.5%	6.2%	-	1.5%	-	-	-	-	-
	PC (n=55)	60.0%	25.5%	29.1%	7.3%	1.8%	10.9%	10.9%	-	1.8%	3.6%	5.5%	-	-	-	-
	Total (n=317)	57.1%	43.2%	40.1%	18.0%	22.7%	11.4%	6.6%	5.4%	4.4%	4.1%	2.2%	2.8%	0.6%	-	-
Total (N=1346)		50.4%	37.2%	32.4%	18.3%	17.5%	8.5%	6.4%	5.4%	4.4%	3.1%	2.4%	2.3%	0.2%	-	-

* Where % Resistance = (# isolates resistant to antimicrobial per meat type per site) / (total # isolates per meat type per site).
† Dashes indicate 0.0% resistance to antimicrobial.

Table 43. Number of *Escherichia coli* Resistant to Multiple Antimicrobial Agents, 2004

Meat Type	Number of Antimicrobials				
	0	**1**	**2-4**	**5-7**	**≥8**
Chicken Breast	86	97	190	23	4
Ground Turkey	74	61	212	24	5
Ground Beef	249	45	36	7	1
Pork Chop	90	72	64	6	0
Total	**499**	**275**	**502**	**60**	**10**

Appendix A-1. Number of Samples Tested by Site, Meat Type, and Month, 2004

Site: CA

Meat Type	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Chicken Breast	10	10	10	10	10	10	10	10	10	10	10	10	120
Ground Turkey	10	10	10	10	10	10	10	10	10	10	10	10	120
Ground Beef	10	10	10	10	10	10	10	10	10	10	10	10	120
Pork Chop	10	10	10	10	10	10	10	10	10	10	10	10	120
Total	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**480**

Site: CO

Meat Type	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Chicken Breast	1	6	7	6	7	10	10	10	10	10	10	10	97
Ground Turkey	5	4	9	6	7	10	10	10	10	10	10	10	101
Ground Beef	8	6	9	6	7	10	10	10	10	10	10	10	106
Pork Chop	2	6	8	6	7	10	10	10	10	10	10	10	99
Total	**16**	**22**	**33**	**24**	**28**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	403

Site: CT

Meat Type	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Chicken Breast	10	10	10	10	10	10	10	10	10	10	10	10	120
Ground Turkey	10	10	10	10	10	10	10	10	10	10	10	10	120
Ground Beef	10	10	10	10	10	10	10	10	10	10	10	10	120
Pork Chop	10	10	10	10	10	10	10	10	10	10	10	10	120
Total	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**480**

Site: GA

Meat Type	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Chicken Breast	10	10	10	10	10	10	10	10	10	10	10	10	120
Ground Turkey	10	10	10	10	10	10	10	10	10	10	10	10	120
Ground Beef	10	10	10	10	10	10	10	10	10	10	10	10	120
Pork Chop	10	10	10	10	10	10	10	10	10	10	10	10	120
Total	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**480**

Site: MD

Meat Type	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Chicken Breast	10	10	10	10	10	10	10	10	10	10	10	10	120
Ground Turkey	10	10	10	10	10	10	10	10	10	10	10	10	120
Ground Beef	10	10	10	10	10	10	10	10	10	10	10	10	120
Pork Chop	10	10	10	10	10	10	10	10	10	10	10	10	120
Total	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**480**

Site: MN

Meat Type	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Chicken Breast	10	10	10	10	10	10	10	10	10	10	10	10	120
Ground Turkey	10	10	10	10	10	10	10	10	10	10	10	10	120
Ground Beef	10	10	10	10	10	10	10	10	10	10	10	10	120
Pork Chop	10	10	10	10	10	10	10	10	10	10	10	10	120
Total:	**20**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**480**

Site: NM

Meat Type	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Chicken Breast	9	10	10	10	10	10	10	10	10	10	10	10	119
Ground Turkey	9	10	9	10	10	10	10	10	10	10	10	10	120
Ground Beef	10	10	10	10	10	10	10	10	10	10	10	10	118
Pork Chop	10	10	9	10	10	10	10	10	10	10	10	10	119
Total:	**38**	**40**	**38**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**476**

Site: NY

Meat Type	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Chicken Breast	10	10	10	10	10	10	10	10	10	10	10	10	120
Ground Turkey	10	10	10	10	10	10	10	10	10	10	10	10	120
Ground Beef	10	10	10	10	10	10	10	10	10	10	10	10	120
Pork Chop	10	10	10	10	10	10	10	10	10	10	10	10	120
Total	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**480**

Site: OR

Meat Type	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Chicken Breast	10	10	10	10	10	10	10	10	10	10	10	10	120
Ground Turkey	10	10	10	10	10	10	10	10	10	10	10	10	120
Ground Beef	10	10	10	10	10	10	10	10	10	10	10	10	120
Pork Chop	10	10	10	10	10	10	10	10	10	10	10	10	120
Total:	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**480**

Site: TN

Meat Type	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Chicken Breast	10	10	10	10	10	10	8	10	10	10	8	10	116
Ground Turkey	10	7	10	10	10	4	10	7	10	8	10	10	106
Ground Beef	10	10	10	10	10	10	10	10	10	10	10	10	120
Pork Chop	10	10	10	10	10	10	10	10	10	10	8	10	118
Total:	**40**	**37**	**40**	**40**	**40**	**34**	**38**	**37**	**40**	**38**	**36**	**40**	**460**

Total Year: **4699**

Appendix A-2. Percent Positive* Samples by Month, Meat Type, and Bacterium, 2004

Month: **January**

Meat Type: Chicken Breast

Bacterium	# of Samples	# of Isolates	Positive (%)
Campylobacter	90	60	66.7%
Salmonella	90	16	17.8%
Enterococcus	40	38	95.0%
Escherichia coli	40	36	90.0%

Meat Type: Ground Turkey

Bacterium	# of Samples	# of Isolates	Positive (%)
Campylobacter	94	1	1.1%
Salmonella	94	22	23.4%
Enterococcus	40	39	97.5%
Escherichia coli	40	37	92.5%

Meat Type: Ground Beef

Bacterium	# of Samples	# of Isolates	Positive (%)
Campylobacter	98	0	0.0%
Salmonella	98	5	5.1%
Enterococcus	40	36	90.0%
Escherichia coli	40	24	60.0%

Meat Type: Pork Chop

Bacterium	# of Samples	# of Isolates	Positive (%)
Campylobacter	92	0	0.0%
Salmonella	92	6	6.5%
Enterococcus	40	35	87.5%
Escherichia coli	40	20	50.0%

** Where % Positive= (# isolates of isolates / # of samples).

Month: February

Meat Type: Chicken Breast

Bacterium	# of Samples	# of Isolates	Positive (%)
Campylobacter	96	59	61.5%
Salmonella	96	9	9.4%
Enterococcus	40	40	100.0%
Escherichia coli	40	37	92.5%

Meat Type: Ground Turkey

Bacterium	# of Samples	# of Isolates	Positive (%)
Campylobacter	91	0	0.0%
Salmonella	91	8	8.8%
Enterococcus	37	33	89.2%
Escherichia coli	37	25	67.6%

Meat Type: Ground Beef

Bacterium	# of Samples	# of Isolates	Positive (%)
Campylobacter	96	0	0.0%
Salmonella	96	0	0.0%
Enterococcus	40	39	97.5%
Escherichia coli	40	28	70.0%

Meat Type: Pork Chop

Bacterium	# of Samples	# of Isolates	Positive (%)
Campylobacter	96	0	0.0%
Salmonella	96	1	1.0%
Enterococcus	40	32	80.0%
Escherichia coli	40	16	40.0%

Month: March

Meat Type: Chicken Breast

Bacterium	# of Samples	# of Isolates	Positive (%)
Campylobacter	97	47	48.5%
Salmonella	97	18	18.6%
Enterococcus	40	39	97.5%
Escherichia coli	40	37	92.5%

Meat Type: Ground Turkey

Bacterium	# of Samples	# of Isolates	Positive (%)
Campylobacter	98	2	2.0%
Salmonella	98	2	2.0%
Enterococcus	40	34	85.0%
Escherichia coli	40	29	72.5%

Meat Type: Ground Beef

Bacterium	# of Samples	# of Isolates	Positive (%)
Campylobacter	99	0	0.0%
Salmonella	99	0	0.0%
Enterococcus	40	33	82.5%
Escherichia coli	40	26	65.0%

Meat Type: Pork Chop

Bacterium	# of Samples	# of Isolates	Positive (%)
Campylobacter	97	0	0.0%
Salmonella	97	1	1.0%
Enterococcus	40	34	85.0%
Escherichia coli	40	15	37.5%

Month: April

Meat Type: Chicken Breast

Bacterium	# of Samples	# of Isolates	Positive (%)
Campylobacter	96	35	36.5%
Salmonella	96	8	8.3%
Enterococcus	40	40	100.0%
Escherichia coli	40	34	85.0%

Meat Type: Ground Turkey

Bacterium	# of Samples	# of Isolates	Positive (%)
Campylobacter	96	0	0.0%
Salmonella	96	18	18.8%
Enterococcus	40	39	97.5%
Escherichia coli	40	31	77.5%

Meat Type: Ground Beef

Bacterium	# of Samples	# of Isolates	Positive (%)
Campylobacter	96	0	0.0%
Salmonella	96	1	1.0%
Enterococcus	40	39	97.5%
Escherichia coli	40	25	62.5%

Meat Type: Pork Chop

Bacterium	# of Samples	# of Isolates	Positive (%)
Campylobacter	96	0	0.0%
Salmonella	96	1	1.0%
Enterococcus	40	38	95.0%
Escherichia coli	40	25	62.5%

Month: **May**

Meat Type: Chicken Breast

Bacterium	# of Samples	# of Isolates	Positive (%)
Campylobacter	97	51	52.6%
Salmonella	97	7	7.2%
Enterococcus	40	39	97.5%
Escherichia coli	40	36	90.0%

Meat Type: Ground Turkey

Bacterium	# of Samples	# of Isolates	Positive (%)
Campylobacter	97	0	0.0%
Salmonella	97	17	17.5%
Enterococcus	40	39	97.5%
Escherichia coli	40	36	90.0%

Meat Type: Ground Beef

Bacterium	# of Samples	# of Isolates	Positive (%)
Campylobacter	97	0	0.0%
Salmonella	97	1	1.0%
Enterococcus	40	39	97.5%
Escherichia coli	40	33	82.5%

Meat Type: Pork Chop

Bacterium	# of Samples	# of Isolates	Positive (%)
Campylobacter	97	0	0.0%
Salmonella	97	0	0.0%
Enterococcus	40	36	90.0%
Escherichia coli	40	22	55.0%

Month: June

Meat Type: Chicken Breast

Bacterium	# of Samples	# of Isolates	Positive (%)
Campylobacter	100	59	59.0%
Salmonella	100	12	12.0%
Enterococcus	40	37	92.5%
Escherichia coli	40	34	85.0%

Meat Type: Ground Turkey

Bacterium	# of Samples	# of Isolates	Positive (%)
Campylobacter	94	2	2.1%
Salmonella	94	11	11.7%
Enterococcus	34	34	100.0%
Escherichia coli	34	24	70.6%

Meat Type: Ground Beef

Bacterium	# of Samples	# of Isolates	Positive (%)
Campylobacter	100	0	0.0%
Salmonella	100	0	0.0%
Enterococcus	40	35	87.5%
Escherichia coli	40	25	62.5%

Meat Type: Pork Chop

Bacterium	# of Samples	# of Isolates	Positive (%)
Campylobacter	100	1	1.0
Salmonella	100	0	0.0%
Enterococcus	40	30	75.0%
Escherichia coli	40	13	32.5%

Month: July

Meat Type: Chicken Breast

Bacterium	# of Samples	# of Isolates	Positive (%)
Campylobacter	98	67	68.4%
Salmonella	98	10	10.2%
Enterococcus	38	38	100.0%
Escherichia coli	38	29	76.3%

Meat Type: Ground Turkey

Bacterium	# of Samples	# of Isolates	Positive (%)
Campylobacter	100	1	1.0%
Salmonella	100	17	17.0%
Enterococcus	40	38	95.0%
Escherichia coli	40	33	82.5%

Meat Type: Ground Beef

Bacterium	# of Samples	# of Isolates	Positive (%)
Campylobacter	100	0	0.0%
Salmonella	100	5	5.0%
Enterococcus	40	36	90.0%
Escherichia coli	40	24	60.0%

Meat Type: Pork Chop

Bacterium	# of Samples	# of Isolates	Positive (%)
Campylobacter	100	0	0.0%
Salmonella	100	0	0.0%
Enterococcus	40	23	57.5%
Escherichia coli	40	21	52.5%

Month: August

Meat Type: Chicken Breast

Bacterium	# of Samples	# of Isolates	Positive (%)
Campylobacter	100	62	62.0%
Salmonella	100	16	16.0%
Enterococcus	40	40	100.0%
Escherichia coli	40	31	77.5%

Meat Type: Ground Turkey

Bacterium	# of Samples	# of Isolates	Positive (%)
Campylobacter	97	0	0.0%
Salmonella	97	17	17.5%
Enterococcus	37	33	89.2%
Escherichia coli	37	29	78.4%

Meat Type: Ground Beef

Bacterium	# of Samples	# of Isolates	Positive (%)
Campylobacter	100	0	0.0%
Salmonella	100	1	1.0%
Enterococcus	40	39	97.5%
Escherichia coli	40	35	87.5%

Meat Type: Pork Chop

Bacterium	# of Samples	# of Isolates	Positive (%)
Campylobacter	100	0	0.0%
Salmonella	100	0	0.0%
Enterococcus	40	36	90.0%
Escherichia coli	40	22	55.0%

Month: September

Meat Type: Chicken Breast

Bacterium	# of Samples	# of Isolates	Positive (%)
Campylobacter	100	72	72.0%
Salmonella	100	14	14.0%
Enterococcus	40	40	100.0%
Escherichia coli	40	31	77.5%

Meat Type: Ground Turkey

Bacterium	# of Samples	# of Isolates	Positive (%)
Campylobacter	100	1	1.0%
Salmonella	100	5	5.0%
Enterococcus	40	38	95.0%
Escherichia coli	40	31	77.5%

Meat Type: Ground Beef

Bacterium	# of Samples	# of Isolates	Positive (%)
Campylobacter	100	0	0.0%
Salmonella	100	0	0.0%
Enterococcus	40	39	97.5%
Escherichia coli	40	29	72.5%

Meat Type: Pork Chop

Bacterium	# of Samples	# of Isolates	Positive (%)
Campylobacter	100	0	0.0%
Salmonella	100	0	0.0%
Enterococcus	40	37	92.5%
Escherichia coli	40	20	50.0%

Month: October

Meat Type: Chicken Breast

Bacterium	# of Samples	# of Isolates	Positive (%)
Campylobacter	100	73	73.0%
Salmonella	100	20	20.0%
Enterococcus	40	39	97.5%
Escherichia coli	40	32	80.0%

Meat Type: Ground Turkey

Bacterium	# of Samples	# of Isolates	Positive (%)
Campylobacter	98	0	0.0%
Salmonella	98	4	4.1%
Enterococcus	38	34	89.5%
Escherichia coli	38	31	81.6%

Meat Type: Ground Beef

Bacterium	# of Samples	# of Isolates	Positive (%)
Campylobacter	100	0	0.0%
Salmonella	100	0	0.0%
Enterococcus	40	36	90.0%
Escherichia coli	40	33	82.5%

Meat Type: Pork Chop

Bacterium	# of Samples	# of Isolates	Positive (%)
Campylobacter	100	1	1.0%
Salmonella	100	0	0.0%
Enterococcus	40	32	80.0%
Escherichia coli	40	22	55.0%

Month: November

Meat Type: Chicken Breast

Bacterium	# of Samples	# of Isolates	Positive (%)
Campylobacter	98	58	59.2%
Salmonella	98	13	13.3%
Enterococcus	38	37	97.4%
Escherichia coli	38	29	76.3%

Meat Type: Ground Turkey

Bacterium	# of Samples	# of Isolates	Positive (%)
Campylobacter	100	5	5.0%
Salmonella	100	13	13.0%
Enterococcus	40	37	92.5%
Escherichia coli	40	34	85.0%

Meat Type: Ground Beef

Bacterium	# of Samples	# of Isolates	Positive (%)
Campylobacter	100	0	0.0%
Salmonella	100	0	0.0%
Enterococcus	40	40	100.0%
Escherichia coli	40	31	77.5%

Meat Type: Pork Chop

Bacterium	# of Samples	# of Isolates	Positive (%)
Campylobacter	98	1	1.0%
Salmonella	98	2	2.0%
Enterococcus	38	34	89.5%
Escherichia coli	38	19	50.0%

Month: December

Meat Type: Chicken Breast

Bacterium	# of Samples	# of Isolates	Positive (%)
Campylobacter	73	52	71.2%
Salmonella	73	4	5.5%
Enterococcus	38	38	100.0%
Escherichia coli	38	37	97.4%

Meat Type: Ground Turkey

Bacterium	# of Samples	# of Isolates	Positive (%)
Campylobacter	100	0	0.0%
Salmonella	100	8	8.0%
Enterococcus	40	39	97.5%
Escherichia coli	40	36	90.0%

Meat Type: Ground Beef

Bacterium	# of Samples	# of Isolates	Positive (%)
Campylobacter	100	0	0.0%
Salmonella	100	1	1.0%
Enterococcus	40	37	92.5%
Escherichia coli	40	25	62.5%

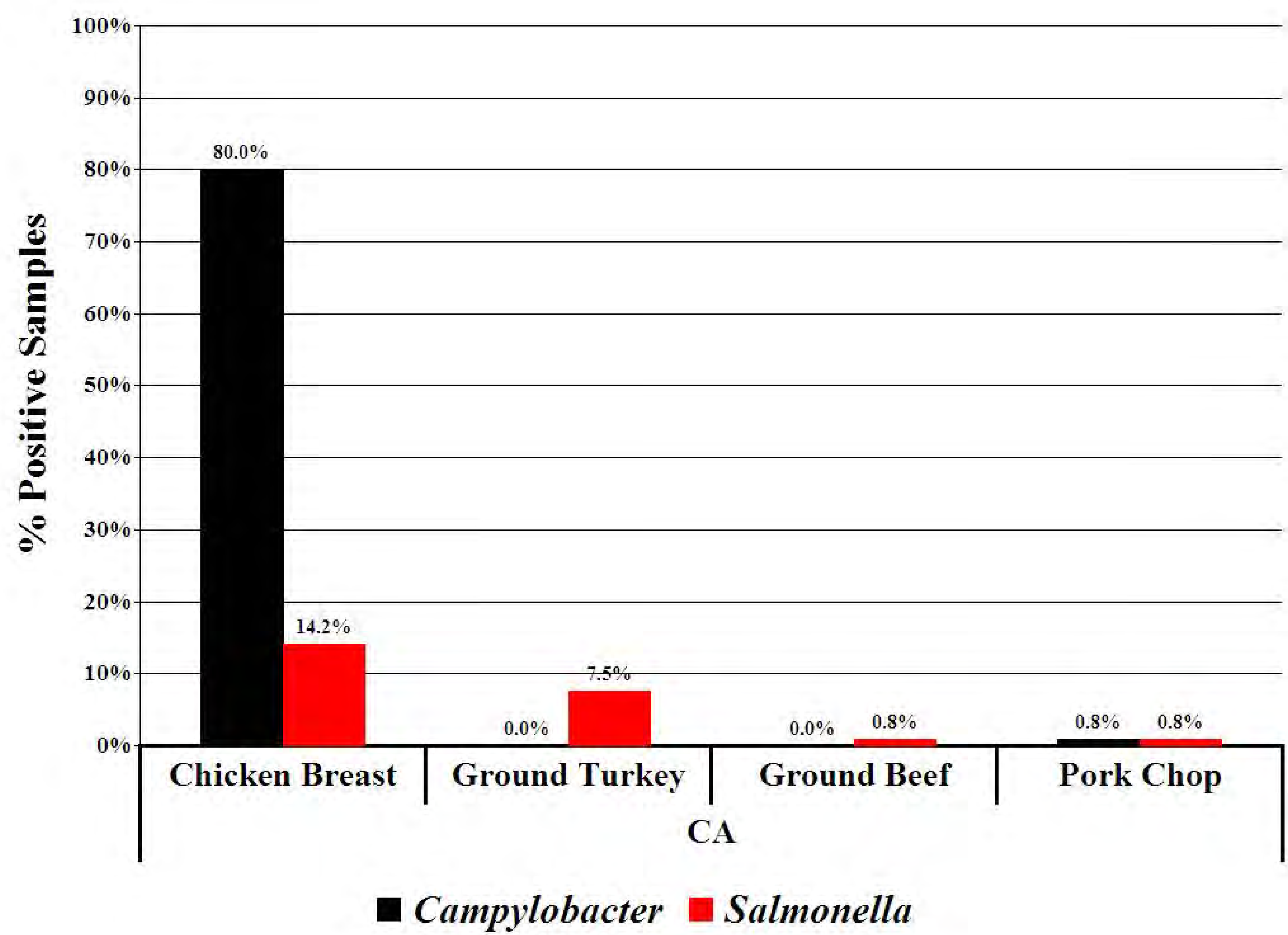
Meat Type: Pork Chop

Bacterium	# of Samples	# of Isolates	Positive (%)
Campylobacter	100	0	0.0%
Salmonella	100	0	0.0%
Enterococcus	40	37	92.5%
Escherichia coli	40	17	42.5%

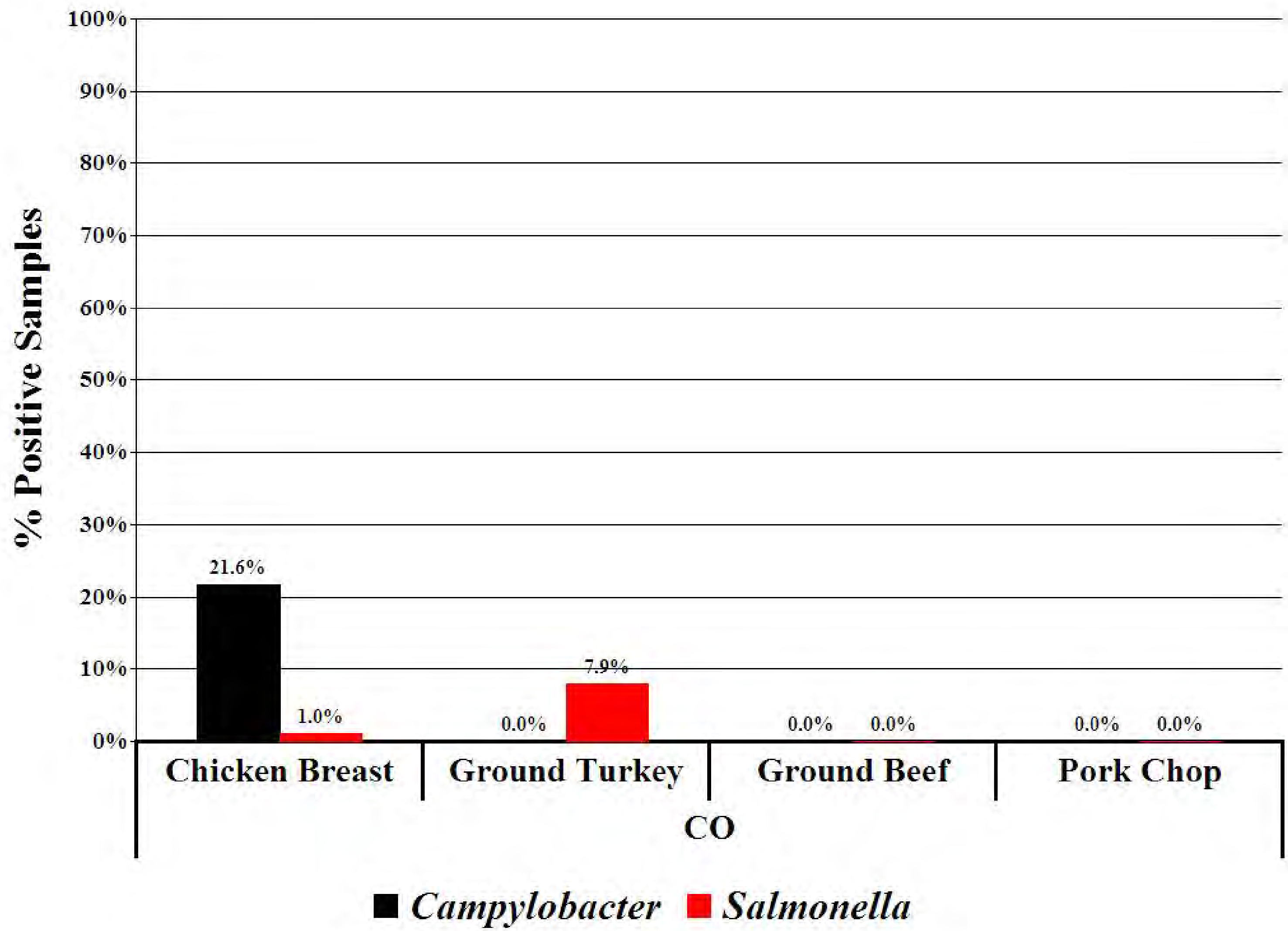
Appendix A-3. Percent Positive Samples by Meat Type, Bacterium, and Site, 2004

Meat Type	Site	*Campylobacter*			*Salmonella*			*Enterococcus*			*Escherichia coli*		
		N	Isolate	%Positive	N	Isolate	%Positive	N	Isolate	%Positive	N	Isolate	%Positive
Chicken Breast	CA	120	96	80.0%	120	17	14.2%						
	CO	97	21	21.6%	97	1	1.0%						
	CT	120	86	71.7%	120	30	25.0%						
	GA	120	61	50.8%	120	6	5.0%	120	120	100.0%	120	115	95.8%
	MD	120	76	63.3%	120	24	20.0%	120	114	95.0%	120	110	91.7%
	MN	120	73	60.8%	120	20	16.7%						
	NM	119	53	44.5%	119	3	2.5%						
	NY	120	96	80.0%	120	16	13.3%						
	OR	120	73	60.8%	120	25	20.8%	120	118	98.3%	120	73	60.8%
	TN	116	71	61.2%	116	15	12.9%	116	114	98.3%	116	102	87.9%
	Total	1172	706	60.2%	1172	157	13.4%	476	466	97.9%	476	400	84.0%
Ground Turkey	CA	120	0	-	120	9	7.5%						
	CO	101	0	-	101	8	7.9%						
	CT	120	2	1.7%	120	26	21.7%						
	GA	120	1	0.8%	120	38	31.7%	120	120	100.0%	120	119	99.2%
	MD	120	2	1.7%	120	13	10.8%	120	106	88.3%	120	109	90.8%
	MN	120	6	5.0%	120	14	11.7%						
	NM	118	0	-	118	9	7.6%						
	NY	120	0	-	120	11	9.2%						
	OR	120	0	-	120	6	5.0%	120	105	87.5%	120	53	44.2%
	TN	106	1	0.9%	106	8	7.5%	106	106	100.0%	106	95	89.6%
	Total	1165	12	1.0%	1165	142	12.2%	466	437	93.8%	466	376	80.7%
Ground Beef	CA	120	0	-	120	1	0.8%						
	CO	106	0	-	106	0	-						
	CT	120	0	-	120	5	4.2%						
	GA	120	0	-	120	1	0.8%	120	117	97.5%	120	91	75.8%
	MD	120	0	-	120	1	0.8%	120	100	83.3%	120	83	69.2%
	MN	120	0	-	120	0	-						
	NM	120	0	-	120	0	-						
	NY	120	0	-	120	0	-						
	OR	120	0	-	120	6	5.0%	120	115	95.8%	120	99	82.5%
	TN	120	0	-	120	0	-	120	116	96.7%	120	65	54.2%
	Total	1186	0	-	1186	14	1.2%	480	448	93.3%	480	338	70.4%
Pork Chop	CA	120	1	0.8%	120	1	0.8%						
	CO	99	0	-	99	0	-						
	CT	120	1	0.8%	120	5	4.2%						
	GA	120	0	-	120	0	-	120	116	96.7%	120	64	53.3%
	MD	120	0	-	120	0	-	120	77	64.2%	120	62	51.7%
	MN	120	0	-	120	0	-						
	NM	119	1	0.8%	119	0	-						
	NY	120	0	-	120	3	2.5%						
	OR	120	0	-	120	2	1.7%	120	108	90.0%	120	51	42.5%
	TN	118	0	-	118	0	-	118	103	87.3%	118	55	46.6%
	Total	1176	3	0.3%	1176	11	0.9%	478	404	84.5%	478	232	48.5%
Total		4699	721	15.3%	4699	324	6.9%	1900	1755	92.4%	1900	1346	70.8%

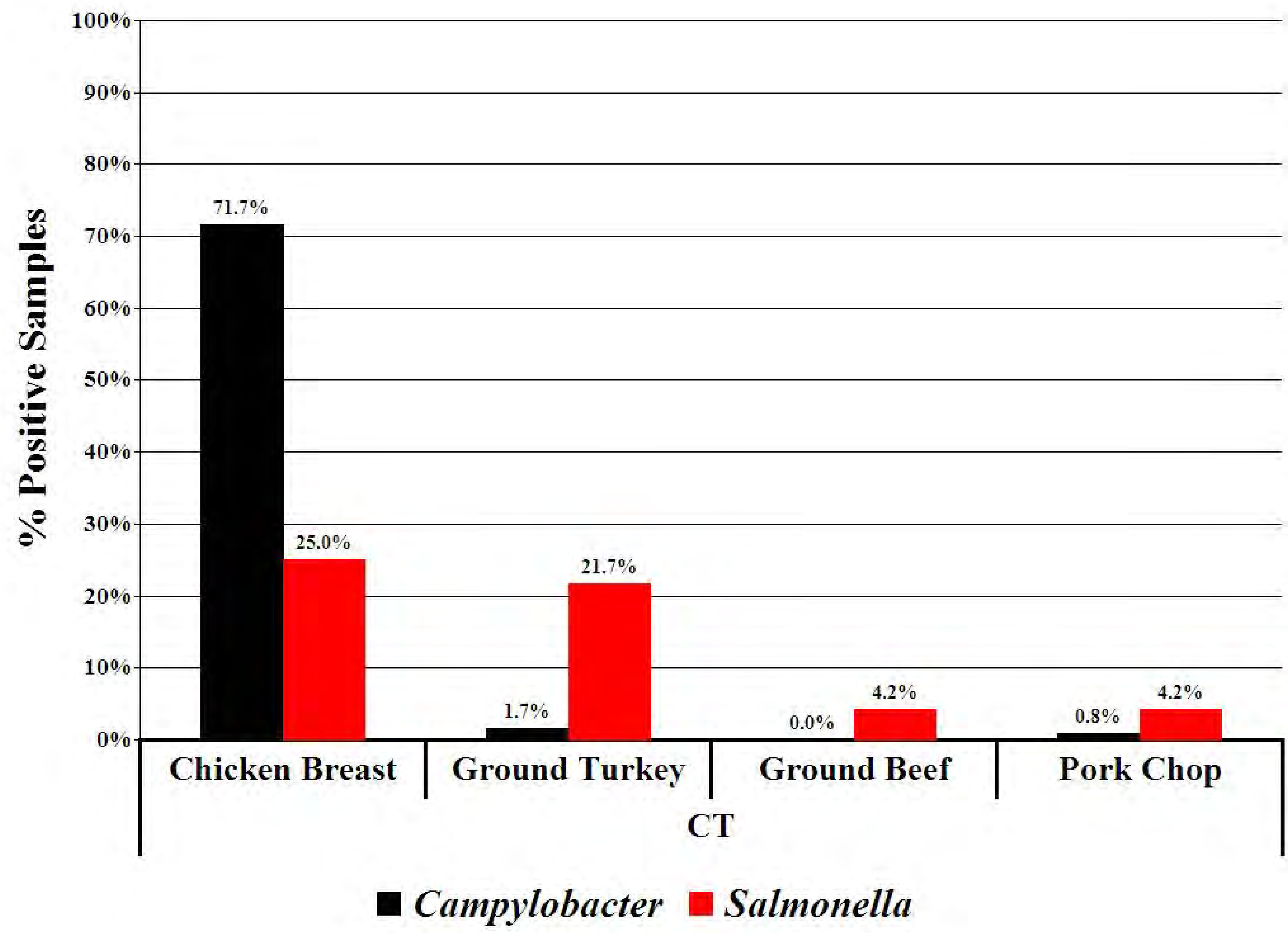
Appendix 3a. Percent Positive Samples by Meat Type, Bacterium in California, 2004



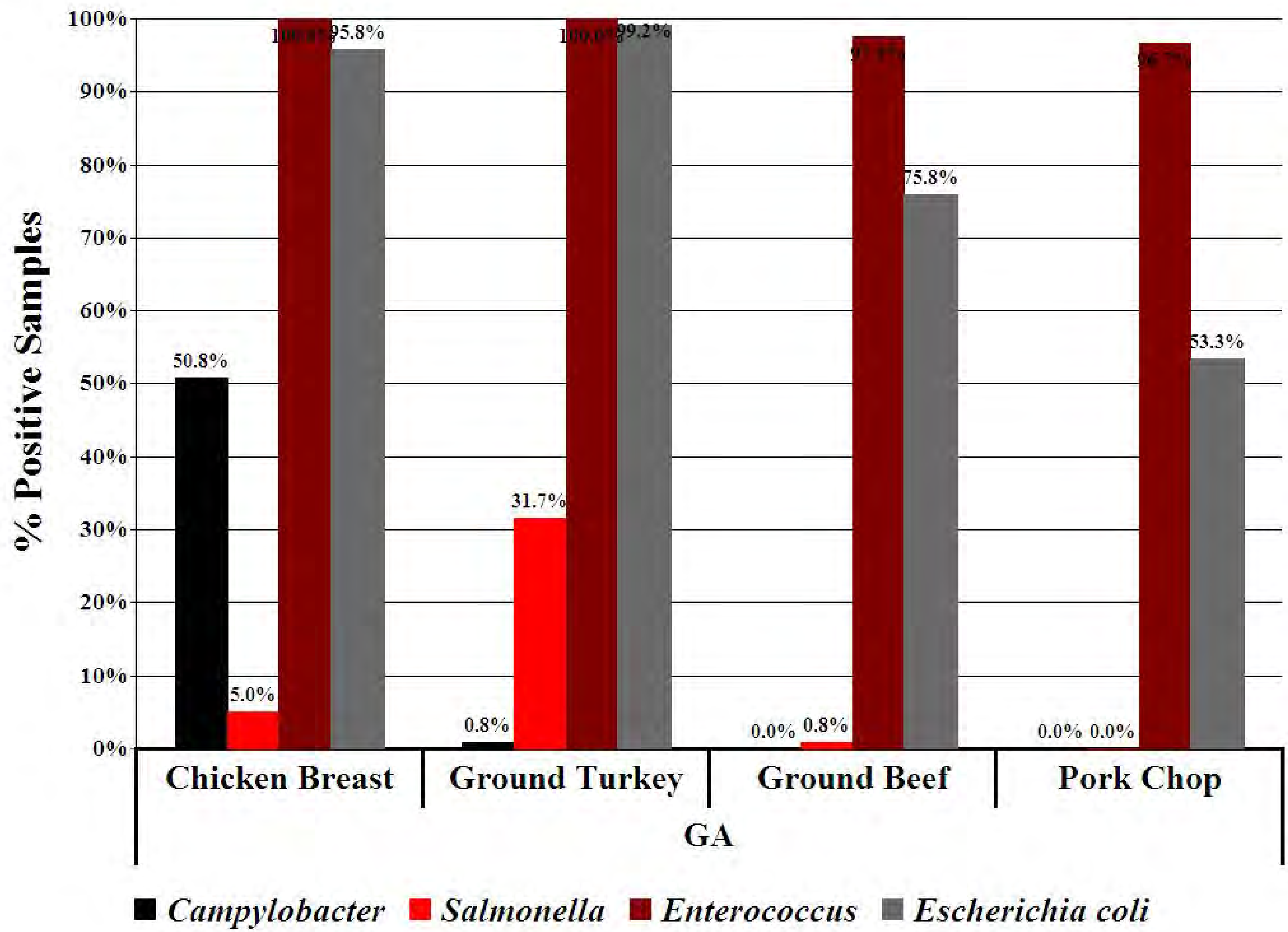
Appendix 3b. Percent Positive Samples by Meat Type, Bacterium in Colorado, 2004



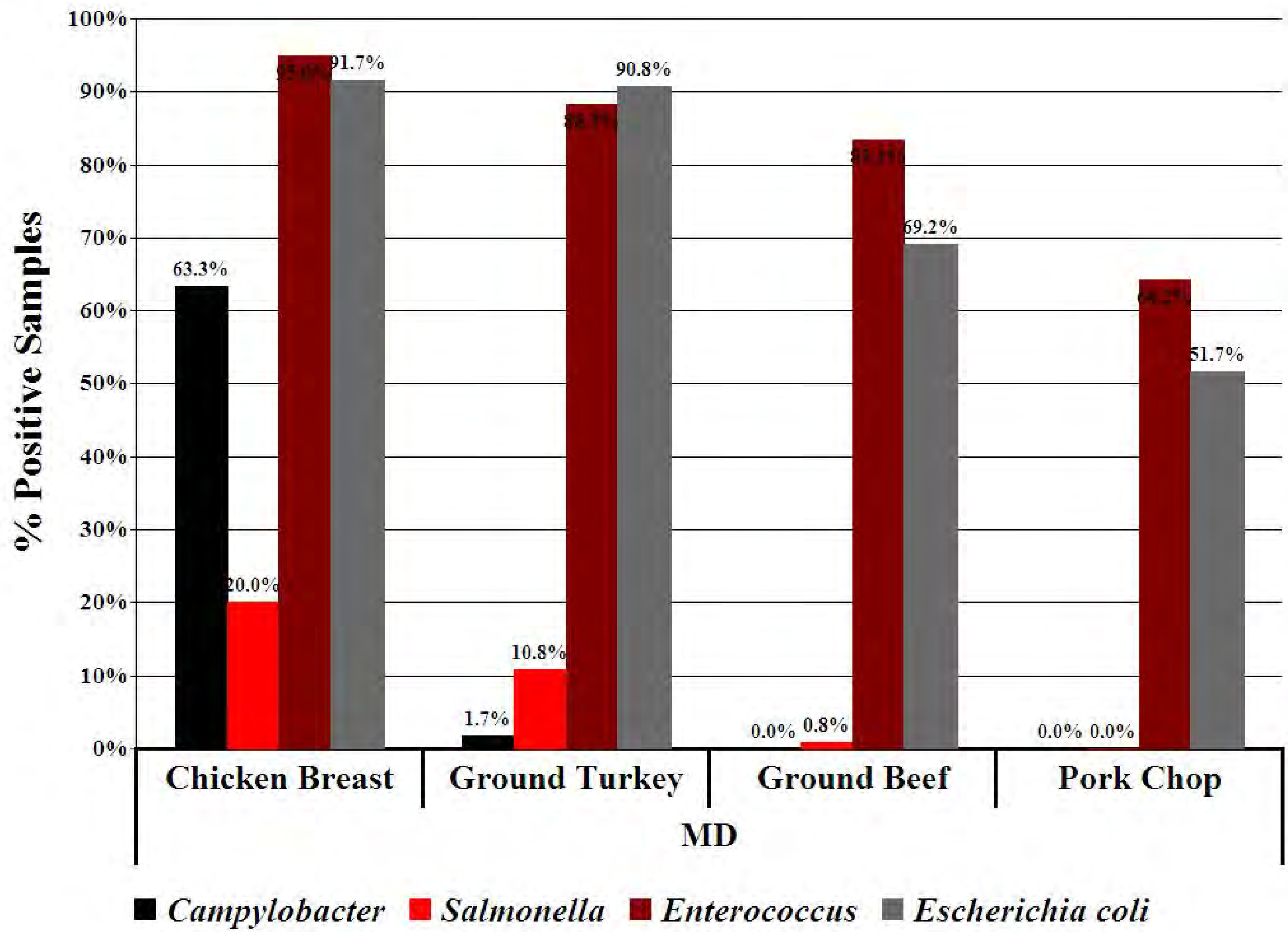
Appendix 3c. Percent Positive Samples by Meat Type, Bacterium in Connecticut, 2004



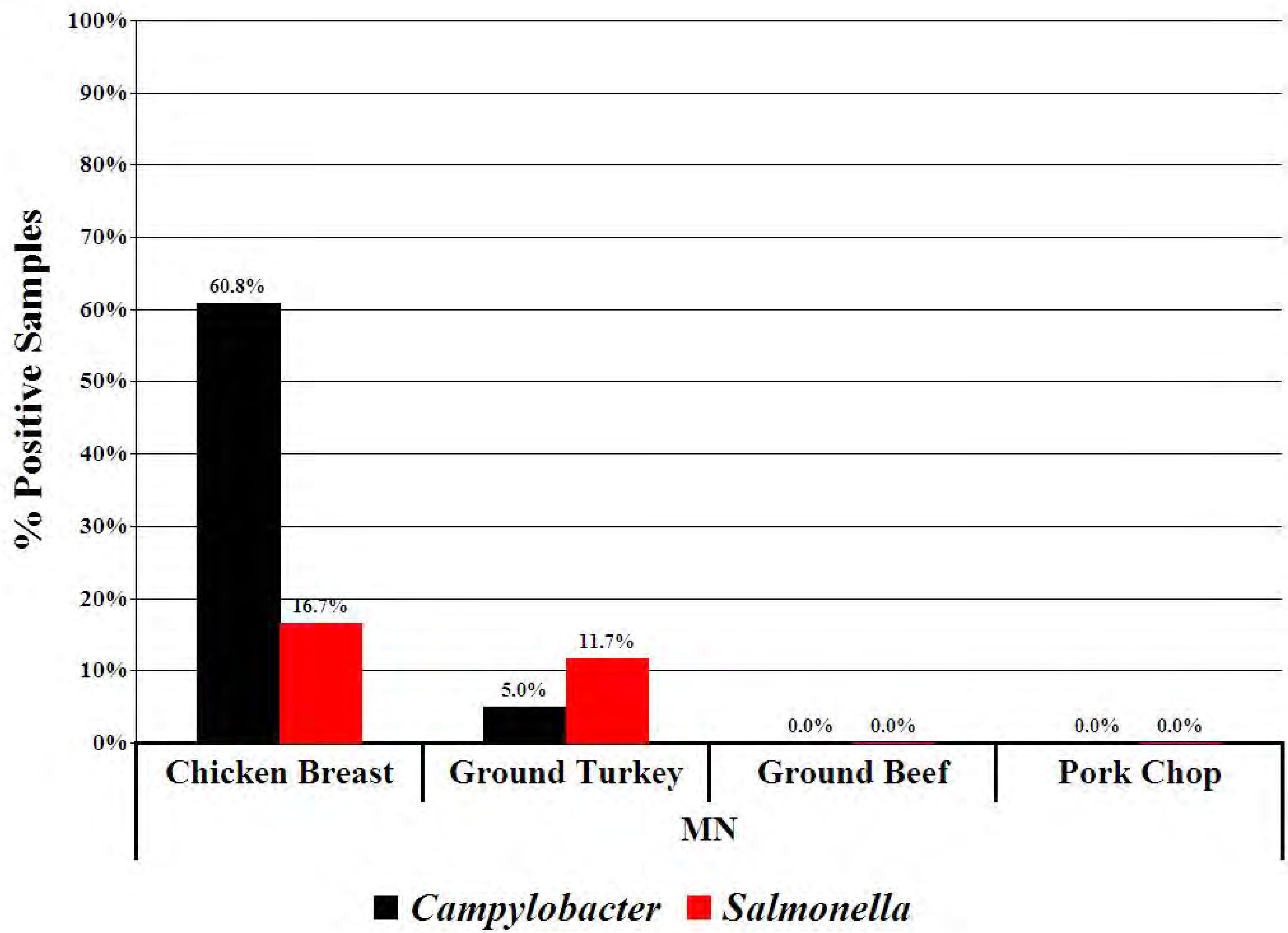
Appendix 3d. Percent Positive Samples by Meat Type, Bacterium in Georgia, 2004



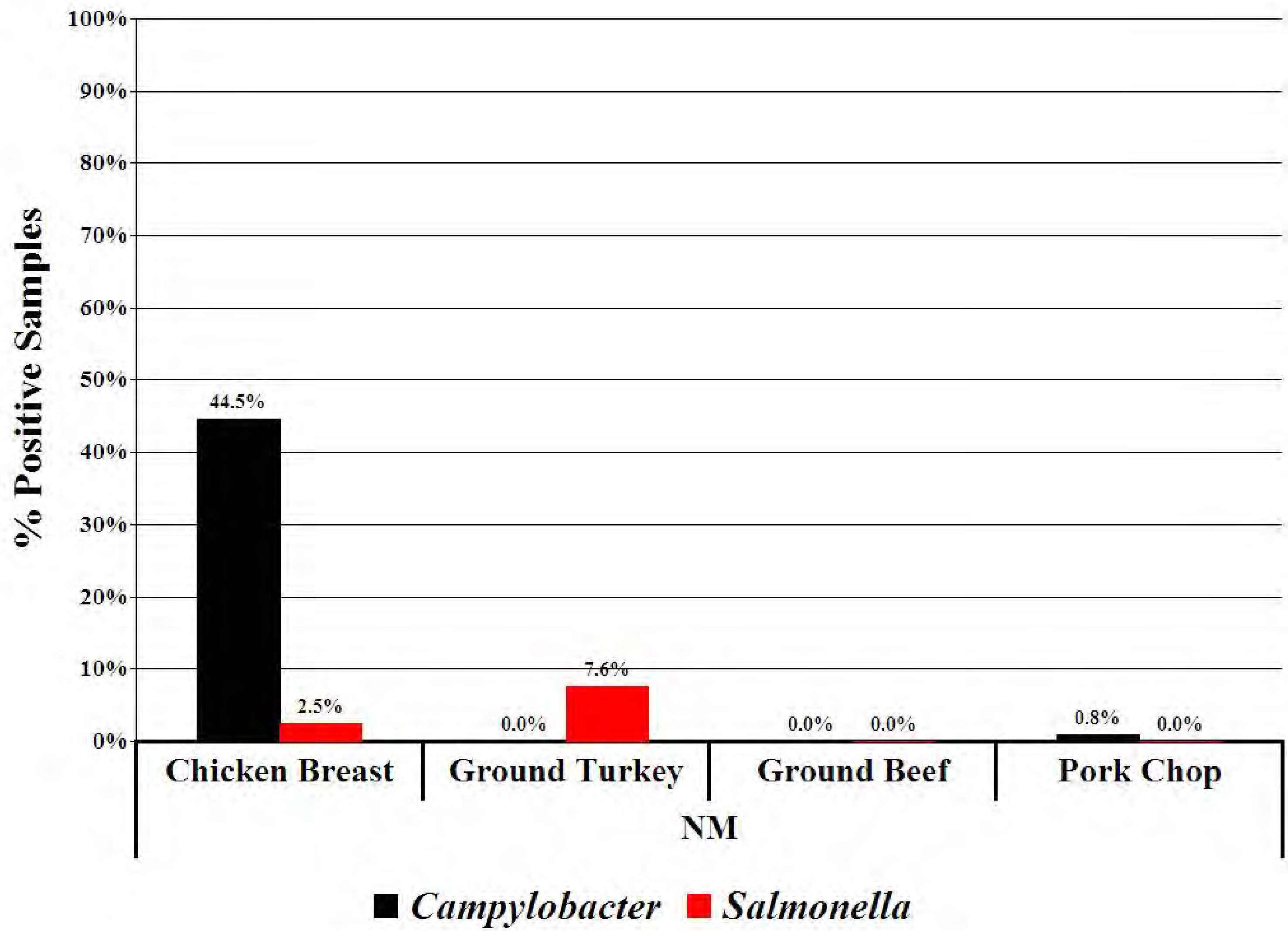
Appendix 3e. Percent Positive Samples by Meat Type, Bacterium in Maryland, 2004



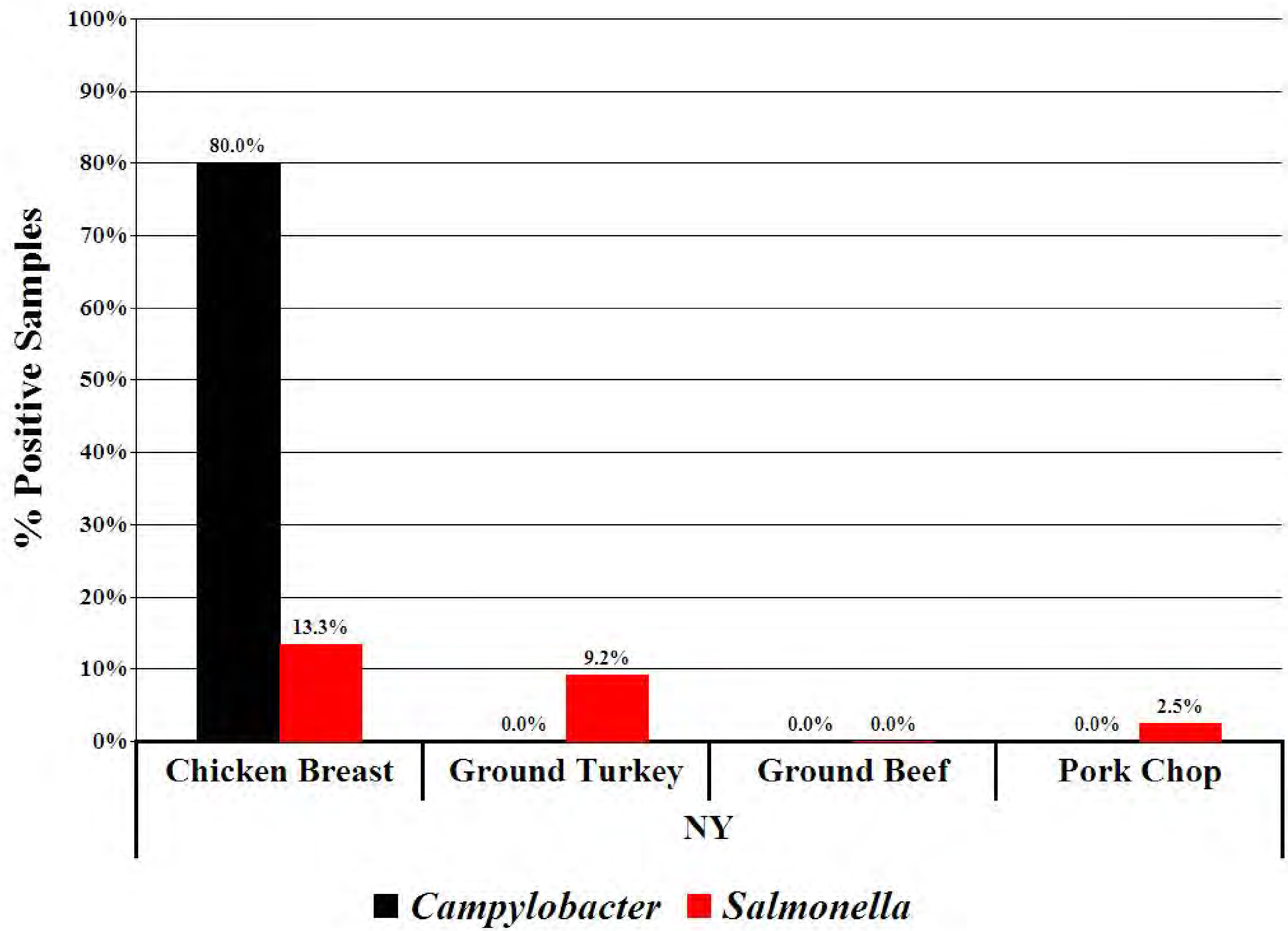
Appendix 3f. Percent Positive Samples by Meat Type, Bacterium in Minnesota, 2004



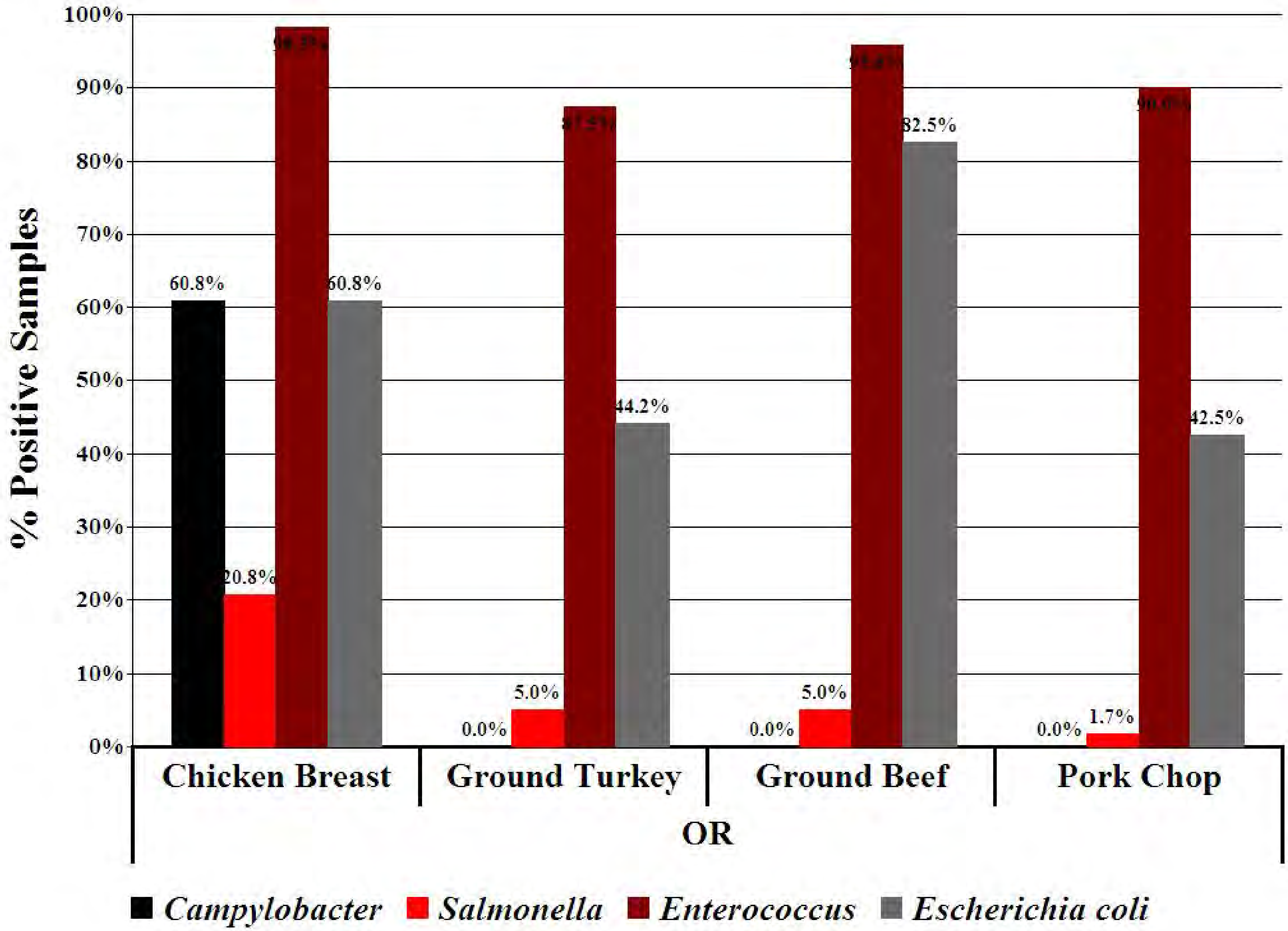
Appendix 3g. Percent Positive Samples by Meat Type, Bacterium in New Mexico, 2004



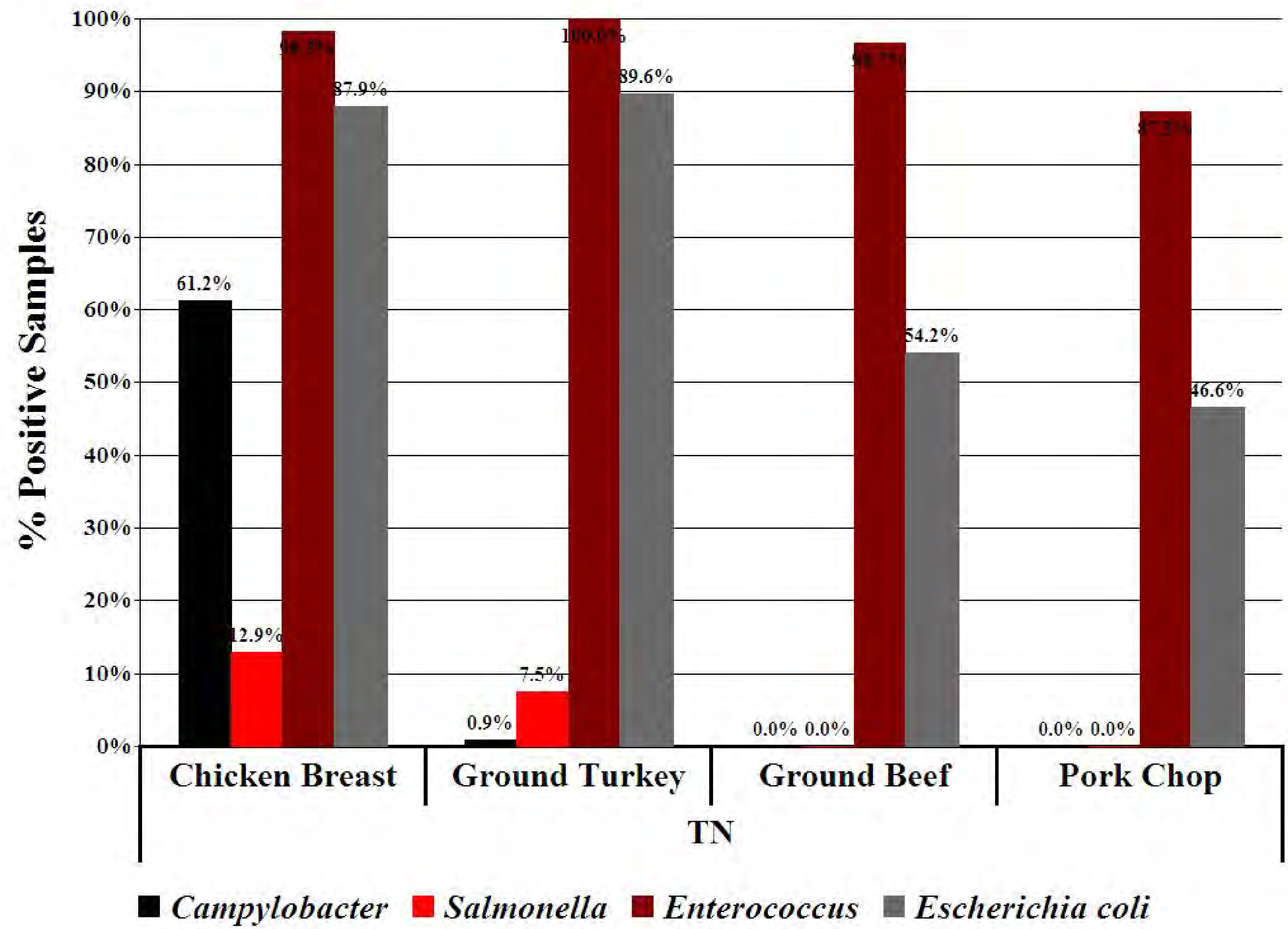
Appendix 3h. Percent Positive Samples by Meat Type, Bacterium in New York, 2004



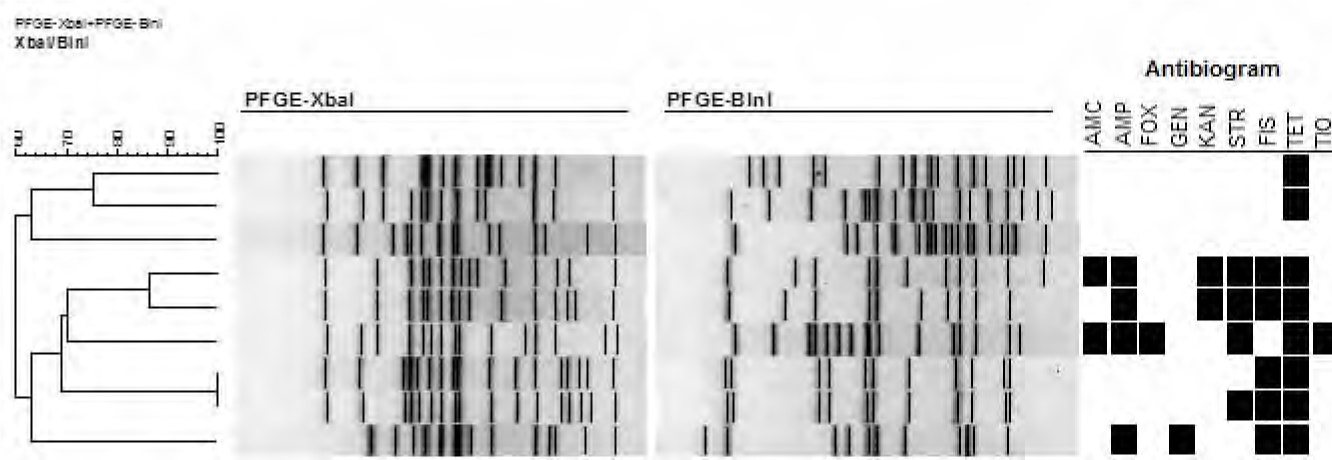
Appendix 3i. Percent Positive Samples by Meat Type, Bacterium in Oregon, 2004



Appendix 3j Percent Positive Samples by Meat Type, Bacterium in Tennessee, 2004

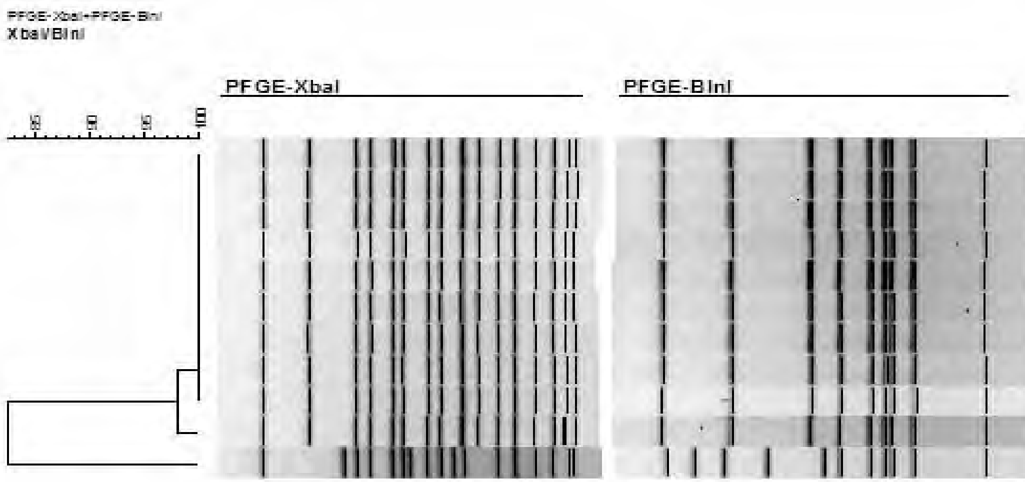


A-4a. PFGE Profiles for *Salmonella* Agona



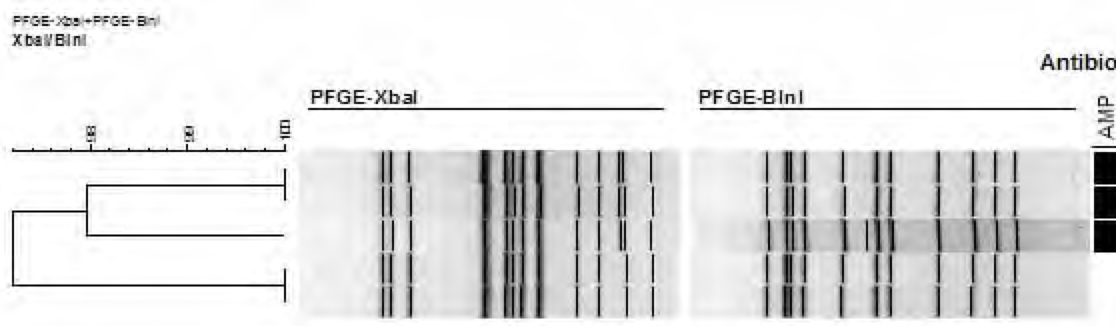
CVM #	State	Source	Date Isolated	Serotype
N500	NY	Pork Chop	03/04	Agona
N1505	CO	Ground Turkey	10/04	Agona
N16	CA	Chicken Breast	09/04	Agona
N1548	GA	Ground Turkey	11/04	Agona
N1549	GA	Ground Turkey	11/04	Agona
N511	NY	Ground Turkey	06/04	Agona
N1512	GA	Ground Turkey	02/04	Agona
N1513	GA	Ground Turkey	02/04	Agona
N522	NY	Ground Turkey	11/04	Agona

A-4b. PFGE Profiles for *Salmonella* Braenderup



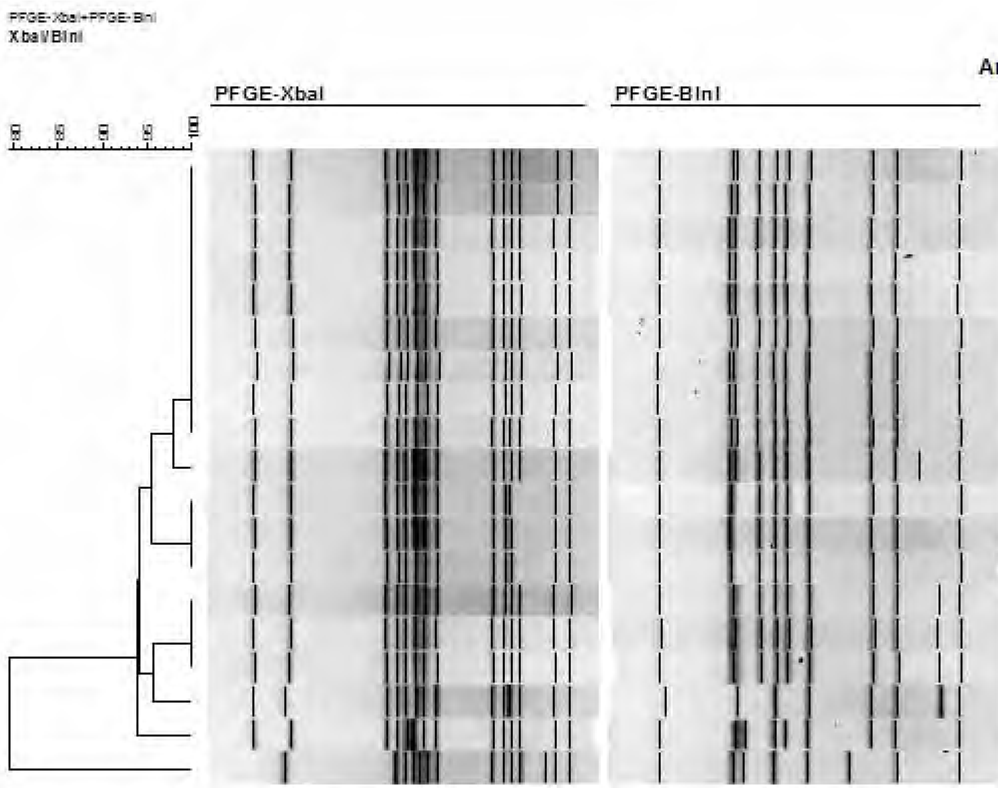
CVM #	State	Source	Date Isolated	Serotype
N157	CT	Ground Beef	01/04	Braenderup
N158	CT	Ground Beef	01/04	Braenderup
N159	CT	Ground Beef	01/04	Braenderup
N160	CT	Ground Beef	01/04	Braenderup
N161	CT	Ground Beef	01/04	Braenderup
N162	CT	Pork Chop	01/04	Braenderup
N163	CT	Pork Chop	01/04	Braenderup
N164	CT	Pork Chop	01/04	Braenderup
N165	CT	Pork Chop	01/04	Braenderup
N166	CT	Pork Chop	01/04	Braenderup
N6	CA	Chicken Breast	03/04	Braenderup

A-4c. PFGE Profiles for *Salmonella* Berta



CVM #	State	Source	Date Isolated	Serotype
N1564	MD	Ground Turkey	04/04	Berta
N1565	MD	Ground Turkey	04/04	Berta
N1569	MD	Ground Beef	04/04	Berta
N297	MN	Chicken Breast	02/04	Berta
N298	MN	Chicken Breast	02/04	Berta

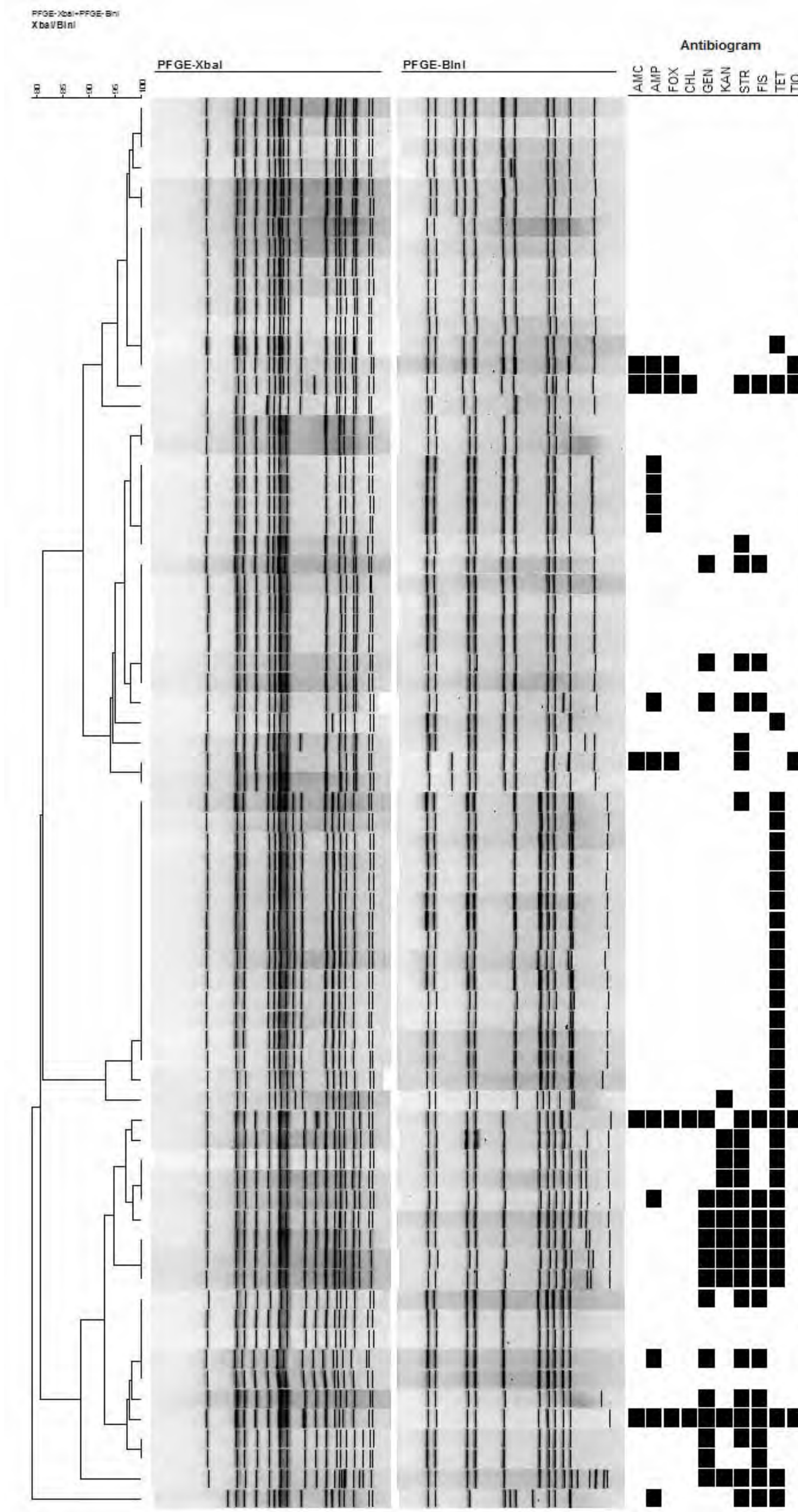
A-4d. PFGE Profiles for *Salmonella* Hadar



Antibiogram

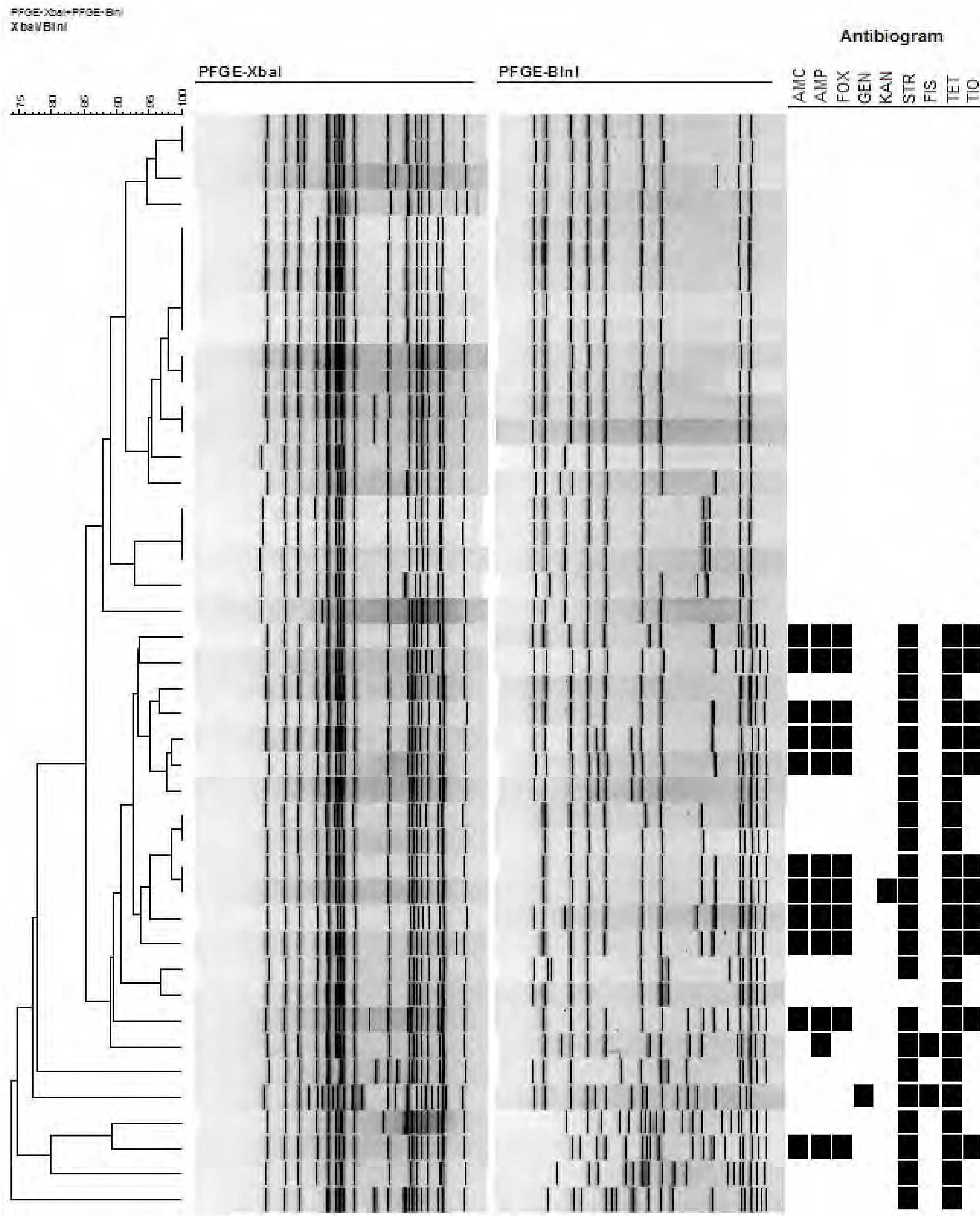
AMP	STR	TET	CVM #	State	Source	Date Isolated	Serotype
		■	N2	CA	Chicken Breast	01/04	Hadar
	■	■	N13	CA	Chicken Breast	08/04	Hadar
	■	■	N329	MN	Ground Turkey	12/04	Hadar
	■	■	N645	OR	Chicken Breast	08/04	Hadar
	■	■	N646	OR	Chicken Breast	08/04	Hadar
	■	■	N1594	TN	Ground Turkey	05/04	Hadar
	■	■	N1595	TN	Ground Turkey	05/04	Hadar
	■	■	N1596	TN	Ground Turkey	05/04	Hadar
	■	■	N1597	TN	Chicken Breast	05/04	Hadar
		■	N310	MN	Ground Turkey	07/04	Hadar
	■	■	N308	MN	Ground Turkey	07/04	Hadar
	■	■	N309	MN	Ground Turkey	07/04	Hadar
■	■	■	N1552	GA	Ground Turkey	12/04	Hadar
	■	■	N627	OR	Chicken Breast	02/04	Hadar
	■	■	N634	OR	Chicken Breast	05/04	Hadar
	■	■	N644	OR	Chicken Breast	08/04	Hadar
	■		N1574	MD	Chicken Breast	06/04	Hadar
	■	■	N300	MN	Ground Turkey	02/04	Hadar
	■	■	N521	NY	Ground Turkey	11/04	Hadar

A-4e. PFGE Profiles for *Salmonella* Heidelberg



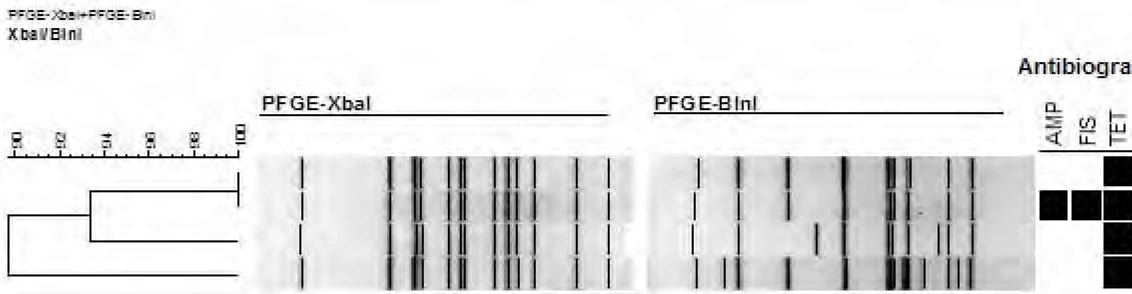
CVM #	State	Source	Date Isolated	Serotype
N631	OR	Chicken Breast	03/04	Heidelberg
N637	OR	Chicken Breast	07/04	Heidelberg
N648	OR	Chicken Breast	09/04	Heidelberg
N15	CA	Chicken Breast	09/04	Heidelberg
N628	OR	Chicken Breast	03/04	Heidelberg
N629	OR	Chicken Breast	03/04	Heidelberg
N17	CA	Chicken Breast	10/04	Heidelberg
N623	OR	Chicken Breast	01/04	Heidelberg
N636	OR	Chicken Breast	07/04	Heidelberg
N638	OR	Chicken Breast	07/04	Heidelberg
N647	OR	Chicken Breast	08/04	Heidelberg
N650	OR	Chicken Breast	10/04	Heidelberg
N652	OR	Chicken Breast	10/04	Heidelberg
N662	OR	Chicken Breast	12/04	Heidelberg
N633	OR	Chicken Breast	05/04	Heidelberg
N649	OR	Chicken Breast	09/04	Heidelberg
N1522	GA	Ground Turkey	04/04	Heidelberg
N1526	GA	Ground Turkey	05/04	Heidelberg
N322	MN	Chicken Breast	11/04	Heidelberg
N324	MN	Chicken Breast	11/04	Heidelberg
N325	MN	Chicken Breast	11/04	Heidelberg
N326	MN	Chicken Breast	11/04	Heidelberg
N421	NM	Chicken Breast	12/04	Heidelberg
N19	CA	Chicken Breast	10/04	Heidelberg
N24	CA	Chicken Breast	11/04	Heidelberg
N317	MN	Chicken Breast	09/04	Heidelberg
N318	MN	Chicken Breast	09/04	Heidelberg
N319	MN	Chicken Breast	09/04	Heidelberg
N653	OR	Chicken Breast	10/04	Heidelberg
N1514	GA	Ground Turkey	02/04	Heidelberg
N1536	GA	Chicken Breast	08/04	Heidelberg
N205	CT	Ground Turkey	12/04	Heidelberg
N201	CT	Chicken Breast	10/04	Heidelberg
N189	CT	Chicken Breast	07/04	Heidelberg
N1553	MD	Chicken Breast	01/04	Heidelberg
N20	CA	Ground Turkey	10/04	Heidelberg
N22	CA	Ground Turkey	10/04	Heidelberg
N23	CA	Ground Turkey	10/04	Heidelberg
N184	CT	Ground Turkey	05/04	Heidelberg
N185	CT	Ground Turkey	05/04	Heidelberg
N186	CT	Ground Turkey	05/04	Heidelberg
N198	CT	Ground Turkey	08/04	Heidelberg
N199	CT	Ground Turkey	08/04	Heidelberg
N632	OR	Ground Turkey	04/04	Heidelberg
N657	OR	Ground Turkey	11/04	Heidelberg
N658	OR	Ground Turkey	11/04	Heidelberg
N659	OR	Ground Turkey	11/04	Heidelberg
N660	OR	Pork Chop	11/04	Heidelberg
N661	OR	Pork Chop	11/04	Heidelberg
N131	CO	Ground Turkey	06/04	Heidelberg
N307	MN	Ground Turkey	06/04	Heidelberg
N416	NM	Ground Turkey	09/04	Heidelberg
N1550	GA	Ground Turkey	11/04	Heidelberg
N508	NY	Pork Chop	04/04	Heidelberg
N517	NY	Ground Turkey	08/04	Heidelberg
N1551	GA	Ground Turkey	12/04	Heidelberg
N1511	GA	Ground Turkey	01/04	Heidelberg
N1518	GA	Ground Turkey	03/04	Heidelberg
N1529	GA	Ground Turkey	06/04	Heidelberg
N1530	GA	Ground Turkey	06/04	Heidelberg
N130	CO	Ground Turkey	05/04	Heidelberg
N203	CT	Ground Turkey	11/04	Heidelberg
N204	CT	Ground Turkey	11/04	Heidelberg
N1506	CO	Ground Turkey	11/04	Heidelberg
N1507	CO	Ground Turkey	12/04	Heidelberg
N9	CA	Ground Turkey	05/04	Heidelberg
N418	NM	Ground Turkey	09/04	Heidelberg
N327	MN	Ground Turkey	12/04	Heidelberg
N328	MN	Ground Turkey	12/04	Heidelberg
N1508	GA	Ground Turkey	01/04	Heidelberg
N1525	GA	Ground Turkey	05/04	Heidelberg

A-4f. PFGE Profiles for *Salmonella* Kentucky



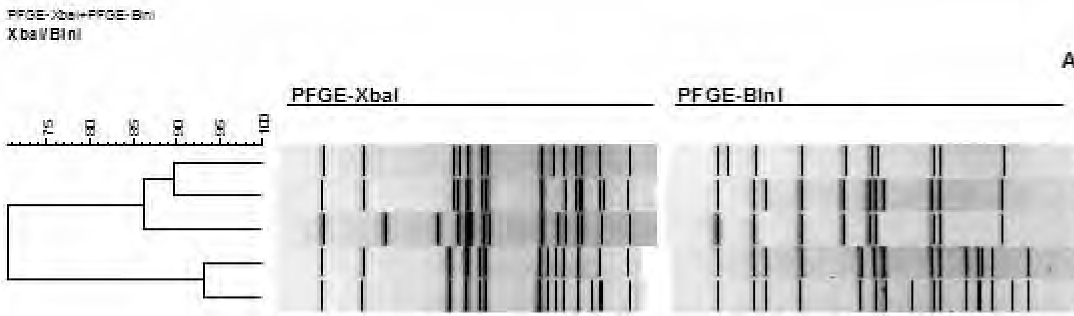
CVM #	State	Source	Date Isolated	Serotype
N196	CT	Chicken Breast	08/04	Kentucky
N197	CT	Chicken Breast	08/04	Kentucky
N630	OR	Chicken Breast	03/04	Kentucky
N1516	GA	Chicken Breast	03/04	Kentucky
N311	MN	Chicken Breast	08/04	Kentucky
N312	MN	Chicken Breast	08/04	Kentucky
N313	MN	Chicken Breast	08/04	Kentucky
N320	MN	Chicken Breast	09/04	Kentucky
N321	MN	Chicken Breast	09/04	Kentucky
N10	CA	Chicken Breast	06/04	Kentucky
N651	OR	Chicken Breast	10/04	Kentucky
N11	CA	Chicken Breast	06/04	Kentucky
N26	CA	Chicken Breast	12/04	Kentucky
N25	CA	Chicken Breast	11/04	Kentucky
N654	OR	Chicken Breast	11/04	Kentucky
N302	MN	Chicken Breast	05/04	Kentucky
N303	MN	Chicken Breast	05/04	Kentucky
N304	MN	Chicken Breast	05/04	Kentucky
N301	MN	Ground Turkey	03/04	Kentucky
N14	CA	Chicken Breast	08/04	Kentucky
N498	NY	Chicken Breast	03/04	Kentucky
N1587	MD	Chicken Breast	10/04	Kentucky
N178	CT	Chicken Breast	04/04	Kentucky
N191	CT	Chicken Breast	07/04	Kentucky
N174	CT	Chicken Breast	03/04	Kentucky
N496	NY	Chicken Breast	02/04	Kentucky
N1517	GA	Chicken Breast	03/04	Kentucky
N495	NY	Chicken Breast	01/04	Kentucky
N515	NY	Chicken Breast	08/04	Kentucky
N323	MN	Chicken Breast	11/04	Kentucky
N518	NY	Chicken Breast	09/04	Kentucky
N510	NY	Chicken Breast	06/04	Kentucky
N501	NY	Chicken Breast	04/04	Kentucky
N192	CT	Chicken Breast	07/04	Kentucky
N504	NY	Chicken Breast	04/04	Kentucky
N519	NY	Chicken Breast	11/04	Kentucky
N188	CT	Chicken Breast	07/04	Kentucky
N1589	MD	Chicken Breast	10/04	Kentucky
N200	CT	Chicken Breast	09/04	Kentucky
N415	NM	Chicken Breast	09/04	Kentucky
N516	NY	Chicken Breast	08/04	Kentucky
N1560	MD	Chicken Breast	02/04	Kentucky
N1607	TN	Chicken Breast	10/04	Kentucky

A-4g. PFGE Profiles for *Salmonella* Mbandaka



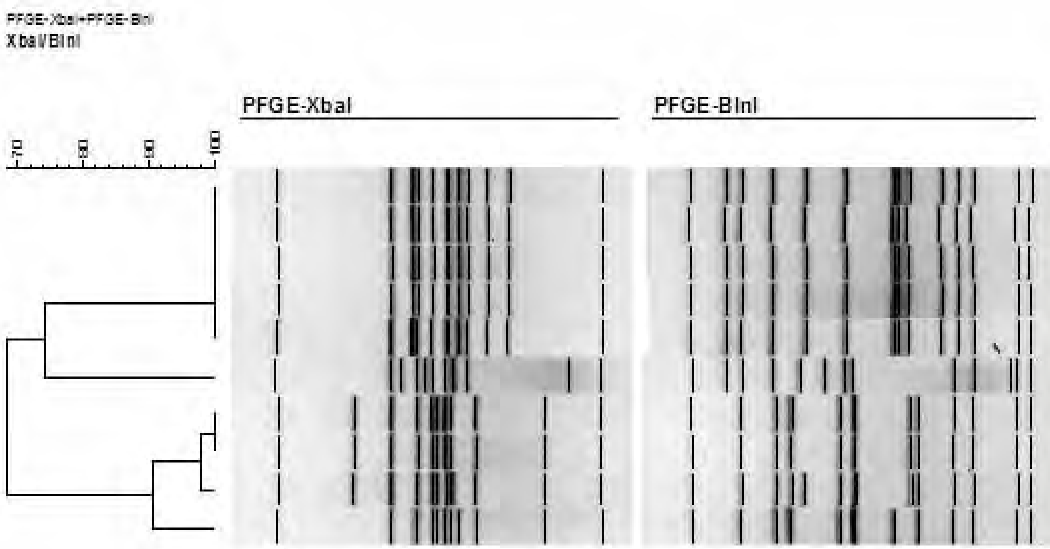
CVM #	State	Source	Date Isolated	Serotype
N295	MN	Chicken Breast	01/04	Mbandaka
N1524	GA	Chicken Breast	05/04	Mbandaka
N1546	GA	Chicken Breast	10/04	Mbandaka
N296	MN	Chicken Breast	01/04	Mbandaka

A-4h. PFGE Profiles for *Salmonella* Montevideo



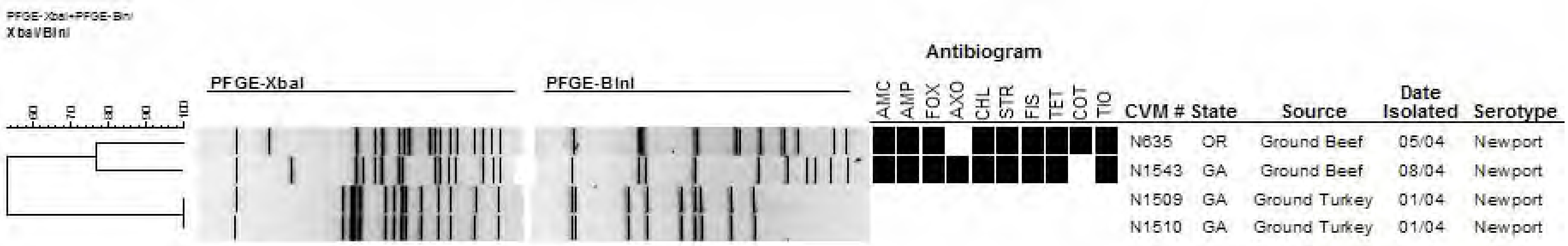
Antibiogram GEN	Antibiogram KAN	Antibiogram STR	CVM #	State	Source	Date Isolated	Serotype
			N1	CA	Chicken Breast	01/04	Montevideo
■		■	N1573	MD	Chicken Breast	06/04	Montevideo
			N8	CA	Chicken Breast	04/04	Montevideo
■			N1540	GA	Ground Turkey	08/04	Montevideo
■	■	■	N1542	GA	Ground Turkey	08/04	Montevideo

A-4i. PFGE Profiles for *Salmonella* Muenster

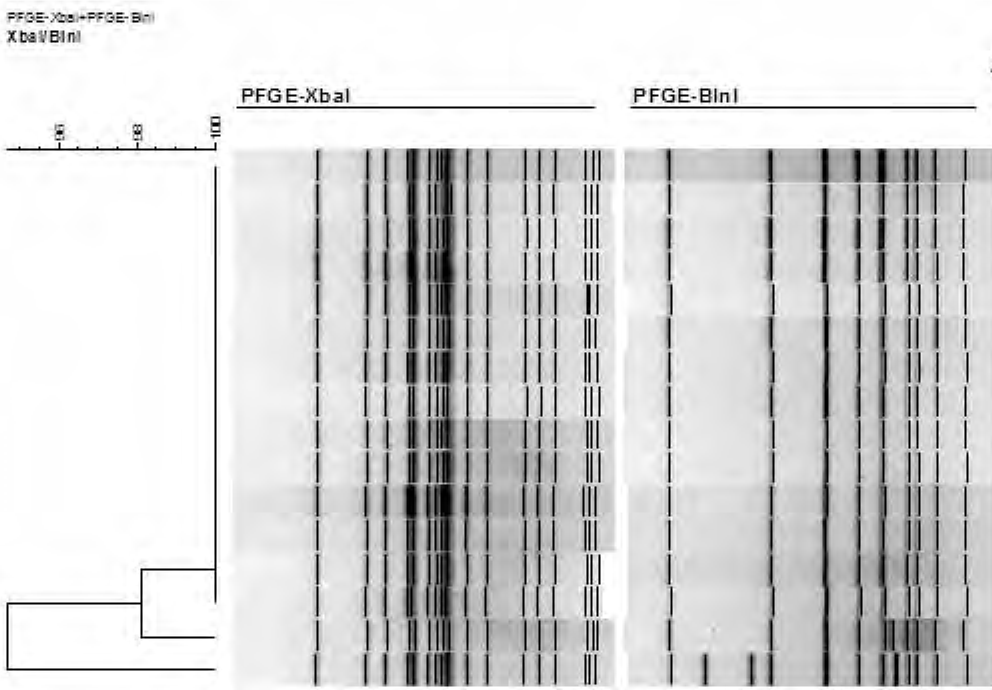


CVM #	State	Source	Date Isolated	Serotype
N639	OR	Ground Beef	07/04	Muenster
N640	OR	Ground Beef	07/04	Muenster
N641	OR	Ground Beef	07/04	Muenster
N642	OR	Ground Beef	07/04	Muenster
N643	OR	Ground Beef	07/04	Muenster
N1562	MD	Chicken Breast	03/04	Muenster
N1556	MD	Ground Turkey	01/04	Muenster
N1557	MD	Ground Turkey	01/04	Muenster
N1555	MD	Ground Turkey	01/04	Muenster
N1558	MD	Ground Turkey	01/04	Muenster

A-4j. PFGE Profiles for *Salmonella* Newport



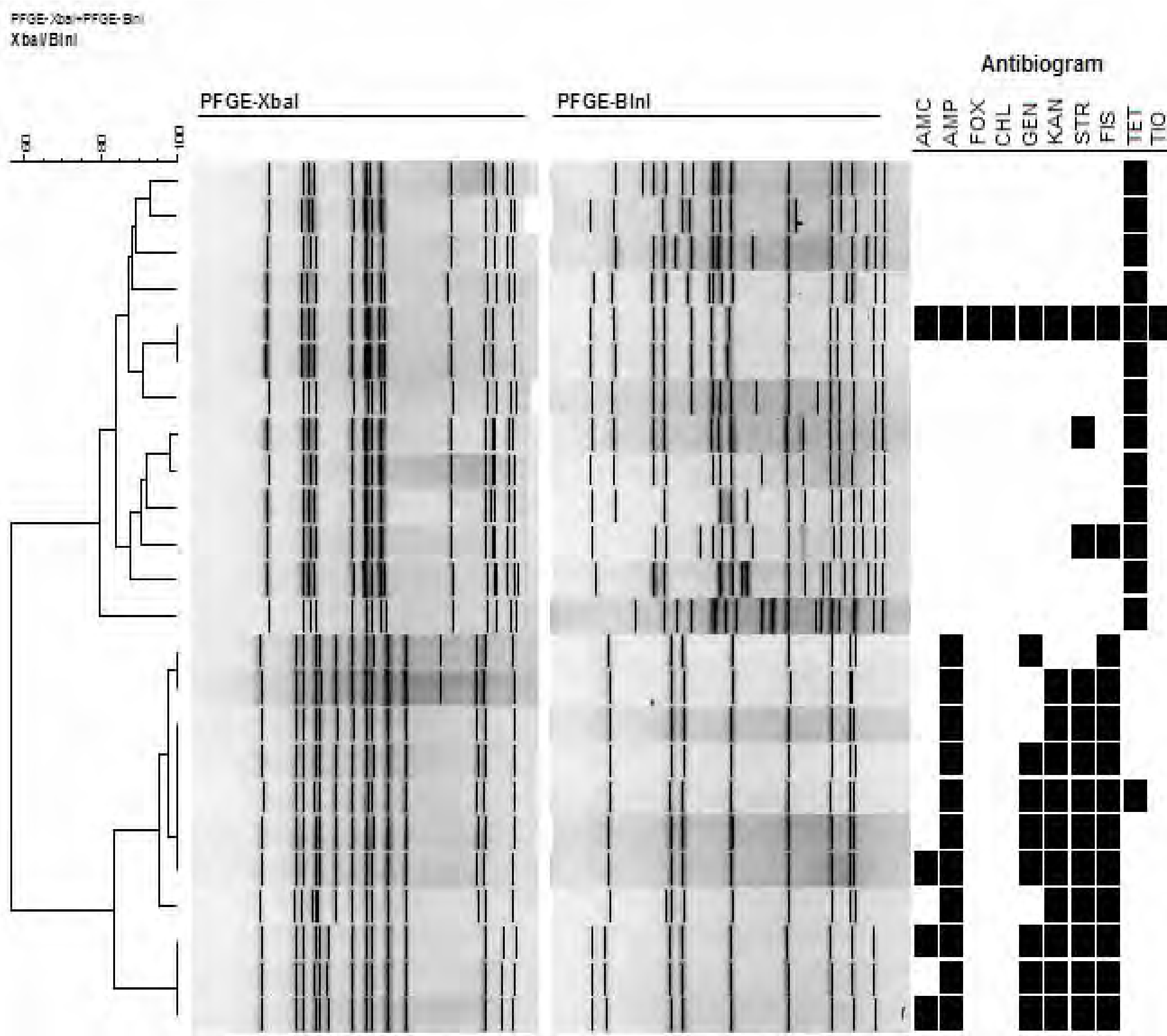
A-4k. PFGE Profiles for *Salmonella* Reading



Antibiogram

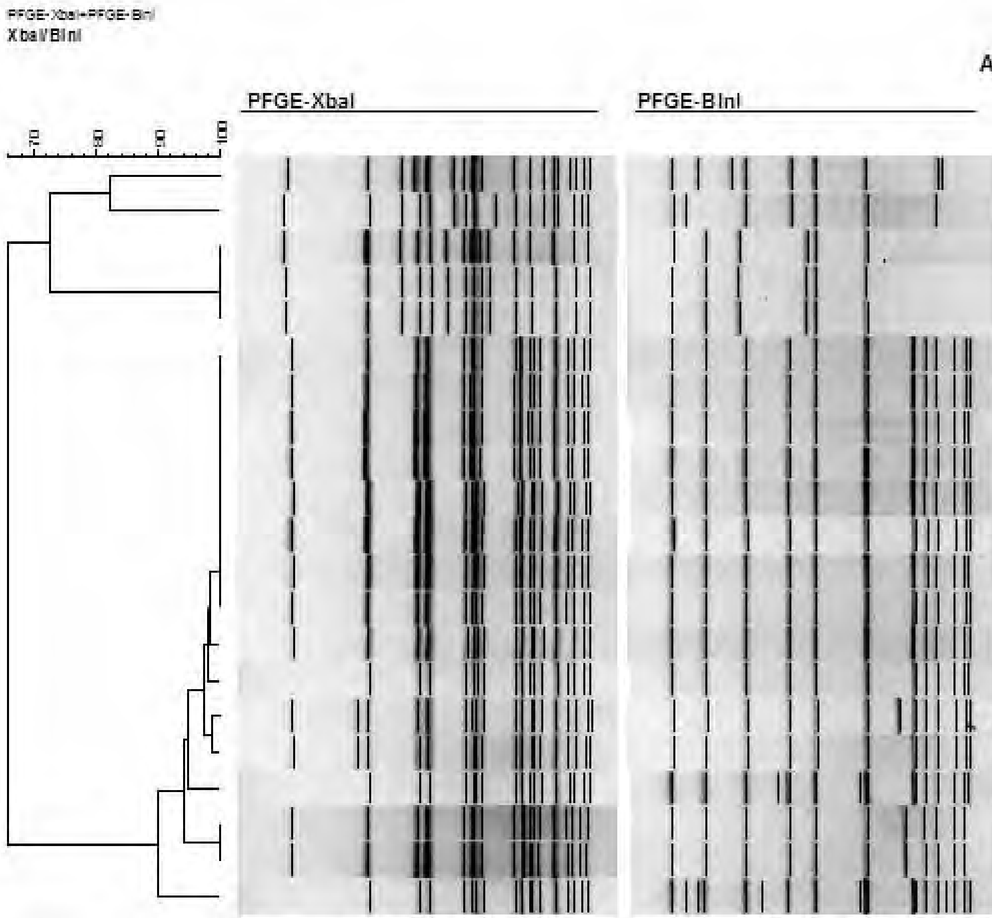
GEN	STR	FIS	TET	CVM #	State	Source	Date Isolated	Serotype
				N127	CO	Ground Turkey	01/04	Reading
				N299	MN	Ground Turkey	02/04	Reading
				N314	MN	Ground Turkey	08/04	Reading
				N315	MN	Ground Turkey	08/04	Reading
				N316	MN	Ground Turkey	08/04	Reading
				N410	NM	Ground Turkey	04/04	Reading
				N411	NM	Ground Turkey	08/04	Reading
				N412	NM	Ground Turkey	08/04	Reading
				N413	NM	Ground Turkey	08/04	Reading
				N414	NM	Ground Turkey	08/04	Reading
				N1534	GA	Ground Turkey	07/04	Reading
				N1535	GA	Ground Turkey	07/04	Reading
				N1538	GA	Ground Turkey	08/04	Reading
				N1541	GA	Ground Turkey	08/04	Reading
				N12	CA	Ground Turkey	07/04	Reading
■	■	■	■	N1519	GA	Ground Turkey	04/04	Reading

A-4l. PFGE Profiles for *Salmonella* Saintpaul



CVM #	State	Source	Date Isolated	Serotype
N1531	GA	Ground Turkey	06/04	Saintpaul
N1537	GA	Ground Turkey	08/04	Saintpaul
N1528	GA	Ground Turkey	06/04	Saintpaul
N305	MN	Ground Turkey	06/04	Saintpaul
N417	NM	Ground Turkey	09/04	Saintpaul
N419	NM	Ground Turkey	09/04	Saintpaul
N132	CO	Ground Turkey	08/04	Saintpaul
N1603	TN	Ground Turkey	07/04	Saintpaul
N1606	TN	Ground Turkey	07/04	Saintpaul
N1604	TN	Ground Turkey	07/04	Saintpaul
N1605	TN	Ground Turkey	07/04	Saintpaul
N1515	GA	Ground Turkey	02/04	Saintpaul
N129	CO	Ground Turkey	05/04	Saintpaul
N624	OR	Ground Turkey	01/04	Saintpaul
N626	OR	Ground Turkey	01/04	Saintpaul
N513	NY	Ground Turkey	07/04	Saintpaul
N514	NY	Ground Turkey	07/04	Saintpaul
N523	NY	Ground Turkey	11/04	Saintpaul
N1523	GA	Ground Turkey	04/04	Saintpaul
N1527	GA	Ground Turkey	05/04	Saintpaul
N3	CA	Ground Turkey	01/04	Saintpaul
N193	CT	Ground Turkey	07/04	Saintpaul
N194	CT	Ground Turkey	07/04	Saintpaul
N195	CT	Ground Turkey	07/04	Saintpaul

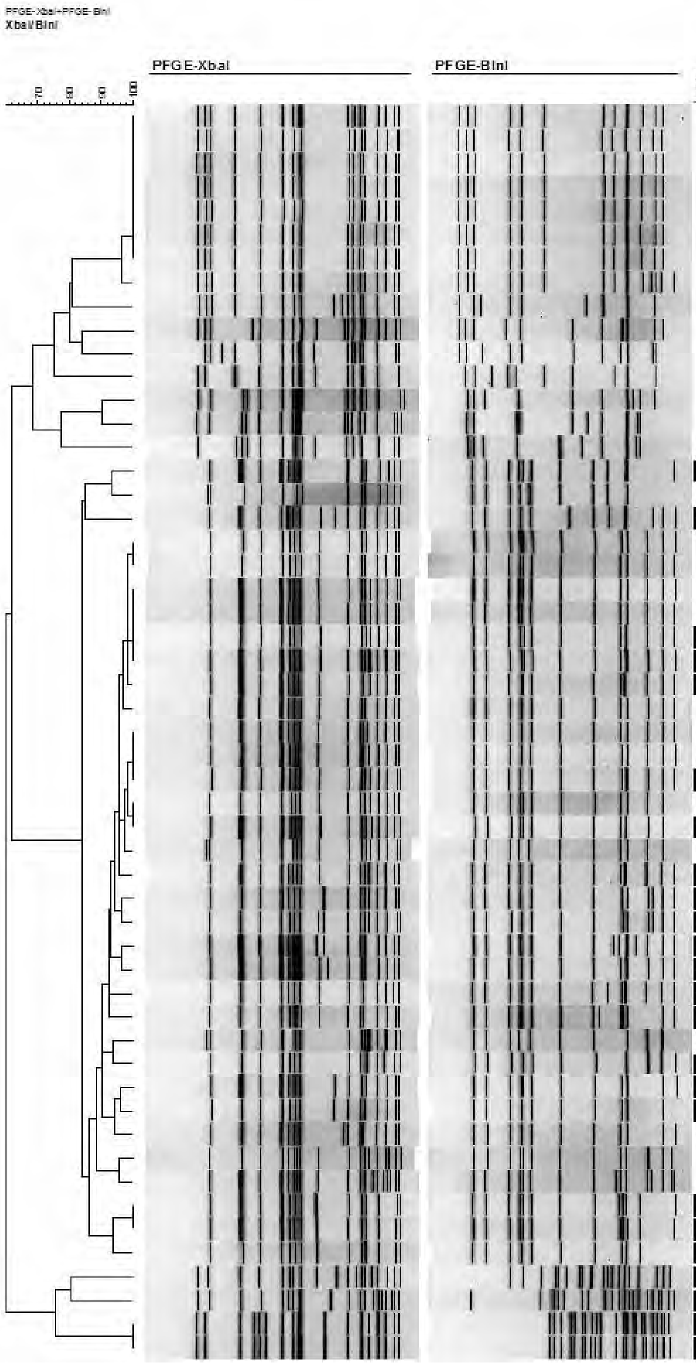
A-4m. PFGE Profiles for *Salmonella* Schwarzengrund



Antibiogram

AMP	GEN	FIS	CVM #	State	Source	Date Isolated	Serotype
			N1581	MD	Chicken Breast	02/04	Schwarzengrund
			N1580	MD	Chicken Breast	08/04	Schwarzengrund
		■	N420	NM	Chicken Breast	10/04	Schwarzengrund
			N655	OR	Chicken Breast	11/04	Schwarzengrund
			N656	OR	Chicken Breast	11/04	Schwarzengrund
			N152	CT	Ground Turkey	01/04	Schwarzengrund
			N153	CT	Ground Turkey	01/04	Schwarzengrund
			N154	CT	Ground Turkey	01/04	Schwarzengrund
			N155	CT	Ground Turkey	01/04	Schwarzengrund
			N156	CT	Ground Turkey	01/04	Schwarzengrund
			N180	CT	Ground Turkey	04/04	Schwarzengrund
			N505	NY	Ground Turkey	04/04	Schwarzengrund
			N512	NY	Ground Turkey	06/04	Schwarzengrund
			N507	NY	Ground Turkey	04/04	Schwarzengrund
			N149	CT	Ground Turkey	01/04	Schwarzengrund
■	■	■	N1566	MD	Ground Turkey	04/04	Schwarzengrund
			N1567	MD	Ground Turkey	04/04	Schwarzengrund
		■	N150	CT	Ground Turkey	01/04	Schwarzengrund
			N1532	GA	Ground Turkey	07/04	Schwarzengrund
			N1533	GA	Ground Turkey	07/04	Schwarzengrund
			N151	CT	Ground Turkey	01/04	Schwarzengrund

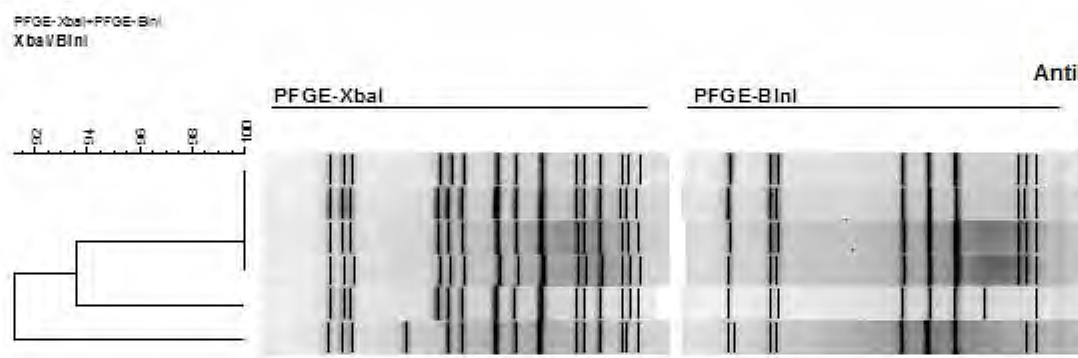
A-4n. PFGE Profiles for *Salmonella* Typhimurium



Antibiogram

AMC	AMP	FOX	CHL	GEN	KAN	STR	FIS	TET	TIO	CVM #	State	Source	Date Isolated	Serotype
										N1609	TN	Chicken Breast	12/04	Typhimurium
										N1611	TN	Chicken Breast	12/04	Typhimurium
										N1612	TN	Chicken Breast	12/04	Typhimurium
										N1613	TN	Chicken Breast	12/04	Typhimurium
										N1614	TN	Chicken Breast	12/04	Typhimurium
					■	■				N1615	TN	Chicken Breast	12/04	Typhimurium
					■	■				N1616	TN	Chicken Breast	12/04	Typhimurium
						■				N1608	TN	Chicken Breast	12/04	Typhimurium
										N1581	MD	Chicken Breast	09/04	Typhimurium var. O 5 - (Copenhagen)
	■			■			■			N18	CA	Chicken Breast	10/04	Typhimurium
						■				N1602	TN	Chicken Breast	06/04	Typhimurium
										N502	NY	Chicken Breast	04/04	Typhimurium
			■			■	■	■		N4	CA	Pork Chop	01/04	Typhimurium
	■		■			■	■	■		N21	CA	Ground Turkey	10/04	Typhimurium
	■		■			■	■	■		N497	NY	Pork Chop	02/04	Typhimurium
■	■	■					■	■	■	N1583	MD	Chicken Breast	10/04	Typhimurium var. O 5 - (Copenhagen)
					■		■	■		N1584	MD	Chicken Breast	10/04	Typhimurium var. O 5 - (Copenhagen)
■	■	■					■	■	■	N169	CT	Chicken Breast	02/04	Typhimurium var. O 5 - (Copenhagen)
					■		■	■		N147	CT	Chicken Breast	01/04	Typhimurium
					■		■	■		N148	CT	Ground Turkey	01/04	Typhimurium
					■		■	■		N142	CT	Chicken Breast	01/04	Typhimurium
					■		■	■		N144	CT	Chicken Breast	01/04	Typhimurium var. O 5 - (Copenhagen)
■	■	■					■	■	■	N170	CT	Chicken Breast	03/04	Typhimurium var. O 5 - (Copenhagen)
■	■	■					■	■	■	N173	CT	Chicken Breast	03/04	Typhimurium var. O 5 - (Copenhagen)
■	■	■			■		■	■	■	N168	CT	Chicken Breast	02/04	Typhimurium var. O 5 - (Copenhagen)
							■	■		N503	NY	Chicken Breast	04/04	Typhimurium var. O 5 - (Copenhagen)
					■		■	■		N1586	MD	Chicken Breast	10/04	Typhimurium var. O 5 - (Copenhagen)
					■		■	■		N1588	MD	Chicken Breast	10/04	Typhimurium var. O 5 - (Copenhagen)
■	■	■			■		■	■	■	N1591	MD	Chicken Breast	12/04	Typhimurium var. O 5 - (Copenhagen)
					■		■	■		N143	CT	Chicken Breast	01/04	Typhimurium
■	■	■					■	■	■	N177	CT	Chicken Breast	03/04	Typhimurium var. O 5 - (Copenhagen)
					■		■	■		N140	CT	Chicken Breast	01/04	Typhimurium var. O 5 - (Copenhagen)
■	■	■			■		■	■	■	N499	NY	Chicken Breast	03/04	Typhimurium var. O 5 - (Copenhagen)
■	■	■					■	■	■	N520	NY	Chicken Breast	11/04	Typhimurium
■	■	■			■		■	■	■	N1563	MD	Chicken Breast	04/04	Typhimurium var. O 5 - (Copenhagen)
■	■	■					■	■	■	N1575	MD	Chicken Breast	06/04	Typhimurium var. O 5 - (Copenhagen)
■	■	■					■	■	■	N1578	MD	Chicken Breast	07/04	Typhimurium var. O 5 - (Copenhagen)
■	■	■			■		■	■	■	N509	NY	Chicken Breast	06/04	Typhimurium
■	■	■					■	■	■	N145	CT	Chicken Breast	01/04	Typhimurium
							■	■		N146	CT	Chicken Breast	01/04	Typhimurium
■	■	■			■		■	■	■	N1570	MD	Chicken Breast	05/04	Typhimurium var. O 5 - (Copenhagen)
■	■	■					■	■	■	N167	CT	Chicken Breast	02/04	Typhimurium var. O 5 - (Copenhagen)
■	■	■					■	■	■	N1577	MD	Chicken Breast	07/04	Typhimurium var. O 5 - (Copenhagen)
							■	■		N1585	MD	Chicken Breast	10/04	Typhimurium var. O 5 - (Copenhagen)
					■		■	■		N141	CT	Chicken Breast	01/04	Typhimurium
	■					■	■	■		N190	CT	Chicken Breast	07/04	Typhimurium
■	■	■					■	■	■	N171	CT	Chicken Breast	03/04	Typhimurium var. O 5 - (Copenhagen)
■	■	■					■	■	■	N172	CT	Chicken Breast	03/04	Typhimurium var. O 5 - (Copenhagen)
■	■	■					■	■	■	N524	NY	Chicken Breast	12/04	Typhimurium
■	■	■							■	N1554	MD	Chicken Breast	01/04	Typhimurium var. O 5 - (Copenhagen)
■	■	■							■	N1582	MD	Chicken Breast	10/04	Typhimurium var. O 5 - (Copenhagen)
■	■	■	■			■	■	■	■	N175	CT	Chicken Breast	03/04	Typhimurium var. O 5 - (Copenhagen)
■	■	■	■			■	■	■	■	N176	CT	Chicken Breast	03/04	Typhimurium var. O 5 - (Copenhagen)

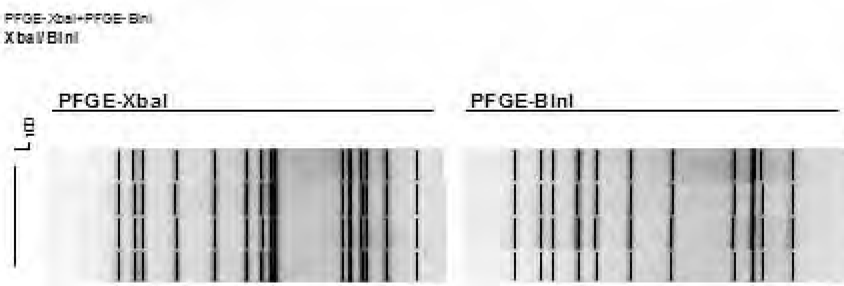
A-4o. PFGE Profiles for *Salmonella* IIIa 18:z4,z32:-



Antibiogram

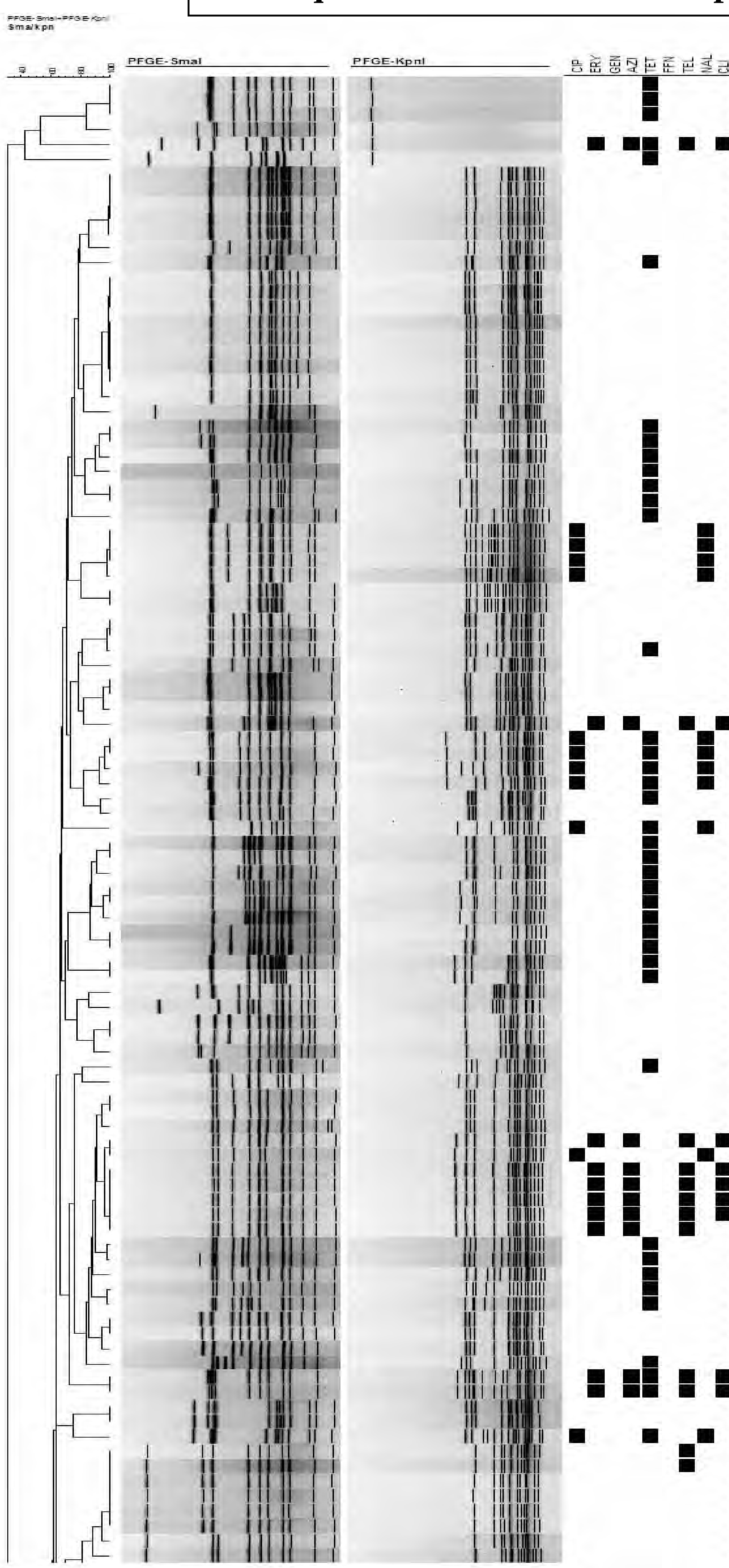
TET	CVM #	State	Source	Date Isolated	Serotype
■	N181	CT	Ground Turkey	04/04	IIIa 18:z4,z32:-
■	N506	NY	Ground Turkey	04/04	IIIa 18:z4,z32:-
■	N1520	GA	Ground Turkey	04/04	IIIa 18:z4,z32:-
■	N1521	GA	Ground Turkey	04/04	IIIa 18:z4,z32:-
	N1545	GA	Ground Turkey	09/04	IIIa 18:z4,z32:-
■	N179	CT	Ground Turkey	04/04	IIIa 18:z4,z32:-

A-4p. PFGE Profiles for *Salmonella* 4,12:i:-

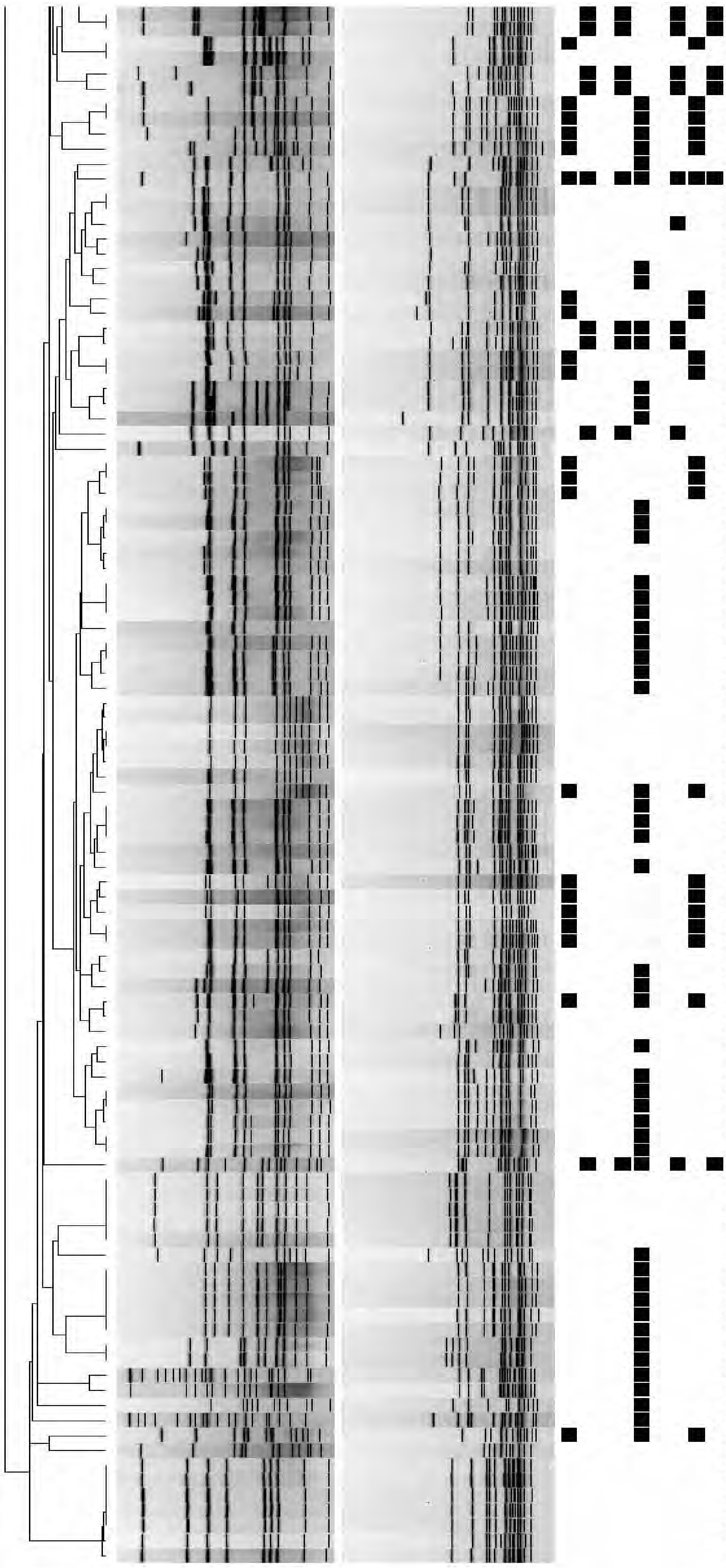


CVM #	State	Source	Date Isolated	Serotype
N1598	TN	Chicken Breast	06/04	4,12:i:-
N1599	TN	Chicken Breast	06/04	4,12:i:-
N1600	TN	Chicken Breast	06/04	4,12:i:-
N1601	TN	Chicken Breast	06/04	4,12:i:-

A-4q. PFGE Profiles for *Campylobacter coli*

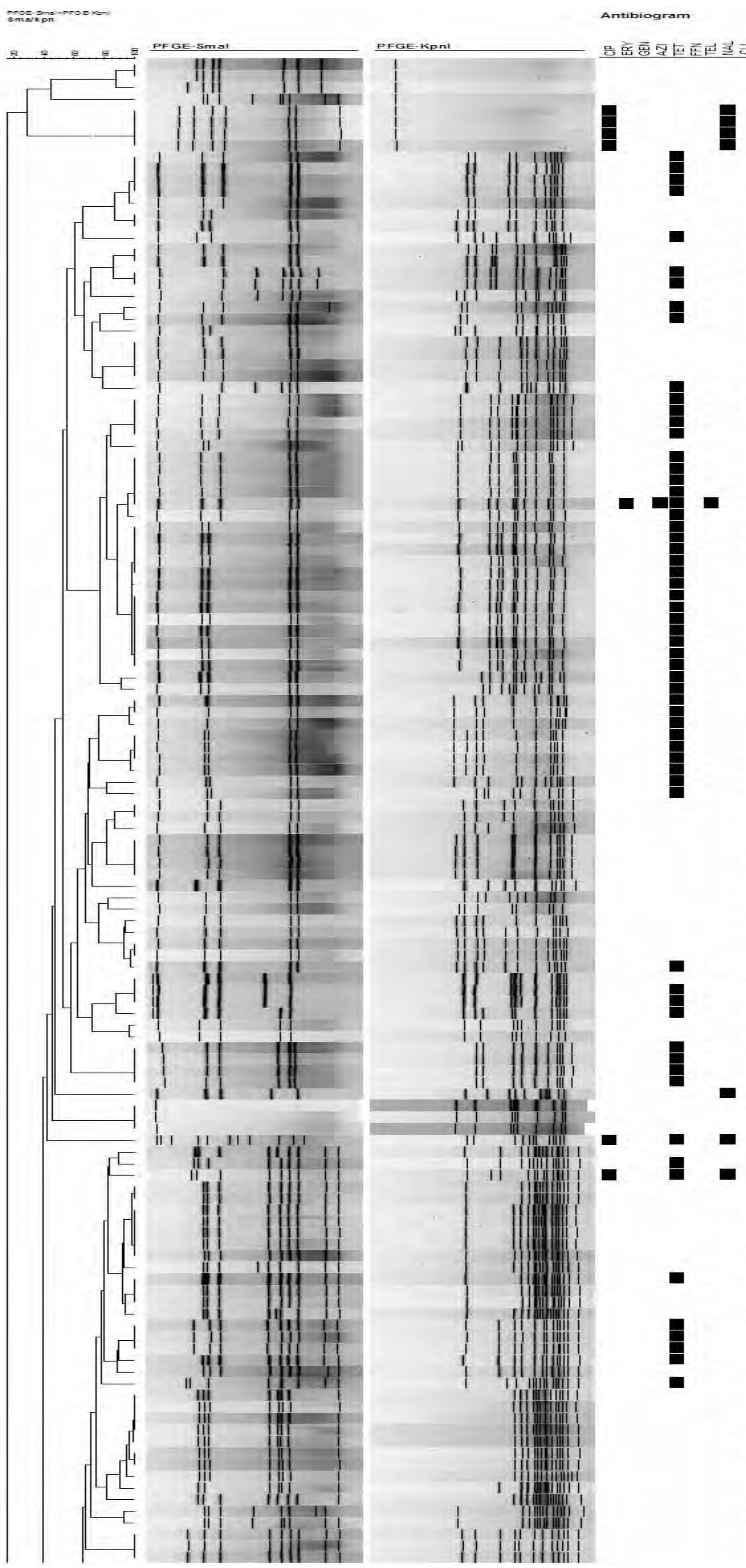


CVM #	State	Source	Date Isolated	Species
N401	MN	Chicken Breast	11/04	C. coli
N403	MN	Chicken Breast	11/04	C. coli
N404	MN	Chicken Breast	11/04	C. coli
N484	NM	Pork Chop	10/04	C. coli
N287	CT	Pork Chop	11/04	C. coli
N332	MN	Chicken Breast	01/04	C. coli
N2604	MD	Chicken Breast	09/04	C. coli
N2605	MD	Chicken Breast	09/04	C. coli
N2606	MD	Chicken Breast	09/04	C. coli
N2608	MD	Chicken Breast	09/04	C. coli
N2607	MD	Chicken Breast	09/04	C. coli
N525	NY	Chicken Breast	01/04	C. coli
N1494	CO	Chicken Breast	10/04	C. coli
N435	NM	Chicken Breast	02/04	C. coli
N443	NM	Chicken Breast	02/04	C. coli
N436	NM	Chicken Breast	02/04	C. coli
N429	NM	Chicken Breast	02/04	C. coli
N430	NM	Chicken Breast	02/04	C. coli
N431	NM	Chicken Breast	02/04	C. coli
N432	NM	Chicken Breast	02/04	C. coli
N434	NM	Chicken Breast	02/04	C. coli
N444	NM	Chicken Breast	02/04	C. coli
N48	CA	Chicken Breast	03/04	C. coli
N2575	MD	Chicken Breast	06/04	C. coli
N2578	MD	Chicken Breast	06/04	C. coli
N1647	GA	Chicken Breast	08/04	C. coli
N269	CT	Chicken Breast	09/04	C. coli
N588	NY	Chicken Breast	08/04	C. coli
N589	NY	Chicken Breast	08/04	C. coli
N3514	TN	Chicken Breast	03/04	C. coli
N3501	TN	Chicken Breast	01/04	C. coli
N3502	TN	Chicken Breast	01/04	C. coli
N3504	TN	Chicken Breast	01/04	C. coli
N3517	TN	Chicken Breast	03/04	C. coli
N2621	MD	Chicken Breast	12/04	C. coli
N2622	MD	Chicken Breast	12/04	C. coli
N135	CO	Chicken Breast	03/04	C. coli
N139	CO	Chicken Breast	05/04	C. coli
N136	CO	Chicken Breast	03/04	C. coli
N1640	GA	Chicken Breast	07/04	C. coli
N111	CA	Chicken Breast	11/04	C. coli
N113	CA	Chicken Breast	11/04	C. coli
N119	CA	Chicken Breast	11/04	C. coli
N1639	GA	Chicken Breast	07/04	C. coli
N544	NY	Chicken Breast	03/04	C. coli
N546	NY	Chicken Breast	03/04	C. coli
N609	NY	Chicken Breast	11/04	C. coli
N529	NY	Chicken Breast	01/04	C. coli
N474	NM	Chicken Breast	10/04	C. coli
N476	NM	Chicken Breast	10/04	C. coli
N384	MN	Chicken Breast	09/04	C. coli
N3570	TN	Chicken Breast	12/04	C. coli
N3572	TN	Chicken Breast	12/04	C. coli
N3566	TN	Chicken Breast	12/04	C. coli
N3565	TN	Chicken Breast	12/04	C. coli
N3571	TN	Chicken Breast	12/04	C. coli
N3569	TN	Chicken Breast	12/04	C. coli
N3567	TN	Chicken Breast	12/04	C. coli
N3568	TN	Chicken Breast	12/04	C. coli
N1651	GA	Chicken Breast	09/04	C. coli
N1652	GA	Chicken Breast	09/04	C. coli
N1675	GA	Chicken Breast	12/04	C. coli
N1676	GA	Chicken Breast	12/04	C. coli
N1646	GA	Chicken Breast	08/04	C. coli
N2551	MD	Chicken Breast	02/04	C. coli
N3551	TN	Chicken Breast	08/04	C. coli
N90	CA	Chicken Breast	09/04	C. coli
N116	CA	Chicken Breast	11/04	C. coli
N1643	GA	Chicken Breast	08/04	C. coli
N1644	GA	Chicken Breast	08/04	C. coli
N1642	GA	Chicken Breast	08/04	C. coli
N473	NM	Chicken Breast	09/04	C. coli
N477	NM	Chicken Breast	10/04	C. coli
N461	NM	Chicken Breast	07/04	C. coli
N462	NM	Chicken Breast	07/04	C. coli
N463	NM	Chicken Breast	07/04	C. coli
N470	NM	Chicken Breast	09/04	C. coli
N471	NM	Chicken Breast	09/04	C. coli
N239	CT	Chicken Breast	06/04	C. coli
N243	CT	Chicken Breast	06/04	C. coli
N478	NM	Chicken Breast	10/04	C. coli
N240	CT	Chicken Breast	06/04	C. coli
N241	CT	Chicken Breast	06/04	C. coli
N106	CA	Chicken Breast	10/04	C. coli
N120	CA	Chicken Breast	12/04	C. coli
N104	CA	Chicken Breast	10/04	C. coli
N101	CA	Chicken Breast	10/04	C. coli
N3508	TN	Chicken Breast	01/04	C. coli
N3509	TN	Chicken Breast	01/04	C. coli
N77	CA	Chicken Breast	07/04	C. coli
N79	CA	Chicken Breast	07/04	C. coli
N433	NM	Chicken Breast	02/04	C. coli
N137	CO	Chicken Breast	05/04	C. coli
N1489	CO	Chicken Breast	07/04	C. coli
N1664	GA	Chicken Breast	11/04	C. coli
N1665	GA	Chicken Breast	11/04	C. coli
N1666	GA	Chicken Breast	11/04	C. coli
N1669	GA	Chicken Breast	11/04	C. coli
N1498	CO	Chicken Breast	11/04	C. coli
N3562	TN	Chicken Breast	11/04	C. coli

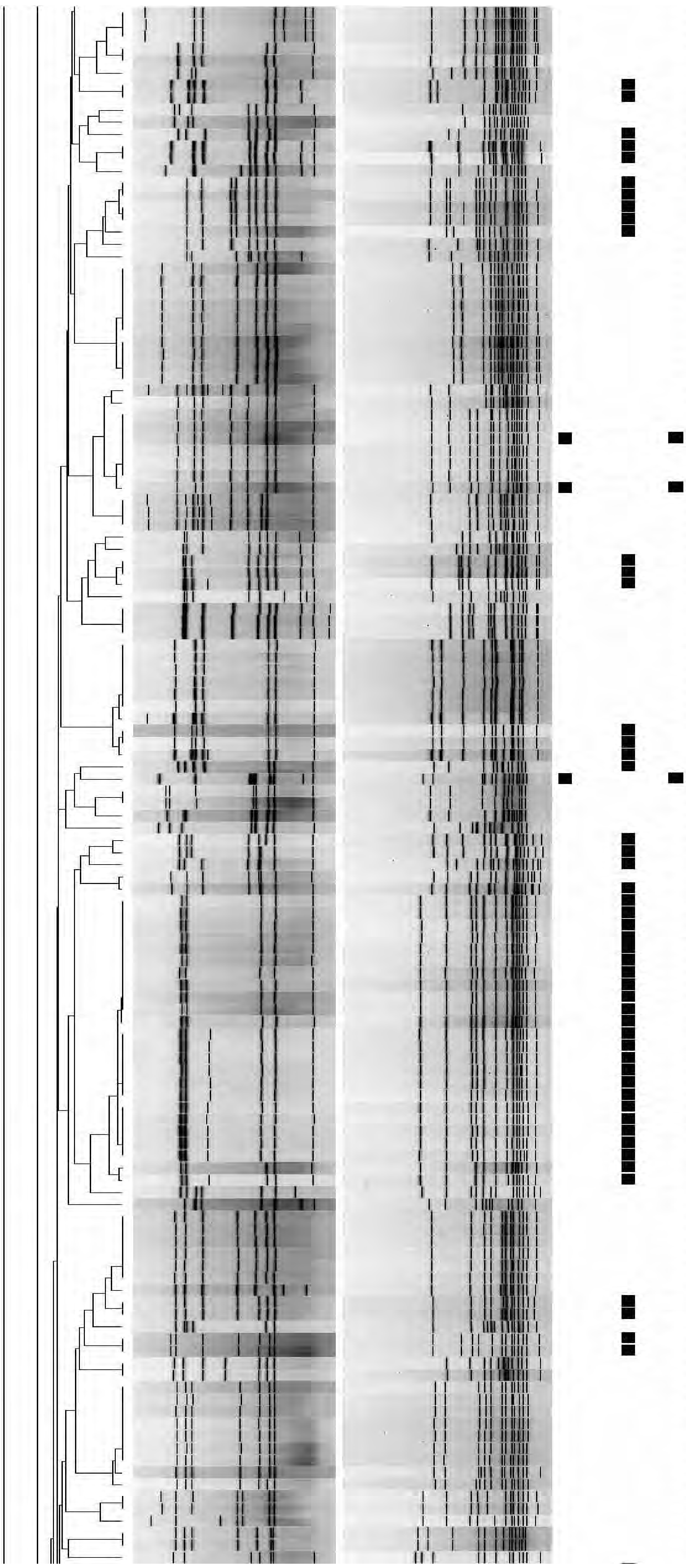


N1629	GA	Chicken Breast	04/04	C. coli
N1632	GA	Chicken Breast	04/04	C. coli
N2552	MD	Chicken Breast	02/04	C. coli
N2556	MD	Chicken Breast	02/04	C. coli
N375	MN	Chicken Breast	08/04	C. coli
N376	MN	Chicken Breast	08/04	C. coli
N2576	MD	Chicken Breast	06/04	C. coli
N2577	MD	Chicken Breast	06/04	C. coli
N281	CT	Chicken Breast	11/04	C. coli
N2579	MD	Chicken Breast	06/04	C. coli
N1631	GA	Chicken Breast	04/04	C. coli
N1636	GA	Chicken Breast	07/04	C. coli
N3528	TN	Chicken Breast	05/04	C. coli
N3529	TN	Chicken Breast	05/04	C. coli
N1638	GA	Chicken Breast	07/04	C. coli
N3558	TN	Chicken Breast	10/04	C. coli
N3560	TN	Chicken Breast	10/04	C. coli
N290	CT	Chicken Breast	12/04	C. coli
N1502	CO	Chicken Breast	12/04	C. coli
N1491	CO	Chicken Breast	07/04	C. coli
N1493	CO	Chicken Breast	09/04	C. coli
N3506	TN	Chicken Breast	01/04	C. coli
N3507	TN	Chicken Breast	01/04	C. coli
N1617	GA	Chicken Breast	01/04	C. coli
N1618	GA	Chicken Breast	01/04	C. coli
N351	MN	Chicken Breast	05/04	C. coli
N352	MN	Chicken Breast	05/04	C. coli
N353	MN	Chicken Breast	05/04	C. coli
N1673	GA	Chicken Breast	12/04	C. coli
N1648	GA	Chicken Breast	08/04	C. coli
N560	NY	Chicken Breast	05/04	C. coli
N562	NY	Chicken Breast	05/04	C. coli
N614	NY	Chicken Breast	11/04	C. coli
N616	NY	Chicken Breast	12/04	C. coli
N619	NY	Chicken Breast	12/04	C. coli
N554	NY	Chicken Breast	04/04	C. coli
N2595	MD	Chicken Breast	08/04	C. coli
N3563	TN	Chicken Breast	09/04	C. coli
N592	NY	Chicken Breast	09/04	C. coli
N594	NY	Chicken Breast	09/04	C. coli
N595	NY	Chicken Breast	09/04	C. coli
N586	NY	Chicken Breast	08/04	C. coli
N621	NY	Chicken Breast	12/04	C. coli
N2553	MD	Chicken Breast	02/04	C. coli
N2615	MD	Chicken Breast	10/04	C. coli
N2613	MD	Chicken Breast	10/04	C. coli
N556	NY	Chicken Breast	04/04	C. coli
N559	NY	Chicken Breast	04/04	C. coli
N535	NY	Chicken Breast	02/04	C. coli
N538	NY	Chicken Breast	02/04	C. coli
N557	NY	Chicken Breast	04/04	C. coli
N587	NY	Chicken Breast	08/04	C. coli
N552	NY	Chicken Breast	03/04	C. coli
N549	NY	Chicken Breast	03/04	C. coli
N550	NY	Chicken Breast	03/04	C. coli
N551	NY	Chicken Breast	03/04	C. coli
N597	NY	Chicken Breast	09/04	C. coli
N2597	MD	Chicken Breast	08/04	C. coli
N224	CT	Chicken Breast	03/04	C. coli
N605	NY	Chicken Breast	10/04	C. coli
N574	NY	Chicken Breast	06/04	C. coli
N2596	MD	Chicken Breast	08/04	C. coli
N2598	MD	Chicken Breast	08/04	C. coli
N1657	GA	Chicken Breast	09/04	C. coli
N2547	MD	Chicken Breast	01/04	C. coli
N2546	MD	Chicken Breast	01/04	C. coli
N553	NY	Chicken Breast	03/04	C. coli
N558	NY	Chicken Breast	04/04	C. coli
N530	NY	Chicken Breast	01/04	C. coli
N220	CT	Chicken Breast	02/04	C. coli
N274	CT	Chicken Breast	10/04	C. coli
N2550	MD	Chicken Breast	02/04	C. coli
N606	NY	Chicken Breast	10/04	C. coli
N607	NY	Chicken Breast	10/04	C. coli
N543	NY	Chicken Breast	02/04	C. coli
N537	NY	Chicken Breast	02/04	C. coli
N539	NY	Chicken Breast	02/04	C. coli
N1500	CO	Chicken Breast	11/04	C. coli
N405	MN	Ground Turkey	11/04	C. coli
N406	MN	Ground Turkey	11/04	C. coli
N407	MN	Ground Turkey	11/04	C. coli
N408	MN	Ground Turkey	11/04	C. coli
N409	MN	Ground Turkey	11/04	C. coli
N71	CA	Pork Chop	06/04	C. coli
N694	OR	Chicken Breast	07/04	C. coli
N696	OR	Chicken Breast	07/04	C. coli
N697	OR	Chicken Breast	07/04	C. coli
N698	OR	Chicken Breast	07/04	C. coli
N716	OR	Chicken Breast	10/04	C. coli
N400	MN	Chicken Breast	11/04	C. coli
N402	MN	Chicken Breast	11/04	C. coli
N486	NM	Chicken Breast	11/04	C. coli
N488	NM	Chicken Breast	11/04	C. coli
N3573	TN	Chicken Breast	12/04	C. coli
N3532	TN	Chicken Breast	05/04	C. coli
N392	MN	Chicken Breast	10/04	C. coli
N3559	TN	Chicken Breast	10/04	C. coli
N210	CT	Chicken Breast	01/04	C. coli
N211	CT	Chicken Breast	01/04	C. coli
N284	CT	Chicken Breast	11/04	C. coli
N285	CT	Chicken Breast	11/04	C. coli
N286	CT	Chicken Breast	11/04	C. coli
N2619	MD	Chicken Breast	11/04	C. coli
N212	CT	Chicken Breast	01/04	C. coli

A-4r. PFGE Profiles for *Campylobacter jejuni*



CVM #	State	Source	Date Isolated	Species
N36	CA	Chicken Breast	02/04	C. jejuni
N44	CA	Chicken Breast	02/04	C. jejuni
N65	CA	Chicken Breast	06/04	C. jejuni
N695	OR	Chicken Breast	07/04	C. jejuni
N2558	MD	Chicken Breast	03/04	C. jejuni
N2565	MD	Chicken Breast	04/04	C. jejuni
N2566	MD	Chicken Breast	04/04	C. jejuni
N2567	MD	Chicken Breast	04/04	C. jejuni
N719	OR	Chicken Breast	10/04	C. jejuni
N731	OR	Chicken Breast	12/04	C. jejuni
N733	OR	Chicken Breast	12/04	C. jejuni
N735	OR	Chicken Breast	12/04	C. jejuni
N701	OR	Chicken Breast	08/04	C. jejuni
N97	CA	Chicken Breast	09/04	C. jejuni
N125	CA	Chicken Breast	12/04	C. jejuni
N83	CA	Chicken Breast	08/04	C. jejuni
N685	OR	Chicken Breast	06/04	C. jejuni
N686	OR	Chicken Breast	06/04	C. jejuni
N91	CA	Chicken Breast	09/04	C. jejuni
N92	CA	Chicken Breast	09/04	C. jejuni
N2580	MD	Chicken Breast	06/04	C. jejuni
N226	CT	Chicken Breast	04/04	C. jejuni
N371	MN	Ground Turkey	07/04	C. jejuni
N385	MN	Chicken Breast	09/04	C. jejuni
N234	CT	Chicken Breast	06/04	C. jejuni
N235	CT	Chicken Breast	06/04	C. jejuni
N237	CT	Chicken Breast	06/04	C. jejuni
N238	CT	Chicken Breast	06/04	C. jejuni
N397	MN	Chicken Breast	10/04	C. jejuni
N692	OR	Chicken Breast	07/04	C. jejuni
N693	OR	Chicken Breast	07/04	C. jejuni
N705	OR	Chicken Breast	09/04	C. jejuni
N711	OR	Chicken Breast	09/04	C. jejuni
N368	MN	Chicken Breast	07/04	C. jejuni
N387	MN	Chicken Breast	09/04	C. jejuni
N388	MN	Chicken Breast	09/04	C. jejuni
N390	MN	Chicken Breast	09/04	C. jejuni
N391	MN	Chicken Breast	09/04	C. jejuni
N699	OR	Chicken Breast	08/04	C. jejuni
N389	MN	Chicken Breast	09/04	C. jejuni
N265	CT	Chicken Breast	09/04	C. jejuni
N722	OR	Chicken Breast	10/04	C. jejuni
N266	CT	Chicken Breast	09/04	C. jejuni
N374	MN	Chicken Breast	08/04	C. jejuni
N720	OR	Chicken Breast	10/04	C. jejuni
N721	OR	Chicken Breast	10/04	C. jejuni
N100	CA	Chicken Breast	10/04	C. jejuni
N105	CA	Chicken Breast	10/04	C. jejuni
N108	CA	Chicken Breast	10/04	C. jejuni
N110	CA	Chicken Breast	11/04	C. jejuni
N268	CT	Chicken Breast	09/04	C. jejuni
N715	OR	Chicken Breast	10/04	C. jejuni
N734	OR	Chicken Breast	12/04	C. jejuni
N267	CT	Chicken Breast	09/04	C. jejuni
N1655	GA	Chicken Breast	09/04	C. jejuni
N33	CA	Chicken Breast	01/04	C. jejuni
N367	MN	Chicken Breast	07/04	C. jejuni
N370	MN	Chicken Breast	07/04	C. jejuni
N366	MN	Chicken Breast	07/04	C. jejuni
N369	MN	Chicken Breast	07/04	C. jejuni
N381	MN	Chicken Breast	08/04	C. jejuni
N377	MN	Chicken Breast	08/04	C. jejuni
N86	CA	Chicken Breast	08/04	C. jejuni
N331	MN	Chicken Breast	01/04	C. jejuni
N82	CA	Chicken Breast	08/04	C. jejuni
N88	CA	Chicken Breast	08/04	C. jejuni
N712	OR	Chicken Breast	09/04	C. jejuni
N362	MN	Chicken Breast	07/04	C. jejuni
N363	MN	Chicken Breast	07/04	C. jejuni
N364	MN	Chicken Breast	07/04	C. jejuni
N365	MN	Chicken Breast	07/04	C. jejuni
N124	CA	Chicken Breast	12/04	C. jejuni
N669	OR	Chicken Breast	02/04	C. jejuni
N670	OR	Chicken Breast	02/04	C. jejuni
N60	CA	Chicken Breast	05/04	C. jejuni
N98	CA	Chicken Breast	09/04	C. jejuni
N706	OR	Chicken Breast	09/04	C. jejuni
N714	OR	Chicken Breast	09/04	C. jejuni
N102	CA	Chicken Breast	10/04	C. jejuni
N378	MN	Chicken Breast	08/04	C. jejuni
N379	MN	Chicken Breast	08/04	C. jejuni
N380	MN	Chicken Breast	08/04	C. jejuni
N383	MN	Chicken Breast	09/04	C. jejuni
N396	MN	Chicken Breast	10/04	C. jejuni
N399	MN	Chicken Breast	10/04	C. jejuni
N372	MN	Chicken Breast	08/04	C. jejuni
N373	MN	Chicken Breast	08/04	C. jejuni
N382	MN	Chicken Breast	09/04	C. jejuni
N386	MN	Chicken Breast	09/04	C. jejuni
N730	OR	Chicken Breast	12/04	C. jejuni
N700	OR	Chicken Breast	08/04	C. jejuni
N703	OR	Chicken Breast	08/04	C. jejuni
N704	OR	Chicken Breast	08/04	C. jejuni
N213	CT	Ground Turkey	01/04	C. jejuni
N1670	GA	Chicken Breast	11/04	C. jejuni
N3512	TN	Chicken Breast	02/04	C. jejuni
N547	NY	Chicken Breast	03/04	C. jejuni
N481	NM	Chicken Breast	10/04	C. jejuni
N483	NM	Chicken Breast	10/04	C. jejuni
N454	NM	Chicken Breast	05/04	C. jejuni
N455	NM	Chicken Breast	05/04	C. jejuni
N456	NM	Chicken Breast	05/04	C. jejuni
N458	NM	Chicken Breast	05/04	C. jejuni
N1623	GA	Chicken Breast	02/04	C. jejuni
N453	NM	Chicken Breast	05/04	C. jejuni
N244	CT	Ground Turkey	06/04	C. jejuni
N479	NM	Chicken Breast	10/04	C. jejuni
N480	NM	Chicken Breast	10/04	C. jejuni
N457	NM	Chicken Breast	05/04	C. jejuni
N112	CA	Chicken Breast	11/04	C. jejuni
N115	CA	Chicken Breast	11/04	C. jejuni
N118	CA	Chicken Breast	11/04	C. jejuni
N109	CA	Chicken Breast	10/04	C. jejuni
N34	CA	Chicken Breast	01/04	C. jejuni
N3511	TN	Chicken Breast	02/04	C. jejuni
N57	CA	Chicken Breast	05/04	C. jejuni
N73	CA	Chicken Breast	07/04	C. jejuni
N1624	GA	Chicken Breast	02/04	C. jejuni
N3521	TN	Chicken Breast	03/04	C. jejuni
N3522	TN	Chicken Breast	03/04	C. jejuni
N95	CA	Chicken Breast	09/04	C. jejuni
N96	CA	Chicken Breast	09/04	C. jejuni
N75	CA	Chicken Breast	07/04	C. jejuni
N291	CT	Chicken Breast	12/04	C. jejuni
N1659	GA	Chicken Breast	10/04	C. jejuni
N667	OR	Chicken Breast	02/04	C. jejuni
N668	OR	Chicken Breast	02/04	C. jejuni
N354	MN	Chicken Breast	05/04	C. jejuni
N355	MN	Chicken Breast	05/04	C. jejuni
N356	MN	Chicken Breast	05/04	C. jejuni



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N107	CA	Chicken Breast	10/04	C. jejuni
N2581	MD	Chicken Breast	06/04	C. jejuni
N489	NM	Chicken Breast	12/04	C. jejuni
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N2625	MD	Chicken Breast	12/04	C. jejuni
N3557	TN	Chicken Breast	10/04	C. jejuni
N292	CT	Chicken Breast	12/04	C. jejuni
N276	CT	Chicken Breast	10/04	C. jejuni
N277	CT	Chicken Breast	10/04	C. jejuni
N2554	MD	Chicken Breast	02/04	C. jejuni
N3526	TN	Chicken Breast	04/04	C. jejuni
N3527	TN	Chicken Breast	04/04	C. jejuni
N3524	TN	Chicken Breast	04/04	C. jejuni
N3525	TN	Chicken Breast	04/04	C. jejuni
N29	CA	Chicken Breast	01/04	C. jejuni
N1501	CO	Chicken Breast	12/04	C. jejuni
N459	NM	Chicken Breast	06/04	C. jejuni
N3537	TN	Chicken Breast	06/04	C. jejuni
N3538	TN	Chicken Breast	06/04	C. jejuni
N3539	TN	Chicken Breast	06/04	C. jejuni
N3540	TN	Chicken Breast	06/04	C. jejuni
N3541	TN	Chicken Breast	06/04	C. jejuni
N3542	TN	Chicken Breast	06/04	C. jejuni
N3533	TN	Chicken Breast	06/04	C. jejuni
N3534	TN	Chicken Breast	06/04	C. jejuni
N3535	TN	Chicken Breast	06/04	C. jejuni
N3536	TN	Chicken Breast	06/04	C. jejuni
N591	NY	Chicken Breast	09/04	C. jejuni
N593	NY	Chicken Breast	09/04	C. jejuni
N247	CT	Chicken Breast	07/04	C. jejuni
N604	NY	Chicken Breast	10/04	C. jejuni
N2563	MD	Chicken Breast	03/04	C. jejuni
N2589	MD	Chicken Breast	07/04	C. jejuni
N2591	MD	Chicken Breast	07/04	C. jejuni
N2592	MD	Chicken Breast	07/04	C. jejuni
N2564	MD	Ground Turkey	03/04	C. jejuni
N571	NY	Chicken Breast	06/04	C. jejuni
N575	NY	Chicken Breast	06/04	C. jejuni
N576	NY	Chicken Breast	06/04	C. jejuni
N87	CA	Chicken Breast	08/04	C. jejuni
N1619	GA	Chicken Breast	01/04	C. jejuni
N344	MN	Chicken Breast	03/04	C. jejuni
N346	MN	Chicken Breast	03/04	C. jejuni
N345	MN	Chicken Breast	03/04	C. jejuni
N398	MN	Chicken Breast	10/04	C. jejuni
N732	OR	Chicken Breast	12/04	C. jejuni
N736	OR	Chicken Breast	12/04	C. jejuni
N737	OR	Chicken Breast	12/04	C. jejuni
N337	MN	Chicken Breast	01/04	C. jejuni
N339	MN	Chicken Breast	02/04	C. jejuni
N340	MN	Chicken Breast	02/04	C. jejuni
N341	MN	Chicken Breast	02/04	C. jejuni
N342	MN	Chicken Breast	02/04	C. jejuni
N343	MN	Chicken Breast	02/04	C. jejuni
N336	MN	Chicken Breast	01/04	C. jejuni
N334	MN	Chicken Breast	01/04	C. jejuni
N335	MN	Chicken Breast	01/04	C. jejuni
N338	MN	Chicken Breast	01/04	C. jejuni
N31	CA	Chicken Breast	01/04	C. jejuni
N2614	MD	Chicken Breast	10/04	C. jejuni
N1621	GA	Chicken Breast	01/04	C. jejuni
N1622	GA	Chicken Breast	01/04	C. jejuni
N1628	GA	Chicken Breast	04/04	C. jejuni
N3523	TN	Ground Turkey	03/04	C. jejuni
N465	NM	Chicken Breast	08/04	C. jejuni
N467	NM	Chicken Breast	08/04	C. jejuni
N133	CO	Chicken Breast	02/04	C. jejuni
N42	CA	Chicken Breast	02/04	C. jejuni
N94	CA	Chicken Breast	09/04	C. jejuni
N40	CA	Chicken Breast	02/04	C. jejuni
N41	CA	Chicken Breast	02/04	C. jejuni
N43	CA	Chicken Breast	02/04	C. jejuni
N45	CA	Chicken Breast	03/04	C. jejuni
N49	CA	Chicken Breast	04/04	C. jejuni
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N85	CA	Chicken Breast	08/04	C. jejuni
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N664	OR	Chicken Breast	01/04	C. jejuni
N665	OR	Chicken Breast	01/04	C. jejuni
N80	CA	Chicken Breast	08/04	C. jejuni
N64	CA	Chicken Breast	06/04	C. jejuni
N66	CA	Chicken Breast	06/04	C. jejuni
N67	CA	Chicken Breast	06/04	C. jejuni
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N56	CA	Chicken Breast	05/04	C. jejuni
N59	CA	Chicken Breast	05/04	C. jejuni
N37	CA	Chicken Breast	02/04	C. jejuni
N51	CA	Chicken Breast	04/04	C. jejuni
N53	CA	Chicken Breast	04/04	C. jejuni
N252	CT	Chicken Breast	08/04	C. jejuni
N3543	TN	Chicken Breast	07/04	C. jejuni
N3545	TN	Chicken Breast	07/04	C. jejuni
N3546	TN	Chicken Breast	07/04	C. jejuni
N3548	TN	Chicken Breast	07/04	C. jejuni
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N490	NM	Chicken Breast	12/04	C. jejuni
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N423	NM	Chicken Breast	01/04	C. jejuni
N253	CT	Chicken Breast	08/04	C. jejuni
N254	CT	Chicken Breast	08/04	C. jejuni
N1660	GA	Chicken Breast	10/04	C. jejuni
N1661	GA	Chicken Breast	10/04	C. jejuni
N663	OR	Chicken Breast	01/04	C. jejuni
N671	OR	Chicken Breast	03/04	C. jejuni
N672	OR	Chicken Breast	03/04	C. jejuni
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N675	OR	Chicken Breast	03/04	C. jejuni
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N677	OR	Chicken Breast	03/04	C. jejuni
N723	OR	Chicken Breast	10/04	C. jejuni
N673	OR	Chicken Breast	03/04	C. jejuni
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N35	CA	Chicken Breast	01/04	C. jejuni
N30	CA	Chicken Breast	01/04	C. jejuni
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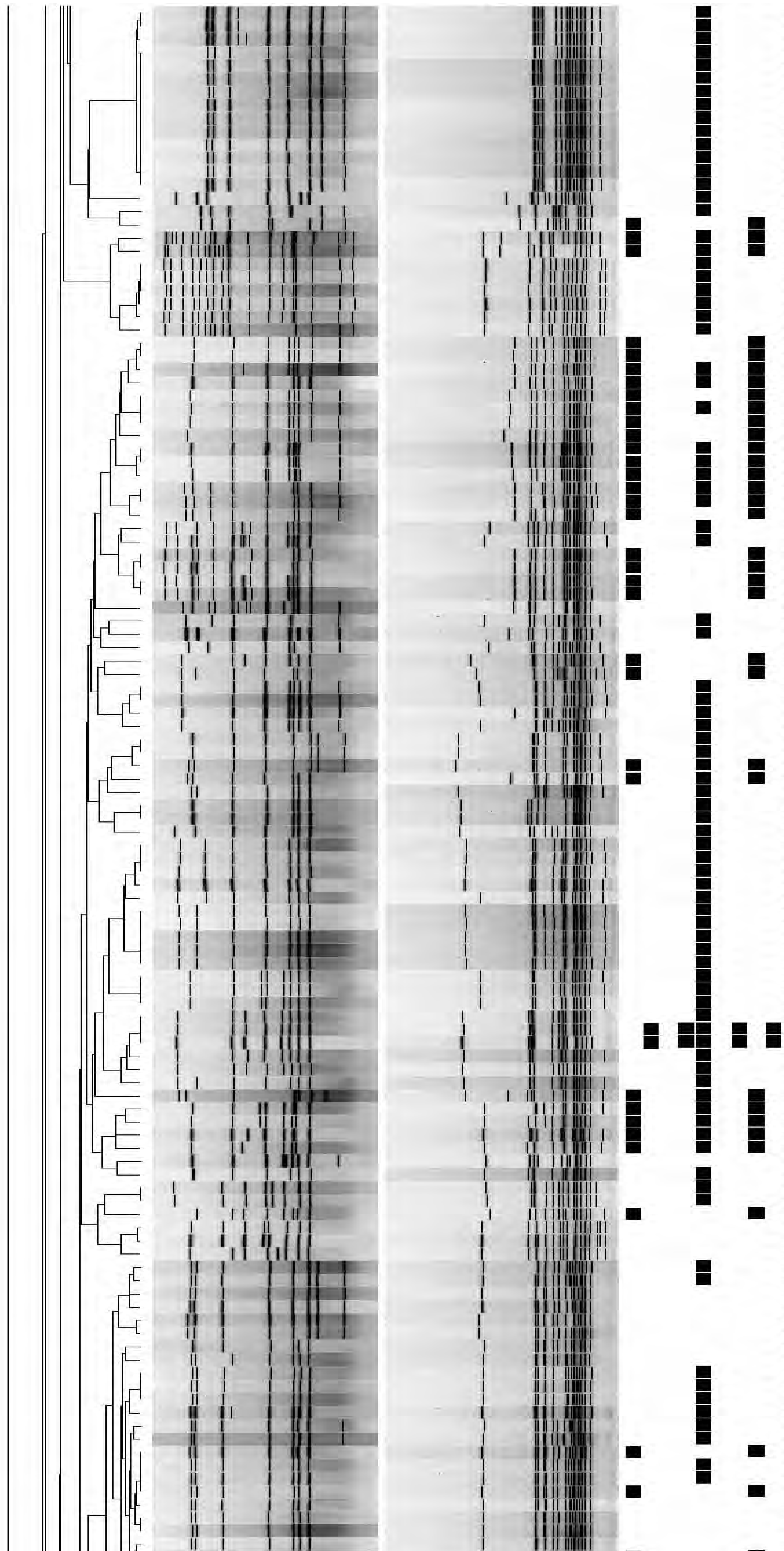

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N728	OR	Chicken Breast	11/04	C. jejuni
N726	OR	Chicken Breast	11/04	C. jejuni
N666	OR	Chicken Breast	02/04	C. jejuni
N678	OR	Chicken Breast	04/04	C. jejuni
N679	OR	Chicken Breast	04/04	C. jejuni
N680	OR	Chicken Breast	04/04	C. jejuni
N683	OR	Chicken Breast	06/04	C. jejuni
N684	OR	Chicken Breast	06/04	C. jejuni
N687	OR	Chicken Breast	06/04	C. jejuni
N702	OR	Chicken Breast	08/04	C. jejuni
N710	OR	Chicken Breast	09/04	C. jejuni
N713	OR	Chicken Breast	09/04	C. jejuni
N729	OR	Chicken Breast	11/04	C. jejuni
N275	CT	Chicken Breast	10/04	C. jejuni
N1495	CO	Chicken Breast	10/04	C. jejuni
N3510	TN	Chicken Breast	02/04	C. jejuni
N1630	GA	Chicken Breast	04/04	C. jejuni
N1672	GA	Chicken Breast	12/04	C. jejuni
N2599	MD	Chicken Breast	08/04	C. jejuni
N2601	MD	Chicken Breast	08/04	C. jejuni
N2603	MD	Chicken Breast	08/04	C. jejuni
N2600	MD	Chicken Breast	08/04	C. jejuni
N2602	MD	Chicken Breast	08/04	C. jejuni
N1667	GA	Chicken Breast	11/04	C. jejuni
N222	CT	Chicken Breast	03/04	C. jejuni
N223	CT	Chicken Breast	03/04	C. jejuni
N256	CT	Chicken Breast	08/04	C. jejuni
N219	CT	Chicken Breast	02/04	C. jejuni
N534	NY	Chicken Breast	01/04	C. jejuni
N608	NY	Chicken Breast	11/04	C. jejuni
N2626	MD	Chicken Breast	12/04	C. jejuni
N2571	MD	Chicken Breast	05/04	C. jejuni
N270	CT	Chicken Breast	10/04	C. jejuni
N273	CT	Chicken Breast	10/04	C. jejuni
N272	CT	Chicken Breast	10/04	C. jejuni
N246	CT	Chicken Breast	07/04	C. jejuni
N248	CT	Chicken Breast	07/04	C. jejuni
N596	NY	Chicken Breast	09/04	C. jejuni
N259	CT	Chicken Breast	08/04	C. jejuni
N293	CT	Chicken Breast	12/04	C. jejuni
N599	NY	Chicken Breast	10/04	C. jejuni
N603	NY	Chicken Breast	10/04	C. jejuni
N217	CT	Chicken Breast	02/04	C. jejuni
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N570	NY	Chicken Breast	06/04	C. jejuni
N1668	GA	Chicken Breast	11/04	C. jejuni
N2559	MD	Chicken Breast	03/04	C. jejuni
N3519	TN	Chicken Breast	03/04	C. jejuni
N1503	CO	Chicken Breast	12/04	C. jejuni
N1504	CO	Chicken Breast		C. jejuni
N3554	TN	Chicken Breast	09/04	C. jejuni
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N2624	MD	Chicken Breast	12/04	C. jejuni
N577	NY	Chicken Breast	07/04	C. jejuni
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N1637	GA	Chicken Breast	07/04	C. jejuni
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N3531	TN	Chicken Breast	05/04	C. jejuni
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N262	CT	Chicken Breast	09/04	C. jejuni
N1645	GA	Chicken Breast	08/04	C. jejuni
N602	NY	Chicken Breast	10/04	C. jejuni
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N227	CT	Chicken Breast	04/04	C. jejuni
N228	CT	Chicken Breast	04/04	C. jejuni
N229	CT	Chicken Breast	04/04	C. jejuni
N230	CT	Chicken Breast	04/04	C. jejuni
N236	CT	Chicken Breast	06/04	C. jejuni
N207	CT	Chicken Breast	01/04	C. jejuni
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N279	CT	Chicken Breast	11/04	C. jejuni
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N3515	TN	Chicken Breast	03/04	C. jejuni
N2555	MD	Chicken Breast	02/04	C. jejuni
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N251	CT	Chicken Breast	07/04	C. jejuni
N1641	GA	Chicken Breast	07/04	C. jejuni
N738	OR	Chicken Breast	12/04	C. jejuni
N3518	TN	Chicken Breast	03/04	C. jejuni
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N540	NY	Chicken Breast	02/04	C. jejuni
N579	NY	Chicken Breast	07/04	C. jejuni
N582	NY	Chicken Breast	07/04	C. jejuni
N528	NY	Chicken Breast	01/04	C. jejuni
N231	CT	Chicken Breast	05/04	C. jejuni
N233	CT	Chicken Breast	05/04	C. jejuni
N622	NY	Chicken Breast	12/04	C. jejuni
N531	NY	Chicken Breast	01/04	C. jejuni
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N618	NY	Chicken Breast	12/04	C. jejuni
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N572	NY	Chicken Breast	06/04	C. jejuni
N542	NY	Chicken Breast	02/04	C. jejuni
N2568	MD	Chicken Breast	05/04	C. jejuni
N2569	MD	Chicken Breast	05/04	C. jejuni
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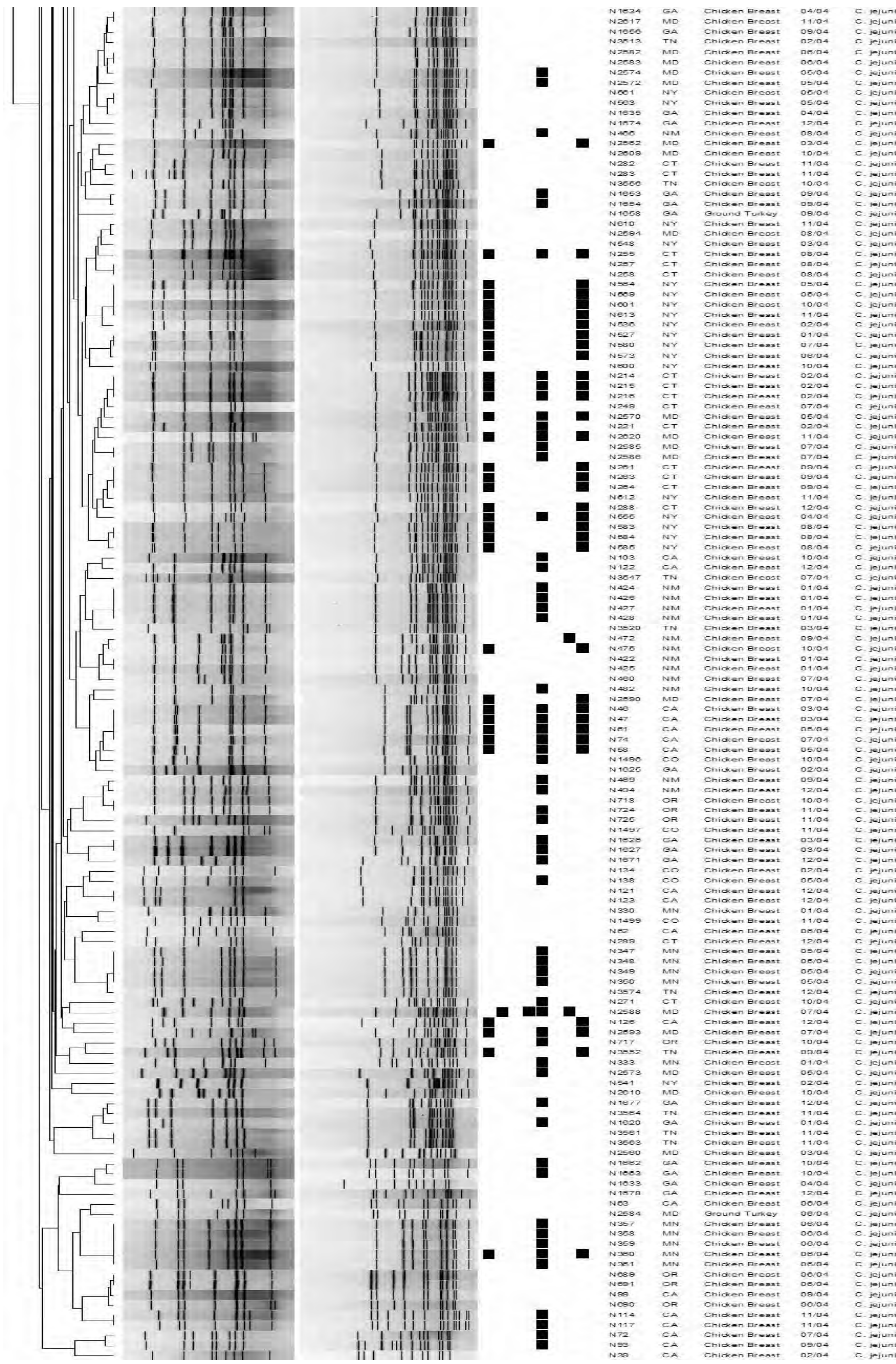

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N2617 MD Chicken Breast 11/04 C. jejuni
N1656 GA Chicken Breast 09/04 C. jejuni
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N2582 MD Chicken Breast 06/04 C. jejuni
N2583 MD Chicken Breast 06/04 C. jejuni
N2574 MD Chicken Breast 05/04 C. jejuni
N2572 MD Chicken Breast 05/04 C. jejuni
N561 NY Chicken Breast 05/04 C. jejuni
N563 NY Chicken Breast 05/04 C. jejuni
N1635 GA Chicken Breast 04/04 C. jejuni
N1674 GA Chicken Breast 12/04 C. jejuni
N466 NM Chicken Breast 08/04 C. jejuni
N2562 MD Chicken Breast 03/04 C. jejuni
N2609 MD Chicken Breast 10/04 C. jejuni
N282 CT Chicken Breast 11/04 C. jejuni
N283 CT Chicken Breast 11/04 C. jejuni
N3556 TN Chicken Breast 10/04 C. jejuni
N1653 GA Chicken Breast 09/04 C. jejuni
N1654 GA Chicken Breast 09/04 C. jejuni
N1658 GA Ground Turkey 09/04 C. jejuni
N610 NY Chicken Breast 11/04 C. jejuni
N2594 MD Chicken Breast 08/04 C. jejuni
N548 NY Chicken Breast 03/04 C. jejuni
N255 CT Chicken Breast 08/04 C. jejuni
N257 CT Chicken Breast 08/04 C. jejuni
N258 CT Chicken Breast 08/04 C. jejuni
N564 NY Chicken Breast 05/04 C. jejuni
N569 NY Chicken Breast 05/04 C. jejuni
N601 NY Chicken Breast 10/04 C. jejuni
N613 NY Chicken Breast 11/04 C. jejuni
N536 NY Chicken Breast 02/04 C. jejuni
N527 NY Chicken Breast 01/04 C. jejuni
N580 NY Chicken Breast 07/04 C. jejuni
N573 NY Chicken Breast 06/04 C. jejuni
N600 NY Chicken Breast 10/04 C. jejuni
N214 CT Chicken Breast 02/04 C. jejuni
N215 CT Chicken Breast 02/04 C. jejuni
N216 CT Chicken Breast 02/04 C. jejuni
N249 CT Chicken Breast 07/04 C. jejuni
N2570 MD Chicken Breast 05/04 C. jejuni
N221 CT Chicken Breast 02/04 C. jejuni
N2620 MD Chicken Breast 11/04 C. jejuni
N2585 MD Chicken Breast 07/04 C. jejuni
N2586 MD Chicken Breast 07/04 C. jejuni
N261 CT Chicken Breast 09/04 C. jejuni
N263 CT Chicken Breast 09/04 C. jejuni
N264 CT Chicken Breast 09/04 C. jejuni
N612 NY Chicken Breast 11/04 C. jejuni
N288 CT Chicken Breast 12/04 C. jejuni
N555 NY Chicken Breast 04/04 C. jejuni
N583 NY Chicken Breast 08/04 C. jejuni
N584 NY Chicken Breast 08/04 C. jejuni
N585 NY Chicken Breast 08/04 C. jejuni
N103 CA Chicken Breast 10/04 C. jejuni
N122 CA Chicken Breast 12/04 C. jejuni
N3547 TN Chicken Breast 07/04 C. jejuni
N424 NM Chicken Breast 01/04 C. jejuni
N426 NM Chicken Breast 01/04 C. jejuni
N427 NM Chicken Breast 01/04 C. jejuni
N428 NM Chicken Breast 01/04 C. jejuni
N3520 TN Chicken Breast 03/04 C. jejuni
N472 NM Chicken Breast 09/04 C. jejuni
N475 NM Chicken Breast 10/04 C. jejuni
N422 NM Chicken Breast 01/04 C. jejuni
N425 NM Chicken Breast 01/04 C. jejuni
N460 NM Chicken Breast 07/04 C. jejuni
N482 NM Chicken Breast 10/04 C. jejuni
N2590 MD Chicken Breast 07/04 C. jejuni
N46 CA Chicken Breast 03/04 C. jejuni
N47 CA Chicken Breast 03/04 C. jejuni
N61 CA Chicken Breast 05/04 C. jejuni
N74 CA Chicken Breast 07/04 C. jejuni
N58 CA Chicken Breast 05/04 C. jejuni
N1496 CO Chicken Breast 10/04 C. jejuni
N1625 GA Chicken Breast 02/04 C. jejuni
N469 NM Chicken Breast 09/04 C. jejuni
N494 NM Chicken Breast 12/04 C. jejuni
N718 OR Chicken Breast 10/04 C. jejuni
N724 OR Chicken Breast 11/04 C. jejuni
N725 OR Chicken Breast 11/04 C. jejuni
N1497 CO Chicken Breast 11/04 C. jejuni
N1626 GA Chicken Breast 03/04 C. jejuni
N1627 GA Chicken Breast 03/04 C. jejuni
N1671 GA Chicken Breast 12/04 C. jejuni
N134 CO Chicken Breast 02/04 C. jejuni
N138 CO Chicken Breast 05/04 C. jejuni
N121 CA Chicken Breast 12/04 C. jejuni
N123 CA Chicken Breast 12/04 C. jejuni
N330 MN Chicken Breast 01/04 C. jejuni
N1499 CO Chicken Breast 11/04 C. jejuni
N62 CA Chicken Breast 06/04 C. jejuni
N289 CT Chicken Breast 12/04 C. jejuni
N347 MN Chicken Breast 05/04 C. jejuni
N348 MN Chicken Breast 05/04 C. jejuni
N349 MN Chicken Breast 05/04 C. jejuni
N350 MN Chicken Breast 05/04 C. jejuni
N3574 TN Chicken Breast 12/04 C. jejuni
N271 CT Chicken Breast 10/04 C. jejuni
N2588 MD Chicken Breast 07/04 C. jejuni
N126 CA Chicken Breast 12/04 C. jejuni
N2593 MD Chicken Breast 07/04 C. jejuni
N717 OR Chicken Breast 10/04 C. jejuni
N3552 TN Chicken Breast 09/04 C. jejuni
N333 MN Chicken Breast 01/04 C. jejuni
N2573 MD Chicken Breast 05/04 C. jejuni
N541 NY Chicken Breast 02/04 C. jejuni
N2610 MD Chicken Breast 10/04 C. jejuni
N1677 GA Chicken Breast 12/04 C. jejuni
N3564 TN Chicken Breast 11/04 C. jejuni
N1620 GA Chicken Breast 01/04 C. jejuni
N3561 TN Chicken Breast 11/04 C. jejuni
N3563 TN Chicken Breast 11/04 C. jejuni
N2560 MD Chicken Breast 03/04 C. jejuni
N1662 GA Chicken Breast 10/04 C. jejuni
N1663 GA Chicken Breast 10/04 C. jejuni
N1633 GA Chicken Breast 04/04 C. jejuni
N1678 GA Chicken Breast 12/04 C. jejuni
N63 CA Chicken Breast 06/04 C. jejuni
N2584 MD Ground Turkey 06/04 C. jejuni
N357 MN Chicken Breast 06/04 C. jejuni
N358 MN Chicken Breast 06/04 C. jejuni
N359 MN Chicken Breast 06/04 C. jejuni
N360 MN Chicken Breast 06/04 C. jejuni
N361 MN Chicken Breast 06/04 C. jejuni
N689 OR Chicken Breast 06/04 C. jejuni
N691 OR Chicken Breast 06/04 C. jejuni
N99 CA Chicken Breast 09/04 C. jejuni
N690 OR Chicken Breast 06/04 C. jejuni
N114 CA Chicken Breast 11/04 C. jejuni
N117 CA Chicken Breast 11/04 C. jejuni
N72 CA Chicken Breast 07/04 C. jejuni
N93 CA Chicken Breast 09/04 C. jejuni
N39 CA Chicken Breast 02/04 C. jejuni

Figure A-5. Antimicrobial Resistance among *Salmonella* by Meat Type, 2004

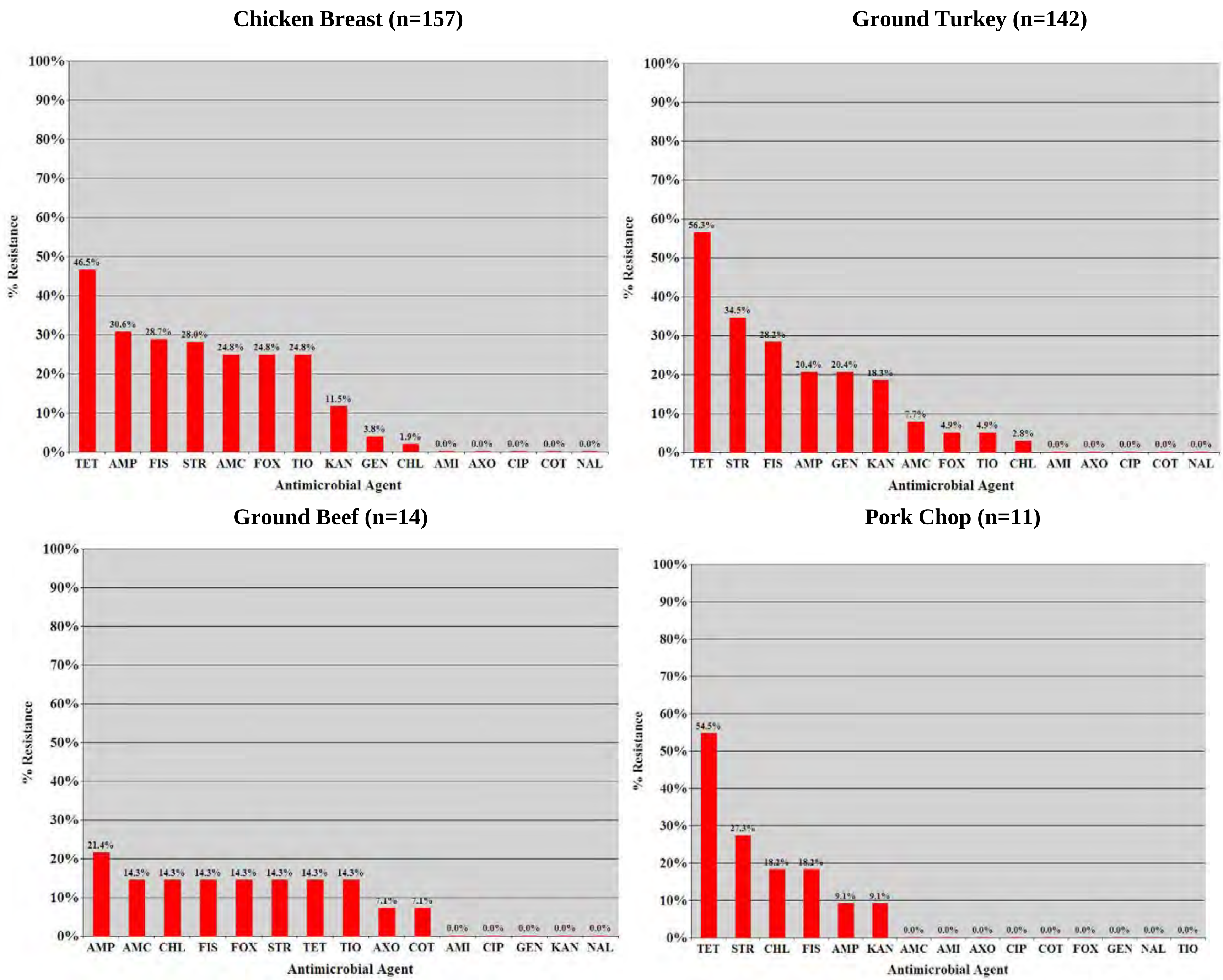
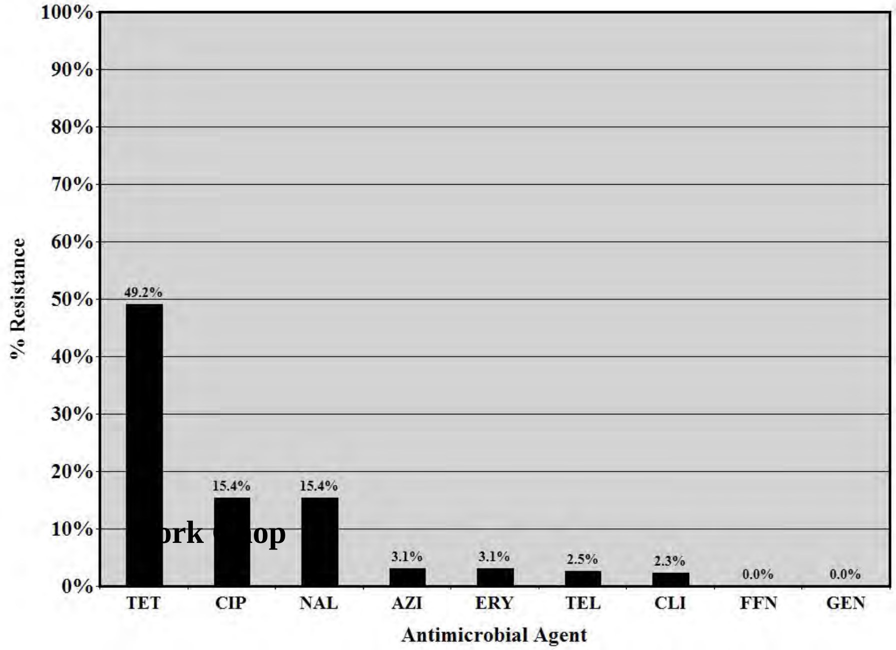
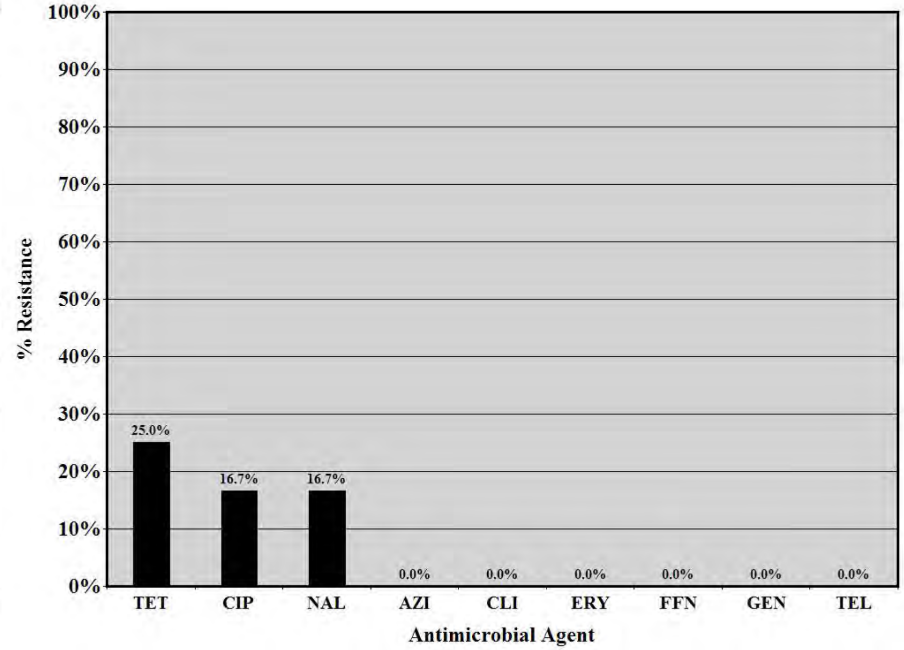


Figure A-6. Antimicrobial Resistance among *Campylobacter* by Meat Type, 2004

Chicken Breast (n=706)



Ground Turkey (n=12)



Pork Chop (n=3)

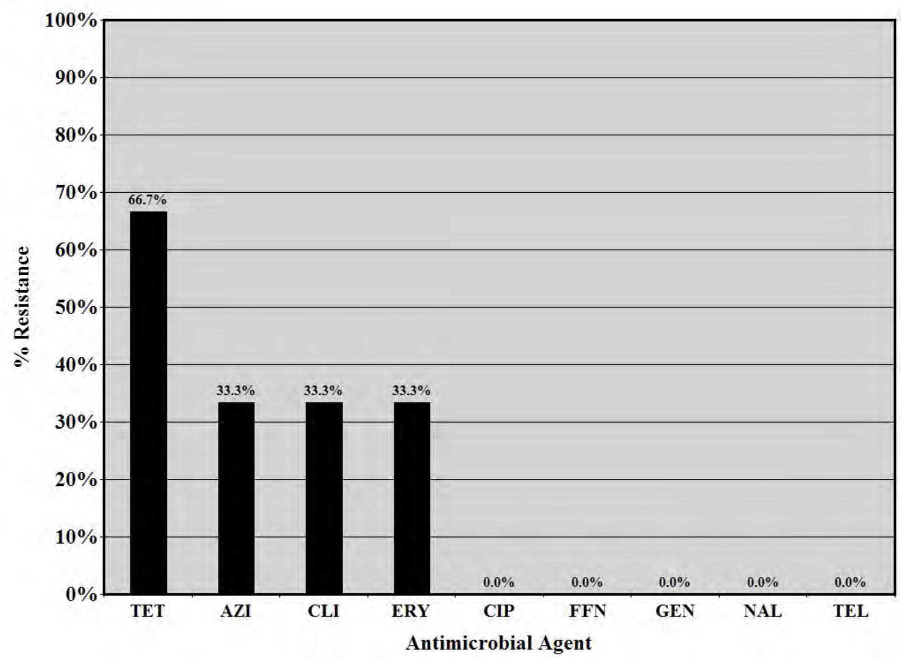
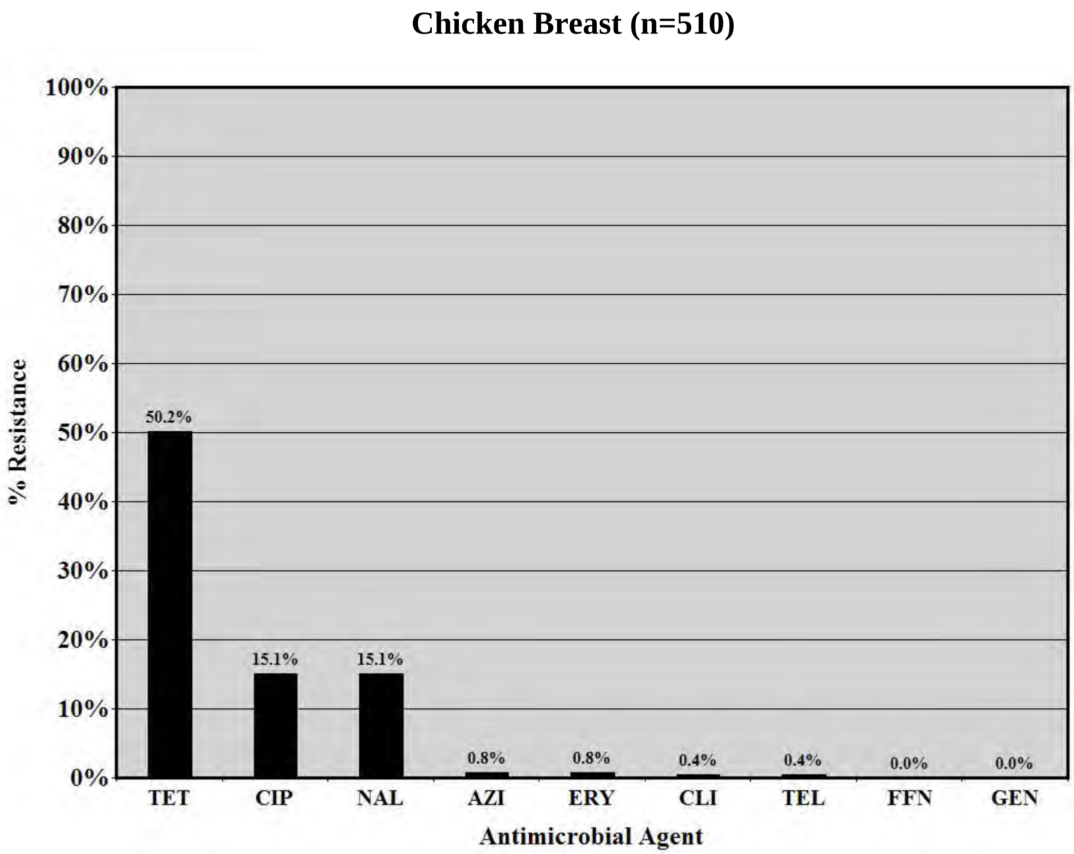


Figure A-6a. Antimicrobial Resistance among *Campylobacter jejuni* Meat Type, 2004



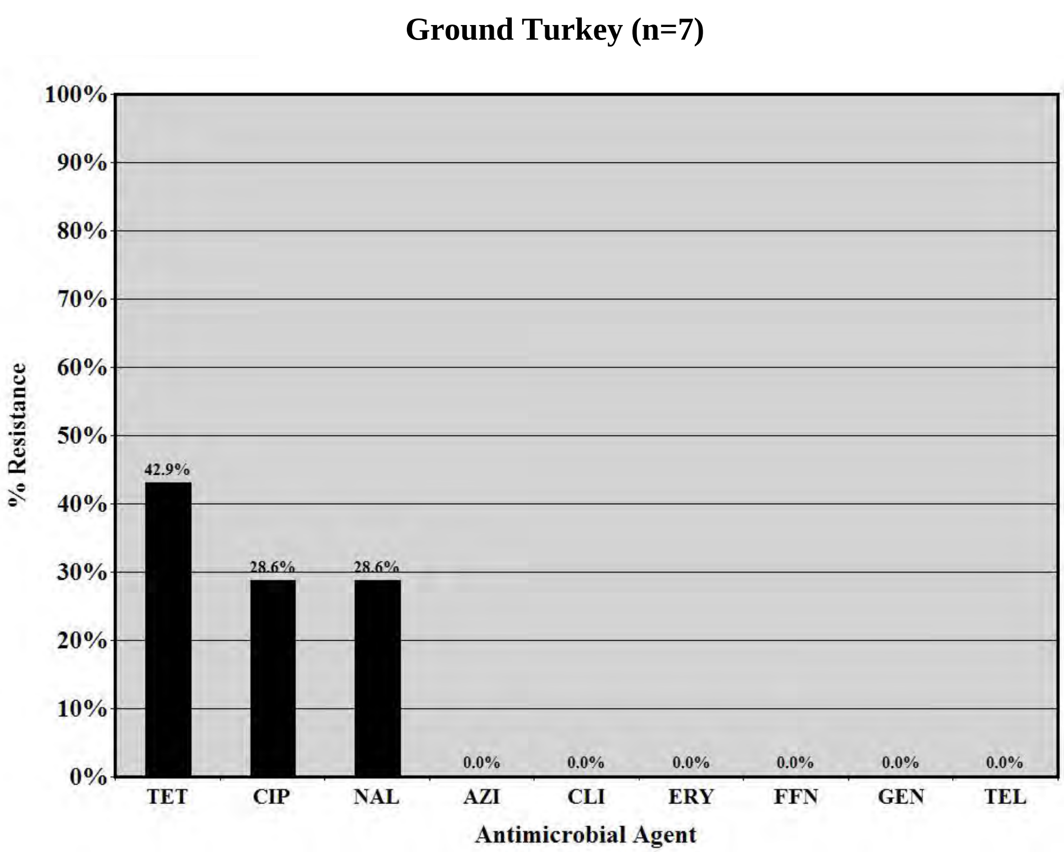
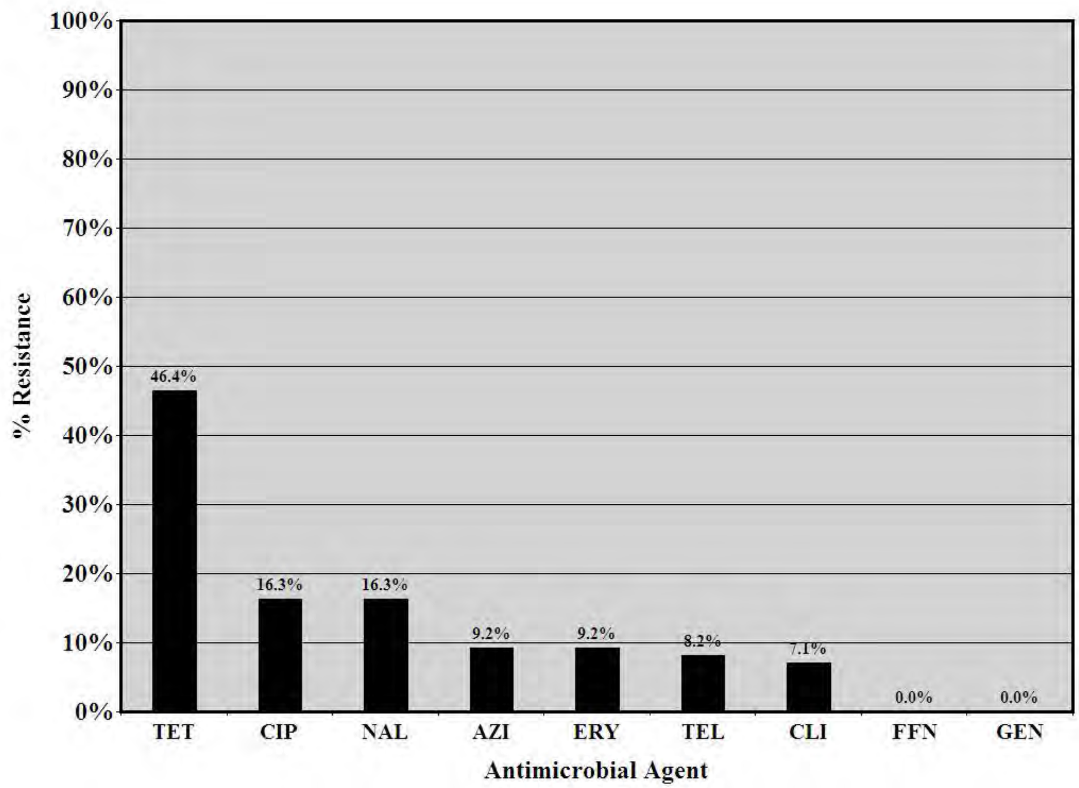


Figure A-6b. Antimicrobial Resistance among *Campylobacter coli* by Meat Type, 2004

Chicken Breast (n=196)



Pork Chop (n=3)

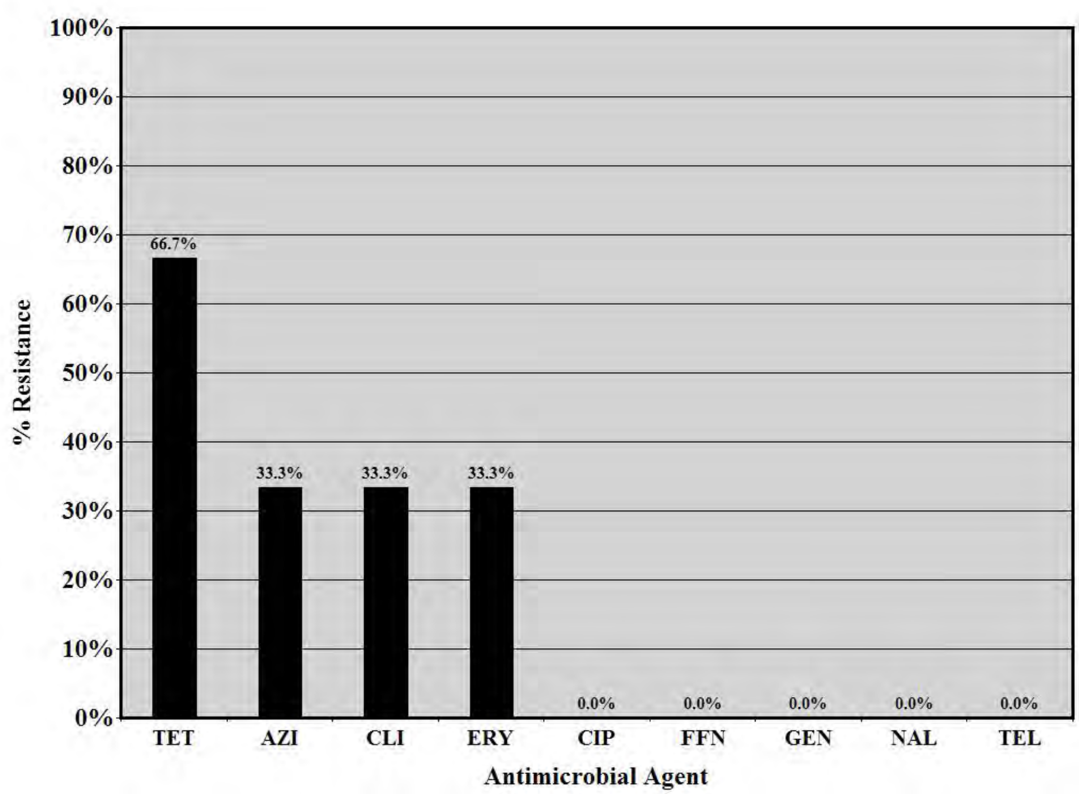
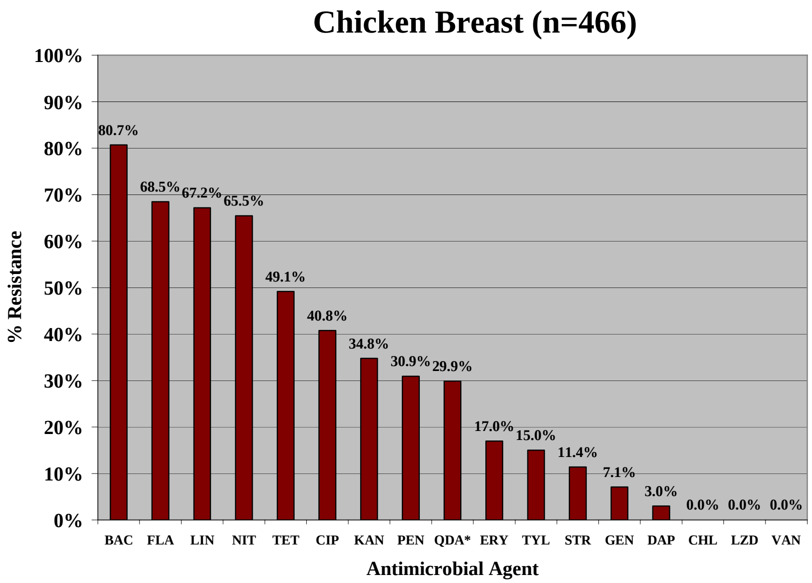
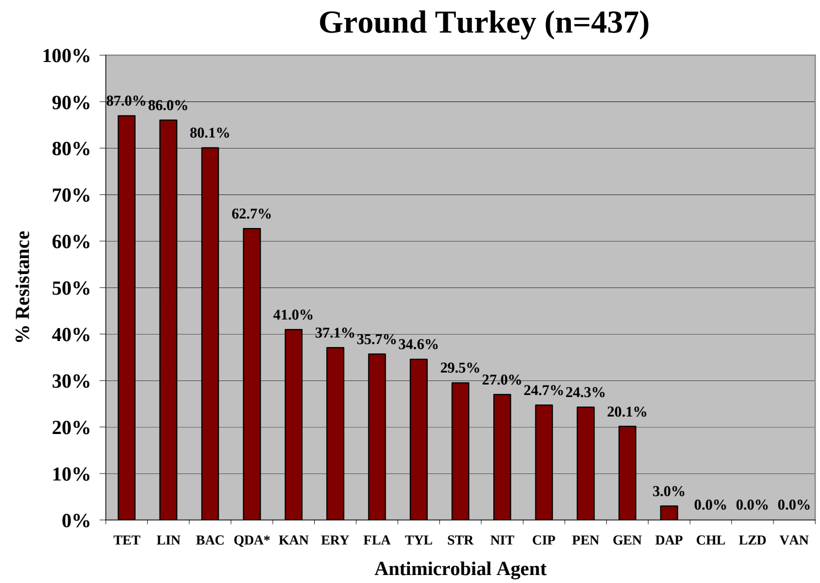


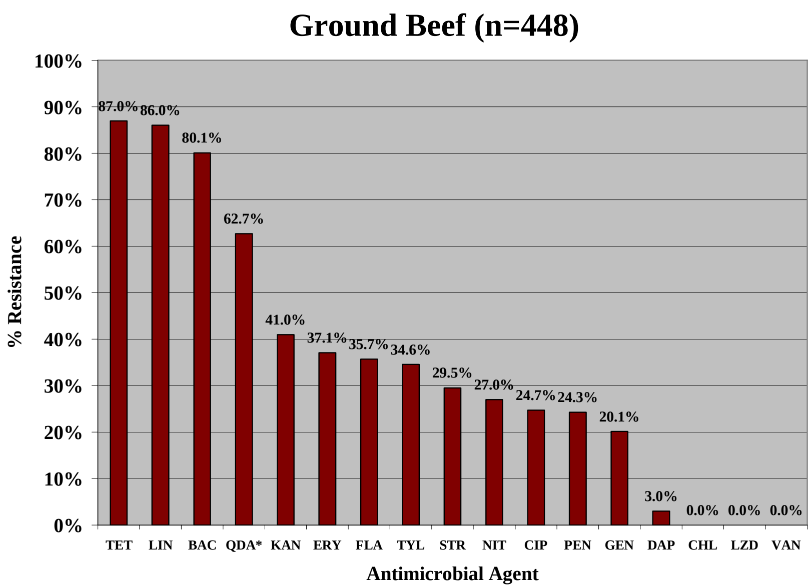
Figure A-7. Antimicrobial Resistance among *Enterococcus* by Meat Type, 2004



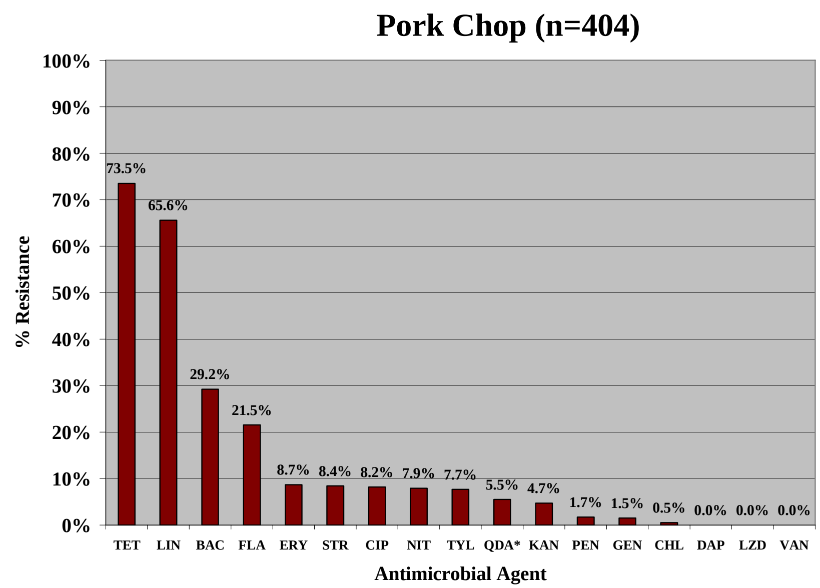
* Presented for all species except E. faecalis in QDA (n=466-88= 378 non E. faecalis)



* Presented for all species except E. faecalis in QDA (n=437-260= 177 non E. faecalis)



* Presented for all species except E. faecalis in QDA (n=448-194= 254 non E. faecalis)



*Presented for all species except E. faecalis in QDA (n=404-313= 91 non E. faecalis)

Figure A-7a. Antimicrobial Resistance among *Enterococcus faecium* by Meat Type, 2004

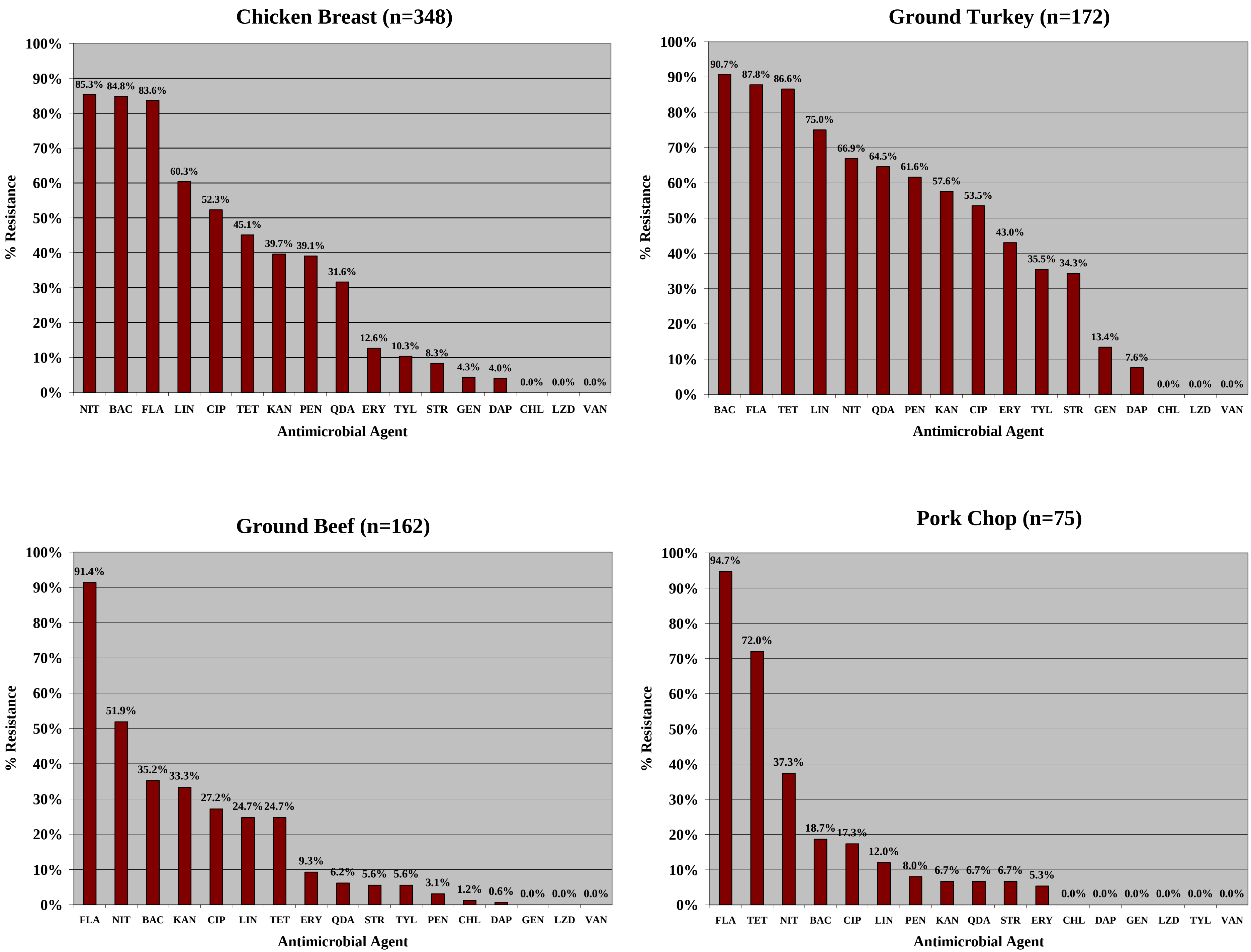
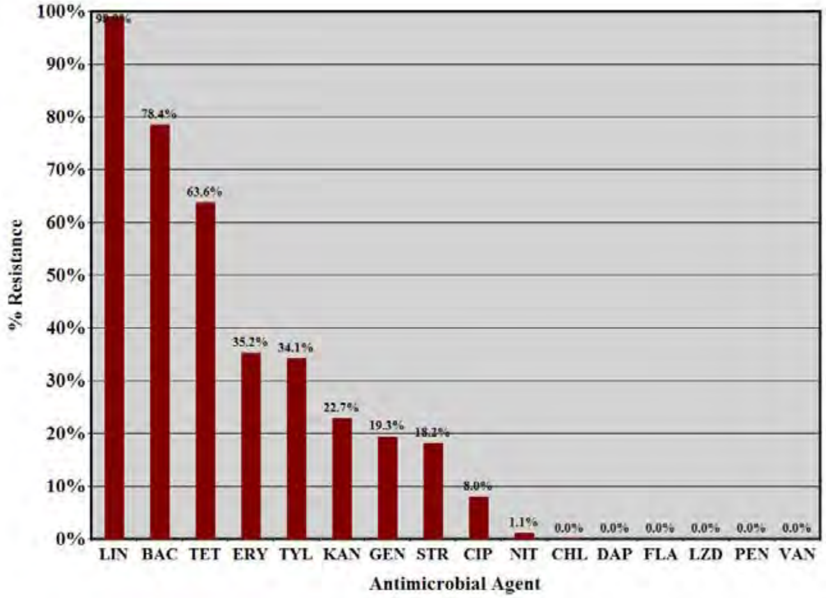


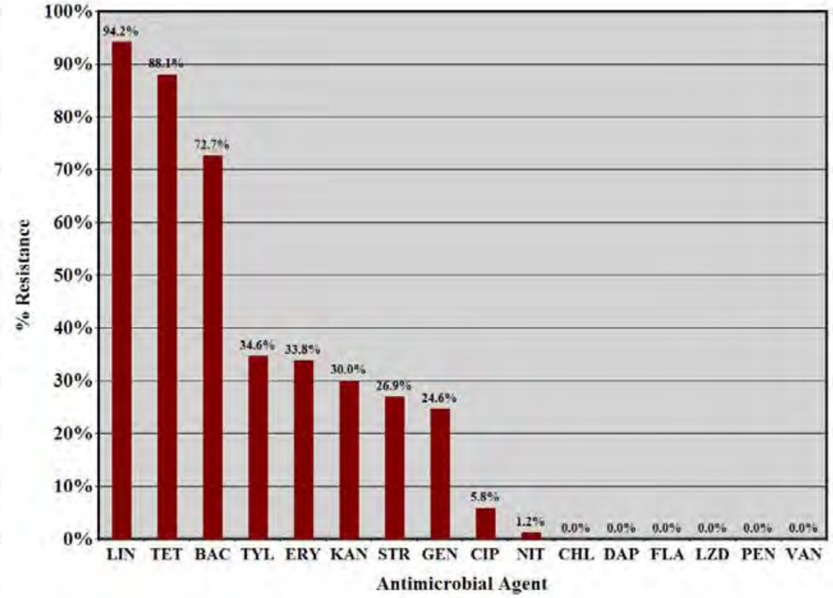
Figure A-7b. Antimicrobial Resistance among *Enterococcus faecalis** by Meat Type, 2004

Chicken Breast (n=88)



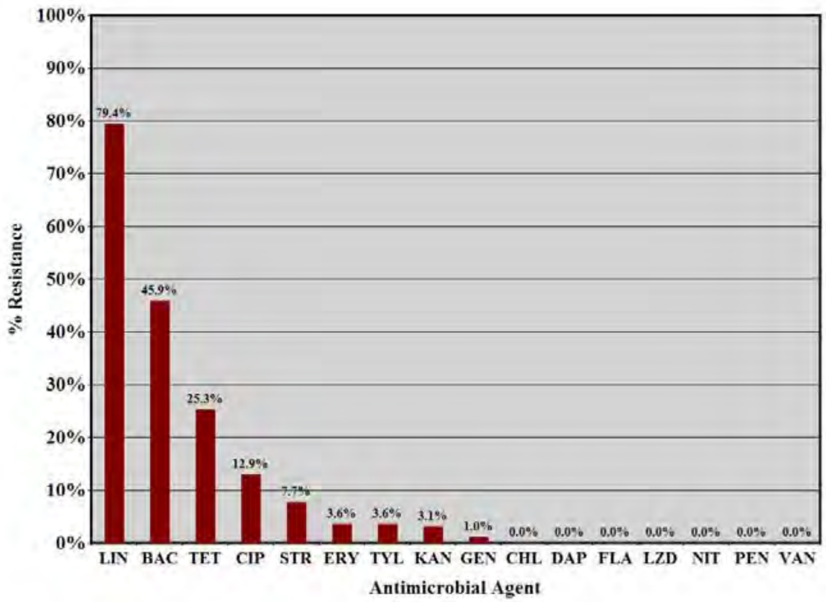
* Data does not include QDA, as *E. faecalis* is considered intrinsically resistant.

Ground Turkey (n=260)



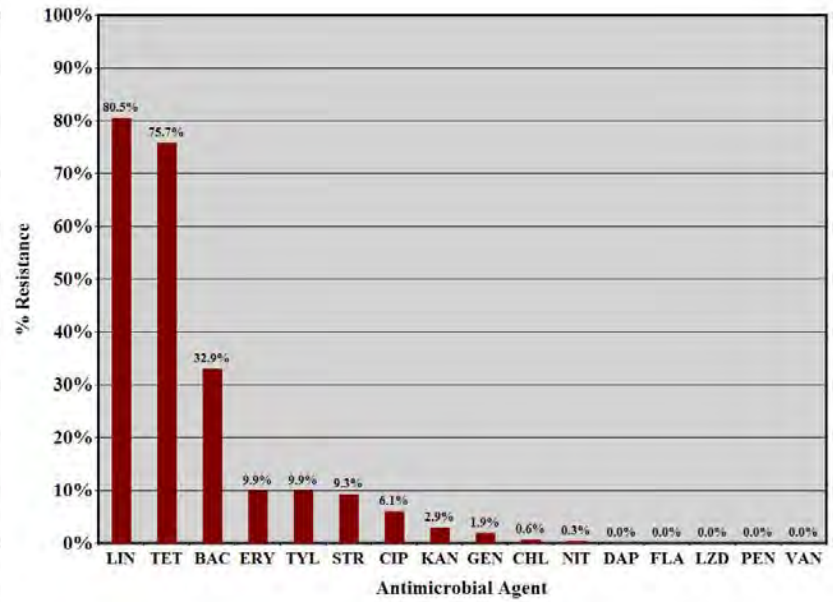
* Data does not include QDA, as *E. faecalis* is considered intrinsically resistant.

Ground Beef (n=194)



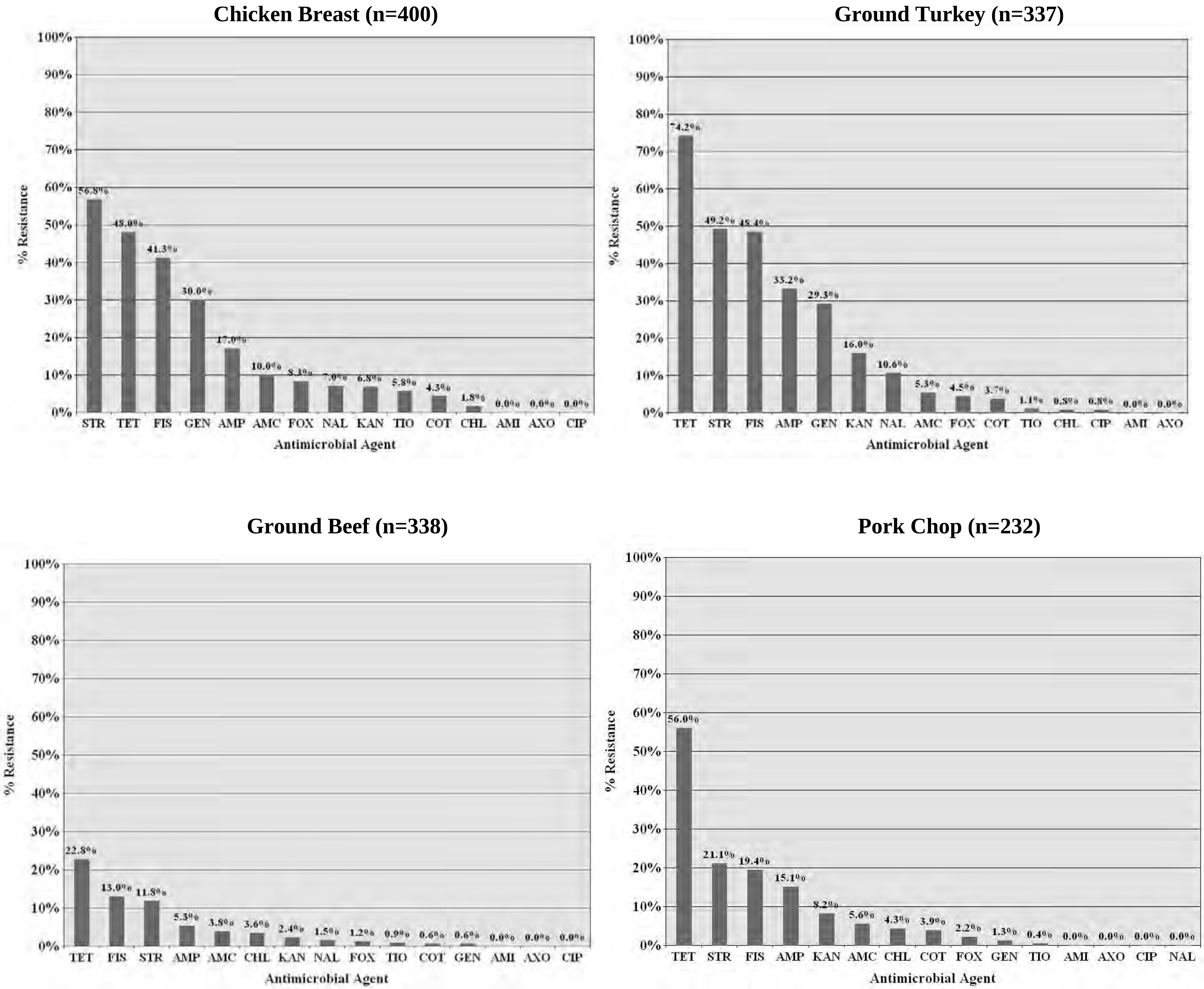
* Data does not include QDA, as *E. faecalis* is considered intrinsically resistant.

Pork Chop (n=313)



* Data does not include QDA, as *E. faecalis* is considered intrinsically resistant.

Figure A-8. Antimicrobial Resistance among *E. coli* by Meat Type, 2004



Appendix A

NATIONAL ANTIMICROBIAL RESISTANCE MONITORING SYSTEM – RETAIL FOOD STUDY ISOLATES MONTHLY LOG SHEET

STATE__________ MONTH__________ YEAR___________

Completed By (Initials): ___________

Circle One → CHICKEN BREAST GROUND TURKEY GROUND BEEF PORK CHOP

PART I

	Sample ID Number	Store Name, City	Brand Name	Lot Number	Cut/Ground IN-STORE (√ One) Y	N	Sell-by Date (M / D / Y)			Purchase Date (M / D / Y)			Lab Process Date (M / D / Y)		
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															

PART II

CONT. ↓	Growth (√ One) Y	N	*Salmonella* IF GROWTH Serotype	Isolate ID Number	Growth (√ One) Y	N	*Campylobacter* IF GROWTH Species	Isolate ID Number	Growth (√ One) Y	N	*E. coli* (GA, MD, TN, OR) IF GROWTH Isolate ID Number	Growth (√ One) Y	N	Enterococci (GA,MD,TN, OR) IF GROWTH Isolate ID Number
1														
2														
3														
4														
5														
6														
7														
8														
9														
10														

Fax log sheet to CDC at 404-371-5444; send original log sheet with specimens to FDA-CVM and keep a copy for your records. Thank you.

NARMS Retail Meat, 2004

Experimental Design and Procedures:

Microbiological analysis:

In the laboratory, samples were refrigerated at 4°C and processed no later than 96 hours after purchase. After microbiological examination, recordings were made on the log sheets whether or not the meat and poultry samples were presumptively positive for *Salmonella*, *Campylobacter*, *E. coli*, and *Enterococcus*. Each laboratory used essentially the same procedure for sample collection. Retail meat and poultry packages were kept intact until they were aseptically opened in the laboratory at the start of examination. For chicken and pork samples, one piece of meat was examined, whereas, 25 g of ground product was examined for ground beef and ground turkey samples. The analytical portions from each sample were placed in separate sterile plastic bags, 250 mL of buffered peptone water was added to each bag, and the bags were vigorously shaken. Fifty mL of the rinsate from each sample was transferred to separate sterile flasks (or other suitable sterile containers) for isolation and identification of *Salmonella*, *Campylobacter*, *E. coli*, or *Enterococcus* using standard microbiological procedures. Once isolated and identified, bacterial isolates were sent to FDA's CVM Office of Research for further characterization including species confirmation, antimicrobial susceptibility testing and PFGE analysis (S*almonella* and *Campylobacter* only).

Salmonella isolation:

Fifty mL of double strength lactose broth was added to each flask containing the 50 mL of rinsate to be used for *Salmonella* isolation. The contents were mixed thoroughly and incubated at 35°C for 24 hours. From each flask, 0.1 ml was then transferred to 9.9 mL tubes of RVR10 medium. The tubes of RVR10 medium were incubated in a water bath at 42°C for 16-20 hours before transferring one ml to pre-warmed (35-37°C) 10 mL tubes of M Broth. The inoculated M Broth tubes were incubated in a water bath at 35-37°C for 6-8 hours. From each M

Broth culture, one ml was heated at 100°C for 15 minutes, and the remaining portion was refrigerated. The heated portion from each culture was cooled to room temperature and tested using the TECRA *Salmonella* Visual Immunoassay kit (International BioProducts, Bothell, WA) or the VIDAS® *Salmonella* Immunoassay kit (bioMerieux, Hazelwood, MO) according to the manufacturers' instructions. If the TECRA or VIDAS assay was negative, the sample was considered negative for *Salmonella*. If the TECRA or VIDAS assay was positive, a loopful of the corresponding, unheated M Broth culture was streaked for isolation onto a XLD agar plate. The inoculated plate was incubated at 35°C for 24 hours. Each XLD agar plate was examined for typical *Salmonella* colonies (pink colonies with or without black centers). If no *Salmonella* like growth was observed on XLD agar, the sample was considered negative and the appropriate documentation was made on the log sheet accompanying the sample. When *Salmonella* like growth was observed, one well-isolated colony was streaked for isolation onto a trypticase soy agar plate supplemented with 5% defibrinated sheep blood (BAP). The BAP(s) were incubated at 35°C for 18-24 hours before sub-culturing an isolated colony for further biochemical identification and serotyping using the FoodNet laboratory's standard procedures. *Salmonella* isolates were subsequently frozen at -60 to -80°C in Brucella broth with 20% glycerol and shipped in cryo-vials on dry ice to FDA-CVM. Upon arrival at CVM, every isolate was streaked for purity on a BAP before being confirmed as *Salmonella* using the Vitek microbial identification system (bioMérieux, Hazelwood, MO). These isolates were further serotyped for O and H antigens using either commercially available (Difco-Becton Dickinson, Sparks, MD) or CDC antisera.

Campylobacter isolation:

Fifty mL of double strength Bolton broth was added to each flask containing the 50 mL of rinsate to be used for *Campylobacter* isolation. The broth and rinsate were mixed thoroughly, but gently to avoid aeration, and incubated at 42°C for 24 hours in a reduced oxygen atmosphere that was obtained using a commercial gas generating envelope or a gas mixture containing 85% nitrogen, 10% carbon dioxide, and 5% oxygen. Using a swab, the first quadrant of a CCA Plate was inoculated with the incubated Bolton broth culture. The remainder of each plate was then streaked with a loop to obtain isolated colonies, and the CCA plates were incubated at 42°C in the above atmosphere for 24 to 48 hours. Each CCA plate was examined for typical *Campylobacter* colonies (round to irregular with smooth edges; thick translucent white growth to spreading, film-like transparent growth). If no *Campylobacter* like growth was observed on a CCA plate, the sample was considered negative and the appropriate documentation was made on the log sheet accompanying the sample. When *Campylobacter* like growth was observed, one typical well-isolated *Campylobacter* like colony from each positive CCA plate was sub-cultured to a BAP and incubated as described for the CCA plates. Following incubation, one typical well-isolated *Campylobacter* like colony was gram stained and tested using a smear catalase, oxidase, hippurate and/or motility test. If the Gram stain showed small, Gram- negative, curved rods, and the isolate was positive with the other test(s) that were conducted, a sample was considered presumptively positive for *Campylobacter*. If the CCA plates or BAPs had no typical colonies or isolate testing was inconsistent with Campylobacter, a sample was considered negative. All isolates presumptively identified as *Campylobacter* were frozen at -60 to -80°C in Brucella broth with 20% glycerol and shipped in cryo-vials on dry ice to FDA-CVM. Upon arrival at CVM, isolates were twice streaked for purity on a BAP before being identified to the species level using PCR assays previously described (2, 6).

E. coli isolation (Georgia, Maryland, Oregon and Tennessee)

Fifty mL of double strength MacConkey broth was added to each flask containing the 50 mL of rinsate to be used for *E. coli* isolation. The contents were mixed thoroughly and incubated at 35°C for 24 hours. One loopful from each flask was then transferred to an EMB agar plate and streaked for isolation. Agar plates were then incubated at 35°C for 24 hours in ambient air and examined for typical *E. coli* colonies (colonies having a dark center and usually a green metallic sheen). If no typical growth was observed on an EMB agar plate, the sample was considered negative and the appropriate documentation was made on the log sheet accompanying the sample. When *E. coli*-like growth was present, one typical, well-isolated colony was streaked for isolation onto a BAP. The BAPs were incubated at 35°C for 24 hours in ambient air and examined for purity. One typical, well-isolated colony was subcultured for indole and oxidase tests. Indole positive and oxidase negative isolates were considered presumptively positive as *E. coli*. Presumptive *E. coli* isolates were subsequently frozen at -60 to -80°C in Brucella broth with 20% glycerol and shipped in cryo-vials on dry ice to FDA-CVM. Upon arrival at CVM, every isolate was streaked for purity on a BAP before being confirmed as *E. coli* using the Vitek microbial identification system (bioMérieux, Hazelwood, MO).

Enterococcus isolation (Georgia, Maryland, Oregon and Tennessee)

Fifty mL of double strength Enterococcosel broth was added to each flask containing the 50 ml of rinsate to be used for *Enterococcus* isolation. The contents were mixed thoroughly and incubated at 45°C for 24 hours in ambient air. If no typical growth or blackening was observed in the flask, the sample was considered negative and the appropriate documentation was made on the log sheet accompanying the sample. If blackening of the broth was observed, a loopful was streaked for isolation onto an EA plate. The plates were then incubated at 35°C for 24 hours in ambient air and examined for enterococcal-like colonies (small colonies surrounded by a blackening of the agar). If no typical growth was observed on the EA plate, the sample was considered negative and the appropriate documentation was made on the log sheet accompanying the sample. If enterococcal-like growth was present, one well-isolated colony was streaked for isolation onto a BAP, and incubated at 35°C for 24 hours in ambient air. Presumptive *Enterococcus* isolates were subsequently frozen at -60 to -80°C in Brucella broth with 20% glycerol and shipped in cryo-vials on dry ice to FDA-CVM. Upon arrival at CVM, every isolate was streaked for purity on a BAP before being confirmed as *Enterococcus* using the Vitek microbial identification system (bioMérieux, Hazelwood, MO).

Antimicrobial Susceptibility Testing:

Antimicrobial MICs were determined using a 96 well broth microdilution method (Sensititre, Trek Diagnostic Systems, Westlake, OH) according to CLSI standards (3, 4, 5). *Salmonella* and *E. coli* isolates were tested using a custom plate developed for Gram negative bacteria, catalog # CMV1AGNF; *Enterococcus* isolates were tested using a custom plate developed for Gram positive bacteria, catalog # CMV1AGPF; and *Campylobacter* isolates were tested using a custom plate developed for *Campylobacter*, catalog # CAMPY (Table 1). CLSI recommended QC organisms were used each time that antimicrobial susceptibility testing was performed. The QC organisms included *Escherichia coli* ATCC 25922, *Enterococcus faecalis* ATCC 29212, *Staphylococcus aureus* ATCC 29213, *Pseudomonas aeruginosa* ATCC 27853, and *Campylobacter jejuni* ATCC 33560 (3, 4, 5).

CLSI approved interpretive criteria were used when available; otherwise tentative NARMS breakpoints were used (Table 1). All antimicrobial susceptibility testing was conducted in the laboratories of the Division of Animal and Food Microbiology, CVM-FDA, Laurel, MD.

Pulsed Field Gel Electrophoresis (PFGE):

Pulsed-field gel electrophoresis was used to assess genetic relatedness among *Salmonella* and *Campylobacter* isolates. The PFGE was performed according to protocols developed by CDC (1). Agarose-embedded DNA was digested with the enzyme *Xba*I for *Salmonella* isolates and *Smal*I for *Campylobacter* isolates DNA restriction fragments were separated by electrophoresis using a Chef Mapper electrophoresis system (Bio-Rad, Hercules, CA). Genomic-DNA profiles or “fingerprints” were analyzed using BioNumerics software (Applied-Maths, Kortrijk, Belgium), and banding patterns were compared using Dice coefficients with a

1.5% band position tolerance. PFGE analysis was conducted in the laboratories of the Division of Animal and Food Microbiology, CVM-FDA, Laurel, MD.

References

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3. Clinical Laboratory Standards Institute. Performance Standards for Antimicrobial Disk and Dilution Susceptibility Tests for Bacteria Isolated from Animals; Approved Standard – Second Edition (M31-A2). 2002. CLSI, Wayne, Pa.
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