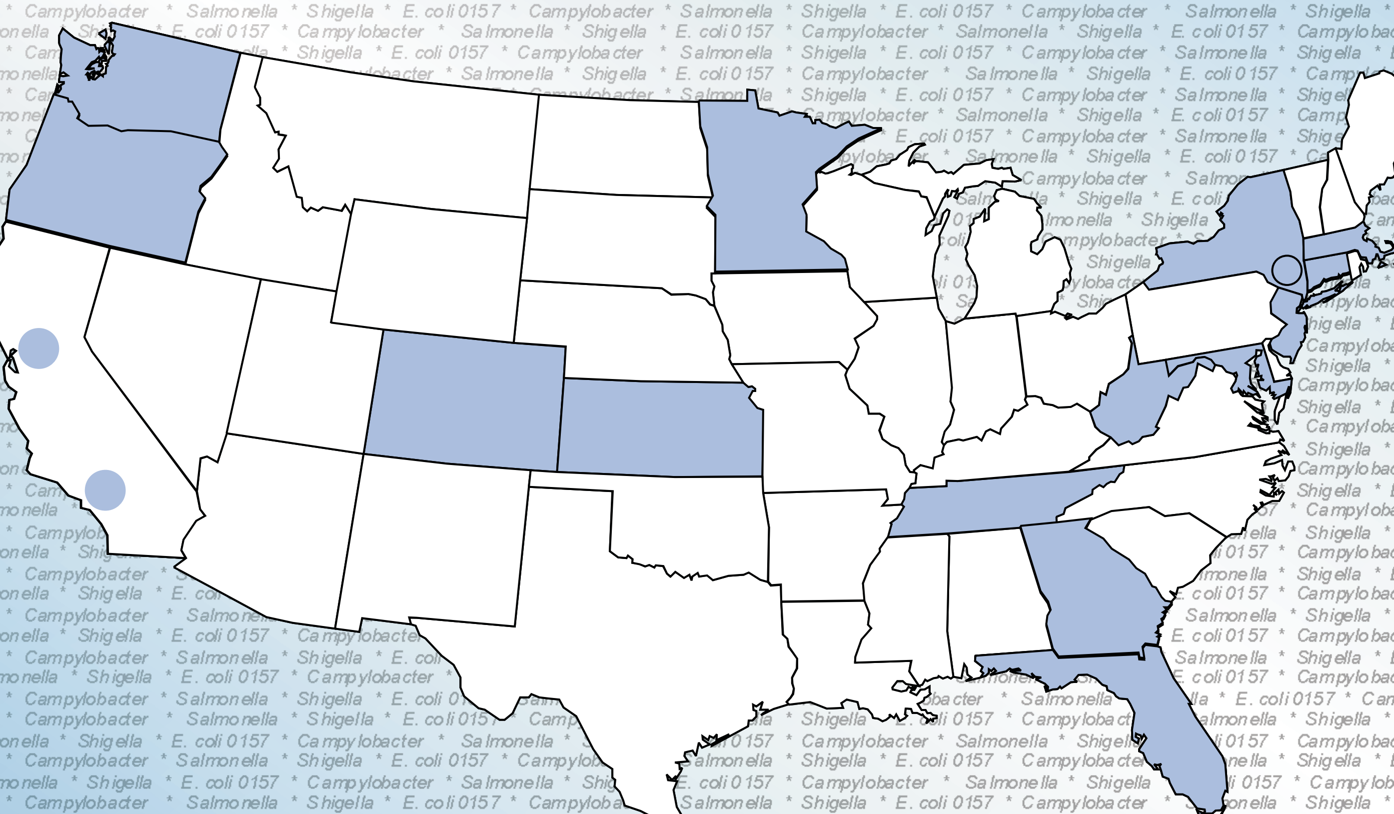
2000 Annual Report

NARMS

National Antimicrobial Resistance Monitoring System: Enteric Bacteria



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- Information on animal isolates is available at http://www.ars-grin.gov/ars/SoAtlantic/Athens/arru/narms.html

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National Antimicrobial Resistance Monitoring System For Enteric Bacteria

2000 Annual Report

Executive Summary

The National Antimicrobial Resistance Monitoring System (NARMS) for Enteric Bacteria is a collaboration between the Centers for Disease Control and Prevention (CDC), participating state and local health departments, and the United States Food and Drug Administration's Center for Veterinary Medicine (FDA-CVM). Many NARMS activities are conducted within the framework of CDC's Emerging Infections Program's Epidemiology and Laboratory Capacity Program and the Foodborne Disease Active Surveillance Network (FoodNet). The primary purpose of NARMS is to monitor antimicrobial resistance among foodborne enteric bacteria isolated from humans. NARMS data are also used to provide platforms for additional studies including field investigations and molecular characterization of resistance determinants, and to guide efforts to mitigate antimicrobial resistance.

In 1996, NARMS began antimicrobial resistance testing of non-Typhi *Salmonella* and *Escherichia coli* O157 isolates. Antimicrobial susceptibility testing of *Campylobacter* isolates was added in 1997, and testing of *Salmonella* Typhi and *Shigella* isolates was added in 1999. In 2000, there were 17 NARMS health department participants, representing approximately 108 million persons (40% of the United States population). Antimicrobial resistance among *Campylobacter* isolates was monitored in the nine FoodNet states, resistance among the other bacteria was monitored in all states.

The following key findings were observed in 2000:

- In 2000, the percentage of *Salmonella* isolates with decreased susceptibility to ciprofloxacin was 1.4% and the percentage resistant to ciprofloxacin was 0.4%. In 1996, 0.4% of isolates had decreased susceptibility to ciprofloxacin and no isolates were resistant.

- The percentage of non-Typhi *Salmonella* isolates with resistance to at least ampicillin, chloramphenicol, streptomycin, sulfamethoxazole, and tetracycline (ACSSuT) was 9% in 2000; of which, 69% were *Salmonella* Typhimurium and 23% were *Salmonella* Newport.

- The percentage of *Salmonella* Newport isolates resistant to at least ampicillin, chloramphenicol, streptomycin, sulfamethoxazole, and tetracycline was 23% in 2000, an increase from 17% in 1999 and 6% in 1996. Strains with resistance to at least nine agents (Newport –9R+) are resistant to ampicillin, chloramphenicol, streptomycin, sulfamethoxazole, tetracycline, cephalothin, ceftiofur, cefoxitin, amoxicillin/clavulanic acid and have a reduced susceptibility to ceftriaxone, and represented 12% of *S.* Newport in 2000.

- The prevalence of ampicillin and trimethoprim-sulfamethoxazole resistance among *Shigella* isolates was 79% and 53%, respectively, in 2000.

- The prevalence of fluoroquinolone resistance among *Campylobacter* isolates was 14% in 2000, a decrease from 18% in 1999.

Surveillance and Laboratory Testing Methods

NARMS was launched in 1996, within the framework of CDC's Emerging Infections Program. NARMS is a collaboration between CDC, the U.S. Food and Drug Administration (FDA), Center for Veterinary Medicine; U.S. Department of Agriculture (USDA), Food Safety and Inspection Service and Agricultural Research Service; and state and local health departments. CDC monitors antimicrobial resistance in enteric bacteria isolated from humans, while USDA monitors antimicrobial resistance in enteric bacteria isolated from animals and meats. Before NARMS was established, antimicrobial resistance was monitored in *Salmonella, Shigella*, and *Campylobacter* using periodic surveys of isolates from a panel of sentinel counties.

NARMS began in 1996 to monitor prospectively the antimicrobial resistance of human non-Typhi *Salmonella* and *Escherichia coli* O157 isolates. Testing of *Campylobacter* isolates was added in 1997, and testing of *Salmonella* Typhi and *Shigella* isolates was added in 1999. In 2000, there were 17 NARMS health department participants (CA, CO, CT, FL, GA, KS, Los Angeles County, MA, MD, MN, NJ, New York City, NY, OR, TN, WA, and WV), representing approximately 108 million persons (40% of the United States population) [Table 1]. In 2000, nine states (CA, CO, CT, GA, MD, MN, NY, OR, and TN) monitored antimicrobial resistance among human *Campylobacter* isolates.

In 2000, NARMS participating public health laboratories selected every tenth non-Typhi *Salmonella,* every *Salmonella* Typhi, every tenth *Shigella*, and every fifth *E. coli* O157 isolate received at their laboratory, and forwarded the isolates to CDC for susceptibility testing. Non-Typhi *Salmonella* refers to all *Salmonella* serotypes except serotype Typhi. At CDC, *Salmonella*, *Shigella*, and *E. coli* O157 isolates are tested with a semiautomated system (Sensititre, Trek Diagnostics, Westlake, OH) to determine the partial range minimum inhibitory concentration (MIC) for 17 antimicrobial agents: amikacin, ampicillin, amoxicillin-clavulanic acid, apramycin, cefoxitin, ceftiofur, ceftriaxone, cephalothin, chloramphenicol, ciprofloxacin, gentamicin, kanamycin, nalidixic acid, streptomycin, sulfamethoxazole, tetracycline, and trimethoprim-sulfamethoxazole [Table 2]. Isolates which were resistant or had intermediate resistance (MIC $\geq$ 16 μg/ml) to ceftriaxone were also tested by the E-test system (AB BIODISK, Solna, Sweden); unless otherwise noted, ceftriaxone resistance results in this report are based upon the E-test system.

Public health laboratories from nine states also selected and forwarded the first *Campylobacter* isolate received each week to CDC for susceptibility testing. For *Campylobacter*, the E-test system is used to determine the MICs for 8 antimicrobial agents: azithromycin, chloramphenicol, ciprofloxacin, clindamycin, erythromycin, gentamicin, nalidixic acid, and tetracycline [Table 2]. After confirmation to genus level, identification of *Campylobacter* to species level is performed using the hippurate test and, for hippurate-negative *Campylobacter* isolates, polymerase chain reaction to identify the hippuricase gene, diagnostic of *Campylobacter jejuni*.

For all pathogens in this report, MIC results are dichotomized: isolates with intermediate susceptibility are categorized as sensitive. Analysis was restricted to one isolate (per pathogen) per patient. When established, National Committee for Clinical Laboratory Standards (NCCLS) interpretation standards were used; apramycin resistance was defined as MIC $\geq$ 64 μg/ml and ceftiofur resistance was defined as MIC $\geq$ 8 μg/ml [Table 2]. Multidrug resistance was defined as resistance to two or more antimicrobial agents and is limited to the 15 agents tested in 1996-2000 (amoxicillin-clavulanic acid, ampicillin, apramycin, ceftiofur, ceftriaxone, cephalothin, chloramphenicol, ciprofloxacin, gentamicin, kanamycin, nalidixic acid, streptomycin, sulfamethoxazole, tetracycline, trimethoprim-sulfamethoxazole). For *Campylobacter* isolates, multidrug resistance is limited to the 6 agents tested in 1997-2000 (chloramphenicol, ciprofloxacin, clindamycin, erythromycin, nalidixic acid, tetracycline).

Results of NARMS Surveillance

<u>Non-Typhi *Salmonella*</u>

Results of NARMS in 2000

A total of 1399 non-Typhi *Salmonella* isolates were received at CDC in 2000 [Figure 1]; of these isolates, 1395 (99%) were viable upon receipt and tested for antimicrobial susceptibility. Of these 1395 isolates, 17 isolates were eliminated from analysis because they were duplicate submissions (10 isolates) or the county of residence was outside the catchment area (7 isolates), leaving 1378 isolates for analysis. Among the 1378 non-Typhi *Salmonella* isolates, 353 (26%) were resistant to one or more agents, 284 (21%) were resistant to two or more agents, and 122 (9%) were resistance to at least ampicillin, chloramphenicol, streptomycin, sulfamethoxazole, and tetracycline (ACSSuT). Of these 122, 84 (69%) were *S.* Typhimurium and 28 (23%) were *S.* Newport. The antimicrobial agents to which the 1378 *Salmonella* demonstrated the highest prevalence of resistance were tetracycline, sulfamethoxazole, streptomycin, and ampicillin: 256 (19%) were resistant to tetracycline, 235 (17%) were resistant to sulfamethoxazole, 223 (16%) were resistant to streptomycin, and 219 (16%) were resistant to ampicillin [Table 3, Figure 2]. Table 4a shows the correlation of resistance among non-Typhi *Salmonella* isolates. For example, there were 5 non-Typhi *Salmonella* resistant to ciprofloxacin; 5 (100%) were also resistant to nalidixic acid, 3 (60%) were also resistant to sulfamethoxazole, tetracycline, and trimethoprim-sulfamethoxazole, 2 (40%) were also resistant to ampicillin, kanamycin, and streptomycin, and 1 (20%) was also resistant to amoxicillin-clavulanic acid, chloramphenicol, and gentamicin. Figure 3 provides MIC results for each of the 17 antimicrobials tested.

Among 1378 *Salmonella* isolates tested, 46 (3%) were not serotyped. Among the 1332 serotyped isolates, 319 (24%) were serotype Enteritidis, 303 (23%) were serotype Typhimurium (includes serotype Typhimurium var. Copenhagen), 124 (9%) were serotype Newport, 79 (6%) were serotype Heidelberg, and 44 (3%) were serotype Javiana; the top 15 serotypes accounted for 81% (1113/1378) of isolates that were serotyped [Table 6]. The serotypes with the highest proportion of isolates that were pansusceptible (among the top 15 serotypes) were Oranienburg (100%), Javiana (98%), and Montevideo (97%) [Table 7]. Figure 4 provides resistance results for each of the antimicrobial agents tested, for the top 15 serotypes. Among the 319 *S.* Enteritidis isolates, 35 (11%) were resistant to one or more antimicrobial agents and 9 (3%) were multidrug resistant [Table 8]. Among the 303 *S.* Typhimurium isolates, 153 (50%) were resistant to one or more antimicrobial agents and 143 (47%) were multidrug resistant. Among the 124 *S*. Newport isolates, 30 (24%) were resistant to one or more antimicrobial agents and 28 (23%) were multidrug resistant; 96% (27/28) of the multidrug resistant *S.* Newport were resistant to 8 or more antimicrobials. The serotypes with the highest proportion of multidrug resistance were Hadar (60%), Agona (56%), and Typhimurium (47%). Table 9 provides data on multidrug resistance among the top serotypes in each site.

In recent years, two multidrug-resistant phenotypes of *S.* Typhimurium have been frequently identified; these are the most common multidrug resistant strains among all *Salmonella*. Figure 5 shows the number of *S.* Typhimurium isolates submitted by site. The most prominent strain is resistant to at least ampicillin, chloramphenicol, streptomycin, sulfamethoxazole, and tetracycline (ACSSuT); a phenotype commonly associated with definitive type 104 (DT104) [Table 10]. Among 303 *S.* Typhimurium isolates tested in 2000, 84 (28%) had at least the ACSSuT resistance pattern; 76 (25%) were ACSSuT and 8 (3%) were ACKSSuT [Figure 6]. Of the 84 *S.* Typhimurium isolates with at least the ACSSuT resistance pattern, 12 (14%) were also resistant to amoxicillin-clavulanic acid, 8 (9%) to kanamycin, 7 (8%) to cephalothin, 6 (7%) to cefoxitin, 6 (7%) to ceftiofur, 5 (6%) to trimethoprim-sulfamethoxazole, 2 (2%) to ceftriaxone, 2 (2%) to gentamicin, 1 (1.2%) to apramycin, and 1 (1.2%) to nalidixic acid [Table 11]. A second multidrug resistant strain, resistance to at least ampicillin, kanamycin, streptomycin, sulfamethoxazole, and tetracycline (AKSSuT), is also prevalent among *S*. Typhimurium [Table 10]. Among 303 *S.* Typhimurium isolates tested in 2000, 28 (9%) had at least the AKSSuT resistance pattern; 20 (7%) were AKSSuT and 8 (3%) were ACKSSuT [Figure 7]. Of the 28 *S.* Typhimurium isolates with at least the AKSSuT resistance pattern, 8 (29%) were also resistant to chloramphenicol, 6 (21%) to amoxicillin-clavulanic acid, 4 (14%) to cephalothin, 4 (14%) to gentamicin, 4 (14%) to trimethoprim-sulfamethoxazole, 3 (11%) to cefoxitin, 3 (11%) to ceftiofur, 2 (7%) to nalidixic acid, and 1 (4%) to apramycin [Table 11].

The third most common multidrug resistant strain of *Salmonella* is among *S.* Newport [Table 8]. Figure 8 shows the number of *S.* Newport isolates submitted by site. Among the 124 *S.* Newport isolates tested in 2000, 28 (23%) had at least the ACSSuT resistance pattern; 22 (18%) were ACSSuT and 6 (5%) were ACKSSuT [Figure 9]. Of the 28 *S.* Newport with at least the ACSSuT resistance pattern, 27 (96%) were also resistant to amoxicillin-clavulanic acid, 27 (96%) to cefoxitin, 27 (96%) to ceftiofur, 27 (96%) to cephalothin, 14 (50%) to ceftriaxone, 6 (21%) to kanamycin, 5 (18%) to trimethoprim-sulfamethoxazole, and 3 (11%) to gentamicin [Table 13]. Among the 124 *S.* Newport isolates tested in 2000, 6 (5%) had at least the AKSSuT resistance pattern. All 6 *S.* Newport isolates with at least the AKSSuT resistance pattern were also resistant to amoxicillin-clavulanic acid, cefoxitin, ceftiofur, cephalothin, and chloramphenicol; 4 (67%) were resistant to ceftriaxone, 3 (50%) to trimethoprim-sulfamethoxazole, and 1 (17%) to gentamicin [Table 13].

Table 14 describes the clinical source of all non-Typhi *Salmonella* isolates tested in 2000. Of the 1378 non-Typhi *Salmonella* isolates, 1169 (85%) were collected from stool specimens, 88 (6%) were from blood specimens, 85 (6%) were from other sources, and 36 (3%) were from an unknown source. Twenty non-Typhi *Salmonella* isolates (1.4%) had a decreased susceptibility to ciprofloxacin (MIC ≥ 0.25); of which, 5 (0.4%) were resistant to ciprofloxacin [Figure 3j]. Table 15 shows the proportion of non-Typhi *Salmonella* isolates with a decreased susceptibility to ciprofloxacin by site. The percentage of non-Typhi *Salmonella* isolates resistant to nalidixic acid (MIC ≥32) was 2% (34/1378) in 2000 [Figure 3m]. Twenty-two non-Typhi *Salmonella* isolates (1.6%) had a decreased susceptibility to ceftriaxone (MIC ≥ 16). When these 22 isolates were tested by E-test, 18 (82%) were resistant to ceftriaxone and 4 (18%) had intermediate resistance to ceftriaxone [Table 5]. Table 16 shows the proportion of non-Typhi *Salmonella* isolates with a decreased susceptibility to ceftriaxone by site.

Trends in NARMS since 1996

In 1996, 34% (103/306) of *S.* Typhimurium isolates tested had at least the ACSSuT resistance pattern. This proportion rose to 35% (115/326) in 1997; after which, it decreased to 32% (120/380) in 1998. The prevalence of the ACSSuT resistance pattern among *S.* Typhimurium isolates was 28% in both 1999 (102/362) and 2000 (84/303) [Figure 6]. A similar trend was seen among *S.* Typhimurium isolates with at least the AKSSuT resistance pattern. In 1996, the prevalence of AKSSuT among *S.* Typhimurium was 9% (27/306). This proportion rose to 13% (41/326) in 1997. In subsequent years, there was a slight decline in prevalence of AKSSuT among *S.* Typhimurium isolates: 12% (46/380) in 1998, 11% (39/362) in 1999, and 9% (28/303) in 2000 [Figure 7].

In 1996, 6% (3/51) of the *S.* Newport isolates had at least the ACSSuT resistance pattern. This proportion decreased to 4% (2/48) in 1997 and 1.3% (1/78) in 1998. The prevalence of ACSSuT in *S.* Newport rose to 17% (17/99) in 1999 and continued to rise to 23% (28/124) in 2000 [Figure 9]. The proportion of *S.* Newport isolates with at least the AKSSuT resistance pattern increased from 2% (1/51) in 1996 to 5% (6/124) in 2000 [Figure 10].

The percentage of *Salmonella* isolates with decreased susceptibility to ciprofloxacin (MIC ≥ 0.25) increased from 0.4% (5/1326) in 1996 to 1.4% (20/1378) in 2000; the percentage resistant to ciprofloxacin (MIC ≥ 4) increased from 0% in 1996 to 0.4% in 2000 [Figure3j]. Additionally, the percentage of *Salmonella* isolates with decreased susceptibility to ceftriaxone (MIC ≥16) increased from 0.1% (1/1326) in 1996 to 1.6% (22/1378) in 2000; the percentage resistant to ceftriaxone increased from 0.1% in 1996 to 1.3% in 2000 [Figure 3g].

***Salmonella* Typhi**

A total of 223 *S.* Typhi isolates were received at CDC in 2000 [Figure 1]; 191 (86%) were viable upon receipt and tested for antimicrobial sensitivity. Of these 191 isolates, 14 isolates were eliminated from analysis because they were duplicate submissions (13 isolates) or the county of residence was outside the catchment area (1 isolate), leaving 177 isolates for analysis. Among the 177 *S.* Typhi isolates, 50 (28%) were resistant to one or more antimicrobial agents and 21 (12%) were resistant to two or more agents [Table 22]. The most common resistances among the 177 *S.* Typhi isolates were to nalidixic acid 41 (23%), sulfamethoxazole 21 (12%), chloramphenicol 19 (11%), tetracycline 19 (11%), and streptomycin 18 (10%) [Table 3, Figure 11]. Figure 12 provides data on *Salmonella* Typhi MICs by antimicrobial agent. None of the *S.* Typhi isolates tested were resistant to amoxicillin-clavulanic acid, ceftriaxone, or ciprofloxacin.

Shigella

A total of 469 *Shigella* isolates were received at CDC in 2000 [Figure 1]; 454 (97%) were viable upon receipt and tested for antimicrobial sensitivity. Three isolates were eliminated from analysis because they were duplicate submissions (2 isolates) or the county of residence was outside the catchment area (1 isolate), leaving 451 isolates for analysis. Of the 451 isolates analyzed, 367 (81%) were *S. sonnei*, 75 (17%) were *S. flexneri*, and 7 (1.5%) were *S. boydii* [Table 17]. Among the 451 *Shigella* isolates, 418 (93%) were resistant to one or more antimicrobial agents and 302 (67%) were multidrug resistant [Table 22]. The most common resistances among the 451 *Shigella* isolates were to ampicillin 356 (79%), streptomycin 258 (57%), sulfamethoxazole 252 (56%), or trimethoprim-sulfamethoxazole 239 (53%) [Table 18, Figure 13]. The 367 *Shigella sonnei* isolates were most frequently resistant to ampicillin 295 (80%), streptomycin 206 (56%), or sulfamethoxazole 206 (56%) [Figure 14a]. The most common resistances among the 75 *Shigella flexneri* isolates were to tetracycline 69 (92%), ampicillin 58 (77%), or chloramphenicol 52 (69%) [Figure 14b]. Figure 15 provides data on *Shigella sonnei* and *Shigella flexneri* MICs by antimicrobial agent. None of the *Shigella* isolates tested were resistant to ceftiofur, ceftriaxone, or ciprofloxacin. One (0.2%) *Shigella* isolate had a decreased susceptibility to ciprofloxacin and none had a decreased susceptibility to ceftriaxone.

***E. coli* O157**

A total of 422 *E. coli* O157 isolates were received at CDC in 2000 [Figure 1]; 419 (99%) were viable upon receipt and tested for antimicrobial sensitivity. Of these 419 isolates, 12 isolates were eliminated from analysis because they were duplicate submissions (6 isolates) or the county of residence was outside the catchment area (6 isolates), leaving 407 isolates for analysis. Among the 407 *E. coli* O157 isolates, 40 (10%) were resistant to one or more antimicrobial agents and 27 (7%) were multidrug resistant [Table 22]. The most common resistances among the 407 *E. coli* O157 isolates were to tetracycline 29 (7%), sulfamethoxazole 24 (6%), and streptomycin 21 (5%) [Table 3, Figure 16]. Figure 17 provides data on *E. coli* O157 MICs by antimicrobial agent. None of the *E. coli* O157 isolates tested were resistant to amikacin, apramycin, ceftriaxone, or ciprofloxacin. One (0.2%) had a decreased susceptibility to ceftriaxone and 1 (0.2%) isolate had a decreased susceptibility to ciprofloxacin.

Campylobacter

Results of NARMS in 2000

A total of 438 *Campylobacter* isolates were received at CDC in 2000; 324 (74%) were viable upon receipt and tested for antimicrobial susceptibility. Of the 324 isolates tested, 306 (94%) were *C. jejuni*, 12 (4%) were *C. coli*, 3 (0.9%) were *C. upsaliensis*, 2 were *C. fetus*, and 1 was *C. lari* [Table 19].

Among the 306 *Campylobacter jejuni* isolates, 149 (49%) were resistant to one or more antimicrobial agents and 47 (15%) were resistant to two or more agents [Table 22]. The most common resistances among the 306 *Campylobacter jejuni* isolates was to tetracycline 118 (39%) followed by nalidixic acid 49 (16%), and ciprofloxacin 43 (14%) [Table 20, Figure 19]. Figure 20 provides data on *C. jejuni* MICs by antimicrobial agent. The proportion of ciprofloxacin-resistance *C. jejuni* varied by site: Maryland 1/2 (50%), Minnesota 12/49 (25%), Georgia 10/47 (21%), Oregon 5/25 (20%), California 7/41 (17%), Connecticut 4/45 (9%), New York State 3/46 (6%), and Tennessee 1/23 (4%). Colorado did not have any ciprofloxacin-resistant *C. jejuni* [Table 21].

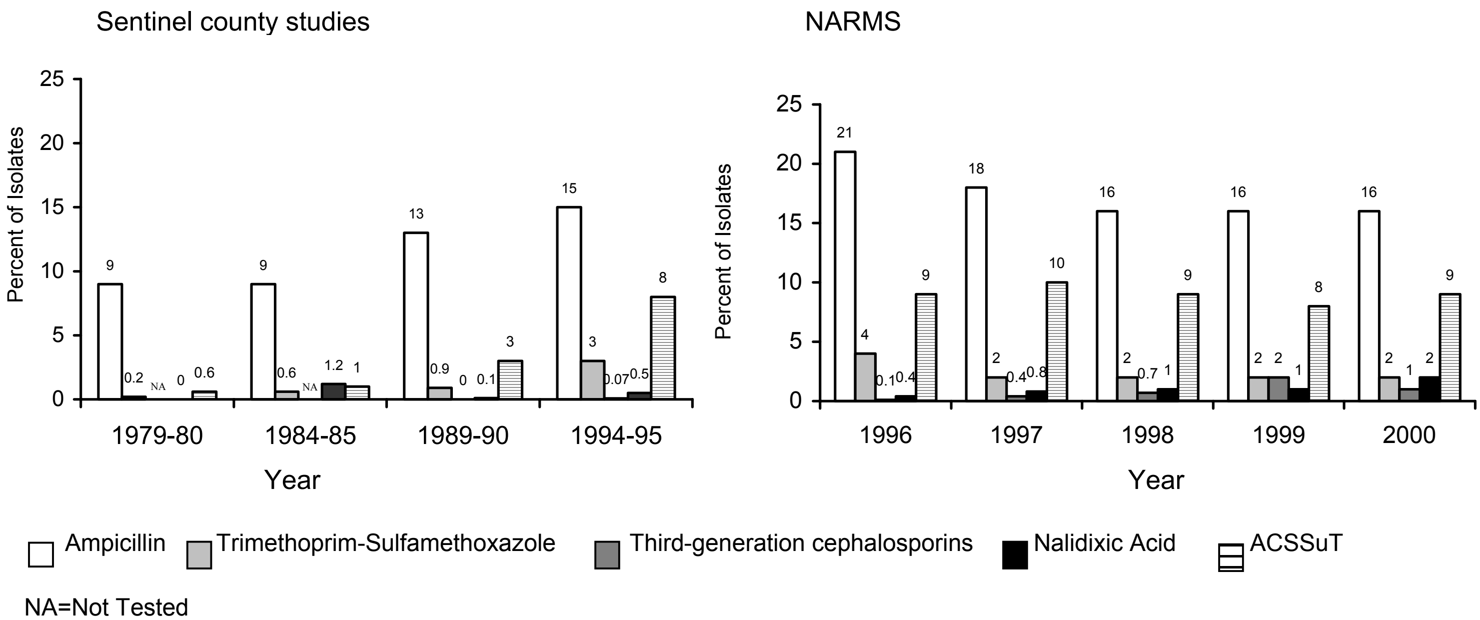
Among the 12 *Campylobacter coli* isolates, 4 (33%) were resistant to one or more antimicrobial agents and 3 (25%) were resistant to two or more agents [Table 22]. The most common resistances among the 12 *Campylobacter coli* isolates were to ciprofloxacin 3 (25%), nalidixic acid 3 (25%), tetracycline 3 (25%), azithromycin 1 (8%), erythromycin 1 (8%), clindamycin 1 (8%), and gentamicin 1 (8%) [Table 20, Figure 19]. Figure 21 provides data on *C. coli* MICs by antimicrobial agent.

Trends in NARMS since 1997

The percentage of *Campylobacter* isolates resistant to ciprofloxacin (MIC $\geq$ 4) increased from 13% (29/217) in 1997 to 18% (58/319) in 1999. In 2000, 14% (46/324) of *Campylobacter* isolates were resistant to ciprofloxacin. During the same time period, the percentage of *Campylobacter* isolates resistant to erythromycin (MIC $\geq$ 8) has decreased from 8% (17/217) in 1997 to 1% (5/324) in 2000.

Non-Typhi *Salmonella*

Summary of Long Term Trends in Antimicrobial Resistance in non-Typhi Salmonella isolates, 1979-2000

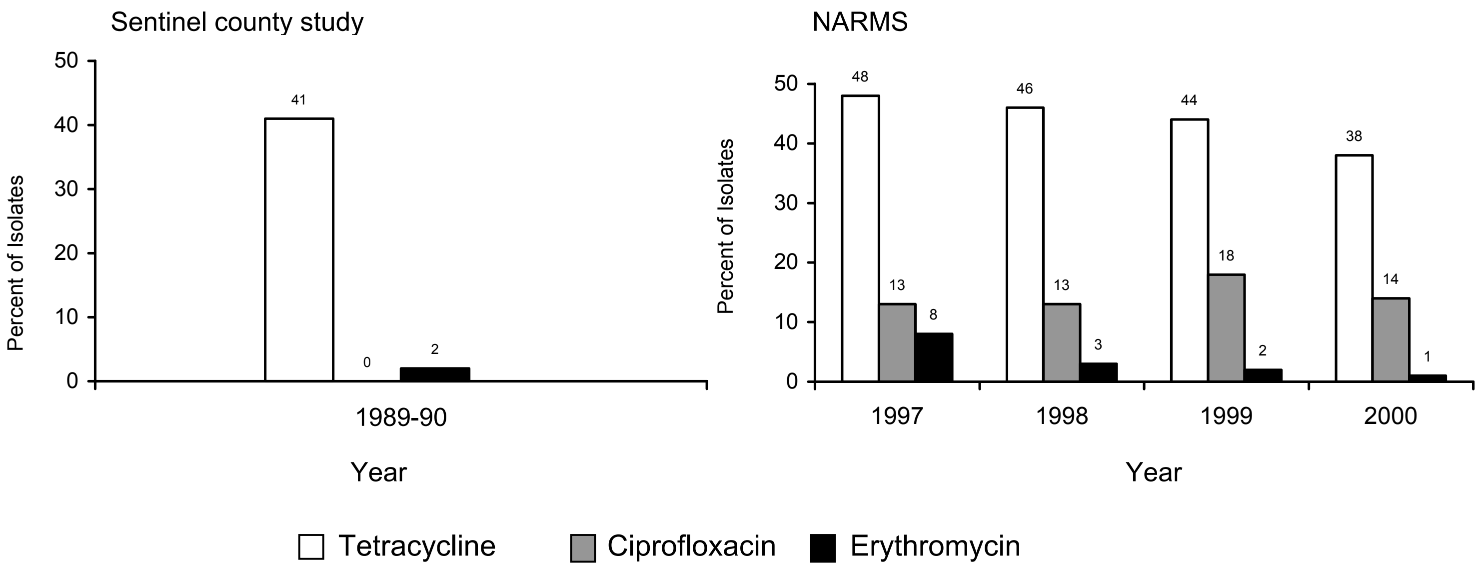


For non-Typhi *Salmonella*, sentinel county surveys were conducted in 1979-80, 1984-85, 1989-90, and 1994-95 (1, 2, 3, 4). Isolates were received at CDC and tested by disk diffusion. The National Antimicrobial Resistance Monitoring System (NARMS) for Enteric Bacteria began testing *Salmonella* in 1996. In NARMS, every 10th non-Typhi *Salmonella* isolate received at participating state public health laboratories is forwarded to CDC and tested by broth microdilution to determine partial range MICs to 17 antimicrobial agents

Over the last quarter century, resistance among non-Typhi *Salmonella* has increased to a number of clinically important antimicrobial agents. Resistance to ampicillin increased first, reaching 21% by 1996. Resistance to trimethoprim-sulfamethoxazole, third-generation cephalosporin (e.g., ceftriaxone), quinolones (e.g., nalidixic acid), and the ACSSuT resistance pattern increased more recently. The greatest public health concerns raised by this resistance are the loss of efficacious agents to treat serious *Salmonella* infections, especially in children. The clinical implications of current resistance levels are potential treatment failure, increased duration of illness, and increased length of hospitalization (3, 5, 6). For more information on treatment of *Salmonella* see Diagnosis and Management of Foodborne Illness: A Primer for Physicians (7).

Campylobacter

Summary of Long Term Trends in Antimicrobial Resistance in Campylobacter isolates, 1979-2000



For *Campylobacter*, a sentinel county survey was conducted in 1989-90 (8). Isolates were received and tested at CDC. The NARMS began testing *Campylobacter* in 1997. In NARMS, one *Campylobacter* isolate per week is forwarded to CDC from nine states and tested by E-test to eight antimicrobials.

Over the last quarter century, resistance among *Campylobacter* has increased to a number of clinically important antimicrobial agents. Resistance to tetracycline increased first, reaching 41% in 1989-90. Resistance to ciprofloxacin increased more recently. No *Campylobacter* resistant to ciprofloxacin (MIC $\geq$ 4) were identified in 1989-90. The percentage of *Campylobacter* isolates resistant to ciprofloxacin increased to 18% in 1999. In 2000, 14% of *Campylobacter* isolates were resistant to ciprofloxacin. As the reservoir for *Campylobacter* is among poultry, it is likely that this resistance is related to the use of antimicrobials in poultry farming. The greatest public health concerns raised by this resistance is a threat to the efficacy of fluoroquinolones. The clinical implications of resistance to fluoroquinolones include an increased duration of illness and potential treatment failure (9). At the same time, resistance to erythromycin has decreased to 1%. For more information on treatment of *Campylobacter* see Diagnosis and Management of Foodborne Illness: A Primer for Physicians (7).

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The NARMS 1997-1999 Annual Reports are posted on the NARMS Website. The address is www.cdc.gov/narms

National Antimicrobial Resistance Monitoring System For Enteric Bacteria

2000 Publications and Abstracts

Publications

1. Angulo F, Johnson K, Tauxe R, Cohen M. Significance and sources of antimicrobial-resistant nontyphoidal *Salmonella* infections in the United States. Microbial Drug Resistance 2000; 6(1):77-83.

2. Dunne E, Fey P, Kludt P, Reporter R, Mostashari F, Shillam P, Wicklund J, Miller C, Holland B, Stamey K, Barrett T, Rasheed J, Tenover F, Ribot E, Angulo F. Emergence of domestically acquired ceftriaxone-resistant *Salmonella* infections associated with ampC-type b-lactamase. Journal of the American Medical Association 2000; 284:3151-6.

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4. Angulo F, Griffin P. Changes in antimicrobial resistance in *Salmonella* enterica serovar Typhimurium. Emerging Infectious Diseases 2000; 6(4):436-7.

Abstracts

1. Agasan A, Reddy S, Williams G, Perry W, Backer M, Ramon A, Headrick M, Allan J, Hardin H, Joyce K, Rossiter S, Mintz E, and the NARMS Working Group. High prevalence of antimicrobial resistance among *Shigella* isolates to agents commonly used for treatment, NARMS 1999. 2nd International Conference on Emerging Infectious Diseases. Atlanta, GA, July 2000.

2. Angulo F, Marano N, Johnson S, MacKinson C, Gilbert L, Park M, DeBess E, Taylor B, Madden J, Hill B, Joyce K, Tenover F, Archibald L, and the EIP Enterococci Study Team. EIP Enterococci Study: Monitoring for the seeds of antimicrobial resistance in the food supply. 2nd International Conference on Emerging Infectious Diseases. Atlanta, GA, July 2000.

3. Angulo F, Marano N, MacKinson C, Gregg C, Sokolow R, DeBess E, Gilbert L, Benson J, Hill B, McDonald C. Isolation of quinupristin/dalfopristin-resistant *Enterococcus faecium* from human stool specimens and retail chicken products in the US-associated with use of virginiamycin in poultry? 1st International Conference on Enterococci. Banff, Canada, February 2000.

4. Dunne E, Van Gilder T, Smith F, Stamey K, Barrett T, Love B, Smith K, Bannerman T, Genevie R, Angulo F. Routine pulsed-field gel electrophoresis (PFGE) in Ohio identifies a prevalent multidrug-resistant strain of *Salmonella* serotype Typhimurium distinct from DT104. 100th American Society of Microbiology General Meeting. Los Angeles, CA, May 2000.

5. Hollinger K, Vose D, Miller M, Thompson S, Vugia D, Fiorentino T, Benson J, Johnson J, Smith K, DeBess E, Angulo F, and the EIP FoodNet Working Group. Fluoroquinolone resistance in *Campylobacter* from chickens and human health impact: a quantitative risk assessment using data from FoodNet and other sources. 2nd International Conference on Emerging Infectious Diseases. Atlanta, GA, July 2000.

6. Johnson K, Marano N, Howard R, Root T, Leano F, Green D, Headrick A, Stamey K, Griffin P, NARMS Working Group. The antimicrobial resistance patterns of *Escherichia coli* O157:H7 - NARMS, 1996-1999. 2nd International Conference on Emerging Infectious Diseases. Atlanta, GA, July 2000.

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8. Karchmer T, MacKinson C, Sullivan M, Johnson S, Gilbert L, Park M, DeBess E, Sokolow R, Tenover F, Joyce K, Angulo F. Presence of quinupristin/dalfopristin-resistance *Enterococcus faecium* in stool specimens from healthy people and in retail chicken products in the US. 4th Decennial International Conference on Nosocomial and Healthcare-Associated Infections. Atlanta, GA, February 2000.

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12. Marano N, Vugia D, Fiorentino T, Segler S, Carter M, Kassenborg H, Smith K, Zansky S, Hollinger K, Angulo F, and the EIP FoodNet Working Group. Fluoroquinolone-

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Table 1. Population size and number of isolates received and tested, by site, 2000

Site	Pop. Size*		Non-Typhi *Salmonella*		*Salmonella* Typhi		*Shigella*		*E. coli* O157		*Campylobacter* **	
	No.	**(%)**	**No.**	**(%)**	**No.**	**(%)**	**No.**	**(%)**	**No.**	**(%)**	**No.**	**(%)**
California [(1)]	3,169,290	(3)	55	(4)	11	(6)	9	(2)	10	(2)	45	(14)
Colorado	4,301,261	(4)	66	(5)	2	(1.1)	25	(5)	24	(6)	32	(10)
Connecticut	3,405,565	(3)	47	(3)	8	(4)	7	(1.5)	25	(6)	45	(14)
Florida	15,982,378 (15)		60	(4)	8	(4)	4	(0.9)	15	(4)		
Georgia	8,186,453	(8)	186	(13)	9	(5)	22	(5)	34	(8)	51	(16)
Kansas	2,688,418	(2)	36	(3)	1	(0.6)	14	(3)	5	(1.2)		
Los Angeles [(2)]	9,519,338	(9)	111	(8)	29	(16)	18	(4)	7	(1.7)		
Maryland	5,296,486	(5)	122	(9)	0	(0)	27	(6)	35	(9)	2	(0.6)
Massachusetts	6,349,097	(6)	55	(4)	14	(8)	10	(2)	9	(2)		
Minnesota	4,919,479	(5)	59	(4)	3	(1.7)	83	(18)	46	(11)	51	(16)
New Jersey	8,414,350	(8)	116	(8)	23	(13)	53	(12)	34	(8)		
New York City [(3)]	8,008,278	(7)	131	(9)	57	(32)	63	(14)	16	(4)		
New York State [(4)]	10,968,179 (10)		126	(9)	4	(2)	28	(6)	63	(15)	48	(15)
Oregon	3,421,399	(3)	34	(2)	4	(2)	9	(2)	24	(6)	25	(8)
Tennessee	5,689.283	(5)	76	(5)	3	(1.7)	33	(7)	11	(3)	25	(8)
Washington	5,894,121	(5)	75	(5)	0	(0)	41	(9)	42	(10)		
West Virginia	1,808,344	(2)	23	(1.6)	1	(0.6)	5	(1.1)	7	(1.7)		
Totals	108,021,719 (100)		1378	(100)	177	(100)	451	(100)	407	(100)	324	(100)

* County population 2000, U.S. Census Bureau, post-census estimates
** *Campylobacter* isolates are submitted only from FoodNet sites, population size of FoodNet sites is 29.5 million persons (see http://www.cdc.gov/foodnet/)
(1) Alameda, Contra Costa, and San Francisco counties
(2) Los Angeles County
(3) Five boroughs of New York City (Bronx, Brooklyn, Manhattan, Queens, Staten Island)
(4) Excluding New York City

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Table 2. Antimicrobial agents used for susceptibility testing for *Salmonella*, *Shigella*, *E. coli* O157, and *Campylobacter* isolates, 2000

Antimicrobial Agent	Antimicrobial Agent Concentration Range (μg/ml)	Breakpoints		
		[R]	[I]	[S]
Amikacin	4 - 32	≥ 64	32	≤ 16
Amoxicillin – Clavulanic Acid	0.5/0.25 – 32/16	≥ 32	16	≤ 8
Ampicillin	2 – 32	≥ 32	16	≤ 8
Apramycin**	2 – 32	≥ 64	16	≤ 8
Azithromycin	0.016 – 256*	≥ 2	0.5-1	≤ 0.25
Cefoxitin	4-32	≥ 32	16	≤8
Ceftiofur**	0.5 – 16	≥ 8	4	≤ 2
Ceftriaxone	0.25 – 64	≥ 64	32	≤ 8
Cephalothin	1 – 32	≥ 32	16	≤ 8
Chloramphenicol	4 – 32 0.016 – 256*	≥ 32	16	≤ 8
Ciprofloxacin	0.015 – 4 0.002 – 32*	≥ 4	2	≤ 1
Clindamycin	0.016 – 256*	≥ 4	1-2	≤ 0.5
Erythromycin	0.016 – 256*	≥ 8	1-4	≤ 0.5
Gentamicin	0.25 – 16 0.016 – 256*	≥ 16	8	≤ 4
Kanamycin	16 – 64	≥ 64	32	≤ 16
Nalidixic Acid	4 – 256 0.047 – 256*	≥ 32		≤ 16
Streptomycin	32 – 256	≥ 64		≤ 32
Sulfamethoxazole	128 – 512	≥ 512		≤ 256
Tetracycline	4 – 32 0.016 – 256*	≥ 16	8	≤ 4
Trimethoprim - Sulfamethoxazole	0.12/2.4 – 4/76	≥ 4/76		≤ 2/38

* Campylobacter antimicrobial agents and concentration ranges used
** No NCCLS interpretive standards for this antimicrobial agent

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Table 3. Antimicrobial resistance of *Salmonella, Shigella,* and *E. coli* O157 isolates, 2000

Antimicrobial Agent	**Non-Typhi *Salmonella* (N=1378)**		***Salmonella* Typhi (N=177)**		***Shigella* (N=451)**		***E. coli* O157 (N=407)**	
	N	**%**	**N**	**%**	N	%	**N**	**%**
Amikacin	0	(0)	2	(1.1)	1	(0.2)	0	(0)
Amoxicillin – Clavulanic Acid	54	(4)	0	(0)	10	(2)	4	(1.0)
Ampicillin	219	(16)	16	(9)	356	(79)	11	(3)
Apramycin	2	(0.1)	2	(1.1)	1	(0.2)	0	(0)
Cefoxitin	43	(3)	3	(1.7)	2	(0.4)	4	(1.0)
Ceftiofur	44	(3)	1	(0.6)	0	(0)	4	(1.0)
Ceftriaxone	18	(1.3)	0	(0)	0	(0)	0	(0)
Cephalothin	54	(4)	2	(1.1)	36	(8)	5	(1.2)
Chloramphenicol	138	(10)	19	(11)	63	(14)	15	(4)
Ciprofloxacin	5	(0.4)	0	(0)	0	(0)	0	(0)
Gentamicin	37	(3)	1	(0.6)	1	(0.2)	2	(0.5)
Kanamycin	77	(6)	1	(0.6)	6	(1.3)	4	(1.0)
Nalidixic Acid	34	(2)	41	(23)	5	(1.1)	2	(0.5)
Streptomycin	223	(16)	18	(11)	258	(57)	21	(5)
Sulfamethoxazole	235	(17)	21	(12)	252	(56)	24	(6)
Tetracycline	256	(19)	19	(11)	202	(45)	29	(7)
Trimethoprim - Sulfamethoxazole	29	(2)	16	(9)	239	(53)	3	(0.7)

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Table 4a. Additional resistance by antimicrobial agent for non-Typhi *Salmonella*, 2000

Resistance to: N (%)	Amika	Amo-Cl	Ampic	Apram	Cefox	Cefti	Ceftr	Cepha	Chlor	Cipro	Genta	Kanam	Naldx	Strep	Sulfa	Tetra	Tri-Su
Amikacin [Amika] 0 (0)	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%
Amox-Clav [Amo-Cl] 54 (3.9)	0 0%	54 100%	54 100%	0 0%	43 79.6%	44 81.5%	18 33.3%	45 83.3%	44 81.5%	1 1.8%	7 13.0%	16 29.6%	3 5.6%	47 87.0%	48 88.9%	46 85.2%	14 25.9%
Ampicillin [Ampic] 219 (15.9)	0 0%	54 24.6%	219 100%	2 0.9%	43 19.6%	44 20.1%	18 8.2%	54 24.6%	130 59.4%	2 0.9%	17 7.8%	56 25.6%	11 5.0%	163 74.4%	173 79.0%	171 78.1%	21 9.6%
Apramycin [Apram] 2 (0.1)	0 0%	0 0%	2 100%	2 100%	0 0%	0 0%	0 0%	0 0%	1 50.0%	0 0%	2 100%	1 50.0%	1 50.0%	1 50.0%	2 100%	2 100%	1 50.0%
Cefoxitin [Cefox] 43 (3.1)	0 0%	43 100%	43 100%	0 0%	43 100%	43 100%	18 41.9%	43 100%	36 83.7%	0 0%	6 13.9%	12 27.9%	1 2.3%	37 86.0%	37 86.0%	37 86.0%	11 25.6%
Ceftiofur [Cefti] 44 (3.2)	0 0%	44 100%	44 100%	0 0%	43 97.7%	44 100%	18 40.9%	44 100%	36 81.8%	0 0%	6 13.6%	12 27.3%	1 2.3%	38 86.4%	38 86.4%	38 86.4%	11 25.0%
Ceftriaxone [Ceftr] 18 (1.3)	0 0%	18 100%	18 100%	0 0%	18 100%	18 100%	18 100%	18 100%	17 94.4%	0 0%	0 0%	7 38.9%	0 0%	18 100%	18 100%	18 100%	8 44.4%
Cephalothin [Cepha] 54 (3.9)	0 0%	45 83.3%	54 100%	0 0%	43 79.6%	44 81.5%	18 33.3%	54 100%	37 68.5%	0 0%	8 14.8%	17 31.5%	2 3.7%	41 75.9%	41 75.9%	41 75.9%	13 24.1%
Chloramphenicol [Chlor] 138 (10.0)	0 0%	44 31.9%	130 94.2%	1 0.7%	36 26.1%	36 26.1%	17 12.3%	37 26.8%	138 100%	1 0.7%	8 5.8%	22 15.9%	6 4.3%	129 93.5%	135 97.8%	136 98.5%	15 10.9%
Ciprofloxacin [Cipro] 5 (0.4)	0 0%	1 20.0%	2 40.0%	0 0%	0 0%	0 0%	0 0%	0 0%	1 20.0%	5 100%	1 20.0%	2 40.0%	5 100%	2 40.0%	3 60.0%	3 60.0%	3 60.0%
Gentamicin [Genta] 37 (2.7)	0 0%	7 18.9%	17 45.9%	2 5.4%	6 16.2%	6 16.2%	0 0%	8 21.6%	8 21.6%	1 2.7%	37 100%	10 27.0%	7 18.9%	29 78.4%	33 89.2%	18 48.6%	5 13.5%
Kanamycin [Kanam] 77 (5.6)	0 0%	16 20.8%	56 72.7%	1 1.3%	12 15.6%	12 15.6%	7 9.1%	17 22.1%	22 28.6%	2 2.6%	10 13.0%	77 100%	7 9.1%	57 74.0%	57 74.0%	69 89.6%	13 16.9%
Nalidixic Acid [Naldx] 34 (2.5)	0 0%	3 8.8%	11 32.3%	1 2.9%	1 2.9%	1 2.9%	0 0%	2 5.9%	6 17.6%	5 14.7%	7 20.6%	7 20.6%	34 100%	10 29.4%	12 35.3%	13 38.2%	9 26.5%
Streptomycin [Strep] 223 (16.2)	0 0%	47 21.1%	163 73.1%	1 0.4%	37 16.6%	38 17.0%	18 8.1%	41 18.4%	129 57.8%	2 0.9%	29 13.0%	57 25.6%	10 4.5%	223 100%	189 84.8%	198 88.8%	19 8.5%
Sulfamethoxazole [Sulfa] 235 (17.0)	0 0%	48 20.4%	173 73.6%	2 0.8%	37 15.7%	38 16.2%	18 7.6%	41 17.4%	135 57.4%	3 1.3%	33 14.0%	57 24.2%	12 5.1%	189 80.4%	235 100%	196 83.4%	28 11.9%
Tetracycline [Tetra] 256 (18.6)	0 0%	46 18.0%	171 66.8%	2 0.8%	37 14.4%	38 14.8%	18 7.0%	41 16.0%	136 53.1%	3 1.2%	18 7.0%	69 27.0%	13 5.1%	198 77.3%	196 76.6%	256 100%	22 8.6%
Trimeth-Sulfa [Tri-Su] 29 (2.1)	0 0%	14 48.3%	21 72.4%	1 3.4%	11 37.9%	11 37.9%	8 27.6%	13 44.8%	15 51.7%	3 10.3%	5 17.2%	13 44.8%	9 31.0%	19 65.5%	28 96.5%	22 75.9%	29 100%

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Table 4b. Additional resistance by antimicrobial agent for *Salmonella* Typhi, 2000

Resistance to: N (%)	Amika	Amo-Cl	Ampic	Apram	Cefox	Cefti	Ceftr	Cepha	Chlor	Cipro	Genta	Kanam	Naldx	Strep	Sulfa	Tetra	Tri-Su
Amikacin [Amika] 2 (1.1)	2 100%	0 0%	0 0%	2 100%	2 100%	1 50.0%	0 0%	0 0%	0 0%	0 0%	1 50.0%	1 50.0%	2 100%	2 100%	1 50.0%	2 100%	0 0%
Amox-Clav [Amo-Cl] 0 (0)	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%
Ampicillin [Ampic] 16 (9.0)	0 0%	0 0%	16 100%	0 0%	0 0%	0 0%	0 0%	2 12.5%	16 100%	0 0%	0 0%	0 0%	13 81.2%	16 100%	16 100%	14 87.5%	16 100%
Apramycin [Apram] 2 (1.1)	2 100%	0 0%	0 0%	2 100%	2 100%	1 50.0%	0 0%	0 0%	0 0%	0 0%	1 50.0%	1 50.0%	2 100%	2 100%	1 50.0%	2 100%	0 0%
Cefoxitin [Cefox] 3 (1.7)	2 66.7%	0 0%	0 0%	2 66.7%	3 100%	1 33.3%	0 0%	0 0%	0 0%	0 0%	1 33.3%	1 33.3%	2 66.7%	2 66.7%	1 33.3%	2 66.7%	0 0%
Ceftiofur [Cefti] 1 (0.6)	1 100%	0 0%	0 0%	1 100%	1 100%	1 100%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	1 100%	1 100%	1 100%	1 100%	0 0%
Ceftriaxone [Ceftr] 0 (0)	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%
Cephalothin [Cepha] 2 (1.1)	0 0%	0 0%	2 100%	0 0%	0 0%	0 0%	0 0%	2 100%	2 100%	0 0%	0 0%	0 0%	2 100%	2 100%	2 100%	2 100%	2 100%
Chloramphenicol [Chlor] 19 (10.7)	0 0%	0 0%	16 84.2%	0 0%	0 0%	0 0%	0 0%	2 10.5%	19 100%	0 0%	0 0%	0 0%	14 73.7%	16 84.2%	17 89.5%	16 84.2%	16 84.2%
Ciprofloxacin [Cipro] 0 (0)	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%
Gentamicin [Genta] 1 (0.6)	1 100%	0 0%	0 0%	1 100%	1 100%	0 0%	0 0%	0 0%	0 0%	0 0%	1 100%	1 100%	1 100%	1 100%	0 0%	1 100%	0 0%
Kanamycin [Kanam] 1 (0.6)	1 100%	0 0%	0 0%	1 100%	1 100%	0 0%	0 0%	0 0%	0 0%	0 0%	1 100%	1 100%	1 100%	1 100%	0 0%	1 100%	0 0%
Nalidixic Acid [Naldx] 41 (23.2)	2 4.9%	0 0%	13 31.7%	2 4.9%	2 4.9%	1 2.4%	0 0%	2 4.8%	14 34.1%	0 0%	1 2.4%	1 2.4%	41 100%	15 36.6%	14 34.1%	16 39.0%	13 31.7%
Streptomycin [Strep] 18 (10.2)	2 11.1%	0 0%	16 88.9%	2 11.1%	2 11.1%	1 5.6%	0 0%	2 11.1%	1 88.9%	0 0%	1 5.6%	1 5.6%	15 83.3%	18 100%	17 94.4%	16 88.9%	16 88.9%
Sulfamethoxazole [Sulfa] 21 (11.9)	1 4.7%	0 0%	16 76.2%	1 4.8%	1 4.8%	1 4.8%	0 0%	2 9.5%	17 80.9%	0 0%	0 0%	0 0%	14 66.7%	17 80.9%	21 100%	15 71.4%	16 76.2%
Tetracycline [Tetra] 19 (10.7)	2 10.5%	0 0%	14 73.7%	2 10.5%	2 10.5%	1 5.3%	0 0%	2 10.5%	16 84.2%	0 0%	1 5.3%	1 5.3%	16 84.2%	16 84.2%	15 78.9%	19 100%	14 73.7%
Trimeth-Sulfa [Tri-Su] 16 (9.0)	0 0%	0 0%	16 100%	0 0%	0 0%	0 0%	0 0%	2 12.5%	16 100%	0 0%	0 0%	0 0%	13 81.2%	16 100%	16 100%	14 87.5%	16 100%

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Table 4c. Additional resistance by antimicrobial agent for *Shigella*, 2000

Resistance to: N (%)	Amika	Amo-Cl	Ampic	Apram	Cefti	Ceftr	Cepha	Chlor	Cipro	Genta	Kanam	Naldx	Strep	Sulfa	Tetra	Tri-Su
Amikacin [Amika] 1 (0.2)	1 100%	0 0%	0 0%	1 100%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	1 100%	1 100%	1 100%	0 0%	1 100%
Amox-Clav [Amo-Cl] 10 (2.2)	0 0%	10 100%	10 100%	0 0%	0 0%	0 0%	7 70.0%	3 30.0%	0 0%	0 0%	2 20.0%	0 0%	7 70.0%	4 40.0%	7 70.0%	5 50.0%
Ampicillin [Ampic] 356 (78.9)	0 0%	10 2.8%	356 100%	0 0%	0 0%	0 0%	34 9.5%	62 17.4%	0 0%	1 0.3%	4 1.1%	0 0%	215 60.4%	206 57.9%	146 41.0%	200 56.2%
Apramycin [Apram] 1 (0.2)	1 100%	0 0%	0 0%	1 100%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	1 100%	1 100%	1 100%	0 0%	1 100%
Cefoxitin [Cefox] 2 (0.4)	1 50.0%	1 50.0%	1 50.0%	1 50.0%	0 0%	0 0%	1 50.0%	0 0%	0 0%	0 0%	1 50.0%	1 50.0%	1 50.0%	1 50.0%	1 50.0%	1 50.0%
Ceftiofur [Cefti] 0 (0)	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%
Ceftriaxone [Ceftr] 0 (0)	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%
Cephalothin [Cepha] 36 (8.0)	0 0%	7 19.4%	34 94.4%	0 0%	0 0%	0 0%	36 100%	1 2.8%	0 0%	1 2.8%	4 11.1%	0 0%	20 55.5%	20 55.5%	21 58.3%	20 55.5%
Chloramphenicol [Chlor] 63 (14.0)	0 0%	3 4.8%	62 98.4%	0 0%	0 0%	0 0%	1 1.6%	63 100%	0 0%	0 0%	0 0%	0 0%	42 66.7%	37 58.7%	61 96.8%	31 49.2%
Ciprofloxacin [Cipro] 0 (0)	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%
Gentamicin [Genta] 1 (0.2)	0 0%	0 0%	1 100%	0 0%	0 0%	0 0%	1 100%	0 0%	0 0%	1 100%	0 0%	0 0%	1 100%	1 100%	1 100%	1 100%
Kanamycin [Kanam] 6 (1.3)	0 0%	2 33.3%	4 66.7%	0 0%	0 0%	0 0%	4 66.7%	0 0%	0 0%	0 0%	6 100%	0 0%	0 0%	2 33.3%	5 83.3%	1 16.7%
Nalidixic Acid [Naldx] 5 (1.1)	1 20.0%	0 0%	0 0%	1 20.0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	5 100%	5 100%	5 100%	4 80.0%	5 100%
Streptomycin [Strep] 258 (57.2)	1 0.4%	7 2.7%	215 83.3%	1 0.4%	0 0%	0 0%	20 7.7%	42 16.3%	0 0%	1 0.4%	0 0%	5 1.9%	258 100%	232 89.9%	160 62.0%	231 89.5%
Sulfamethoxazole [Sulfa] 252 (55.9)	1 0.4%	4 1.6%	206 81.7%	1 0.4%	0 0%	0 0%	20 7.9%	37 14.7%	0 0%	1 0.4%	2 0.8%	5 2.0%	232 92.1%	252 100%	157 62.3%	231 91.7%
Tetracycline [Tetra] 202 (44.8)	0 0%	7 3.5%	146 72.3%	0 0%	0 0%	0 0%	21 10.4%	61 30.2%	0 0%	1 0.5%	5 2.5%	4 2.0%	160 79.2%	157 77.7%	202 100%	148 73.3%
Trimeth-Sulfa [Tri-Su] 239 (53.0)	1 0.4%	5 2.1%	200 83.7%	1 0.4%	0 0%	0 0%	20 8.4%	31 13.0%	0 0%	1 0.4%	1 0.4%	5 2.1%	231 96.6%	231 96.6%	148 61.9%	239 100%

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Table 4d. Additional resistance by antimicrobial agent for *E. coli* O157, 2000

Resistance to: N (%)	Amika	Amo-Cl	Ampic	Apram	Cefox	Cefti	Ceftr	Cepha	Chlor	Cipro	Genta	Kanam	Naldx	Strep	Sulfa	Tetra	Tri-Su
Amikacin [Amika] 0 (0)	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%
Amox-Clav [Amo-Cl] 4 (1.0)	0 0%	4 100%	4 100%	0 0%	4 100%	4 100%	0 0%	4 100%	4 100%	0 0%	0 0%	0 0%	0 0%	4 100%	4 100%	4 100%	0 0%
Ampicillin [Ampic] 11 (2.7)	0 0%	4 36.4%	11 100%	0 0%	4 36.4%	4 36.4%	0 0%	4 36.4%	6 54.5%	0 0%	1 9.1%	2 18.2%	0 0%	9 81.8%	7 63.6%	7 63.6%	2 18.2%
Apramycin [Apram] 0 (0)	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%
Cefoxitin [Cefox] 4 (1.0)	0 0%	4 100%	4 100%	0 0%	4 100%	4 100%	0 0%	4 100%	4 100%	0 0%	0 0%	0 0%	0 0%	4 100%	4 100%	4 100%	0 0%
Ceftiofur [Cefti] 4 (1.0)	0 0%	4 100%	4 100%	0 0%	4 100%	4 100%	0 0%	4 100%	4 100%	0 0%	0 0%	0 0%	0 0%	4 100%	4 100%	4 100%	0 0%
Ceftriaxone [Ceftr] 0 (0)	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%
Cephalothin [Cepha] 5 (1.2)	0 0%	4 80.0%	4 80.0%	0 0%	4 80.0%	4 80.0%	0 0%	5 100%	4 80.0%	0 0%	0 0%	0 0%	0 0%	4 80.0%	4 80.0%	4 80.0%	0 0%
Chloramphenicol [Chlor] 15 (3.7)	0 0%	4 26.7%	6 40.0%	0 0%	4 26.7%	4 26.7%	0 0%	4 26.7%	15 100%	0 0%	1 6.7%	1 6.7%	0 0%	14 93.3%	14 93.3%	14 93.3%	1 6.7%
Ciprofloxacin [Cipro] 0 (0)	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%
Gentamycin [Genta] 2 (0.5)	0 0%	0 0%	1 50.0%	0 0%	0 0%	0 0%	0 0%	0 0%	1 50.0%	0 0%	2 100%	0 0%	0 0%	1 50.0%	2 100%	1 50.0%	1 50.0%
Kanamycin [Kanam] 4 (1.0)	0 0%	0 0%	2 50.0%	0 0%	0 0%	0 0%	0 0%	0 0%	1 25.0%	0 0%	0 0%	4 100%	0 0%	3 75.0%	1 25.0%	3 75.0%	1 25.0%
Nalidixic Acid [Naldx] 2 (0.5)	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	2 100%	0 0%	0 0%	0 0%	0 0%
Streptomycin [Strep] 21 (5.2)	0 0%	4 19.0%	9 42.9%	0 0%	4 19.0%	4 19.0%	0 0%	4 19.0%	14 66.7%	0 0%	1 4.8%	3 14.3%	0 0%	21 100%	16 76.2%	17 80.9%	3 14.3%
Sulfamethoxazole [Sulfa] 24 (5.9)	0 0%	4 16.7%	7 29.2%	0 0%	4 16.7%	4 16.7%	0 0%	4 16.7%	14 58.3%	0 0%	2 8.3%	1 4.2%	0 0%	16 66.7%	24 100%	21 87.5%	3 12.5%
Tetracycline [Tetra] 29 (7.1)	0 0%	4 13.8%	7 24.1%	0 0%	4 13.8%	4 13.8%	0 0%	4 13.8%	14 48.3%	0 0%	1 3.4%	3 10.3%	0 0%	17 58.6%	21 72.4%	29 100%	3 10.3%
Trimeth-Sulfa [Tri-Su] 3 (0.7)	0 0%	0 0%	2 66.7%	0 0%	0 0%	0 0%	0 0%	0 0%	1 33.3%	0 0%	1 33.3%	1 33.3%	0 0%	3 100%	3 100%	3 100%	3 100%

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Table 4e. Additional resistance by antimicrobial agent for *Campylobacter*, 2000

Resistance to: N (%)	Azith	Chlor	Cipro	Clind	Eryth	Genta	Naldx	Tetra
Azithromycin [Azith] 7 (2.2)	7 100%	0 0%	3 42.9%	4 57.1%	5 71.4%	0 0%	3 42.9%	2 28.6%
Chloramphenicol [Chlor] 0 (0)	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%	0 100%
Ciprofloxacin [Cipro] 46 (14.2)	3 6.5%	0 0%	46 100%	3 6.5%	3 6.5%	1 2.2%	46 100%	22 47.8%
Clindamycin [Clind] 4 (1.2)	4 100%	0 0%	3 75.0%	4 100%	4 100%	0 0%	3 75.0%	1 25.0%
Erythromycin [Eryth] 5 (1.5)	5 100%	0 0%	3 60.0%	4 80.0%	5 100%	0 0%	3 60.0%	1 20.0%
Gentamicin [Genta] 1 (0.3)	0 0%	0 0%	1 100%	0 0%	0 0%	1 100%	1 100%	1 100%
Nalidixic Acid [Naldx] 54 (16.7)	3 5.6%	0 0%	46 85.2%	3 5.6%	3 5.6%	1 1.8%	54 100%	24 44.4%
Tetracycline [Tetra] 122 (37.6)	2 1.6%	0 0%	22 18.0%	1 0.8%	1 0.8%	1 0.8%	24 19.7%	121 100%

Table 5. Comparison of ceftriaxone Sensititre and E-test results among non-Typhi *Salmonella* isolates with a decreased susceptibility to ceftriaxone (MIC $\geq$ 16 µg/ml), by Sensititre 2000

Isolate	Sensititre MIC (µg/ml)	I/R*	E-test MIC (µg/ml)	I/R*
1	32	I	>256	R
2	32	I	>256	R
3	32	I	>256	R
4	32	I	>256	R
5	16	I	>256	R
6	32	I	192	R
7	32	I	128	R
8	32	I	128	R
9	32	I	96	R
10	32	I	96	R
11	16	I	96	R
12	16	I	96	R
13	32	I	64	R
14	32	I	64	R
15	32	I	64	R
16	16	I	64	R
17	16	I	64	R
18	16	I	64	R
19	16	I	48	I
20	16	I	32	I
21	16	I	32	I
22	32	I	24	I

*I = Intermediate (MIC 16-32 µg/ml); R = Resistant (MIC $\geq$ 64 µg/ml)

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Table 6. Top fifteen non-Typhi *Salmonella* Serotypes, 2000

Serotype	**N**	**%**
Enteritidis	319	23.2
Typhimurium	303	22.0
Newport	124	9.0
Heidelberg	79	5.7
Javiana	44	3.2
Thompson	35	2.5
Montevideo	31	2.2
Muenchen	27	2.0
St. Paul	26	1.9
Hadar	25	1.8
Oranienburg	25	1.8
Infantis	24	1.7
Braenderup	23	1.7
Agona	16	1.2
Java	13	0.9
Not Serotyped	46	3.3
All Others	218	15.8
Total	**1378**	**100**

Table 7. Frequency of pansusceptibility* among the 15 most commonly isolated non-Typhi *Salmonella* serotypes, 2000

Serotype	**Total Isolates**		**Pansusceptible Isolates**	
	#	**% of *Salmonella***	**#**	**% of Serotype**
Oranienburg	25	1.8	25	100
Javiana	44	3.2	43	97.7
Montevideo	31	2.2	30	96.8
Muenchen	27	2.0	26	96.3
Braenderup	23	1.7	22	95.6
Java	13	0.9	12	92.3
Enteritidis	319	23.2	284	89.0
Thompson	35	2.5	31	88.6
Infantis	24	1.7	21	87.5
St. Paul	26	1.9	22	84.6
Newport	124	9.0	94	75.8
Heidelberg	79	5.7	50	63.3
Typhimurium	303	22.0	150	49.5
Agona	16	1.2	5	31.2
Hadar	25	1.8	5	20.0

***Pansusceptible to 15 antimicrobial agents tested, 1996-2000: amoxicillin-clavulanic acid, ampicillin, apramycin, ceftiofur, ceftriaxone, cephalothin, chloramphenicol, ciprofloxacin, gentamicin, kanamycin, nalidixic acid, streptomycin, sulfamethoxazole, tetracycline, trimethoprim-sulfamethoxazole**

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Table 8. Frequency of resistance and multidrug* resistance among top 15 non-Typhi *Salmonella* serotypes, 2000

Serotype	Total		Number resistant to ≥ 1 antimicrobial		Number resistant to ≥ 2 antimicrobials		Number resistant to ≥ 5 antimicrobials		Number resistant to ≥ 8 antimicrobials	
	N	%	N	%	N	%	N	%	N	%
Enteritidis	319	24.0	35	11.0	9	2.8	0	0	0	0
Typhimurium	303	22.7	153	50.5	143	47.2	108	35.6	9	3.0
Newport	124	9.3	30	24.2	28	22.6	28	22.6	27	21.8
Heidelberg	79	5.9	29	36.7	22	27.8	3	3.8	1	1.3
Javiana	44	3.3	1	2.3	1	2.3	1	2.3	0	0
Thompson	35	2.6	4	11.4	2	5.7	0	0	0	0
Montevideo	31	2.3	1	3.2	1	3.2	0	0	0	0
Muenchen	27	2.0	1	3.7	0	0	0	0	0	0
St. Paul	26	1.9	4	15.4	3	11.5	0	0	0	0
Hadar	25	1.9	20	80.0	15	60.0	1	4.0	0	0
Oranienburg	25	1.9	0	0	0	0	0	0	0	0
Infantis	24	1.8	3	12.5	2	8.3	0	0	0	0
Braenderup	23	1.7	1	4.3	0	0	0	0	0	0
Agona	16	1.2	11	68.7	9	56.2	1	6.2	1	6.2
Java	13	1.0	1	7.7	1	7.7	1	7.7	0	0
Other Serotypes	218	15.8	46	21.1	35	16.0	11	5.0	3	1.4
Total Serotyped	1332	100.0	340	25.5	271	20.3	154	11.6	41	3.0
Not Serotyped	46	NA	13	28.3	13	28.3	5	10.9	0	0

***Multidrug resistant to antimicrobial agents tested, 1996-2000: amoxicillin-clavulanic acid, ampicillin, apramycin, ceftiofur, ceftriaxone, cephalothin, chloramphenicol, ciprofloxacin, gentamicin, kanamycin, nalidixic acid, streptomycin, sulfamethoxazole, tetracycline, trimethoprim-sulfamethoxazole**

Table 9a. Frequency of multidrug* resistance among the most common non-Typhi *Salmonella* serotypes in each site, 2000

Site	Most Common Serotypes	Total		Number resistant to ≥ 1 antimicrobial		Number resistant to ≥ 2 antimicrobials		Number resistant to ≥ 5 antimicrobials		Number resistant to ≥ 8 antimicrobials	
		N	%	N	%	N	%	N	%	N	%
California	Enteritidis	12	21.8	1	8.3	0	0	0	0	0	0
	Typhimurium	12	21.8	8	66.7	7	58.3	5	41.7	0	0
	Heidelberg	7	12.7	3	42.8	2	28.6	0	0	0	0
	Saint Paul	3	5.4	0	0	0	0	0	0	0	0
	Hadar	2	3.6	2	100.0	1	50.0	0	0	0	0
	Javiana	2	3.6	0	0	0	0	0	0	0	0
	Newport	2	3.6	1	50.0	1	50.0	1	50.0	1	50.0
	Thompson	2	3.6	0	0	0	0	0	0	0	0
	Other	13	23.6	1	7.7	1	7.7	0	0	0	0
	Total	**55**	**100.0**	**16**	**29.1**	**12**	**21.8**	**6**	**10.1**	**1**	**1.8**
Colorado	Enteritidis	20	30.3	3	15.0	1	5.0	0	0	0	0
	Typhimurium	17	25.7	11	64.7	10	58.8	6	35.3	0	0
	Heidelberg	5	7.6	3	60.0	3	60.0	0	0	0	0
	Montevideo	5	7.6	0	0	0	0	0	0	0	0
	Newport	5	7.6	2	40.0	2	40.0	2	40.0	2	40.0
	Other	14	21.2	6	42.8	5	35.7	0	0	0	0
	Total	**66**	**100.0**	**25**	**37.8**	**21**	**31.8**	**8**	**12.1**	**2**	**3.0**

*Multidrug resistant to antimicrobial agents tested, 1996-2000: amoxicillin-clavulanic acid, ampicillin, apramycin, ceftiofur, ceftriaxone, cephalothin, chloramphenicol, ciprofloxacin, gentamicin, kanamycin, nalidixic acid, streptomycin, sulfamethoxazole, tetracycline, trimethoprim-sulfamethoxazole

Table 9b. Frequency of multidrug* resistance among the most common non-Typhi *Salmonella* serotypes in each site, 2000

Site	Most Common Serotypes	Total		Number resistant to ≥ 1 antimicrobial		Number resistant to ≥ 2 antimicrobials		Number resistant to ≥ 5 antimicrobials		Number resistant to ≥ 8 antimicrobials	
		N	%	N	%	N	%	N	%	N	%
Connecticut	Enteritidis	13	27.7	1	7.7	1	7.7	0	0	0	0
	Typhimurium	10	21.3	5	50.0	5	50.0	5	50.0	1	10.0
	Muenchen	4	8.5	0	0	0	0	0	0	0	0
	Heidelberg	3	6.4	1	33.3	0	0	0	0	0	0
	Newport	3	6.4	2	66.7	2	66.7	2	66.7	2	66.7
	Virchow	3	6.4	1	33.3	0	0	0	0	0	0
	Other	11	23.4	3	27.3	1	9.1	1	9.1	0	0
	Total	**47**	**100.0**	**13**	**27.6**	**9**	**19.1**	**8**	**17.0**	**3**	**6.4**
Florida	Javiana	14	23.3	0	0	0	0	0	0	0	0
	Newport	13	21.7	0	0	0	0	0	0	0	0
	Typhimurium	12	20.0	6	50.0	5	41.7	3	25.0	0	0
	Flint	4	6.7	0	0	0	0	0	0	0	0
	Enteritidis	2	3.3	1	50.0	0	0	0	0	0	0
	Manhattan	2	3.3	0	0	0	0	0	0	0	0
	Montevideo	2	3.3	0	0	0	0	0	0	0	0
	Oranienburg	2	3.3	0	0	0	0	0	0	0	0
	Other	9	15.0	1	11.1	1	11.1	1	11.1	0	0
	Total	**60**	**100.0**	**8**	**13.3**	**6**	**10.0**	**4**	**6.7**	**0**	**0**

*Multidrug resistant to antimicrobial agents tested, 1996-2000: amoxicillin-clavulanic acid, ampicillin, apramycin, ceftiofur, ceftriaxone, cephalothin, chloramphenicol, ciprofloxacin, gentamicin, kanamycin, nalidixic acid, streptomycin, sulfamethoxazole, tetracycline, trimethoprim-sulfamethoxazole

Table 9c. Frequency of multidrug* resistance among the most common non-Typhi *Salmonella* serotypes in each site, 2000

Site	Most Common Serotypes	Total		Number resistant to ≥ 1 antimicrobial		Number resistant to ≥ 2 antimicrobials		Number resistant to ≥ 5 antimicrobials		Number resistant to ≥ 8 antimicrobials	
		N	%	N	%	N	%	N	%	N	%
Georgia	Typhimurium	45	24.2	22	48.9	19	42.2	13	28.9	0	0
	Newport	27	14.5	1	3.7	1	3.7	1	3.7	1	3.7
	Javiana	17	9.1	0	0	0	0	0	0	0	0
	Enteritidis	15	8.1	2	13.3	1	6.7	0	0	0	0
	Infantis	9	4.8	1	11.1	1	11.1	0	0	0	0
	Other	67	36.0	5	7.5	5	7.5	1	1.5	1	1.5
	Not Serotyped	6	3.2	1	16.7	1	16.7	0	0	0	0
	Total	**186**	**100.0**	**32**	**17.2**	**28**	**15.0**	**15**	**8.1**	**2**	**1.1**
Kansas	Typhimurium	13	36.1	3	23.1	3	23.1	3	23.1	2	15.4
	Newport	6	16.7	4	66.7	4	66.7	4	66.7	4	66.7
	Enteritidis	3	8.3	0	0	0	0	0	0	0	0
	Agona	2	5.5	1	50.0	1	50.0	1	50.0	1	50.0
	Other	8	22.2	0	0	0	0	0	0	0	0
	Not Serotyped	4	11.1	1	25.0	1	25.0	1	25.0	0	0
	Total	**36**	**100.0**	**9**	**25.0**	**9**	**25.0**	**9**	**25.0**	**7**	**19.4**

*Multidrug resistant to antimicrobial agents tested, 1996-2000: amoxicillin-clavulanic acid, ampicillin, apramycin, ceftiofur, ceftriaxone, cephalothin, chloramphenicol, ciprofloxacin, gentamicin, kanamycin, nalidixic acid, streptomycin, sulfamethoxazole, tetracycline, trimethoprim-sulfamethoxazole

Table 9d. Frequency of multidrug* resistance among the most common non-Typhi *Salmonella* serotypes in each site, 2000

Site	Most Common Serotypes	Total N	Total %	Number resistant to ≥ 1 antimicrobial N	Number resistant to ≥ 1 antimicrobial %	Number resistant to ≥ 2 antimicrobials N	Number resistant to ≥ 2 antimicrobials %	Number resistant to ≥ 5 antimicrobials N	Number resistant to ≥ 5 antimicrobials %	Number resistant to ≥ 8 antimicrobials N	Number resistant to ≥ 8 antimicrobials %
Los Angeles County	Enteritidis	25	22.5	0	0	0	0	0	0	0	0
	Typhimurium	20	18.0	9	45.0	9	45.0	6	30.0	1	5.0
	Newport	9	8.1	5	55.5	3	33.3	3	33.3	3	33.3
	Thompson	5	4.5	0	0	0	0	0	0	0	0
	Berta	4	3.6	4	100.0	3	75.0	0	0	0	0
	Montevideo	4	3.6	1	25.0	1	25.0	0	0	0	0
	Oranienburg	4	3.6	0	0	0	0	0	0	0	0
	Other	37	33.3	10	27.0	7	18.9	3	8.1	1	2.7
	Not Serotyped	3	2.7	3	100.0	3	100.0	2	66.7	0	0
	Total	**111**	**100.0**	**32**	**28.8**	**26**	**23.4**	**14**	**12.6**	**5**	**4.5**
Maryland	Enteritidis	19	34.5	2	10.5	1	5.3	0	0	0	0
	Typhimurium	8	14.5	5	62.5	4	50.0	4	50.0	0	0
	Heidelberg	3	5.4	1	33.3	1	33.3	0	0	0	0
	Javiana	3	5.4	0	0	0	0	0	0	0	0
	Newport	3	5.4	0	0	0	0	0	0	0	0
	Other	16	29.1	4	25.0	3	18.7	0	0	0	0
	Not Serotyped	3	5.4	0	0	0	0	0	0	0	0
	Total	**55**	**100.0**	**12**	**21.8**	**9**	**16.4**	**4**	**7.3**	**0**	**0**

*Multidrug resistant to antimicrobial agents tested, 1996-2000: amoxicillin-clavulanic acid, ampicillin, apramycin, ceftiofur, ceftriaxone, cephalothin, chloramphenicol, ciprofloxacin, gentamicin, kanamycin, nalidixic acid, streptomycin, sulfamethoxazole, tetracycline, trimethoprim-sulfamethoxazole

Table 9e. Frequency of multidrug* resistance among the most common non-Typhi *Salmonella* serotypes in each site, 2000

Site	Most Common Serotypes	Total		Number resistant to ≥ 1 antimicrobial		Number resistant to ≥ 2 antimicrobials		Number resistant to ≥ 5 antimicrobials		Number resistant to ≥ 8 antimicrobials	
		N	%	N	%	N	%	N	%	N	%
Massachusetts	Enteritidis	30	24.6	1	3.3	0	0	0	0	0	0
	Typhimurium	26	21.3	10	38.5	10	38.5	9	34.6	2	7.7
	Heidelberg	11	9.0	4	36.4	2	18.2	0	0	0	0
	Newport	9	7.4	4	44.4	4	44.4	4	44.4	4	44.4
	Thompson	8	6.6	0	0	0	0	0	0	0	0
	Other	36	29.5	11	30.5	7	19.4	3	8.3	0	0
	Not Serotyped	2	1.6	0	0	0	0	0	0	0	0
	Total	**122**	**100.0**	**30**	**24.6**	**23**	**18.8**	**16**	**13.1**	**6**	**4.9**
Minnesota	Typhimurium	23	39.0	7	30.4	6	26.1	5	21.7	0	0
	Enteritidis	11	18.6	1	9.1	0	0	0	0	0	0
	Newport	4	6.8	2	50.0	2	50.0	2	50.0	1	25.0
	Agona	2	3.4	1	50.0	1	50.0	0	0	0	0
	Java	2	3.4	0	0	0	0	0	0	0	0
	Muenchen	2	3.4	0	0	0	0	0	0	0	0
	Senftenberg	2	3.4	0	0	0	0	0	0	0	0
	Thompson	2	3.4	0	0	0	0	0	0	0	0
	Other	9	15.2	2	22.2	2	22.2	0	0	0	0
	Not Serotyped	2	3.4	0	0	0	0	0	0	0	0
	Total	**59**	**100.0**	**13**	**22.0**	**11**	**18.6**	**7**	**12.1**	**1**	**1.7**

*Multidrug resistant to antimicrobial agents tested, 1996-2000: amoxicillin-clavulanic acid, ampicillin, apramycin, ceftiofur, ceftriaxone, cephalothin, chloramphenicol, ciprofloxacin, gentamicin, kanamycin, nalidixic acid, streptomycin, sulfamethoxazole, tetracycline, trimethoprim-sulfamethoxazole

Table 9f. Frequency of multidrug* resistance among the most common non-Typhi *Salmonella* serotypes in each site, 2000

Site	Most Common Serotypes	Total		Number resistant to ≥ 1 antimicrobial		Number resistant to ≥ 2 antimicrobials		Number resistant to ≥ 5 antimicrobials		Number resistant to ≥ 8 antimicrobials	
		N	%	N	%	N	%	N	%	N	%
New Jersey	Enteritidis	47	40.5	4	8.5	0	0	0	0	0	0
	Typhimurium	28	24.1	16	57.1	16	57.1	12	42.8	0	0
	Newport	6	5.2	1	16.7	1	16.7	1	16.7	1	16.7
	Heidelberg	5	4.3	3	60.0	3	60.0	1	20.0	0	0
	Berta	2	1.7	1	50.0	1	50.0	0	0	0	0
	Litchfield	2	1.7	0	0	0	0	0	0	0	0
	Oranienburg	2	1.7	0	0	0	0	0	0	0	0
	Poona	2	1.7	0	0	0	0	0	0	0	0
	Other	17	14.6	4	23.5	2	11.8	1	5.9	0	0
	Not Serotyped	5	4.3	3	60.0	3	60.0	0	0	0	0
	Total	**116**	**100.0**	**32**	**27.6**	**26**	**22.4**	**13**	**11.2**	**1**	**0.9**

*Multidrug resistant to antimicrobial agents tested, 1996-2000: amoxicillin-clavulanic acid, ampicillin, apramycin, ceftiofur, ceftriaxone, cephalothin, chloramphenicol, ciprofloxacin, gentamicin, kanamycin, nalidixic acid, streptomycin, sulfamethoxazole, tetracycline, trimethoprim-sulfamethoxazole

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Table 9g. Frequency of multidrug* resistance among the most common non-Typhi *Salmonella* serotypes in each site, 2000

Site	Most Common Serotypes	Total N	Total %	Number resistant to ≥ 1 antimicrobial N	Number resistant to ≥ 1 antimicrobial %	Number resistant to ≥ 2 antimicrobials N	Number resistant to ≥ 2 antimicrobials %	Number resistant to ≥ 5 antimicrobials N	Number resistant to ≥ 5 antimicrobials %	Number resistant to ≥ 8 antimicrobials N	Number resistant to ≥ 8 antimicrobials %
New York City	Enteritidis	60	45.8	16	26.7	4	6.7	0	0	0	0
	Typhimurium	21	16.0	15	71.4	15	71.4	13	61.9	0	0
	Heidelberg	6	4.6	2	33.3	2	33.3	0	0	0	0
	Infantis	4	3.0	0	0	0	0	0	0	0	0
	Saint Paul	4	3.0	1	25.0	1	25.0	0	0	0	0
	Thompson	4	3.0	2	50.0	1	25.0	0	0	0	0
	Other	29	22.1	5	17.2	4	13.8	0	0	0	0
	Not Serotyped	3	2.3	1	33.3	1	33.3	1	33.3	0	0
	Total	**131**	**100.0**	**42**	**32.1**	**28**	**21.4**	**14**	**10.7**	**0**	**0**
New York State	Enteritidis	34	27.0	3	8.8	1	2.9	0	0	0	0
	Typhimurium	25	19.8	8	32.0	7	28.0	6	24.0	0	0
	Heidelberg	9	7.1	3	33.3	1	11.1	1	11.1	0	0
	Hadar	6	4.8	6	100.0	5	83.3	0	0	0	0
	Infantis	5	4.0	1	20.0	1	20.0	1	20.0	0	0
	Other	39	30.9	7	17.9	5	12.8	3	7.7	2	5.1
	Not Serotyped	8	6.3	2	25.0	2	25.0	0	0	0	0
	Total	**126**	**100.0**	**30**	**23.8**	**22**	**17.5**	**11**	**8.7**	**2**	**1.6**

*Multidrug resistant to antimicrobial agents tested, 1996-2000: amoxicillin-clavulanic acid, ampicillin, apramycin, ceftiofur, ceftriaxone, cephalothin, chloramphenicol, ciprofloxacin, gentamicin, kanamycin, nalidixic acid, streptomycin, sulfamethoxazole, tetracycline, trimethoprim-sulfamethoxazole

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Table 9h. Frequency of multidrug* resistance among the most common non-Typhi *Salmonella* serotypes in each site, 2000

Site	Most Common Serotypes	Total N	Total %	Number resistant to ≥ 1 antimicrobial N	%	Number resistant to ≥ 2 antimicrobials N	%	Number resistant to ≥ 5 antimicrobials N	%	Number resistant to ≥ 8 antimicrobials N	%
Oregon	Enteritidis	7	20.6	0	0	0	0	0	0	0	0
	Typhimurium	5	14.7	3	60.0	3	60.0	2	40.0	0	0
	Montevideo	3	8.8	0	0	0	0	0	0	0	0
	Newport	3	8.8	0	0	0	0	0	0	0	0
	Saint Paul	3	8.8	1	33.3	1	33.3	0	0	0	0
	Other	12	35.3	5	41.7	4	33.3	0	0	0	0
	Not Serotyped	1	2.9	0	0	0	0	0	0	0	0
	Total	**34**	**100.0**	**9**	**26.5**	**8**	**23.5**	**2**	**5.9**	**0**	**0**
Tennessee	Newport	20	26.3	5	25.0	5	25.0	5	25.0	5	25.0
	Typhimurium	11	14.5	7	63.6	7	63.6	7	63.6	0	0
	Heidelberg	8	10.5	4	50.0	3	37.5	1	12.5	1	12.5
	Enteritidis	6	7.9	0	0	0	0	0	0	0	0
	Other	23	30.3	3	13.0	2	8.7	0	0	0	0
	Not Serotyped	8	10.5	1	12.5	1	12.5	0	0	0	0
	Total	**76**	**100.0**	**20**	**26.3**	**18**	**23.7**	**13**	**17.1**	**6**	**7.9**

*Multidrug resistant to antimicrobial agents tested, 1996-2000: amoxicillin-clavulanic acid, ampicillin, apramycin, ceftiofur, ceftriaxone, cephalothin, chloramphenicol, ciprofloxacin, gentamicin, kanamycin, nalidixic acid, streptomycin, sulfamethoxazole, tetracycline, trimethoprim-sulfamethoxazole

Table 9i. Frequency of multidrug* resistance among the most common non-Typhi *Salmonella* serotypes in each site, 2000

Site	Most Common Serotypes	Total N	Total %	Number resistant to ≥ 1 antimicrobial N	%	Number resistant to ≥ 2 antimicrobials N	%	Number resistant to ≥ 5 antimicrobials N	%	Number resistant to ≥ 8 antimicrobials N	%
Washington	Typhimurium	23	30.7	17	73.9	16	69.6	12	52.2	3	13.0
	Enteritidis	11	14.7	0	0	0	0	0	0	0	0
	Heidelberg	7	9.3	1	14.3	1	14.3	0	0	0	0
	Newport	6	8.0	1	16.7	1	16.7	1	16.7	1	16.7
	Saint Paul	4	5.3	1	25.0	0	0	0	0	0	0
	Other	23	30.7	5	21.7	5	21.7	2	8.7	0	0
	Not Serotyped	1	1.3	1	100.0	1	100.0	1	100.0	0	0
	Total	**75**	**100.0**	**26**	**34.7**	**24**	**32.0**	**16**	**21.3**	**4**	**5.3**
West Virginia	Enteritidis	4	17.4	0	0	0	0	0	0	0	0
	Typhimurium	4	17.4	1	25.0	1	25.0	1	25.0	0	0
	Heidelberg	3	13.0	1	33.3	1	33.3	1	33.3	0	0
	Newport	3	13.0	1	33.3	1	33.3	1	33.3	1	33.3
	Hadar	2	8.7	1	50.0	1	50.0	0	0	0	0
	Other	7	30.4	0	0	0	0	0	0	0	0
	Total	**23**	**100.0**	**4**	**17.4**	**4**	**17.4**	**3**	**13.0**	**1**	**4.3**

*Multidrug resistant to antimicrobial agents tested, 1996-2000: amoxicillin-clavulanic acid, ampicillin, apramycin, ceftiofur, ceftriaxone, cephalothin, chloramphenicol, ciprofloxacin, gentamicin, kanamycin, nalidixic acid, streptomycin, sulfamethoxazole, tetracycline, trimethoprim-sulfamethoxazole

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Table 10. *S*. Typhimurium isolates with at least ACSSuT*, ACKSSuT**, or AKSSuT*** resistance patterns, by site, 2000

Site	# non-Typhi *Salmonella* isolates tested	*Salmonella* Typhimurium N	%	ACSSuT Typhimurium N	%	ACKSSuT Typhimurium N	%	AKSSuT Typhimurium N	%
California	55	12	21.8	3	25.0	0	0	2	16.7
Colorado	66	17	25.8	4	23.5	0	0	2	11.8
Connecticut	47	10	21.3	5	50.0	1	10.0	1	10.0
Florida	60	12	20.0	3	25.0	0	0	0	0
Georgia	186	45	24.2	11	24.4	1	2.2	3	6.7
Kansas	36	13	36.1	2	15.4	2	15.4	3	23.1
Los Angeles	111	20	18.0	4	20.0	0	0	2	10.0
Maryland	55	8	14.5	3	37.5	0	0	0	0
Massachusetts	122	26	21.3	6	23.1	1	3.8	3	11.5
Minnesota	59	23	39.0	4	17.4	0	0	0	0
New Jersey	116	28	24.1	8	28.6	1	3.6	3	10.7
New York City	131	21	16.0	11	52.4	0	0	0	0
New York State	126	25	19.8	4	16.0	0	0	1	4.0
Oregon	34	5	14.7	2	40.0	0	0	0	0
Tennessee	76	11	14.5	6	54.4	1	9.1	2	18.2
Washington	75	23	30.7	7	30.4	1	4.3	6	26.1
West Virginia	23	4	17.4	1	25.0	0	0	0	0
Totals	**1378**	**303**	**22.0**	**84**	**27.7**	**8**	**2.6**	**28**	**9.2**

*ACSSuT=Ampicillin, Chloramphenicol, Streptomycin, Sulfamethoxazole, Tetracycline
**ACKSSuT=Ampicillin, Chloramphenicol, Kanamycin, Streptomycin, Sulfamethoxazole, Tetracycline
***AKSSuT= Ampicillin, Kanamycin, Streptomycin, Sulfamethoxazole, Tetracycline

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Table 11. Additional antimicrobial resistance for *S*. Typhimurium isolates with at least ACSSuT, ACKSSuT***, or AKSSuT**** resistance patterns, 2000**

Antimicrobial	ACSSuT (N=84)		ACKSSuT (N=8)		AKSSuT (N=28)	
	N	%	N	%	N	%
Amoxicillin-Clavulanic Acid	12	14.3	4	50.0	6	21.4
Apramycin	1	1.2	1	12.5	1	3.6
Cefoxitin	6	7.1	2	25.0	3	10.7
Ceftiofur	6	7.1	2	25.0	3	10.7
Ceftriaxone	2	2.4	1	12.5	2	7.1
Cephalothin	7	8.3	3	37.5	4	14.3
Chloramphenicol	*NA		*NA		8	28.6
Gentamicin	2	2.4	2	25.0	4	14.3
Kanamycin	8	9.5	*NA		*NA	
Nalidixic Acid	1	1.2	1	12.5	2	7.1
Trimethoprim-Sulfamethoxazole	5	5.9	2	25.0	4	14.3

*NA: Not Applicable
**ACSSuT=Ampicillin, Chloramphenicol, Streptomycin, Sulfamethoxazole, Tetracycline
***ACKSSuT=Ampicillin, Chloramphenicol, Kanamycin, Streptomycin, Sulfamethoxazole, Tetracycline
****AKSSuT=Ampicillin, Kanamycin, Streptomycin, Sulfamethoxazole, Tetracycline

Table 12. *S*. Newport isolates with at least ACSSuT*, ACKSSuT**, or AKSSuT*** resistance patterns, by site, 2000

Site	# non-Typhi *Salmonella* isolates tested	*Salmonella* Newport		ACSSuT Newport		ACKSSuT Newport		AKSSuT Newport	
		N	%	N	%	N	%	N	%
California	55	2	3.6	1	50.0	0	0	0	0
Colorado	66	5	7.6	2	40.0	0	0	0	0
Connecticut	47	3	6.4	2	66.7	0	0	0	0
Florida	60	13	21.7	0	0	0	0	0	0
Georgia	186	27	14.5	1	3.7	0	0	0	0
Kansas	36	6	16.7	4	66.7	3	50.0	3	50.0
Los Angeles	111	9	8.1	3	33.3	1	11.1	1	11.1
Maryland	55	3	5.4	0	0	0	0	0	0
Massachusetts	122	9	7.4	4	44.4	1	11.1	1	11.1
Minnesota	59	4	6.8	2	50.0	0	0	0	0
New Jersey	116	6	5.2	1	16.7	0	0	0	0
New York City	131	1	0.8	0	0	0	0	0	0
New York State	126	4	3.2	1	25.0	0	0	0	0
Oregon	34	3	8.8	0	0	0	0	0	0
Tennessee	76	20	26.3	5	25.0	1	5.0	1	5.0
Washington	75	6	8.0	1	16.7	0	0	0	0
West Virginia	23	3	13.0	1	33.3	0	0	0	0
Totals	**1378**	**124**	**9.0**	**28**	**22.6**	**6**	**4.8**	**6**	**4.8**

*ACSSuT=Ampicillin, Chloramphenicol, Streptomycin, Sulfamethoxazole, Tetracycline
**ACKSSuT=Ampicillin, Chloramphenicol, Kanamycin, Streptomycin, Sulfamethoxazole, Tetracycline
***AKSSuT= Ampicillin, Kanamycin, Streptomycin, Sulfamethoxazole, Tetracycline

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Table 13. Additional antimicrobial resistance for *S*. Newport isolates with at least ACSSuT**, ACKSSuT***, or AKSSuT**** resistance patterns, 2000

Antimicrobial	ACSSuT (N=28)		ACKSSuT (N=6)		AKSSuT (N=6)	
	N	%	N	%	N	%
Amoxicillin-Clavulanic Acid	27	96.4	6	100.0	6	100.0
Apramycin	0	0	0	0	0	0
Cefoxitin	27	96.4	6	100.0	6	100.0
Ceftiofur	27	96.4	6	100.0	6	100.0
Ceftriaxone	14	50.0	4	66.7	4	66.7
Cephalothin	27	96.4	6	100.0	6	100.0
Chloramphenicol	*NA		*NA		6	100.0
Gentamicin	3	10.7	1	16.7	1	16.7
Kanamycin	6	21.4	*NA		*NA	
Nalidixic Acid	0	0	0	0	0	0
Trimethoprim-Sulfamethoxazole	5	17.9	3	50.0	3	50.0

*NA: Not Applicable
**ACSSuT=Ampicillin, Chloramphenicol, Streptomycin, Sulfamethoxazole, Tetracycline
***ACKSSuT=Ampicillin, Chloramphenicol, Kanamycin, Streptomycin, Sulfamethoxazole, Tetracycline
****AKSSuT=Ampicillin, Kanamycin, Streptomycin, Sulfamethoxazole, Tetracycline

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Table 14. Clinical source of non-Typhi *Salmonella* isolates, 2000

	Blood		Stool		Other		Unknown		Total	
Isolate	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
S. Enteritidis	24	7.5	269	84.1	13	4.0	13	4.0	319	23.2
S. Typhimurium	17	5.6	265	87.5	14	4.6	7	2.3	303	22.0
S. Typhimurium -- ACSSuT	8	9.5	70	83.3	3	3.6	3	3.6	84	6.1
S. Typhimurium -- AKSSuT	2	7.1	25	89.2	1	3.6	0	0	28	2.0
All other *S.* Typhimurium	7	3.6	170	89.1	10	5.2	4	2.1	191	13.8
S. Newport	1	0.8	115	92.7	7	5.6	1	0.8	124	9.0
S. Newport -- ACSSuT	1	3.6	26	92.9	1	3.6	0	0	28	2.0
S. Newport -- AKSSuT	0	0	6	100	0	0	0	0	6	0.4
All other *S.* Newport	0	0	83	92.2	6	6.7	1	1.1	90	6.5
S. Heidelberg	15	19.0	51	64.6	11	13.9	2	2.5	79	5.7
S. Heidelberg -- ACSSuT	0	0	1	100	0	0	0	0	1	0.1
All other *S.* Heidelberg	15	19.2	50	64.1	11	14.1	2	2.6	78	5.6
S. Javiana	1	2.3	41	93.3	1	2.3	1	2.3	44	3.2
S. Thompson	2	5.7	29	82.9	2	5.7	2	5.7	35	2.5
S. Montevideo	1	3.2	26	83.9	2	6.5	2	6.5	31	2.2
S. Muenchen	0	0	24	88.9	2	7.4	1	3.7	27	2.0
S. St. Paul	1	3.8	24	92.3	1	3.8	0	0	26	1.9
S. Hadar	0	0	25	100	0	0	0	0	25	1.8
S. Oranienburg	3	12.0	19	76.0	3	12.0	0	0	25	1.8
S. Infantis	1	4.2	19	79.2	3	12.2	1	4.2	24	1.7
S. Braenderup	0	0	20	87.0	2	8.7	1	4.3	23	1.7
S. Agona	2	12.5	14	87.5	0	0	0	0	16	1.2
S. Agona -- ACSSuT	0	0	1	100	0	0	0	0	1	0.1
All other *S.* Agona	2	13.3	13	86.7	0	0	0	0	15	1.1

S. Java	0 0	12 92.3	1 7.7	0 0	13 0.9
S. Java -- ACSSuT	0 0		0 0	0 0	1 0.1
All other *S*. Java	0 0	1 100 11 91.7	1 8.3	0 0	12 0.8
Other *Salmonella*	20 7.6	216 81.8	23 8.7	5 1.9	264 19.1
Total	**88 6.4**	**1169 84.8**	**85 6.2**	**36 2.6**	**1378 100.0**

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Table 15. Proportion of non-Typhi *Salmonella*, submitted by site, with reduced susceptibility to ciprofloxacin (MIC $\geq$ 0.25 µg/ml), 2000

Site	# isolates with reduced susceptibility	# non-Typhi *Salmonella* isolates tested	% with reduced susceptibility	Serotype
California	1	55	1.8	Enteritidis (1)
Colorado	0	66	0	
Connecticut	0	47	0	
Florida	1	60	1.7	Senftenberg (1)*
Georgia	1	186	0.5	Senftenberg (1)*
Kansas	1	36	2.8	Typhimurium (1)
Los Angeles	5	111	4.5	Berta (3), Blockley (1), Virchow (1)
Maryland	1	55	1.8	Blockley (1)
Massachusetts	4	122	3.3	Paratyphi (2), Indiana (1)*, Typhimurium (1)
Minnesota	0	59	0	
New Jersey	0	116	0	
New York City	0	131	0	
New York State	1	126	0.8	Muenster (1)
Oregon	2	34	5.9	Schwarzengrund (2)*
Tennessee	0	76	0	
Washington	3	75	4.0	Schwarzengrund (1), Hadar (1), Virchow (1)
West Virginia	0	23	0	
Total	**20**	**1378**	**1.4**	**Berta (3), Schwarzengrund (3), Blockley (2), Paratyphi (2), Senftenberg (2), Typhimurium (2), Virchow (2), Enteritidis (1), Hadar (1), Indiana (1), Muenster (1)**

*These isolates were also resistant to ciprofloxacin.

Table 16. Proportion of non-Typhi *Salmonella*, submitted by site, with reduced susceptibility to ceftriaxone (MIC ≥ 16 μg/ml), 2000

Site	# isolates with reduced susceptibility	# non-Typhi *Salmonella* isolates tested	% with reduced susceptibility	Serotype
California	0	55	0	
Colorado	2	66	3.0	Newport (2)*
Connecticut	1	47	2.1	Newport (1)*
Florida	0	60	0	
Georgia	1	186	0.5	Newport (1)*
Kansas	5	36	13.9	Newport (3)*, Agona (1)*, Typhimurium (1)*
Los Angeles	2	111	1.8	Newport (1)*, Typhimurium (1)*
Maryland	0	55	0	
Massachusetts	2	122	1.6	Newport (2)*
Minnesota	1	59	1.7	Newport (1)*
New Jersey	0	116	0	
New York City	2	131	1.5	Typhimurium (2)
New York State	2	126	1.6	Newport (1)*, Typhimurium (1)
Oregon	0	34	0	
Tennessee	1	76	1.3	Newport (1)*
Washington	2	75	2.7	Newport (1), Typhimurium (1)*
West Virginia	1	23	4.3	Newport (1)*
Total	**22**	**1378**	**1.6**	**Newport (15), Typhimurium (6), Agona (1),**

*These isolates were also resistant to ceftriaxone.

Table 17. Frequency of *Shigella* species, 2000

Species	**N**	**%**
sonnei	367	81.4
flexneri	75	16.6
boydii	7	1.5
not identified	2	0.4
Total	**451**	**100.0**

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Table 18. Antimicrobial resistance of *Shigella* isolates, 2000

Antibiotic	All *Shigella* (N=451)		*Shigella sonnei* (N=367)		*Shigella flexneri* (N=75)		*Shigella boydii* (N=7)	
	# Resistant	% Resistant	# Resistant	% Resistant	# Resistant	% Resistant	# Resistant	% Resistant
Amikacin	1	0.2	1	0.3	0	0	0	0
Amoxicillin – Clavulanic Acid	10	2.2	7	1.9	3	4.0	0	0
Ampicillin	356	78.9	295	80.4	58	77.3	1	14.3
Apramycin	1	0.2	1	0.3	0	0	0	0
Cefoxitin	2	0.4	2	0.5	0	0	0	0
Ceftiofur	0	0	0	0	0	0	0	0
Ceftriaxone	0	0	0	0	0	0	0	0
Cephalothin	36	8.0	32	8.7	2	2.7	0	0
Chloramphenicol	63	14.0	10	2.7	52	69.3	1	14.3
Ciprofloxacin	0	0	0	0	0	0	0	0
Gentamicin	1	0.2	1	0.3	0	0	0	0
Kanamycin	6	1.3	6	1.6	0	0	0	0
Nalidixic Acid	5	1.1	5	1.4	0	0	0	0
Streptomycin	258	57.2	206	56.1	46	61.3	4	57.1
Sulfamethoxazole	252	55.9	206	56.1	40	53.3	4	57.1
Tetracycline	202	44.8	126	34.3	69	92.0	5	71.4
Trimethoprim - Sulfamethoxazole	239	53.0	202	55.0	32	42.7	3	42.9

Table 19. Frequency of *Campylobacter* species, 2000

Species	**N**	**%**
jejuni	306	94.4
coli	12	3.7
upsaliensis	3	0.9
fetus	2	0.6
lari	1	0.3
Total	**324**	**100.0**

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Table 20. Antimicrobial resistance of *Campylobacter* isolates, 2000

Antibiotic	All *Campylobacter* (N=324)		*Campylobacter jejuni* (N=306)		*Campylobacter coli* (N=12)	
	# Resistant	% Resistant	# Resistant	% Resistant	# Resistant	% Resistant
Azithromycin	7	2.2	6	2.0	1	8.3
Chloramphenicol	0	0	0	0	0	0
Ciprofloxacin	46	14.2	43	14.0	3	25.0
Clindamycin	4	1.2	3	1.0	1	8.3
Erythromycin	5	1.5	4	1.3	1	8.3
Gentamicin	1	0.3	0	0	1	8.3
Nalidixic Acid	54	16.7	49	16.0	3	25.0
Tetracycline	122	37.6	118	38.6	3	25.0

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Table 21a. Antimicrobial resistance of *Campylobacter jejuni* isolates, by site, 2000

Site	Antibiotic	*Campylobacter jejuni* (N=306)	
		#Resistant	% Resistant within state
California (N=41)	Azithromycin	0	0
	Chloramphenicol	0	0
	Ciprofloxacin	7	17.1
	Clindamycin	0	0
	Erythromycin	0	0
	Gentamicin	0	0
	Nalidixic Acid	7	17.1
	Tetracycline	13	31.7
Colorado (N=28)	Azithromycin	0	0
	Chloramphenicol	0	0
	Ciprofloxacin	0	0
	Clindamycin	0	0
	Erythromycin	0	0
	Gentamicin	0	0
	Nalidixic Acid	0	0
	Tetracycline	8	28.6
Connecticut (N=45)	Azithromycin	2	4.4
	Chloramphenicol	0	0
	Ciprofloxacin	4	8.9
	Clindamycin	0	0
	Erythromycin	1	2.2
	Gentamicin	0	0
	Nalidixic Acid	5	11.1
	Tetracycline	17	37.8

Table 21b. Antimicrobial resistance of *Campylobacter jejuni* isolates, by site, 2000

Site	Antibiotic	*Campylobacter jejuni* (N=306)	
		#Resistant	% Resistant within state
Georgia (N=47)	Azithromycin	2	4.3
	Chloramphenicol	0	0
	Ciprofloxacin	10	21.3
	Clindamycin	2	4.3
	Erythromycin	2	4.3
	Gentamicin	0	0
	Nalidixic Acid	11	23.4
	Tetracycline	21	44.7
Maryland (N=2)	Azithromycin	0	0
	Chloramphenicol	0	0
	Ciprofloxacin	1	50.0
	Clindamycin	0	0
	Erythromycin	0	0
	Gentamicin	0	0
	Nalidixic Acid	1	50.0
	Tetracycline	2	100.0
Minnesota (N=49)	Azithromycin	2	4.1
	Chloramphenicol	0	0
	Ciprofloxacin	12	24.5
	Clindamycin	1	2.0
	Erythromycin	1	2.0
	Gentamicin	0	0
	Nalidixic Acid	13	26.5
	Tetracycline	25	51.0

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Table 21c. Antimicrobial resistance of *Campylobacter jejuni* isolates, by site, 2000

Site	Antibiotic	*Campylobacter jejuni* (N=306)	
		#Resistant	% Resistant within state
New York State (N=46)	Azithromycin	0	0
	Chloramphenicol	0	0
	Ciprofloxacin	3	6.5
	Clindamycin	0	0
	Erythromycin	0	0
	Gentamicin	0	0
	Nalidixic Acid	4	8.7
	Tetracycline	17	37.0
Oregon (N=25)	Azithromycin	0	0
	Chloramphenicol	0	0
	Ciprofloxacin	5	20.0
	Clindamycin	0	0
	Erythromycin	0	0
	Gentamicin	0	0
	Nalidixic Acid	6	24.0
	Tetracycline	8	32.0
Tennessee (N=23)	Azithromycin	0	0
	Chloramphenicol	0	0
	Ciprofloxacin	1	4.3
	Clindamycin	0	0
	Erythromycin	0	0
	Gentamicin	0	0
	Nalidixic Acid	2	8.7
	Tetracycline	6	26.1

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Table 22. Frequency of Resistance and Multidrug* Resistance Among *Salmonella* Typhi, *Shigella*, *E. coli* O157, and *Campylobacter* isolates, 2000

Isolate	Total		Number resistant to ≥ 1 antimicrobial		Number resistant to ≥ 2 antimicrobials		Number resistant to ≥ 5 antimicrobials		Number resistant to ≥ 8 antimicrobials	
	N	%	N	%	N	%	N	%	N	%
Salmonella Typhi	177	100.0	50	28.2	21	11.9	18	10.2	2	1.1
Shigella	451	100.0	418	92.7	302	67.0	122	27.0	0	0
sonnei	367	81.4	339	92.4	233	63.5	90	24.5	0	0
flexneri	75	16.6	72	96.0	62	82.7	30	40.0	0	0
E. coli O157	407	100.0	40	9.8	27	6.6	7	1.7	4	1.0
Campylobacter	324	100.0	155	47.8	51	15.7	3	0.9	0	0
jejuni	306	94.4	149	48.7	47	15.3	2	0.6	0	0
coli	12	3.7	4	33.3	3	25.0	1	8.3	0	0

***Multidrug resistance for *Salmonella*, *Shigella*, *E. coli* O157 to antimicrobials tested 1996-2000: amoxicillin-clavulanic acid, ampicillin, apramycin, ceftiofur, ceftriaxone, cephalothin, chloramphenicol, ciprofloxacin, gentamicin, kanamycin, nalidixic acid, streptomycin, sulfamethoxazole, tetracycline, trimethoprim-sulfamethoxazole; Multidrug resistance for *Campylobacter* to antimicrobials tested 1997-2000**

Table 23a. Summary: Antimicrobial resistance of *Salmonella* isolates, 1996-2000

Salmonella, Non-Typhi	1996	1997	1998	1999	2000
Salmonella isolates	1326	1301	1466	1499	1378
Isolates resistant to ≥ 1 antimicrobial agents*	37% (493)	34% (443)	27% (397)	26% (390)	26% (353)
Isolates resistant to ≥ 2 antimicrobial agents*	31% (404)	27% (345)	24% (346)	21% (317)	21% (284)
Isolates resistant to ≥ 5 antimicrobial agents*	12% (163)	14% (182)	14% (207)	12% (176)	12% (165)
Isolates resistant to ≥ 8 antimicrobial agents*	0.3% (4)	1.2% (16)	1.5% (22)	2% (31)	3% (41)
Serotyped *Salmonella*	93% (1231)	93% (1215)	96% (1411)	97% (1461)	97% (1332)
Serotyped *Salmonella* which are Enteritidis	29% (357)	25% (301)	17% (245)	18% (269)	24% (319)
S. Enteritidis isolates resistant to ≥ 1 antimicrobial agents*	31% (110)	26% (78)	12% (30)	16% (44)	11% (35)
Serotyped *Salmonella* which are Typhimurium**	25% (306)	27% (326)	27% (380)	25% (362)	23% (303)
S. Typhimurium isolates resistant to ≥ 1 antimicrobial agents*	64% (196)	62% (202)	53% (200)	49% (179)	50% (153)
S. Typhimurium with at least ACSSuT resistance pattern	34% (103)	35% (115)	32% (120)	28% (102)	28% (84)
Salmonella isolates that were at least Typhimurium ACSSuT	8% (103)	9% (115)	8% (120)	7% (102)	6% (84)
S. Typhimurium with at least AKSSuT resistance pattern	9% (27)	13% (41)	12% (46)	11% (39)	9% (28)
Salmonella isolates that were at least Typhimurium AKSSuT	2% (27)	3% (41)	3% (46)	3% (39)	2% (28)
S. Typhimurium with at least ACKSSuT resistance pattern	4% (13)	3% (9)	4% (17)	3% (12)	3% (8)

* Using only antimicrobial agents (n=15) tested in all five years

** Includes *S*. Typhimurium and *S*. Typhimurium variant Copenhagen

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Table 23a. Summary: Antimicrobial resistance of *Salmonella* isolates, 1996-2000

Salmonella, Non-Typhi	1996	1997	1998	1999	2000
Salmonella isolates that were at least Typhimurium ACKSSuT	1.0% (13)	0.7% (9)	1.2% (17)	0.8% (12)	0.6% (8)
S. Typhimurium isolates with at least ACSSuT or AKSSuT	42% (130)	48% (156)	44% (166)	39% (141)	37% (112)
Serotyped *Salmonella* which are Newport	4% (51)	4% (48)	5% (78)	7% (99)	9% (124)
S. Newport isolates resistant to ≥ 1 antimicrobial agents*	18% (9)	12% (6)	5% (4)	24% (23)	24% (30)
S. Newport with at least ACSSuT resistance pattern	6% (3)	4% (2)	1.3% (1)	17% (17)	23% (28)
Salmonella isolates that were at least Newport ACSSuT	0.2% (3)	0.2% (2)	0.1% (1)	1.2% (17)	2% (28)
S. Newport with at least AKSSuT resistance pattern	2% (1)	0% (0)	0% (0)	1.0% (1)	5% (6)
Salmonella isolates that were at least Newport AKSSuT	0.1% (1)	0% (0)	0% (0)	0.1% (1)	0.4% (6)
S. Newport with at least ACKSSuT resistance pattern	2% (1)	0% (0)	0% (0)	1.0% (1)	5% (6)
Salmonella isolates that were at least Newport ACKSSuT	0.1% (1)	0% (0)	0% (0)	0.1% (1)	0.4% (6)
S. Newport isolates with at least ACSSuT or AKSSuT ACKSSuT	8% (4)	4% (2)	1.3% (1)	18% (18)	27% (34)
Ciprofloxacin (MIC ≥ 0.25)	0.4% (5)	0.5% (7)	0.7% (10)	1.0% (15)	1.4% (20)
Ciprofloxacin (MIC ≥ 4)	0% (0)	0% (0)	0.1% (1)	0.1% (1)	0.4% (5)
Ceftriaxone (MIC ≥ 16) (Sensititre)	0.1% (1)	0.4% (5)	0.7% (10)	1.9% (28)	1.6% (22)
Ceftriaxone (MIC ≥ 64) (E-test)	0.1% (1)	0.4% (5)	0.7% (10)	1.9% (28)	1.3% (18)
Nalidixic Acid (MIC ≥ 32)	0.4% (5)	0.8% (11)	1.4% (20)	1.1% (16)	2% (34)

* Using only antimicrobial agents (n=15) tested in all five years

** Includes *S.* Typhimurium and *S.* Typhimurium variant Copenhagen

Table 23a. Summary: Antimicrobial resistance of *Salmonella* isolates, 1996-2000

Salmonella, Non-Typhi	1996	1997	1998	1999	2000
Amikacin (MIC ≥ 64)	Not Tested	0% (0)	0% (0)	0% (0)	0% (0)
Amoxicillin-Clavulanic Acid (MIC ≥ 32)	1.5% (20)	1.5% (19)	1.6% (24)	2% (36)	4% (54)
Ampicillin (MIC ≥ 32)	21% (279)	18% (241)	16% (241)	16% (234)	16% (219)
Apramycin (MIC ≥ 64)	0% (0)	0% (0)	0% (0)	0.3% (5)	0.1% (2)
Ceftiofur (MIC ≥ 8)	4% (53)	3% (44)	0.9% (14)	2% (31)	3% (44)
Cephalothin (MIC ≥ 32)	3% (47)	3% (43)	2% (33)	4% (55)	4% (54)
Chloramphenicol (MIC ≥ 32)	11% (141)	10% (131)	10% (145)	9% (138)	10% (138)
Gentamicin (MIC ≥ 16)	5% (64)	3% (38)	3% (42)	2% (34)	3% (37)
Kanamycin (MIC ≥ 64)	5% (65)	5% (66)	6% (84)	4% (66)	6% (77)
Streptomycin (MIC ≥ 64)	21% (275)	22% (282)	19% (273)	17% (254)	16% (223)
Sulfamethoxazole (MIC ≥ 512)	23% (305)	25% (328)	19% (283)	18% (272)	17% (235)
Tetracycline (MIC ≥ 16)	24% (321)	22% (283)	20% (295)	19% (292)	19% (256)
Trimethoprim-Sulfamethoxazole (MIC ≥ 4/76)	4% (51)	1.8% (24)	2% (34)	2% (31)	2% (29)

* Using only antimicrobial agents (n=15) tested in all five years

** Includes *S*. Typhimurium and *S*. Typhimurium variant Copenhagen

Table 23b. Summary: Antimicrobial resistance of *E. coli* O157 isolates, 1996-2000

E. coli O157	1996	1997	1998	1999	2000
E. coli O157 isolates	201	161	313	292	407
Isolates resistant to ≥ 1 antimicrobial agents*	21% (42)	12% (20)	7% (23)	10% (30)	10% (40)
Isolates resistant to ≥ 2 antimicrobial agents*	8% (15)	7% (11)	5% (17)	4% (12)	7% (27)
Amikacin (MIC ≥ 64)	Not Tested	0% (0)	0% (0)	0% (0)	0% (0)
Amoxicillin-Clavulanic Acid (MIC ≥ 32)	0% (0)	0% (0)	0% (0)	0.3% (1)	1.0% (4)
Ampicillin (MIC ≥ 32)	1.5% (3)	0% (0)	3% (8)	1.4% (4)	3% (11)
Apramycin (MIC ≥ 64)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)
Ceftiofur (MIC ≥ 8)	5% (10)	0% (0)	0% (0)	0% (0)	1.0% (4)
Ceftriaxone (MIC ≥ 16) (Sensititre)	0% (0)	0% (0)	0% (0)	0% (0)	0.2% (1)
Ceftriaxone (MIC ≥ 64) (E-test)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)
Cephalothin (MIC ≥ 32)	3% (6)	4% (6)	0% (0)	0.7% (2)	1.2% (5)
Chloramphenicol (MIC ≥ 32)	0.5% (1)	0% (0)	0.3% (1)	0% (0)	4% (15)
Ciprofloxacin (MIC ≥ 4)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)
Gentamicin (MIC ≥ 16)	0% (0)	0% (0)	0% (0)	0.3% (1)	0.5% (2)
Kanamycin (MIC ≥ 64)	0% (0)	0% (0)	0.3% (1)	0.7% (2)	1.0% (4)
Nalidixic Acid (MIC ≥ 32)	0% (0)	0% (0)	0% (0)	0.7% (2)	0.5% (2)
Streptomycin (MIC ≥ 64)	2% (4)	2% (4)	1.9% (6)	3% (8)	5% (21)
Sulfamethoxazole (MIC ≥ 512)	14% (28)	11% (17)	6% (18)	8% (24)	6% (24)
Tetracycline (MIC ≥ 16)	5% (10)	3% (5)	4% (14)	3% (10)	7% (29)
Trimethoprim-Sulfamethoxazole (MIC ≥ 4/76)	0% (0)	0% (0)	0.6% (2)	1.4% (4)	0.7% (3)

* Using only antimicrobial agents (n=15) tested in all five years

Table 23c. Summary: Antimicrobial resistance of *Campylobacter* isolates, 1997-2000

Campylobacter	1997	1998	1999	2000
Campylobacter jejuni isolates	209	330	295	306
Isolates resistant to ≥ 1 antimicrobial agents***	59% (124)	55% (181)	54% (158)	49% (149)
Isolates resistant to ≥ 2 antimicrobial agents***	26% (55)	16% (54)	19% (57)	15% (47)
Ciprofloxacin (MIC ≥ 0.25)	38% (79)	22% (74)	22% (64)	20% (60)
Ciprofloxacin (MIC ≥ 4)	13% (27)	13% (44)	18% (52)	14% (43)
Nalidixic Acid (MIC ≥ 32)	23% (49)	15% (50)	20% (59)	16% (49)
Erythromycin (MIC ≥ 8)	8% (16)	3% (9)	2% (6)	1.3% (4)
Azithromycin (MIC ≥ 2)	Not Tested	1.8% (6)	3% (8)	2% (6)
Chloramphenicol (MIC ≥ 32)	6% (12)	0.6% (2)	0.3% (1)	0% (0)
Clindamycin (MIC ≥ 4)	6% (12)	0.9% (3)	1.0% (3)	1.0% (3)
Gentamicin(MIC ≥ 16)	Not Tested	0% (0)	0% (0)	0% (0)
Tetracycline(MIC ≥ 16)	48% (100)	46% (153)	46% (135)	39% (118)

*** Using only *Campylobacter* antimicrobial agents (n=6) tested in all four years

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Table 23c. Summary: Antimicrobial resistance of *Campylobacter* isolates, 1997-2000

Campylobacter	1997	1998	1999	2000
Campylobacter coli isolates	4	9	20	12
Isolates resistant to ≥ 1 antimicrobial agents***	75% (3)	55% (5)	50% (10)	33% (4)
Isolates resistant to ≥ 2 antimicrobial agents***	25% (1)	33% (3)	35% (7)	25% (3)
Ciprofloxacin (MIC ≥ 0.25)	50% (2)	44% (4)	35% (7)	25% (3)
Ciprofloxacin (MIC ≥ 4)	0% (0)	11% (1)	30% (6)	25% (3)
Nalidixic Acid (MIC ≥ 32)	25% (1)	55% (5)	30% (6)	25% (3)
Erythromycin (MIC ≥ 8)	0% (0)	11% (1)	10% (2)	8% (1)
Azithromycin (MIC ≥ 2)	Not Tested	11% (1)	10% (2)	8% (1)
Chloramphenicol (MIC ≥ 32)	25% (1)	22% (2)	0% (0)	0% (0)
Clindamycin (MIC ≥ 4)	0% (0)	11% (1)	10% (2)	8% (1)
Gentamicin (MIC ≥ 16)	Not Tested	0% (0)	0% (0)	8% (1)
Tetracycline (MIC ≥ 16)	75% (3)	44% (4)	30% (6)	25% (3)

*** Using only *Campylobacter* antimicrobial agents (n=6) tested in all four years

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Table 24a. Summary: Multidrug* resistance of non-Typhi *Salmonella* isolates, 1996-2000

Non-Typhi *Salmonella*

Year	# isolates tested	Number resistant to ≥ 1 antimicrobial		Number resistant to ≥ 2 antimicrobials		Number resistant to ≥ 5 antimicrobials		Resistant to at least ACSSuT**		Resistant to at least AKSSuT**		Resistant to ceftriaxone (MIC≥64 µg/ml)		Decreased susceptibility to ciprofloxacin (MIC≥.25 µg/ml)	
		N	%	N	%	N	%	N	%	N	%	N	%	N	%
1996	1326	493	37	404	31	163	12	117	9	31	2	1	0.07	5	0.4
1997	1301	443	34	345	27	182	14	125	10	46	4	5	0.4	7	0.5
1998	1466	397	27	346	24	207	14	130	9	50	3	10	0.7	10	0.7
1999	1499	390	26	317	21	176	12	125	8	44	3	28	1.9	15	1.0
2000	1378	353	26	284	21	165	12	122	9	44	3	18	1.3	20	1.4

Salmonella Enteritidis

Year	# isolates tested	Number resistant to ≥ 1 antimicrobial		Number resistant to ≥ 2 antimicrobials		Number resistant to ≥ 5 antimicrobials		Resistant to at least ACSSuT**		Resistant to at least AKSSuT**		Resistant to ceftriaxone (MIC≥64 µg/ml)		Decreased susceptibility to ciprofloxacin (MIC≥.25 µg/ml)	
		N	%	N	%	N	%	N	%	N	%	N	%	N	%
1996	357	110	31	84	23	13	4	1	0.3	0	0	0	0	3	0.8
1997	301	78	26	37	12	17	6	1	0.3	1	0.3	0	0	2	0.7
1998	245	30	12	16	7	0	0	0	0	0	0	0	0	2	0.8
1999	269	44	16	26	10	2	0.7	2	0.7	0	0	1	0.4	6	2.2
2000	319	35	11	9	3	0	0	0	0	0	0	0	0	1	0.3

* Using only antimicrobial agents (n=15) tested in all five years
**ACSSuT=Ampicillin, Chloramphenicol, Streptomycin, Sulfamethoxazole, and Tetracycline; AKSSuT= Ampicillin, Kanamycin, Streptomycin, Sulfamethoxazole, and Tetracycline

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Table 24b. Summary: Multidrug* resistance of non-Typhi *Salmonella* isolates, 1996-2000

Salmonella Typhimurium

Year	# isolates tested	Number resistant to ≥ 1 antimicrobial		Number resistant to ≥ 2 antimicrobials		Number resistant to ≥ 5 antimicrobials		Resistant to at least ACSSuT**		Resistant to at least AKSSuT**		Resistant to ceftriaxone (MIC≥64 µg/ml)		Decreased susceptibility to ciprofloxacin (MIC≥.25 µg/ml)	
		N	%	N	%	N	%	N	%	N	%	N	%	N	%
1996	306	196	64	177	58	125	41	103	34	27	9	0	0	1	0.3
1997	326	202	62	188	58	154	47	115	35	41	13	5	1.5	1	0.3
1998	380	200	53	193	51	159	42	120	32	46	12	7	1.8	1	0.3
1999	362	179	49	166	46	129	36	102	28	39	11	6	1.7	1	0.3
2000	303	153	50	143	47	108	36	84	28	28	9	3	0.9	2	0.7

Salmonella Newport

Year	# isolates tested	Number resistant to ≥ 1 antimicrobial		Number resistant to ≥ 2 antimicrobials		Number resistant to ≥ 5 antimicrobials		Resistant to at least ACSSuT**		Resistant to at least AKSSuT**		Resistant to Ceftriaxone (MIC≥64 µg/ml)		Decreased susceptibility to Ciprofloxacin (MIC≥.25 µg/ml)	
		N	%	N	%	N	%	N	%	N	%	N	%	N	%
1996	51	9	18	4	8	3	6	3	6	1	2	0	0	0	0
1997	48	6	12	3	6	2	4	2	4	0	0	0	0	0	0
1998	78	4	5	2	3	2	3	1	1.3	0	0	1	1.3	0	0
1999	99	23	24	17	17	17	17	17	17	1	1.0	17	17	0	0
2000	124	30	24	28	23	28	23	28	23	6	5	14	11	0	0

* Using only antimicrobial agents (n=15) tested in all five years
**ACSSuT=Ampicillin, Chloramphenicol, Streptomycin, Sulfamethoxazole, and Tetracycline; AKSSuT= Ampicillin, Kanamycin, Streptomycin, Sulfamethoxazole, and Tetracycline

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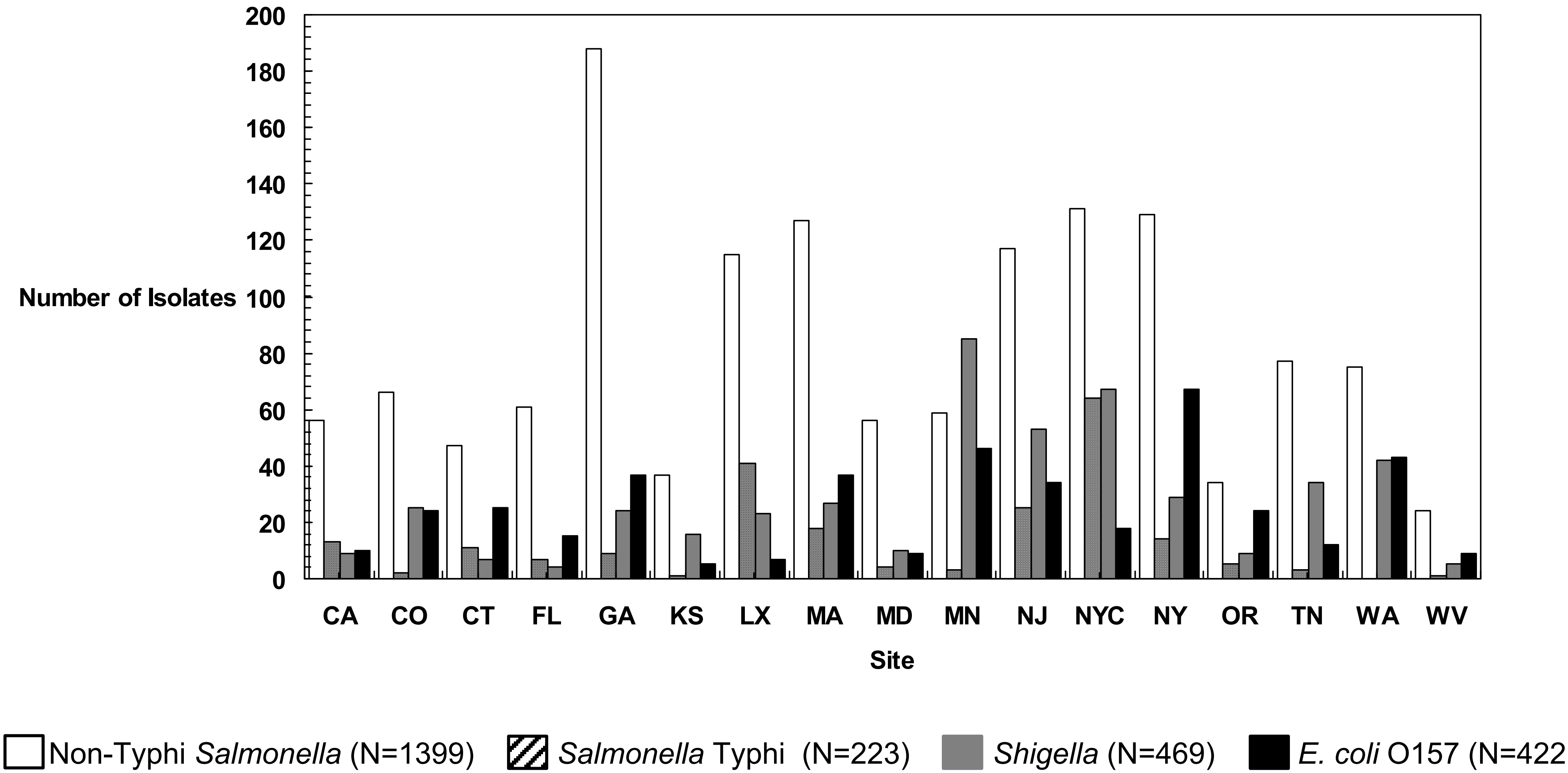
Figure 1. Number of isolates submitted, by site, 2000



CA=Alameda, Contra Costa, and San Francisco counties

LX=Los Angeles County

NX=excluding New York City

NYC=New York City

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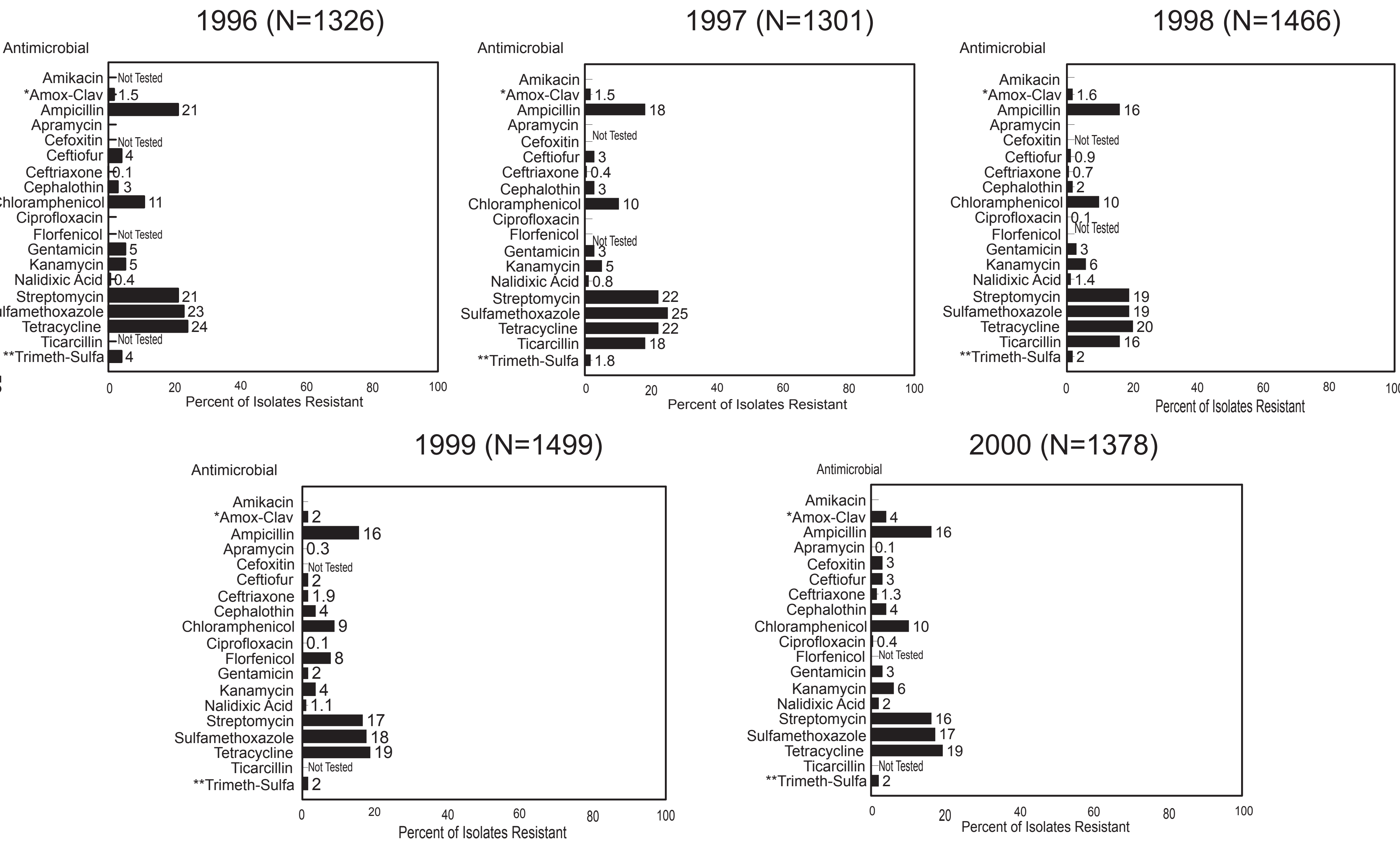
Figure 2. Resistance among non-Typhi *Salmonella* isolates, 1996-2000



*Amox-Clav=Amoxicillin-Clavulanic Acid **Trimeth-Sulfa=Trimethoprim-Sulfamethoxazole

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Figure 3a. MICs for amikacin among non-Typhi *Salmonella* isolates, 1996 - 2000

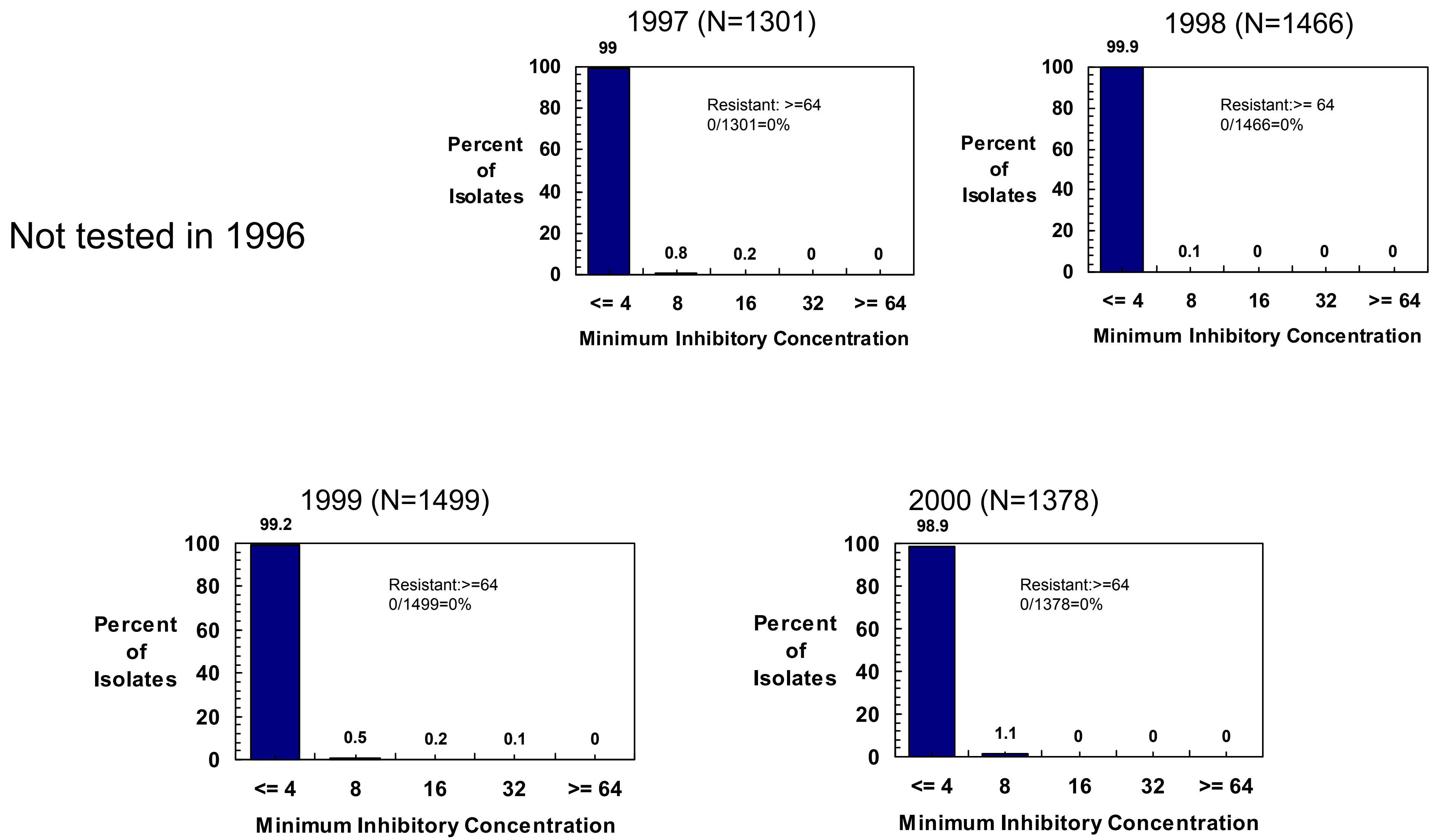

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Figure 3b. MICs for amoxicillin-clavulanic acid among non-Typhi *Salmonella* isolates, 1996 - 2000

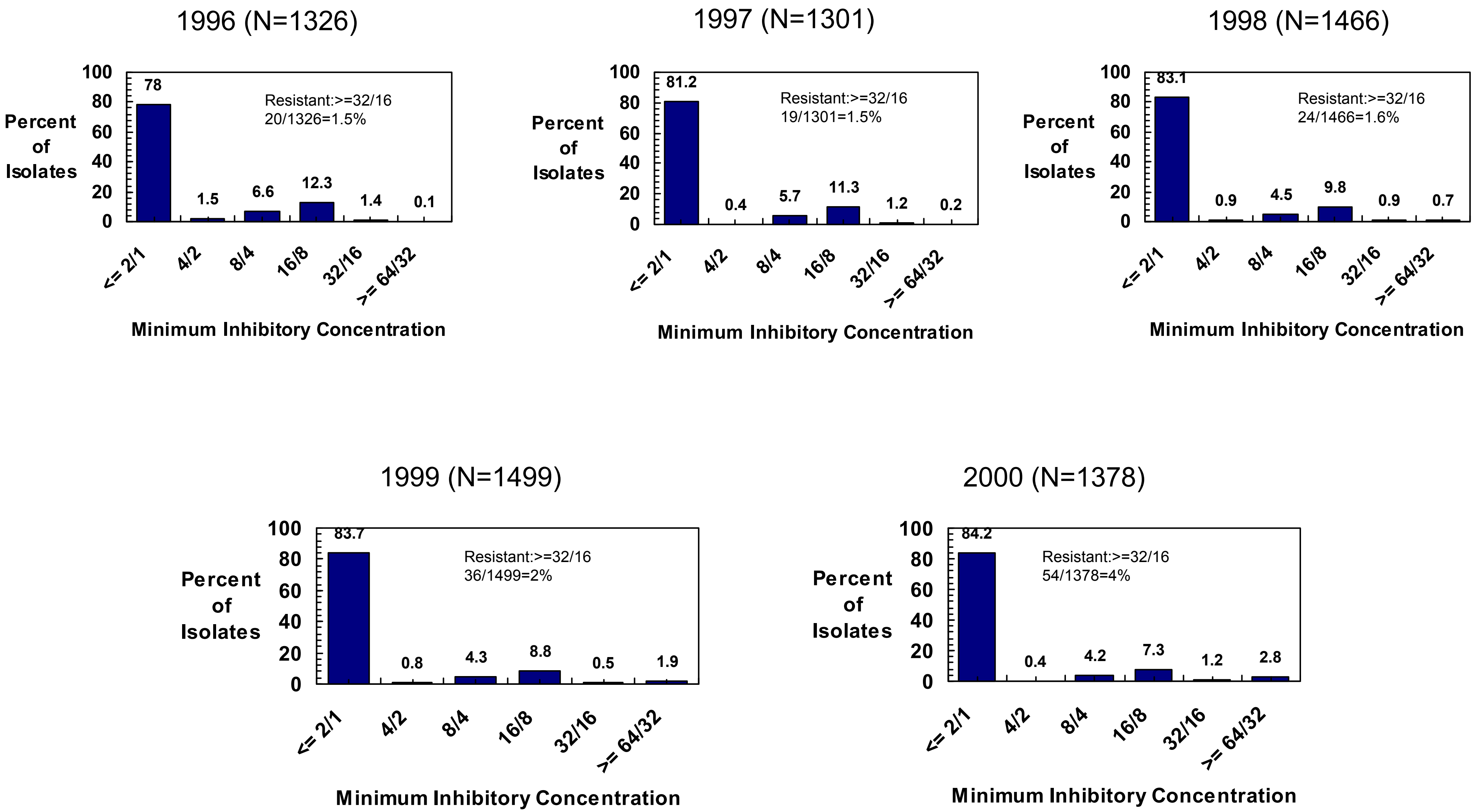

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Figure 3c. MICs for ampicillin among non-Typhi *Salmonella* isolates, 1996 - 2000

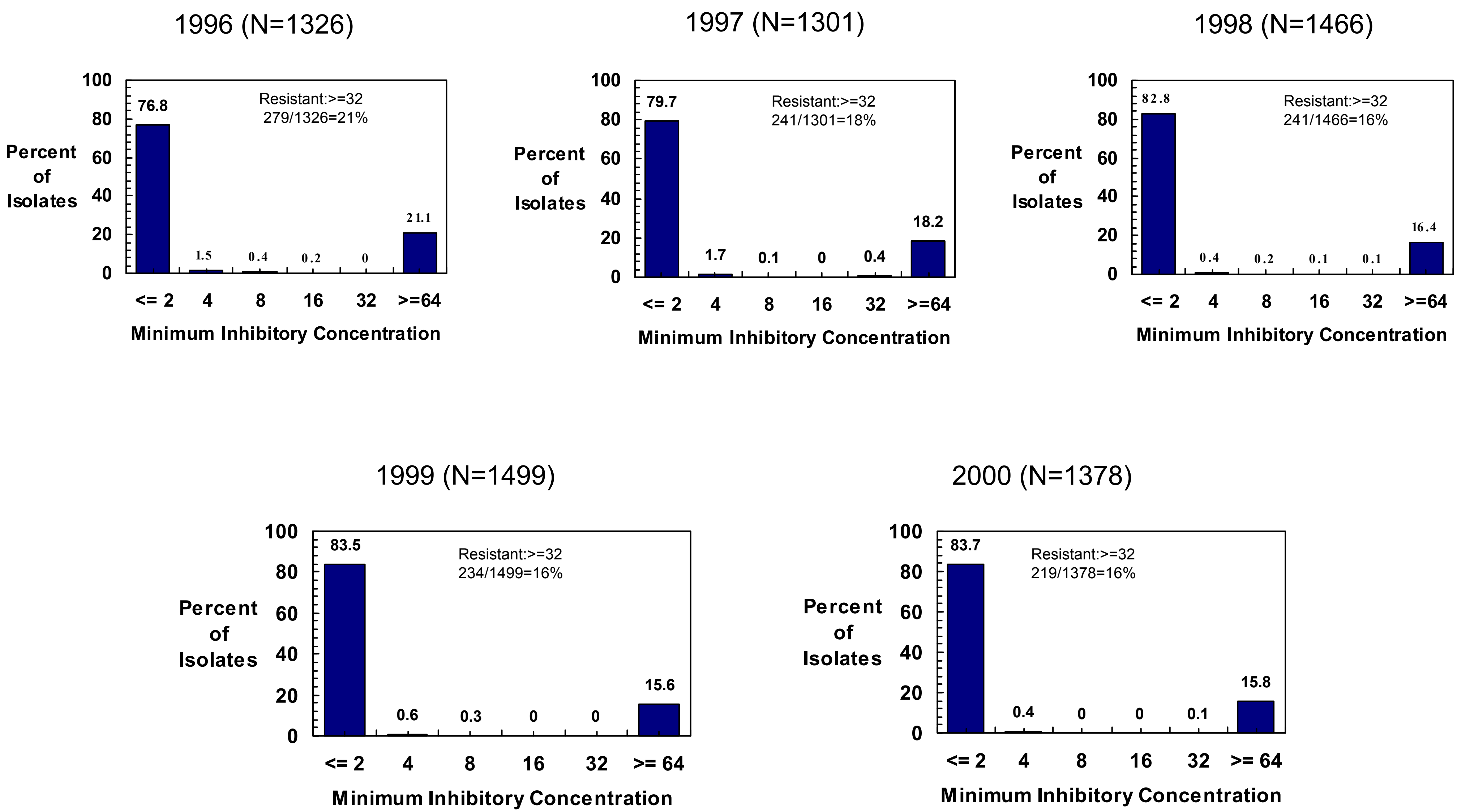

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Figure 3d. MICs for apramycin among non-Typhi *Salmonella* isolates, 1996 - 2000

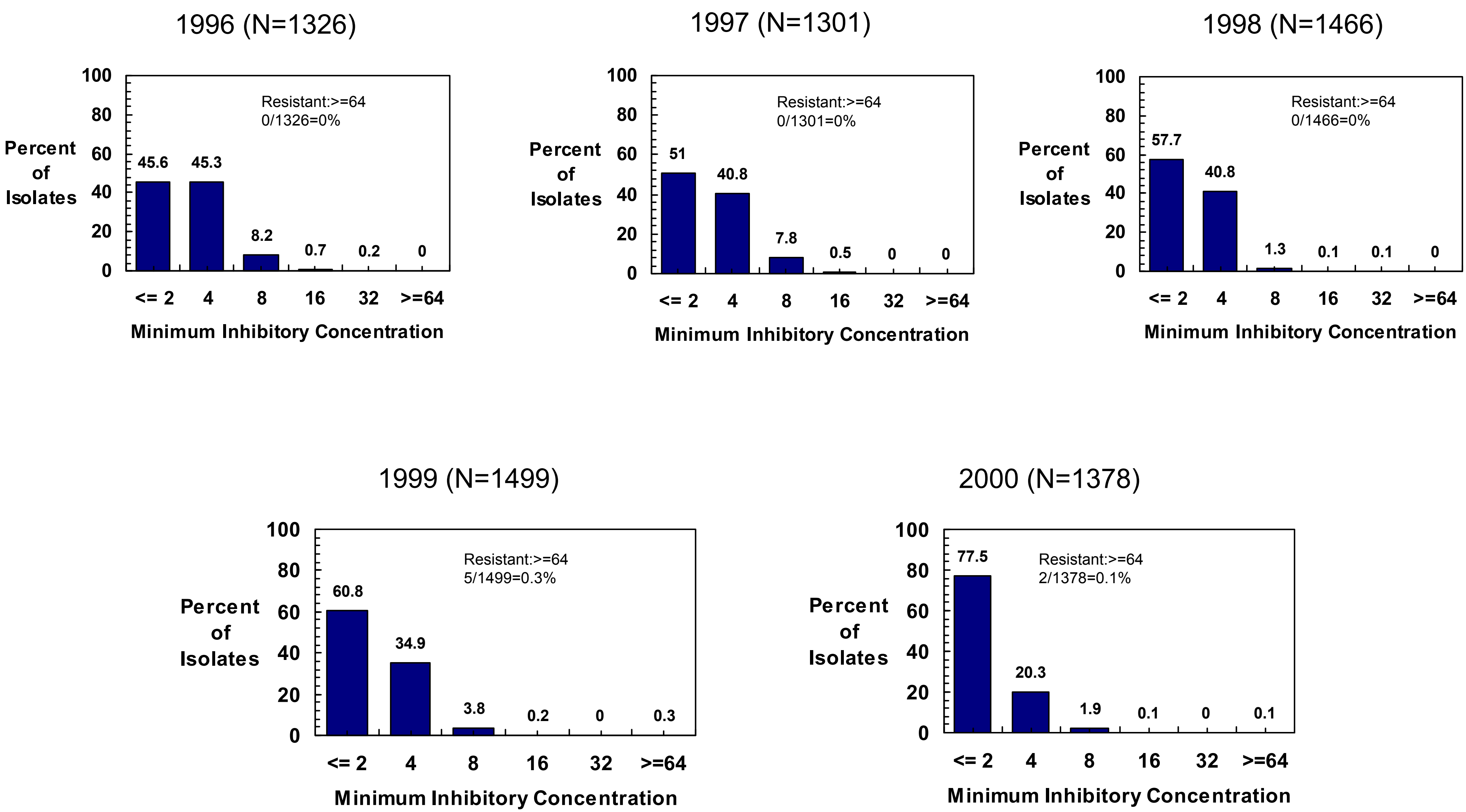

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Figure 3e. MICs for cefoxitin among non-Typhi *Salmonella* isolates, 1996 - 2000

Not tested in 1996 - 1999

2000 (N=1378)

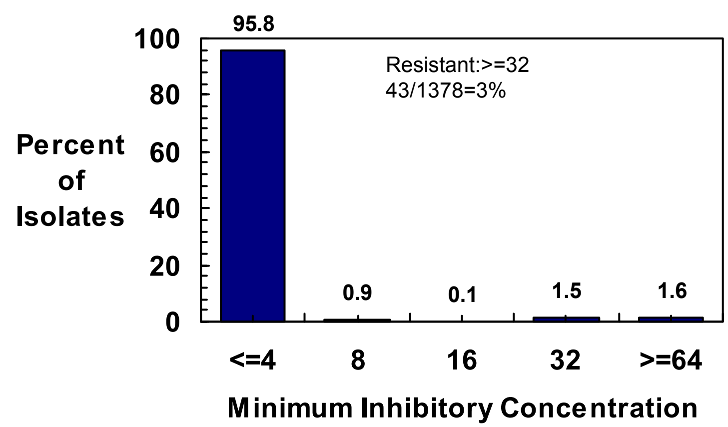

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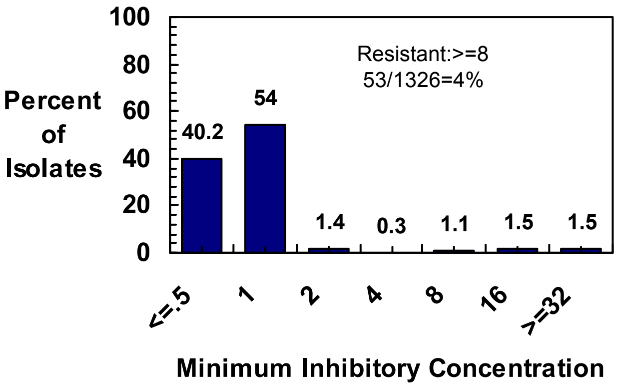
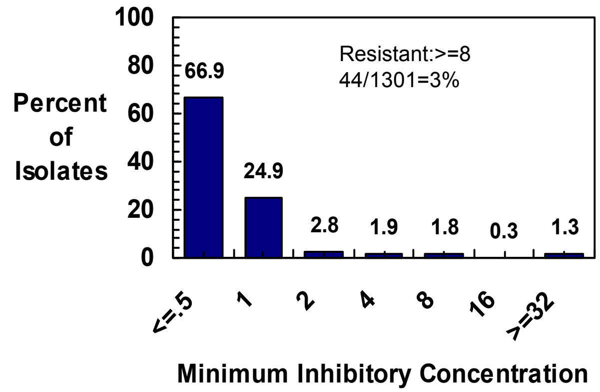
Figure 3f. MICs for ceftiofur among non-Typhi *Salmonella* isolates, 1996 - 2000

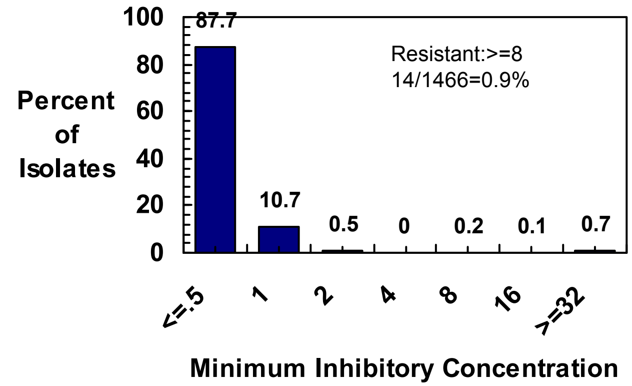
1996 (N=1326)



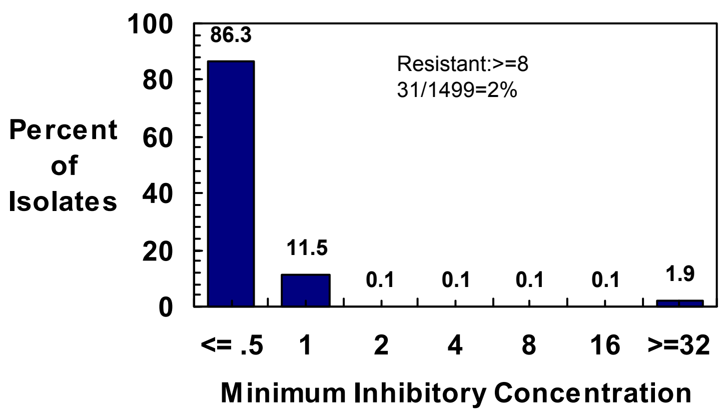
1997 (N=1301)



1998 (N=1466)



1999 (N=1499)



2000 (N=1378)

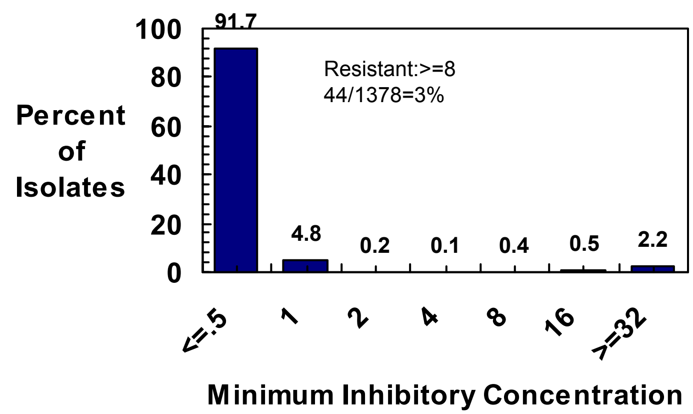


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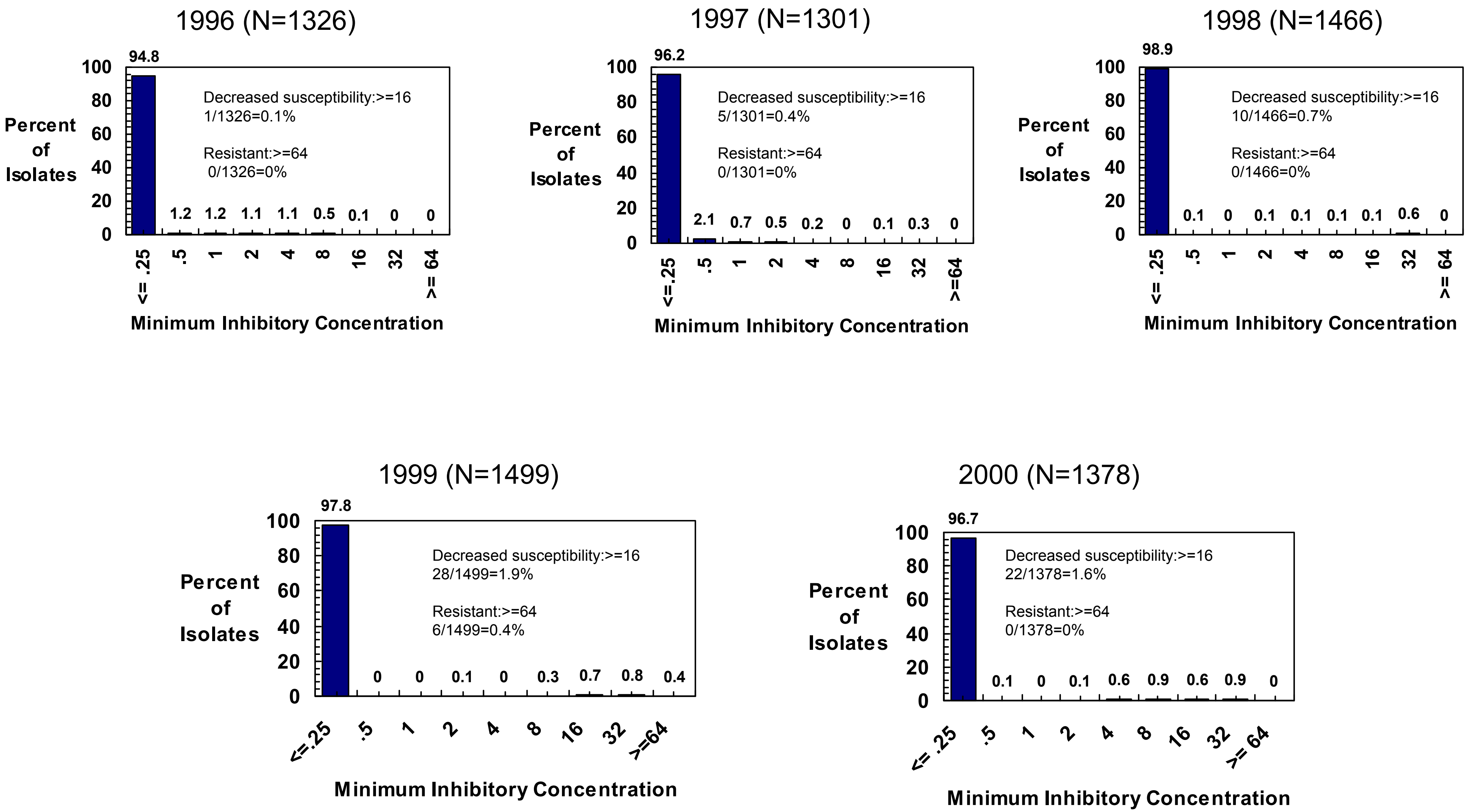
Figure 3g. MICs for ceftriaxone* among non-Typhi *Salmonella* isolates, 1996 - 2000



* Sensititre results only, isolates with decreased susceptibility are also tested by E-test

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Figure 3h. MICs for cephalothin among non-Typhi *Salmonella* isolates, 1996 - 2000

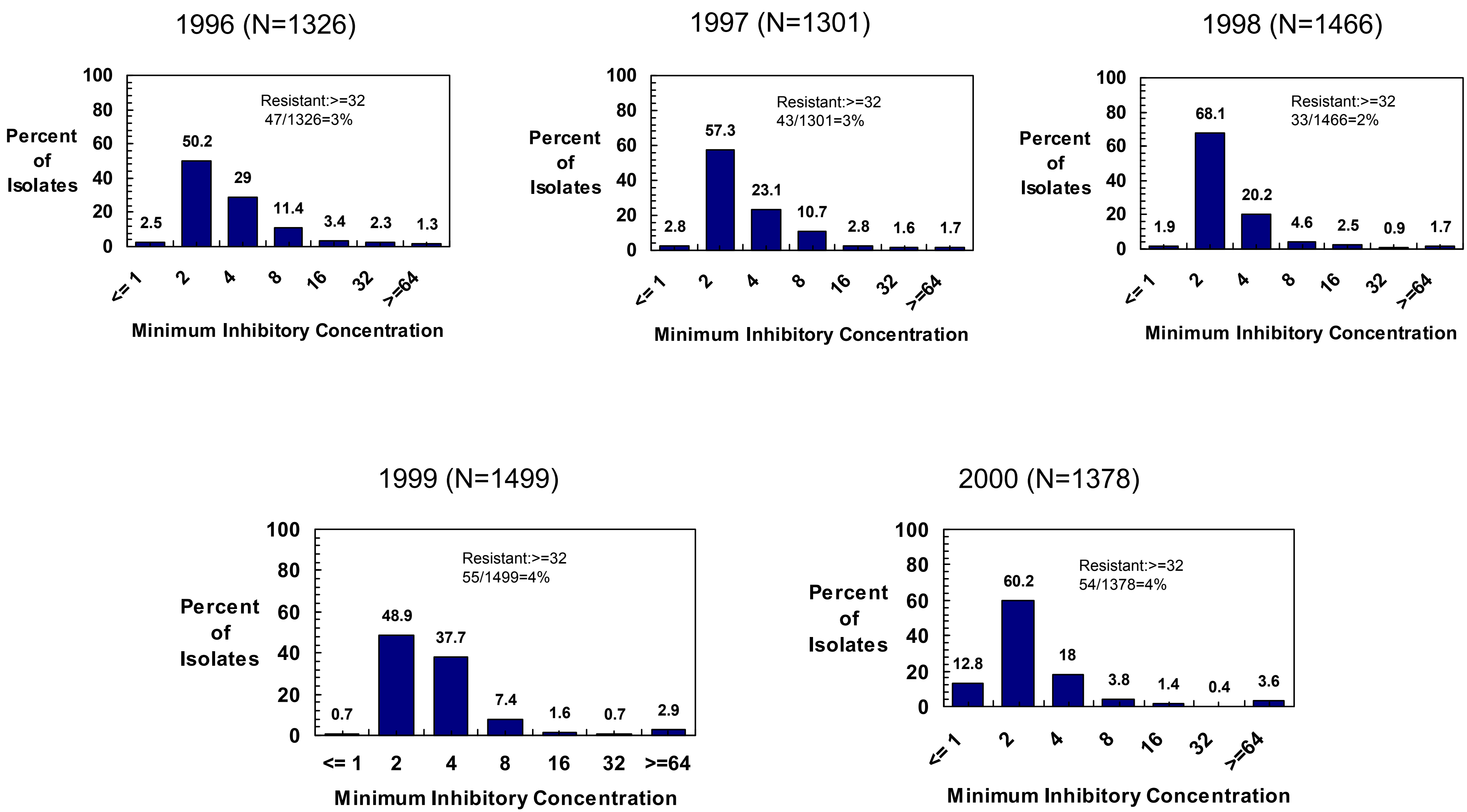

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Figure 3i. MICs for chloramphenicol among non-Typhi *Salmonella* isolates, 1996 - 2000

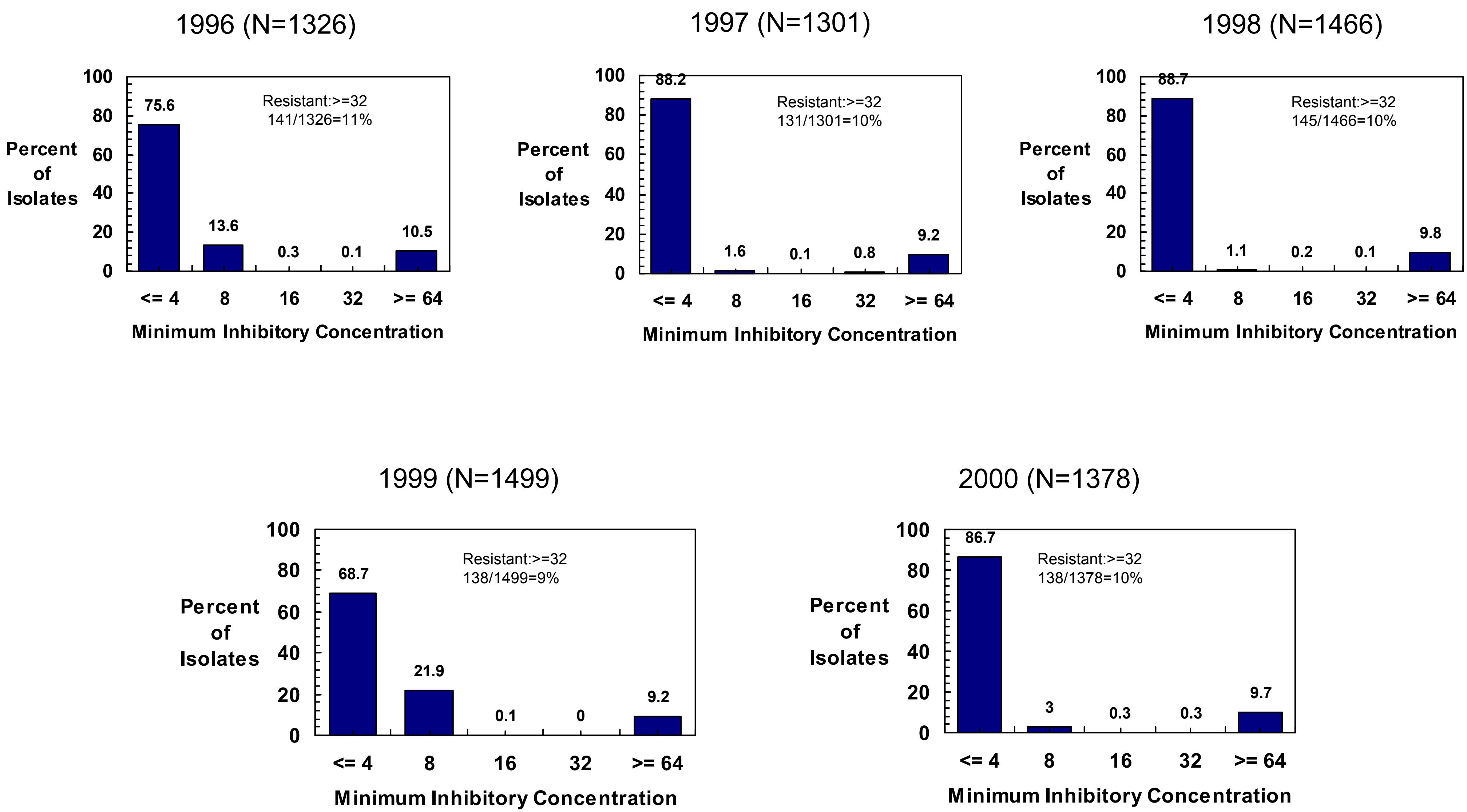

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Figure 3j. MICs for ciprofloxacin among non-Typhi *Salmonella* isolates, 1996 - 2000

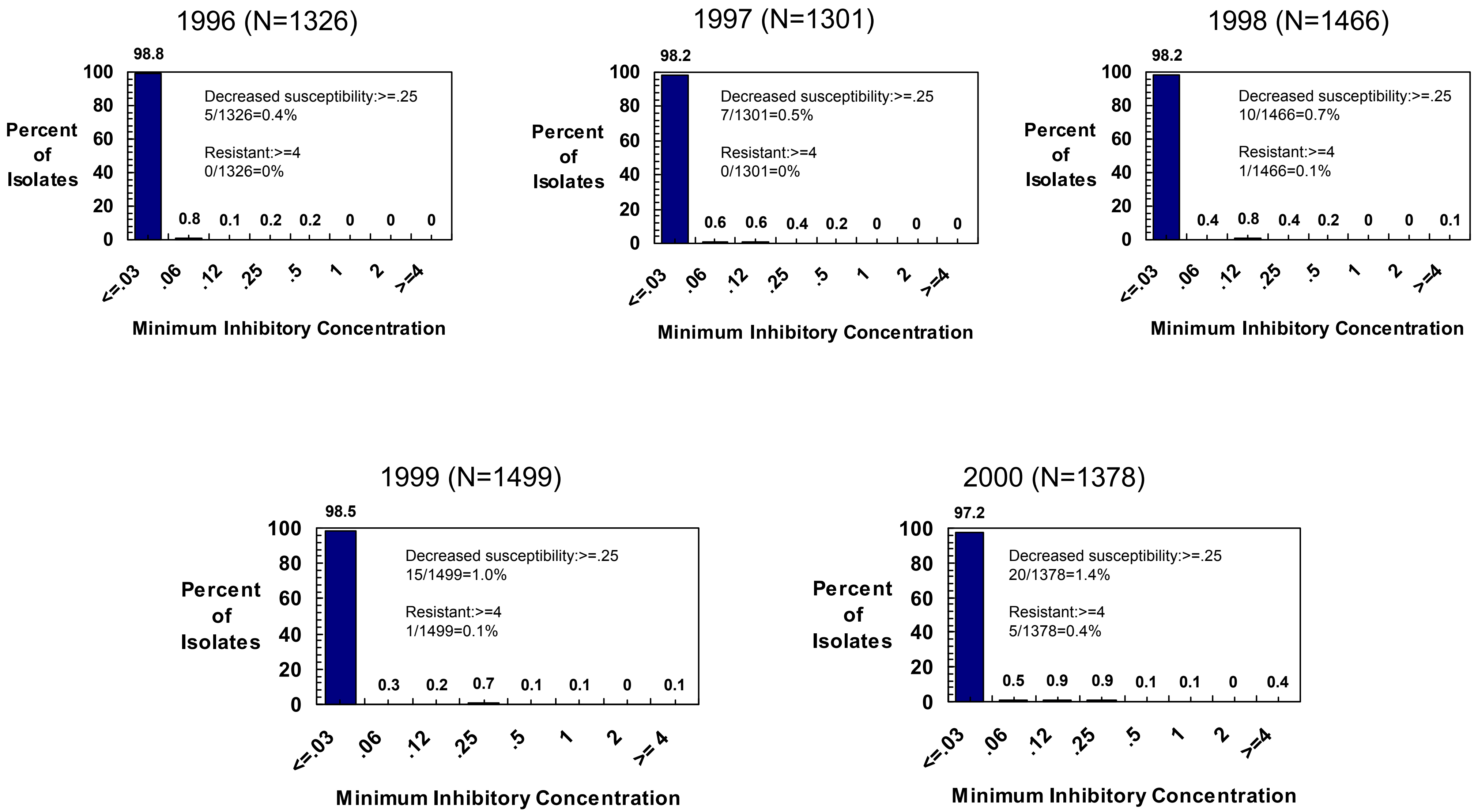

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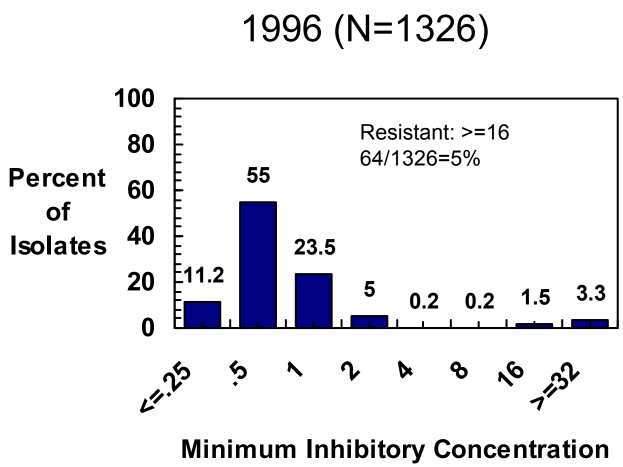
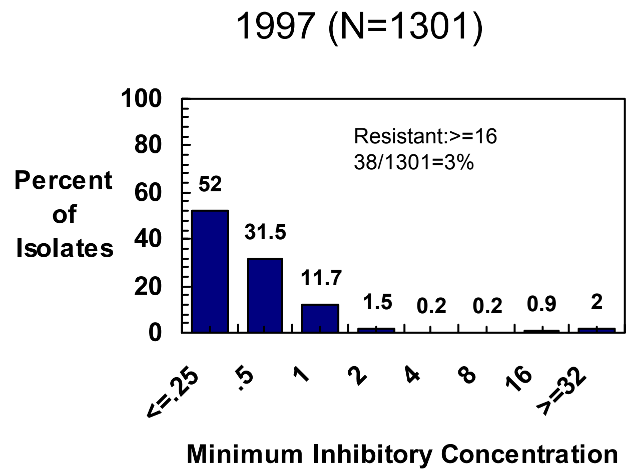
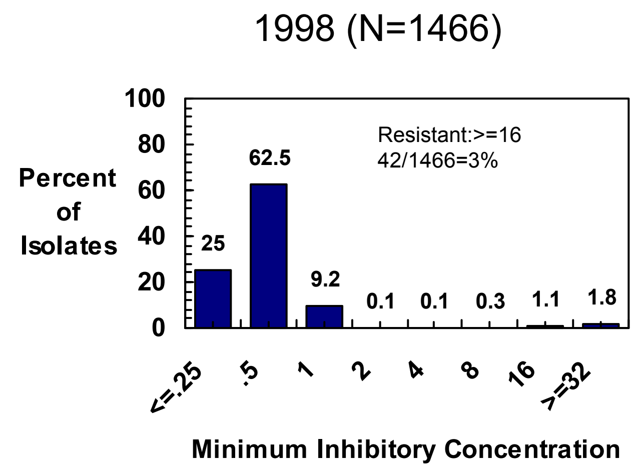
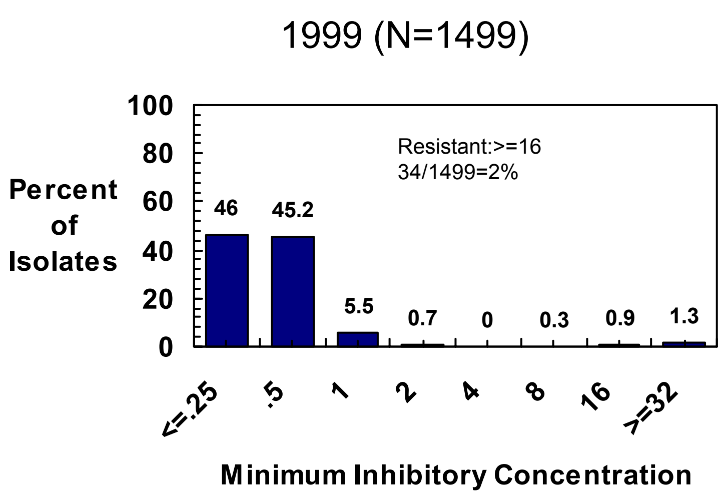
Figure 3k. MICs for gentamicin among non-Typhi *Salmonella* isolates, 1996 - 2000









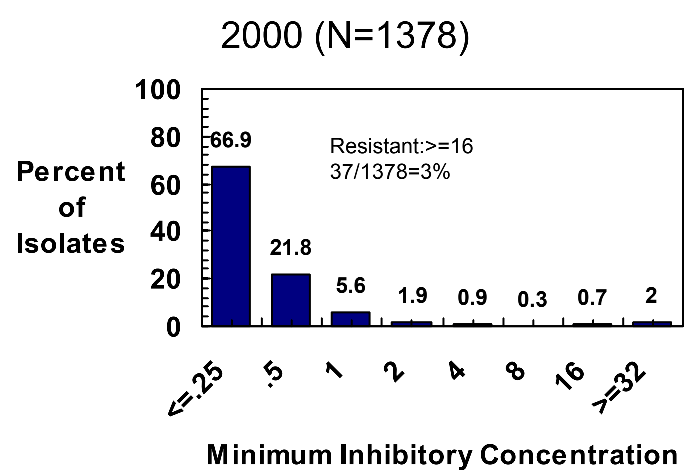


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Figure 3I. MICs for kanamycin among non-Typhi *Salmonella* isolates, 1996 - 2000

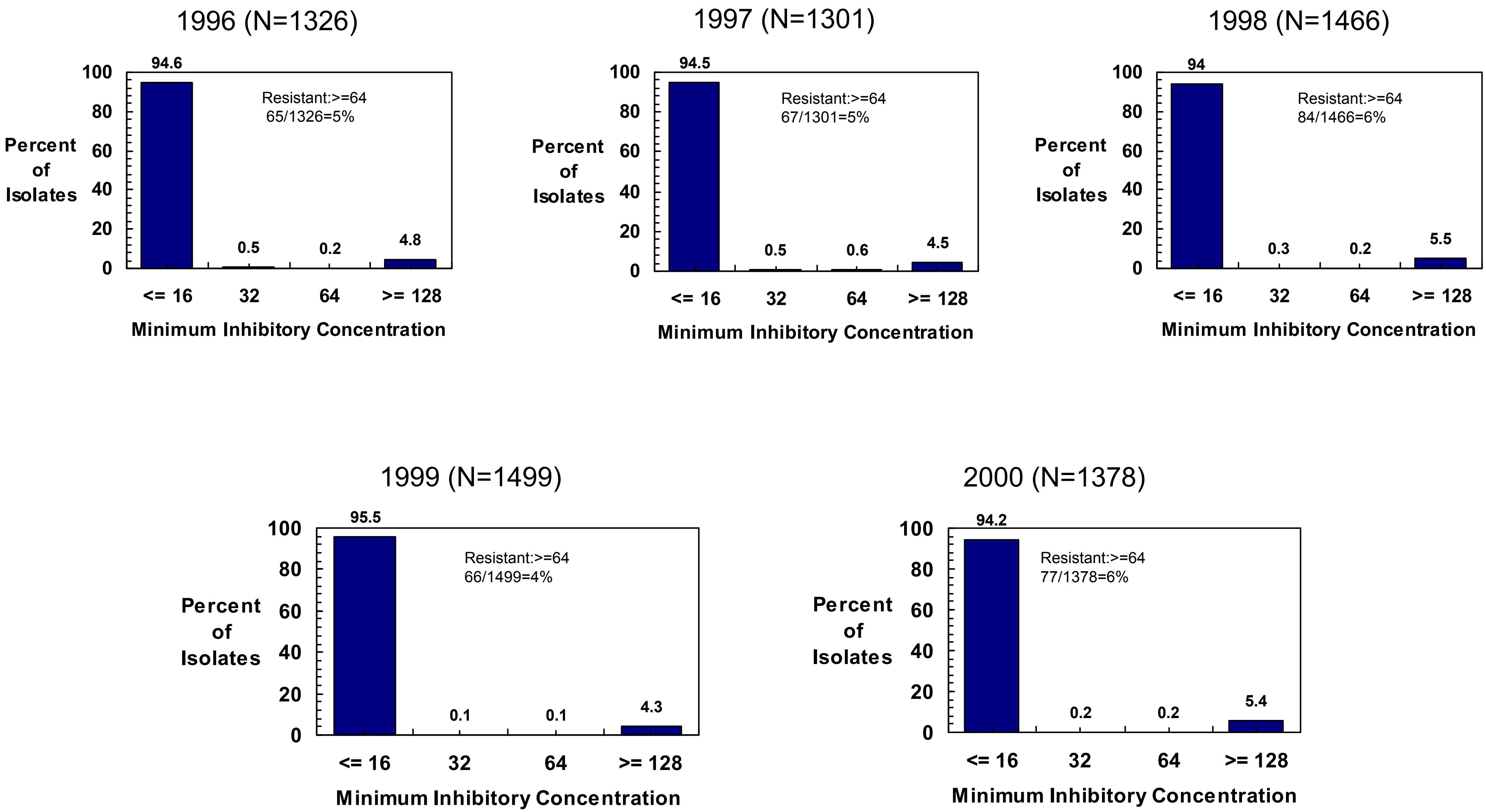

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Figure 3m. MICs for nalidixic acid among non-Typhi *Salmonella* isolates, 1996 - 2000

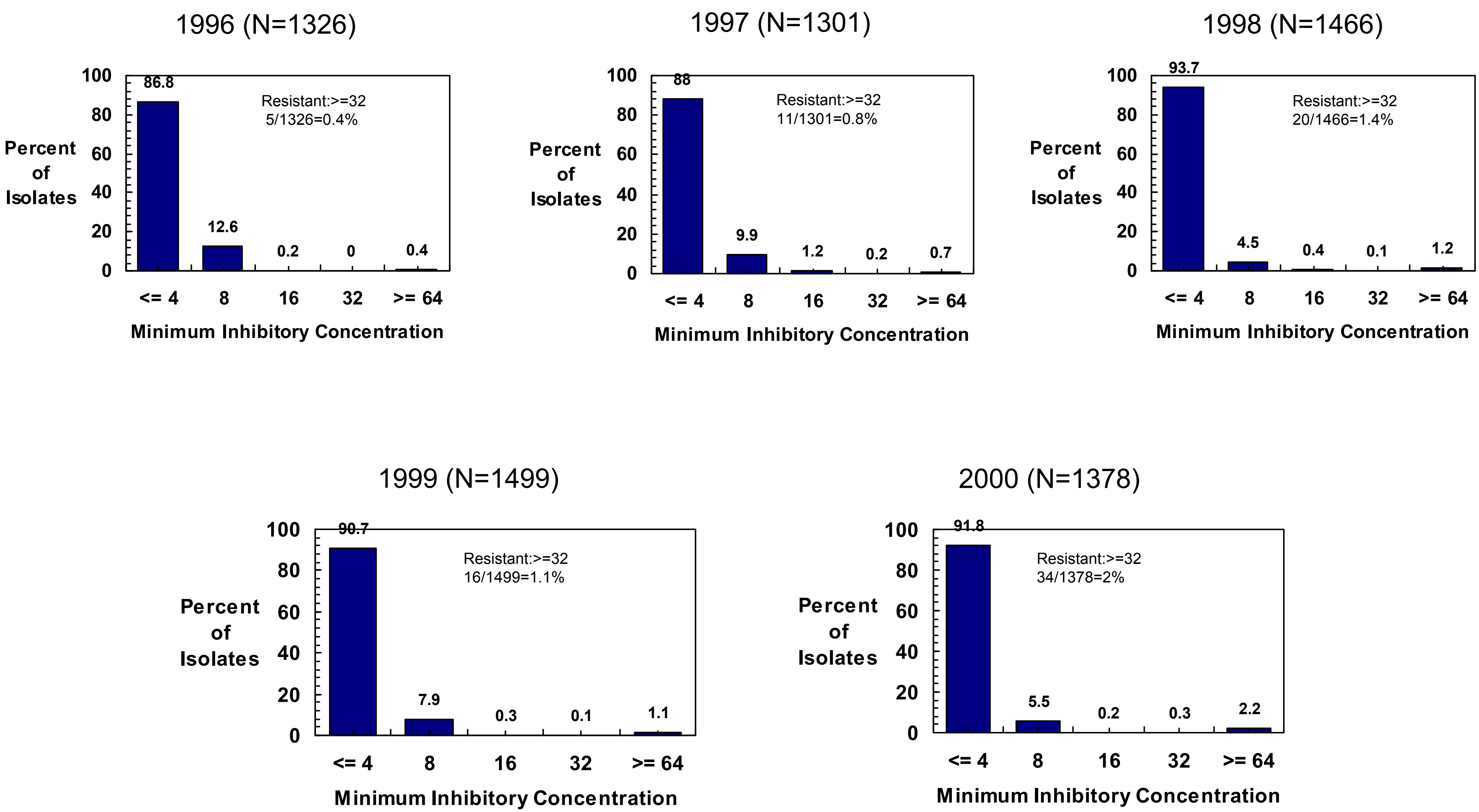

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Figure 3n. MICs for streptomycin among non-Typhi *Salmonella* isolates, 1996 - 2000

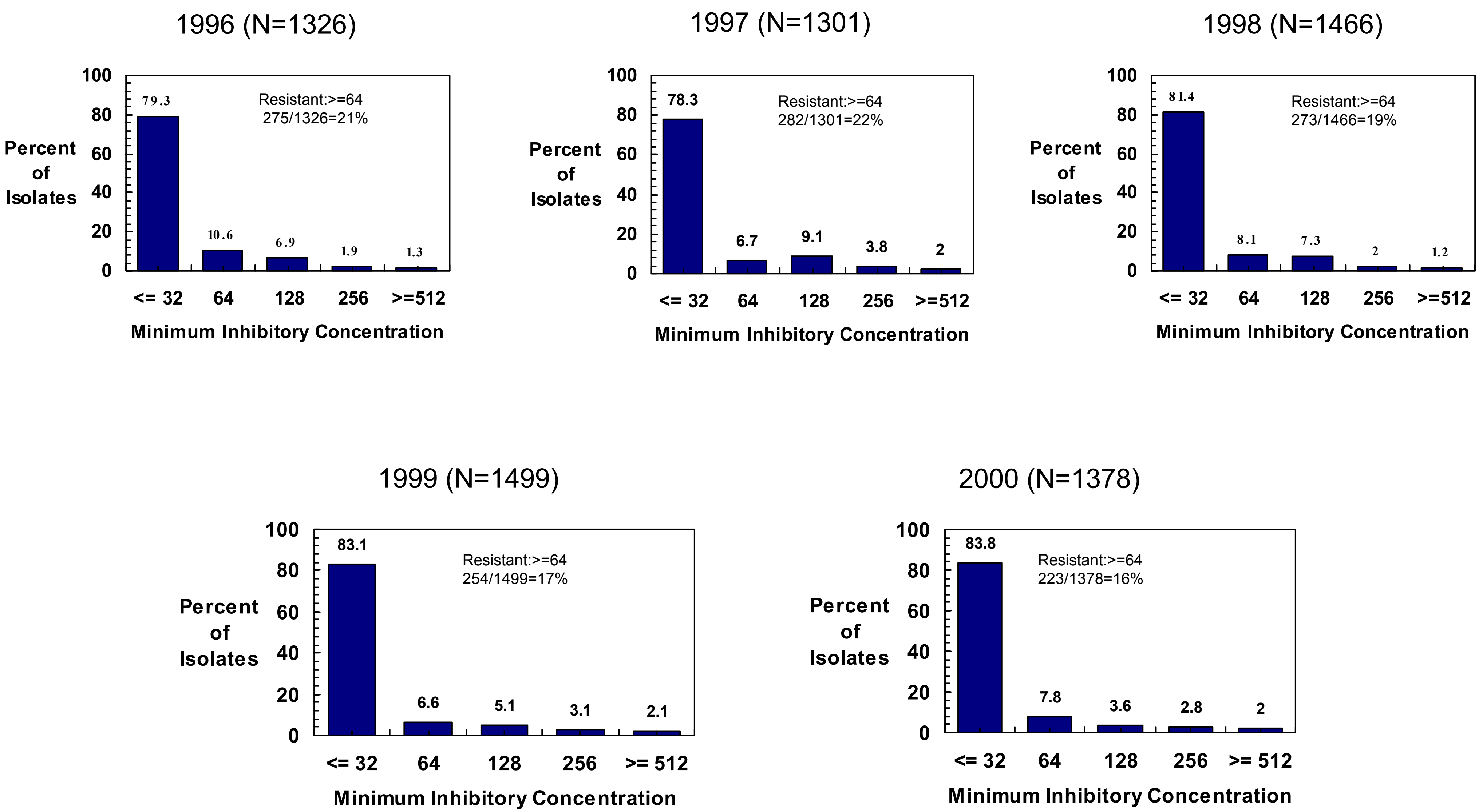

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Figure 3o. MICs for sulfamethoxazole among non-Typhi *Salmonella* isolates, 1996 - 2000

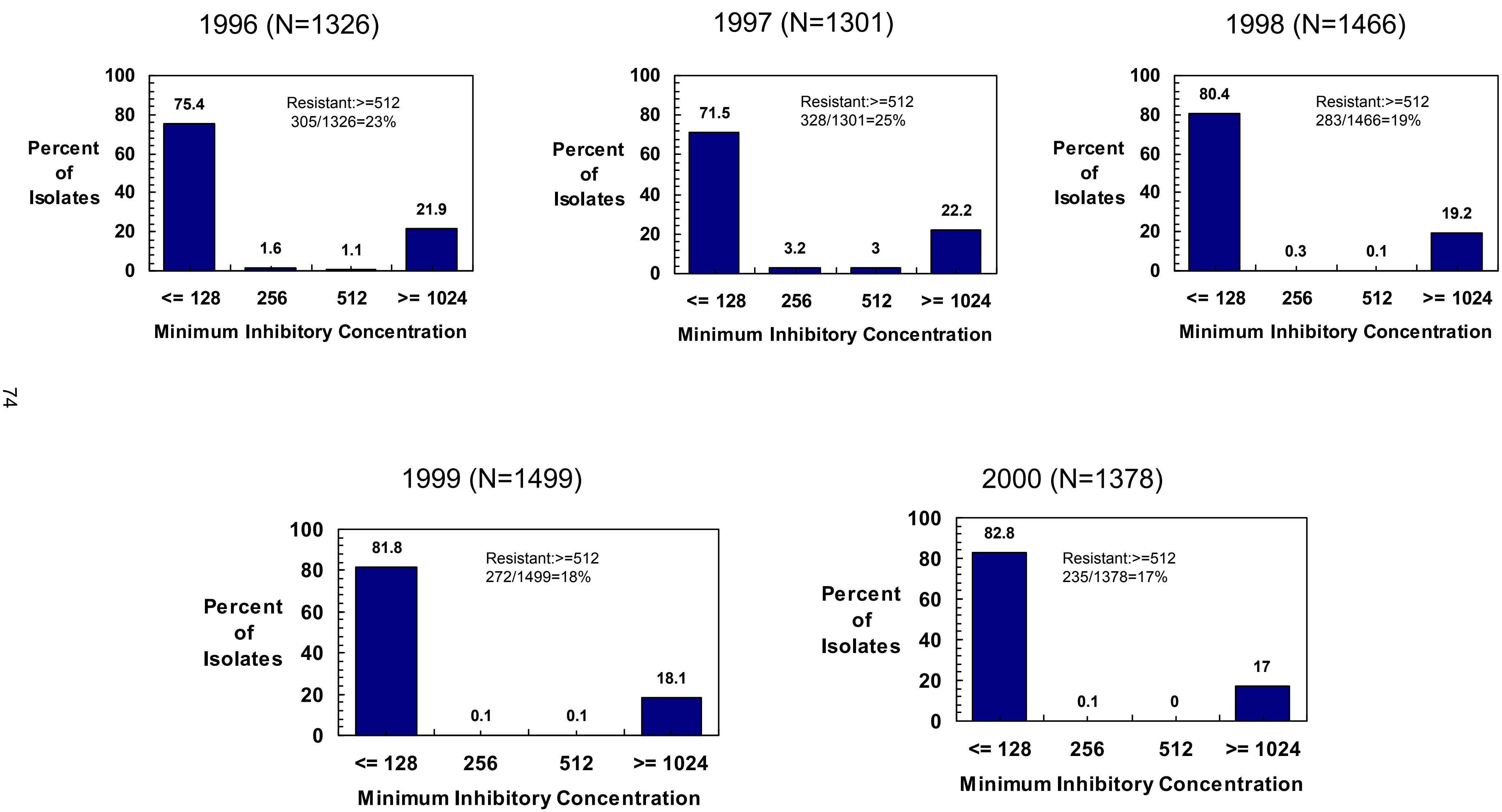

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Figure 3p. MICs for tetracycline among non-Typhi *Salmonella* isolates, 1996 - 2000

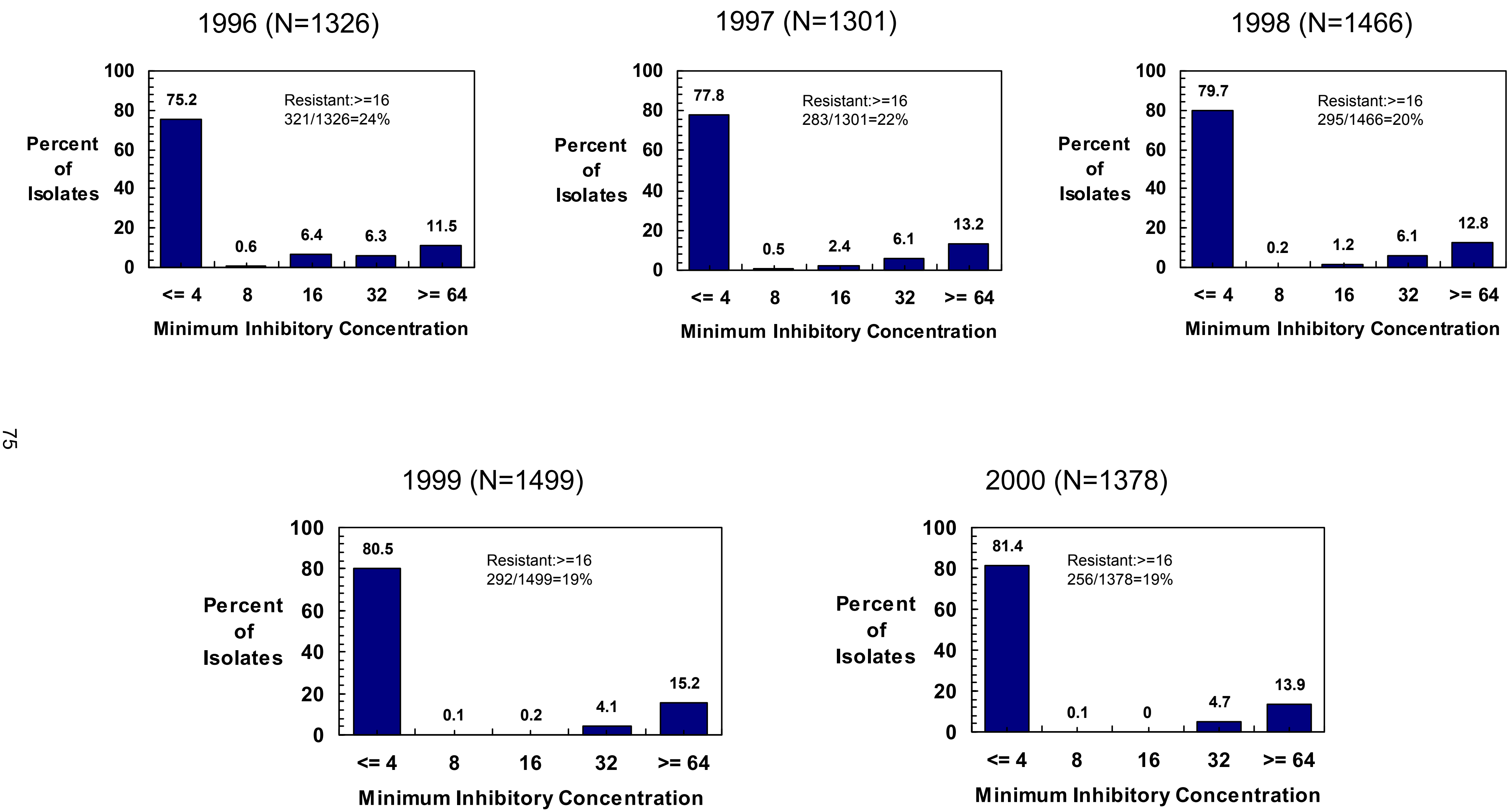

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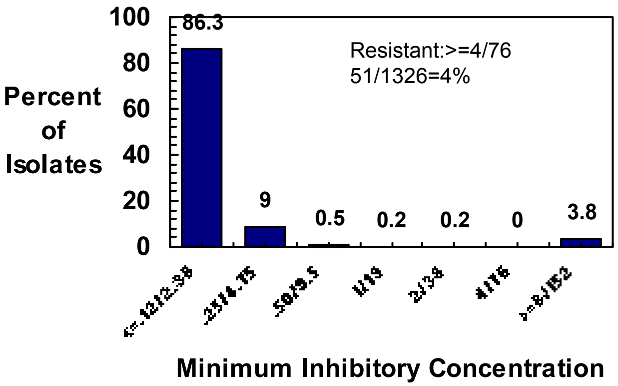
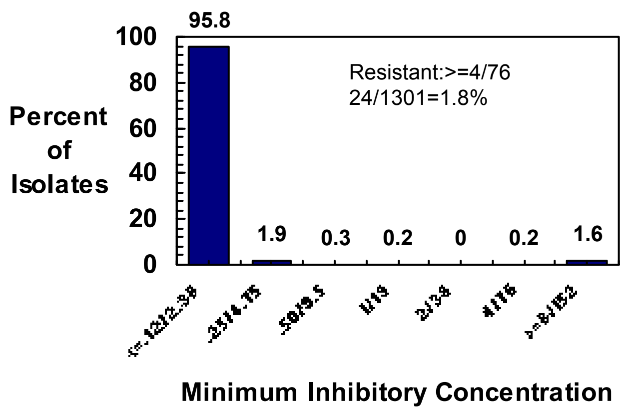
Figure 3q. MICs for trimethoprim-sulfamethoxazole among non-Typhi *Salmonella* isolates, 1996 - 2000

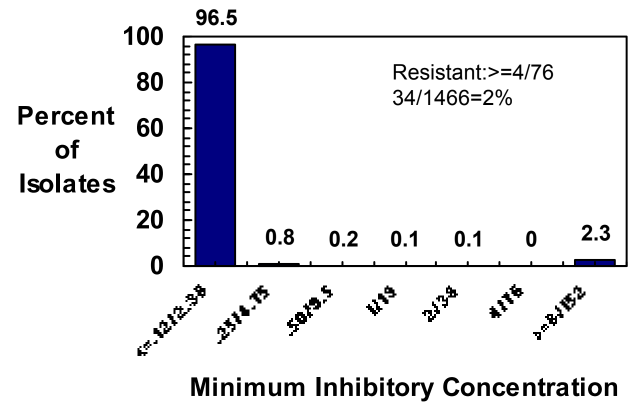
1996 (N=1326)



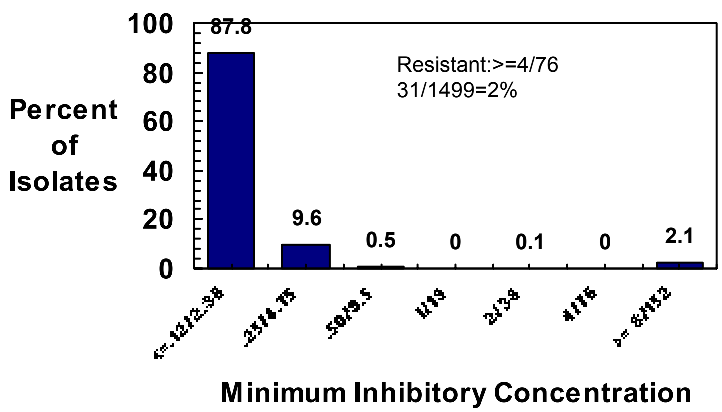
1997 (N=1301)



1998 (N=1466)



1999 (N=1499)



2000 (N=1378)

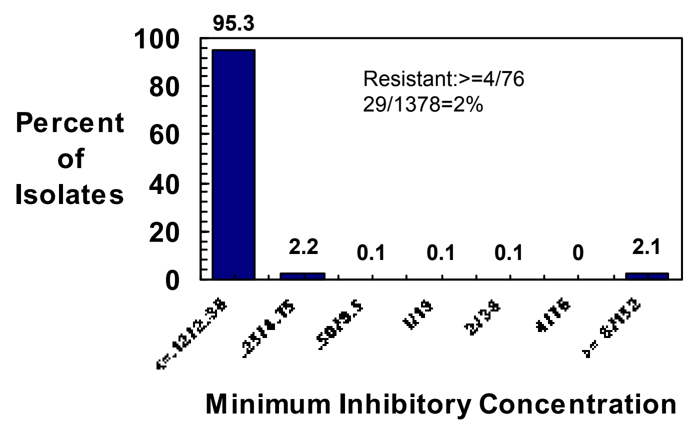


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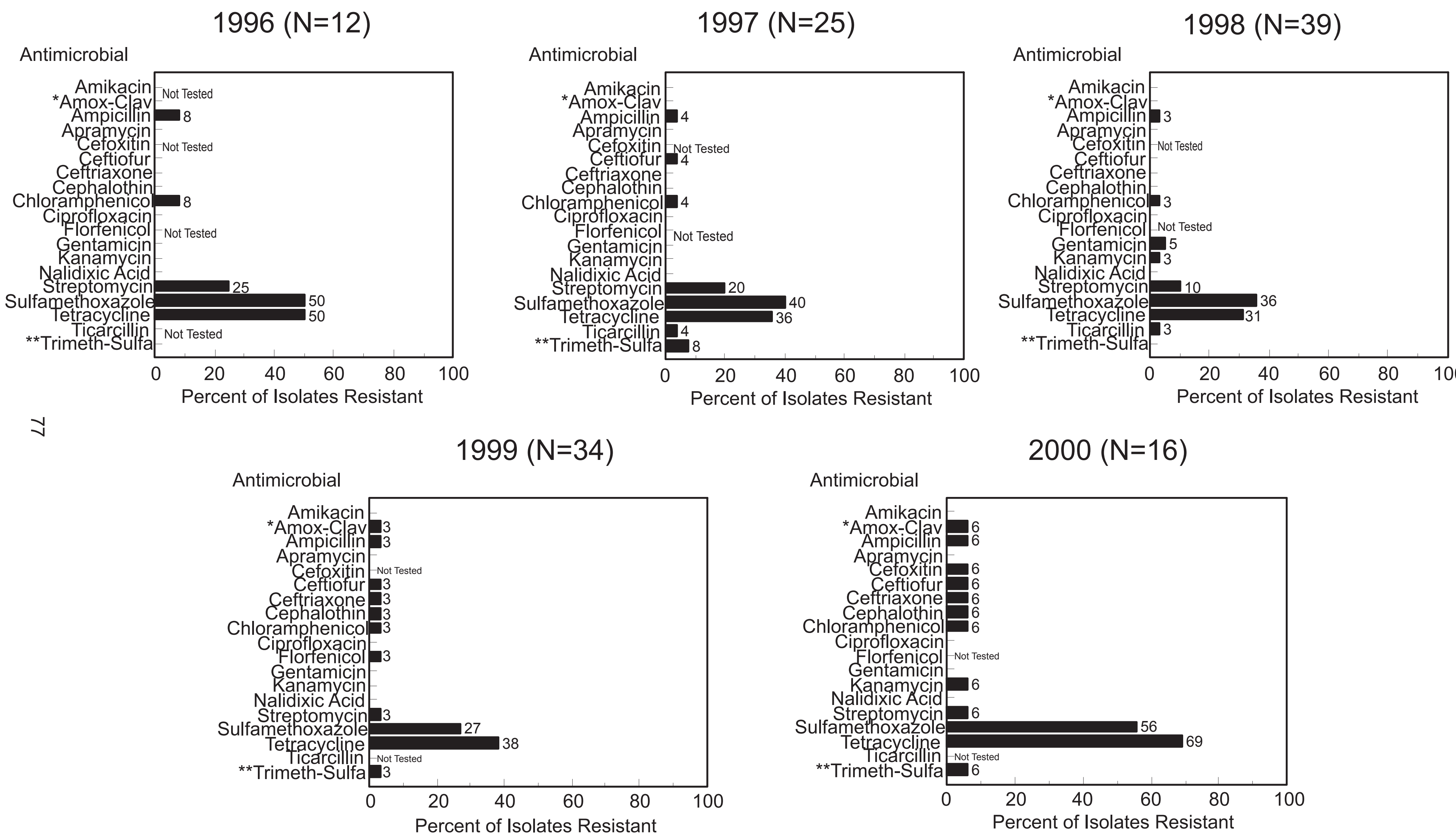
Figure 4a. Resistance among *Salmonella* serotype Agona isolates, 1996 - 2000



*Amox-Clav=Amoxicillin-Clavulanic Acid **Trimeth-Sulfa=Trimethoprim-Sulfamethoxazole

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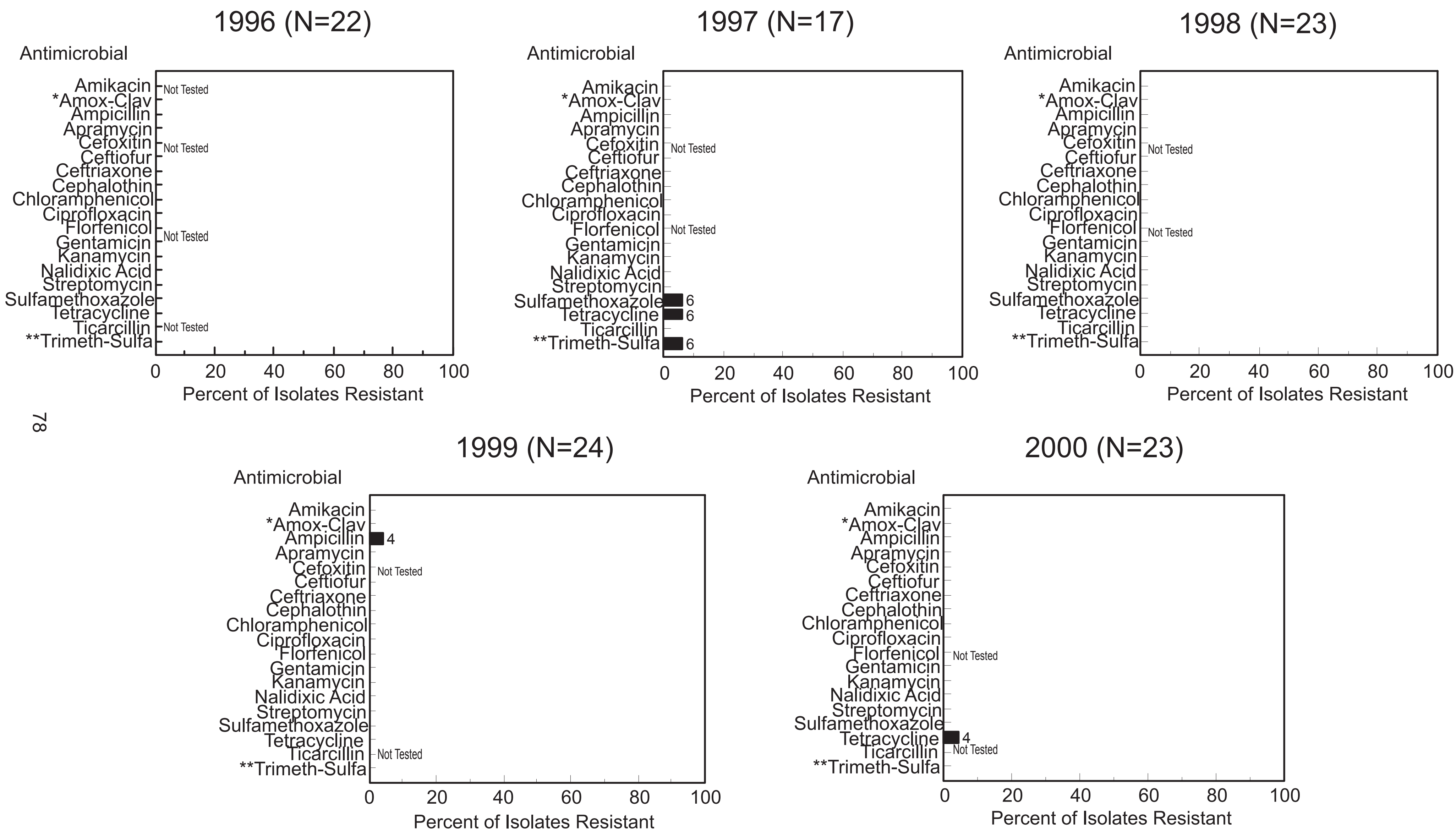
Figure 4b. Resistance among *Salmonella* serotype Braenderup isolates, 1996 - 2000



*Amox-Clav=Amoxicillin-Clavulanic Acid **Trimeth-Sulfa=Trimethoprim-Sulfamethoxazole

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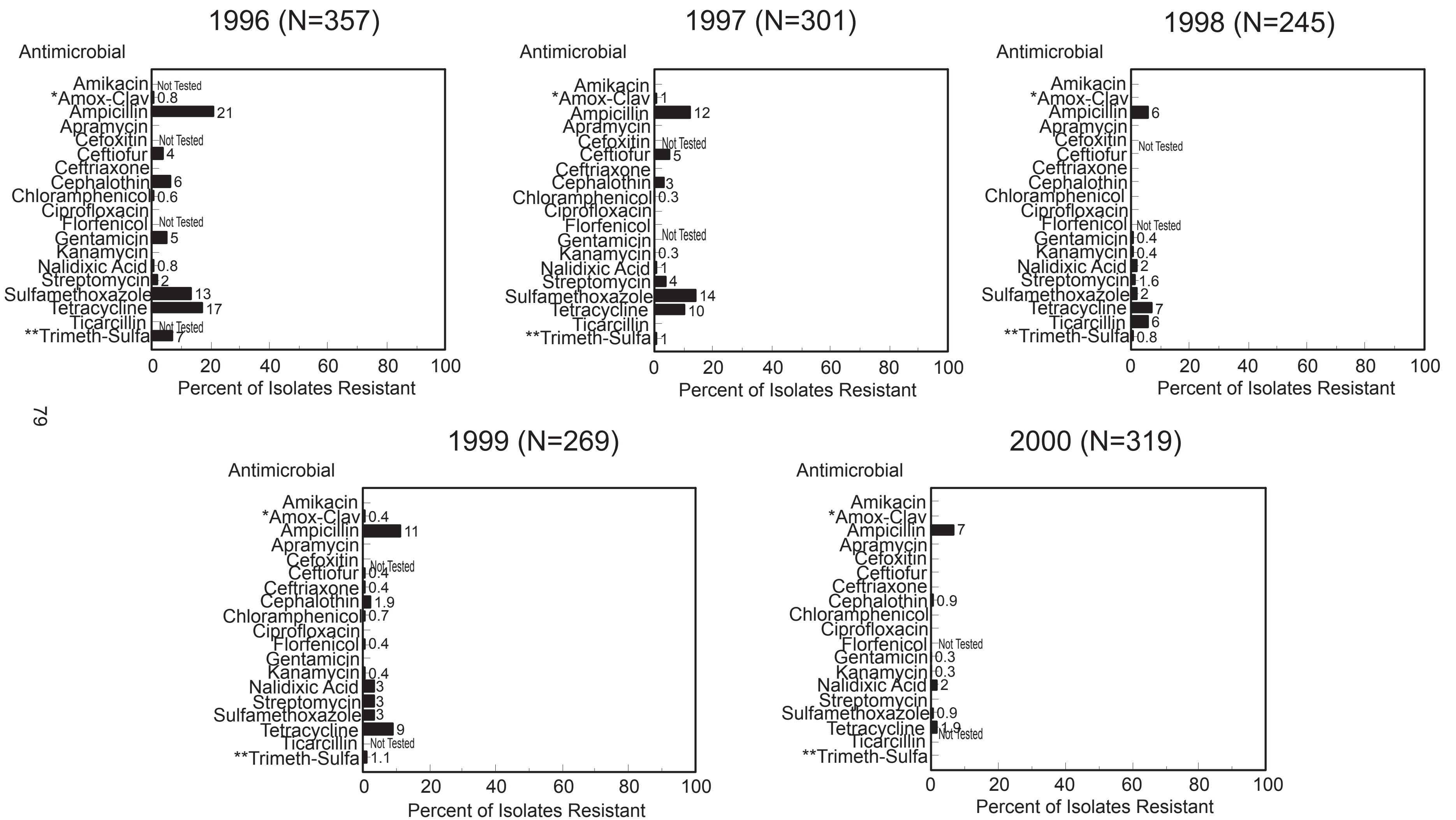
Figure 4c. Resistance among *Salmonella* serotype Enteritidis isolates, 1996 - 2000



*Amox-Clav=Amoxicillin-Clavulanic Acid **Trimeth-Sulfa=Trimethoprim-Sulfamethoxazole

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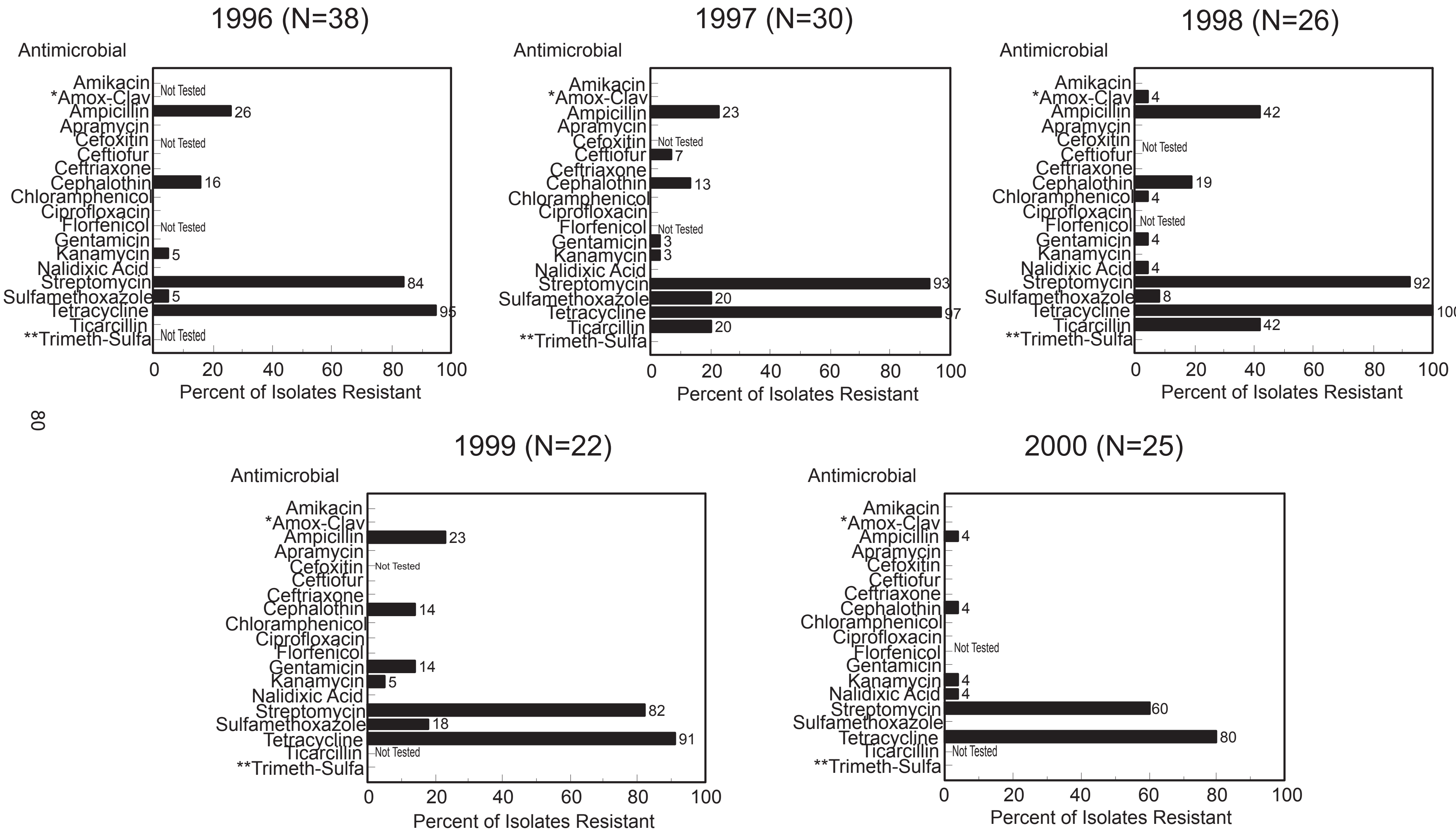
Figure 4d. Resistance among *Salmonella* serotype Hadar isolates, 1996 - 2000



*Amox-Clav=Amoxicillin-Clavulanic Acid **Trimeth-Sulfa=Trimethoprim-Sulfamethoxazole

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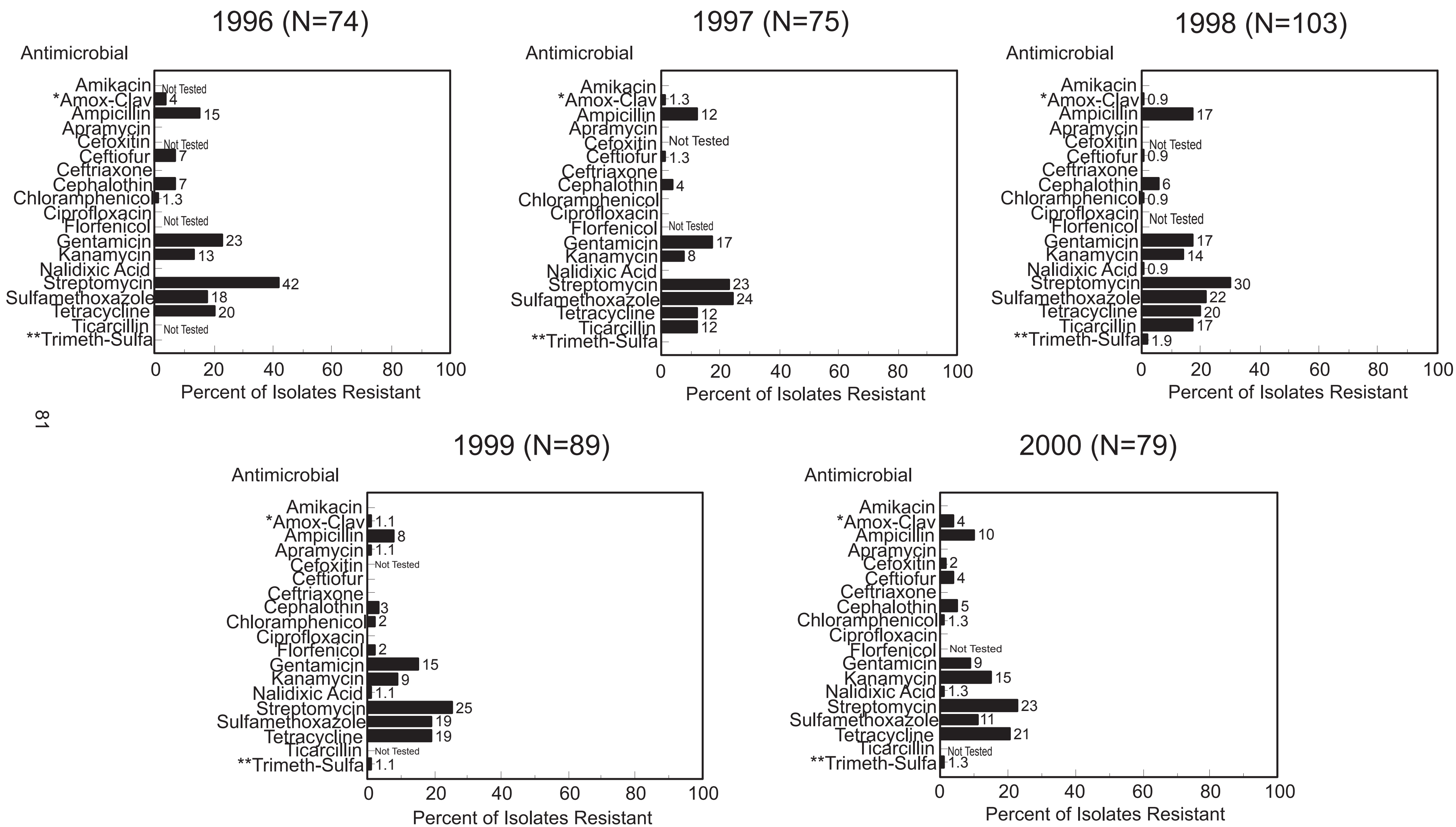
Figure 4e. Resistance among *Salmonella* serotype Heidelberg isolates, 1996 - 2000



*Amox-Clav=Amoxicillin-Clavulanic Acid **Trimeth-Sulfa=Trimethoprim-Sulfamethoxazole

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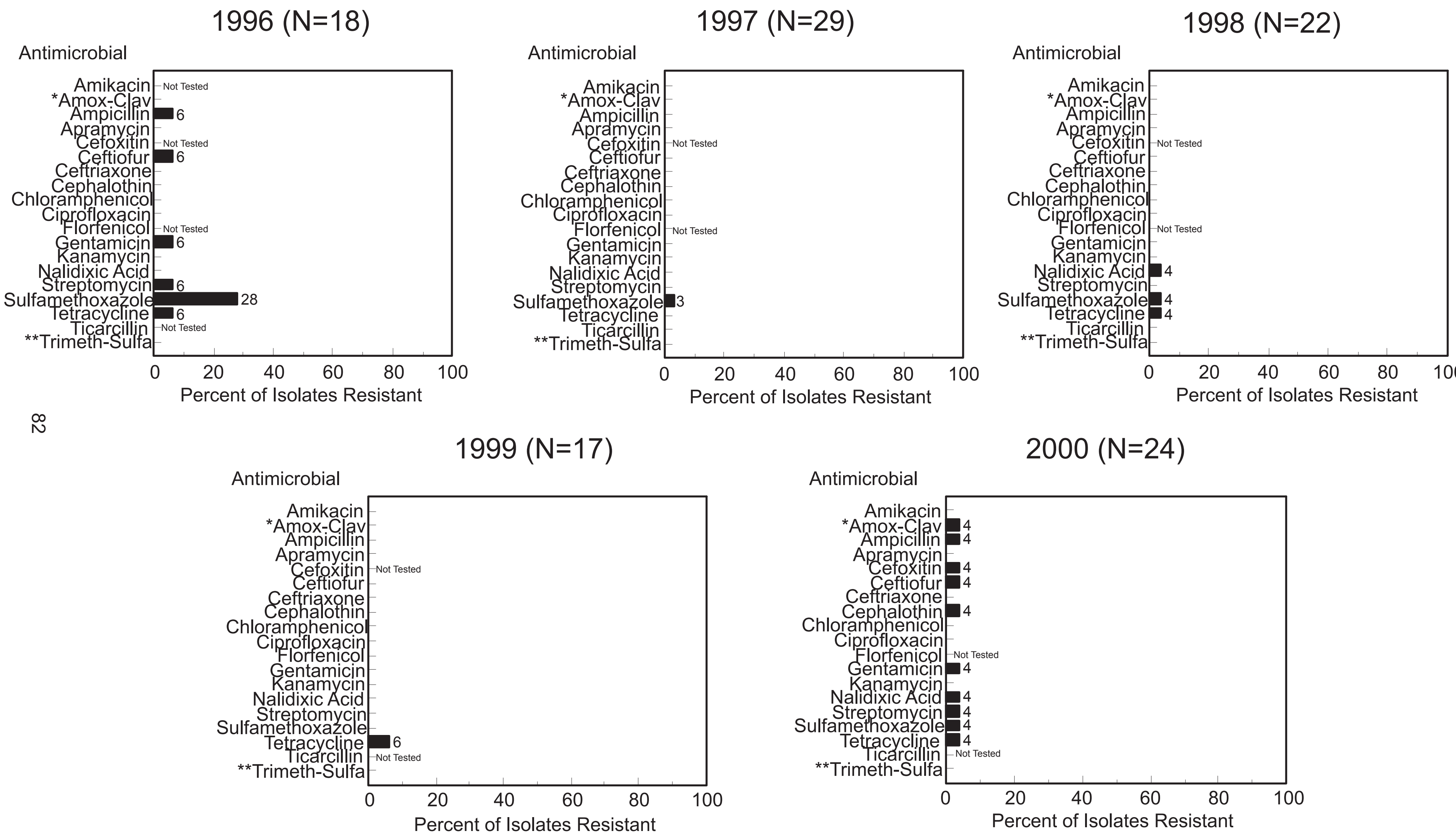
Figure 4f. Resistance among *Salmonella* serotype Infantis isolates, 1996 - 2000



*Amox-Clav=Amoxicillin-Clavulanic Acid **Trimeth-Sulfa=Trimethoprim-Sulfamethoxazole

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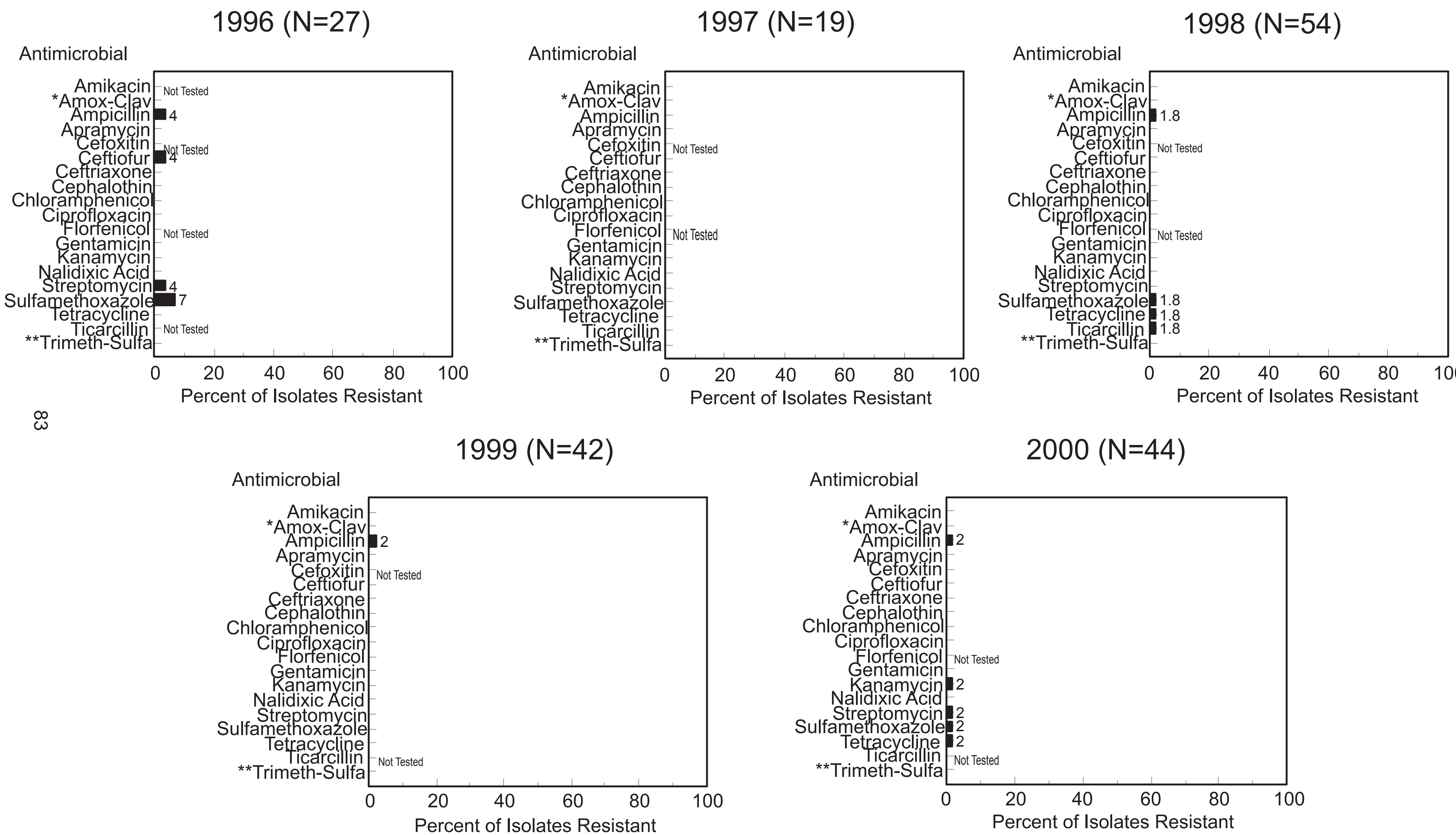
Figure 4g. Resistance among *Salmonella* serotype Javiana isolates, 1996 - 2000



*Amox-Clav=Amoxicillin-Clavulanic Acid **Trimeth-Sulfa=Trimethoprim-Sulfamethoxazole

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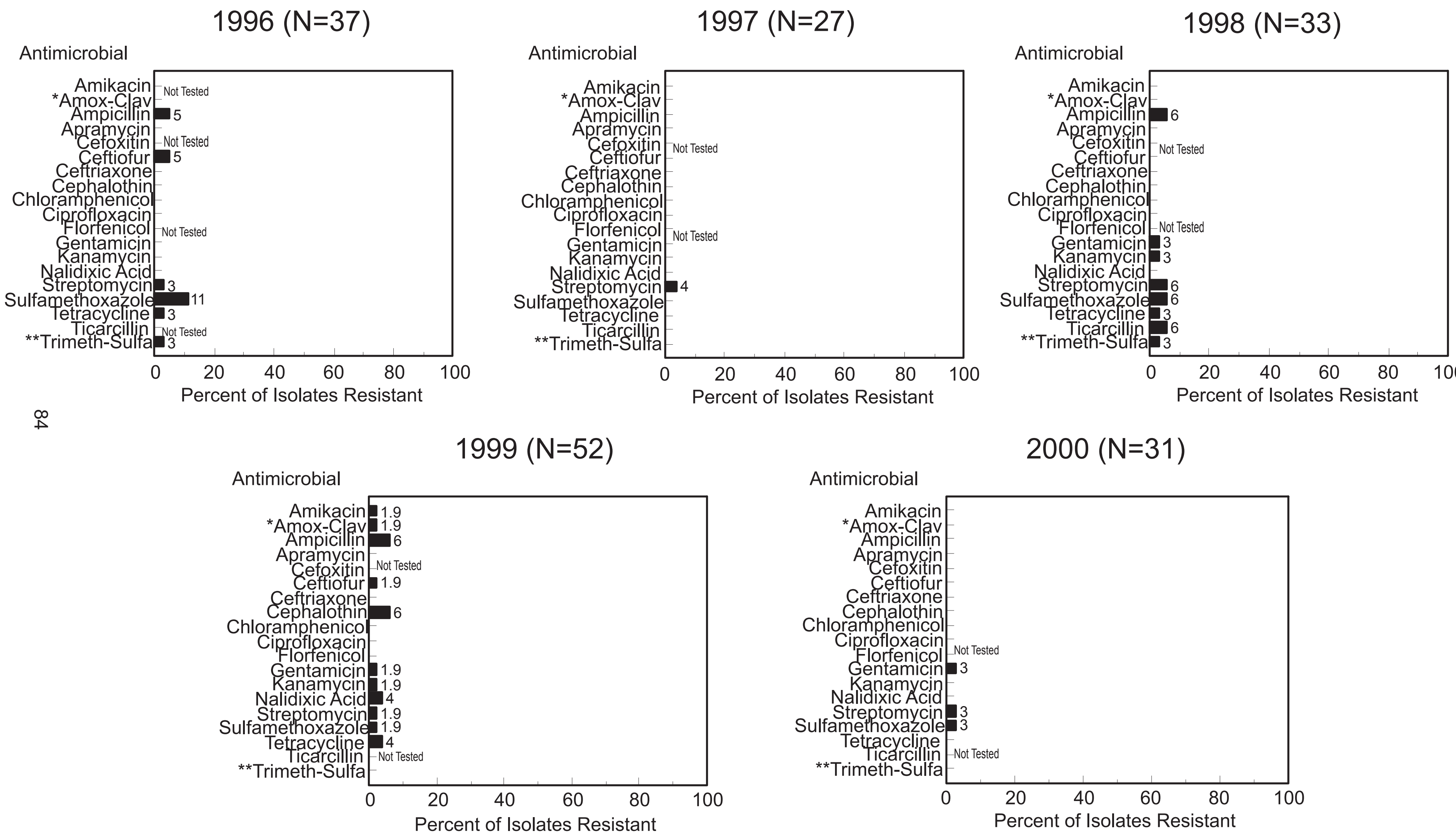
Figure 4h. Resistance among *Salmonella* serotype Montevideo isolates, 1996 - 2000



*Amox-Clav=Amoxicillin-Clavulanic Acid **Trimeth-Sulfa=Trimethoprim-Sulfamethoxazole

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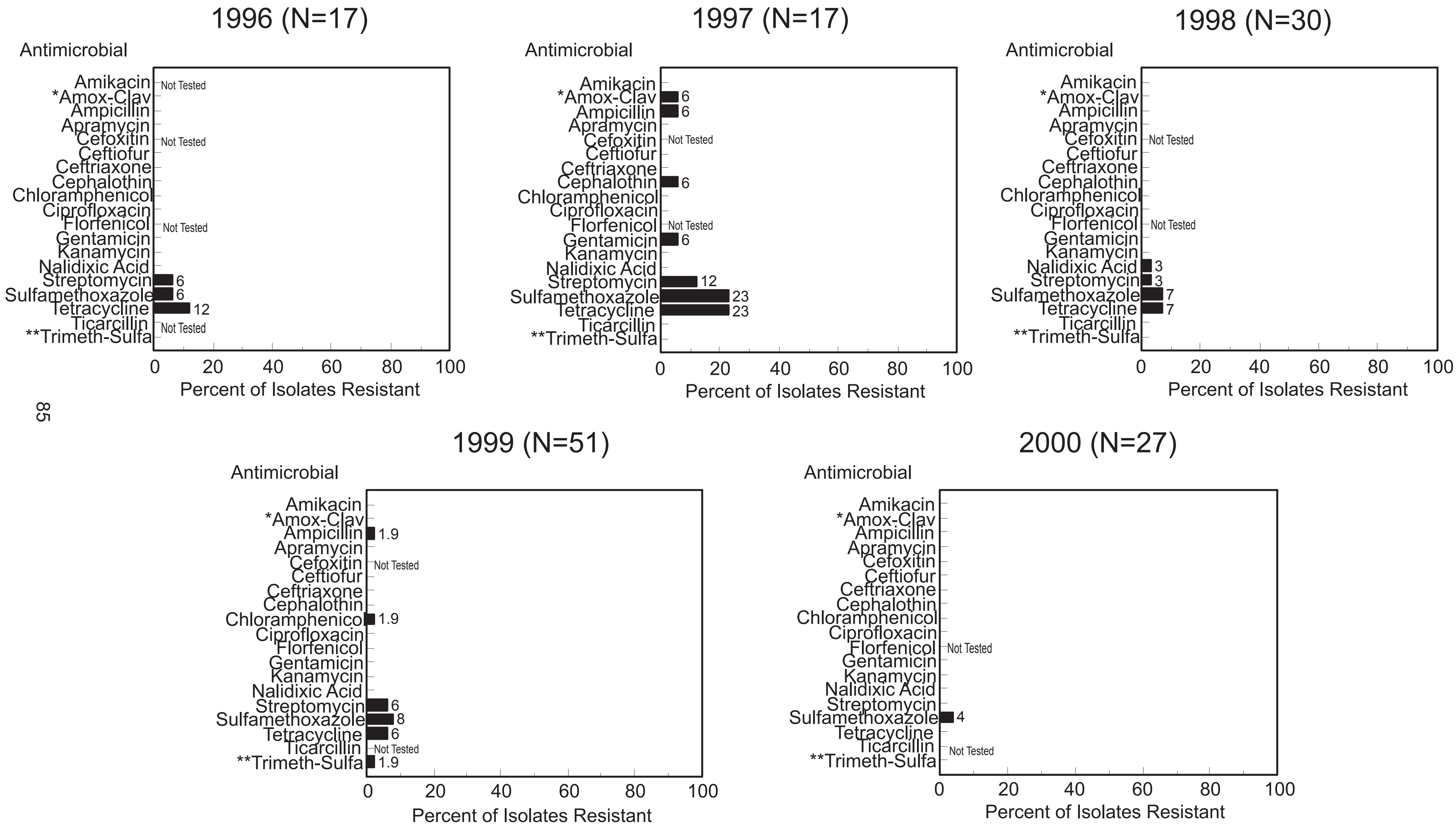
Figure 4i. Resistance among *Salmonella* serotype Muenchen isolates, 1996 - 2000



*Amox-Clav=Amoxicillin-Clavulanic Acid **Trimeth-Sulfa=Trimethoprim-Sulfamethoxazole

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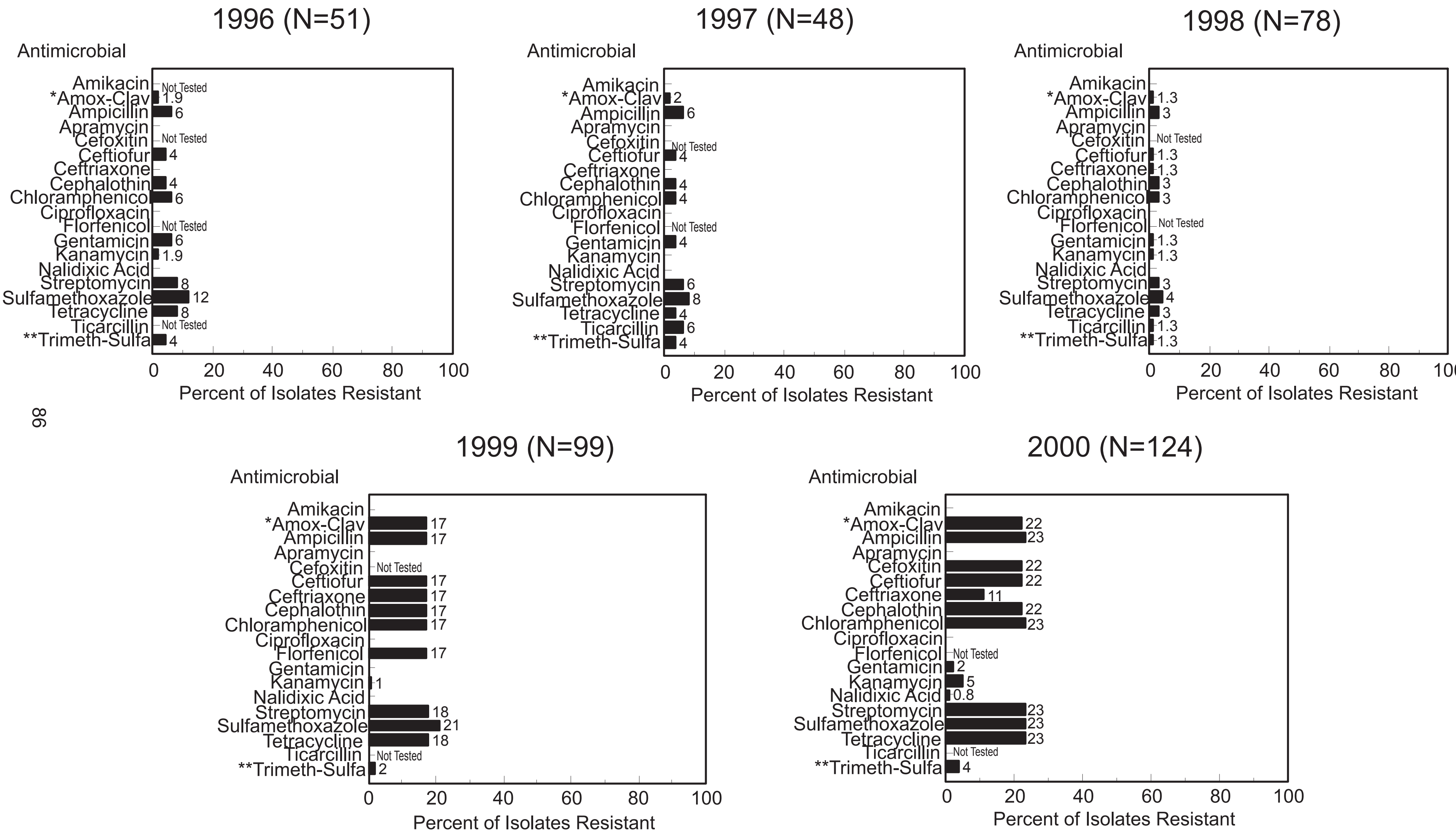
Figure 4j. Resistance among *Salmonella* serotype Newport isolates, 1996 - 2000



*Amox-Clav=Amoxicillin-Clavulanic Acid　　**Trimeth-Sulfa=Trimethoprim-Sulfamethoxazole

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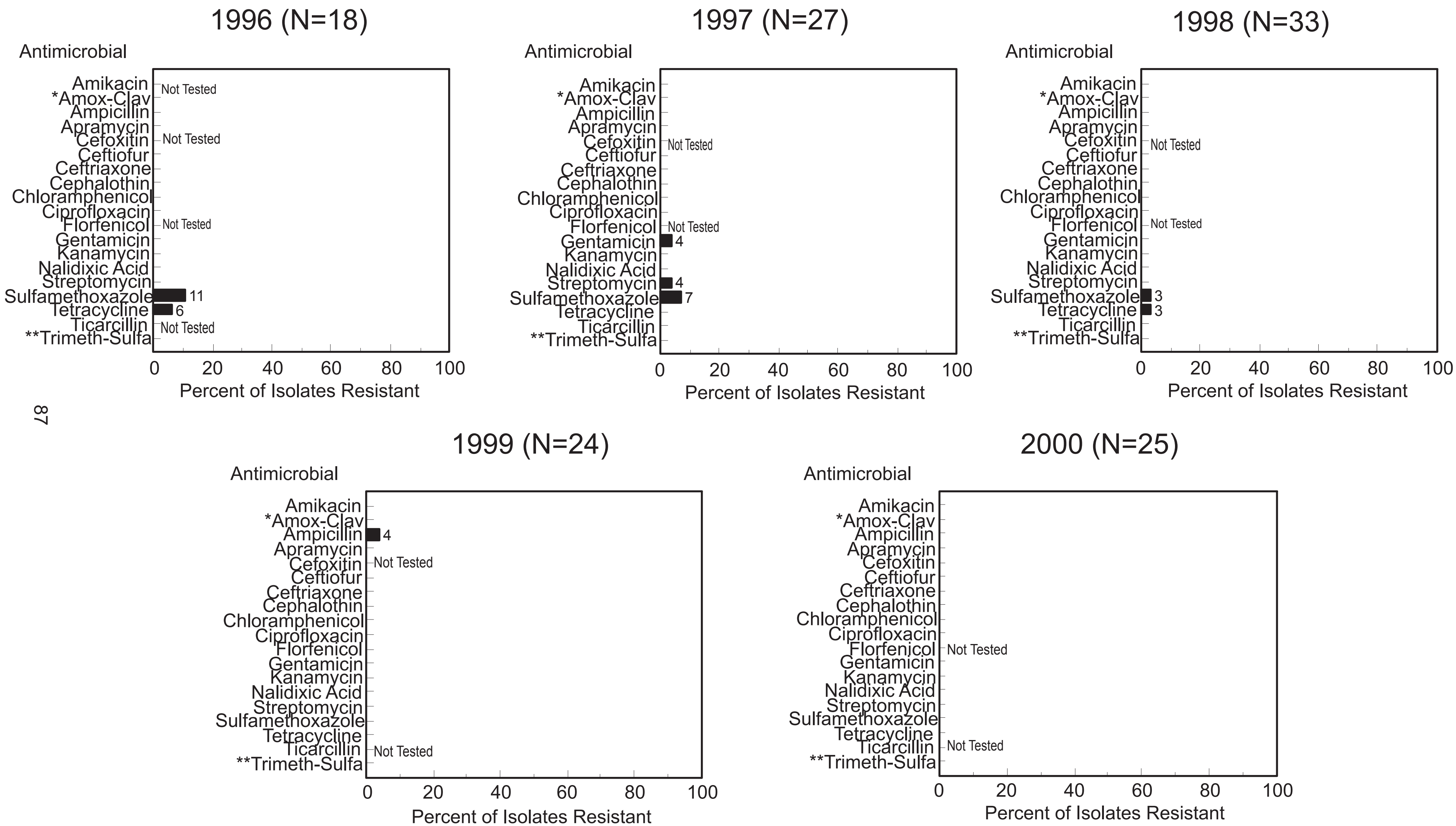
Figure 4k. Resistance among *Salmonella* serotype Oranienburg isolates, 1996 - 2000



*Amox-Clav=Amoxicillin-Clavulanic Acid **Trimeth-Sulfa=Trimethoprim-Sulfamethoxazole

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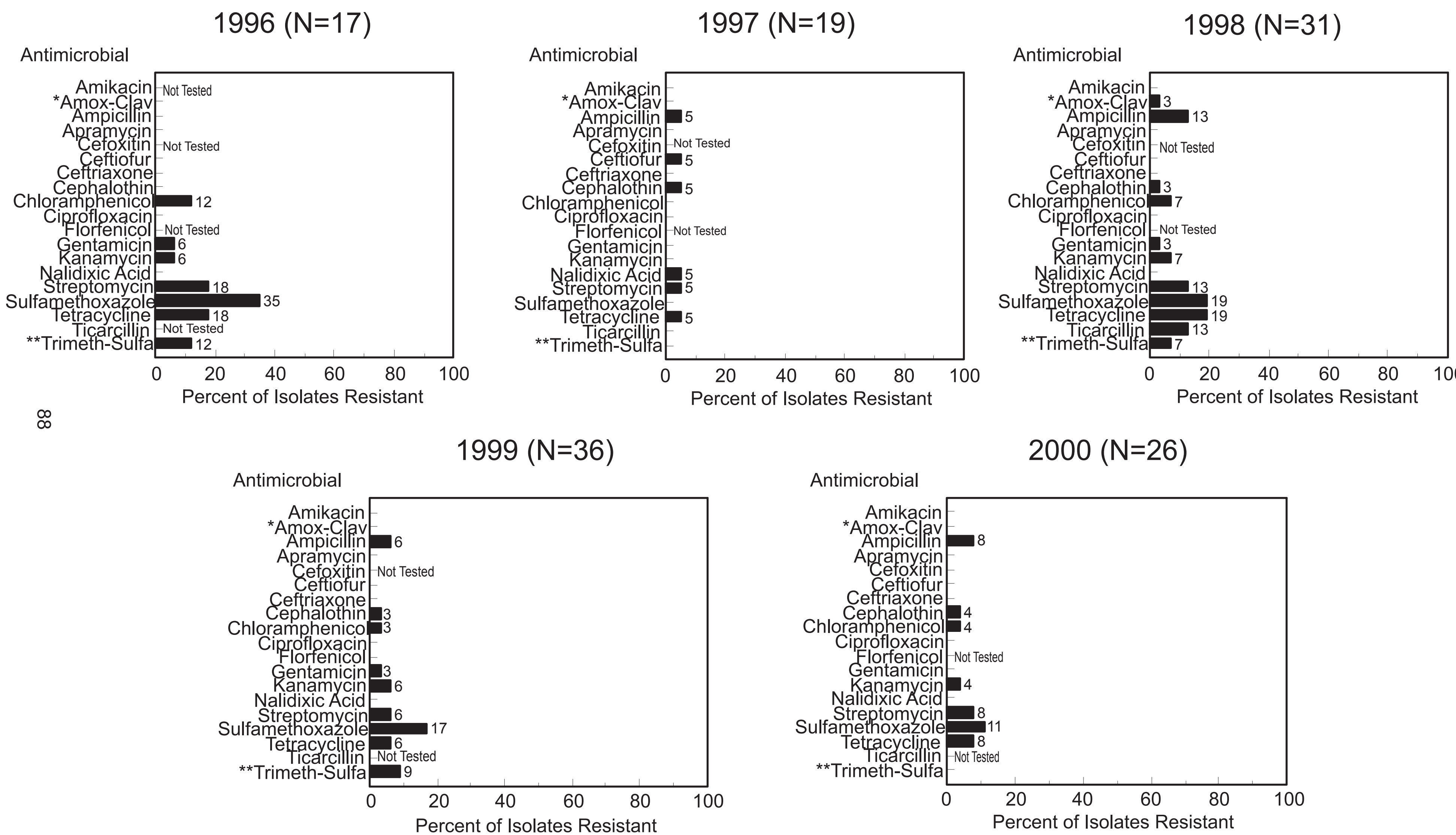
Figure 4l. Resistance among *Salmonella* serotype Saint Paul isolates, 1996 - 2000



*Amox-Clav=Amoxicillin-Clavulanic Acid **Trimeth-Sulfa=Trimethoprim-Sulfamethoxazole

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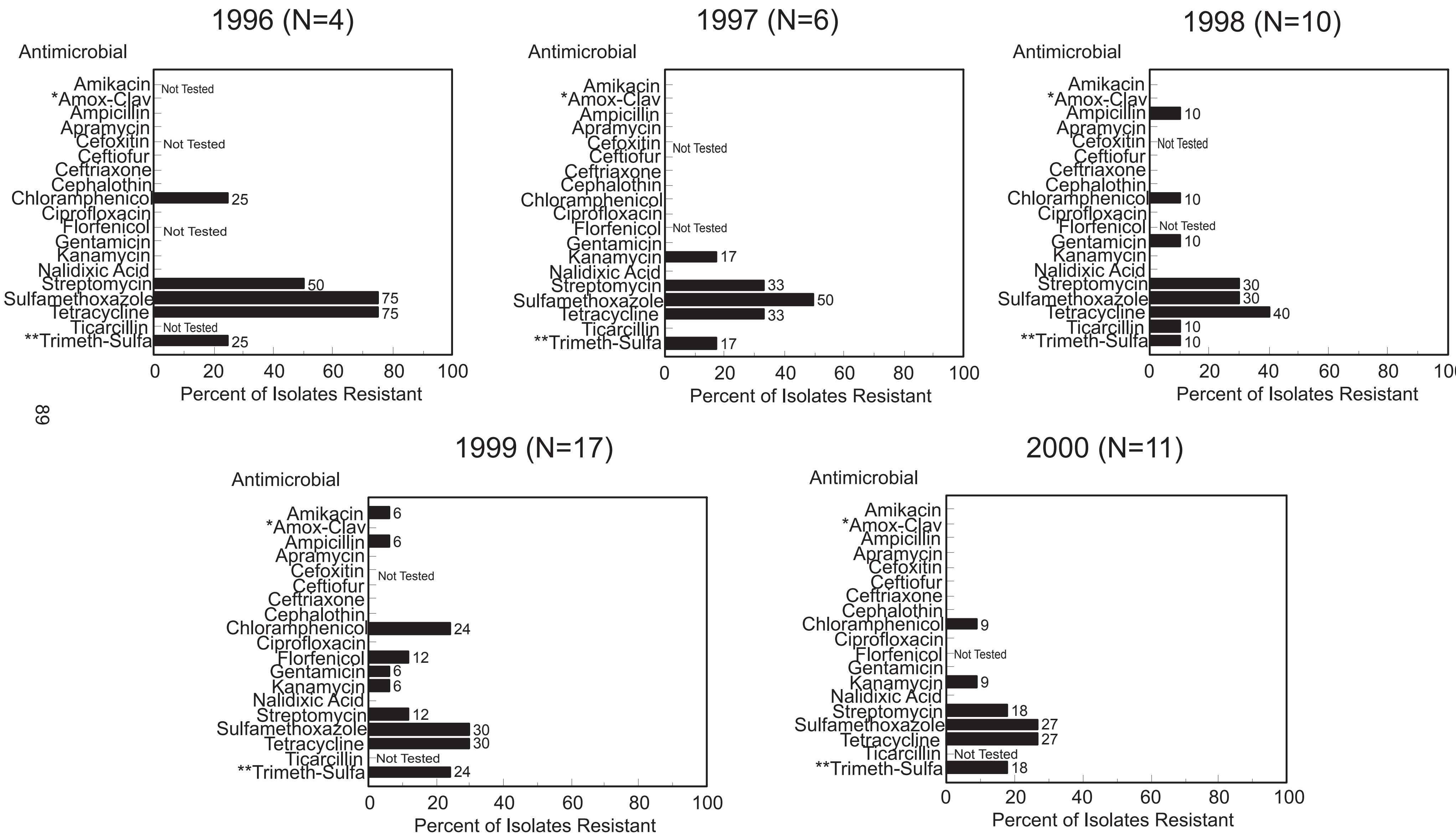
Figure 4m. Resistance among *Salmonella* serotype Stanley isolates, 1996 - 2000



*Amox-Clav=Amoxicillin-Clavulanic Acid **Trimeth-Sulfa=Trimethoprim-Sulfamethoxazole

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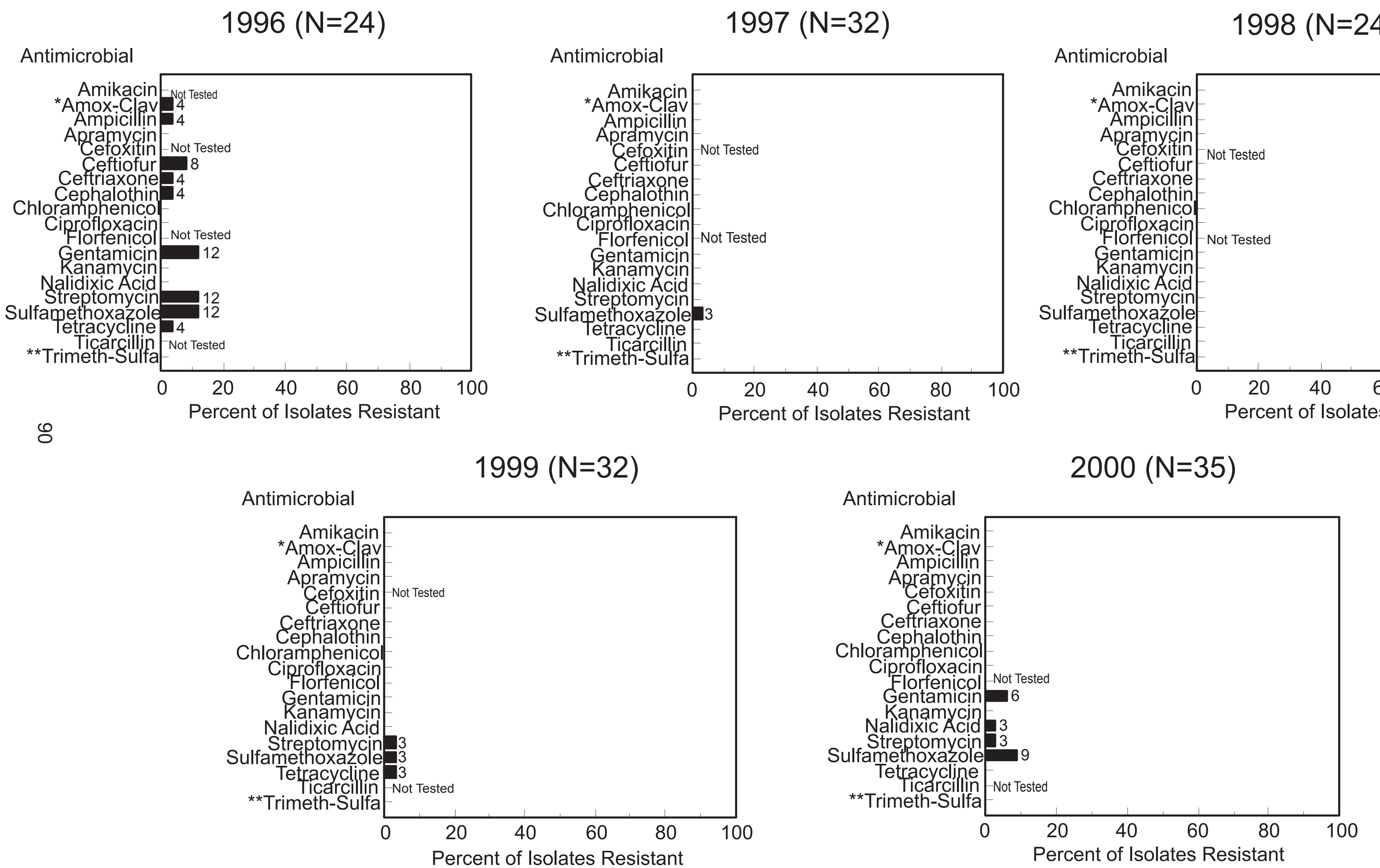
Figure 4n. Resistance among *Salmonella* serotype Thompson isolates, 1996 - 2000



*Amox-Clav=Amoxicillin-Clavulanic Acid **Trimeth-Sulfa=Trimethoprim-Sulfamethoxazole

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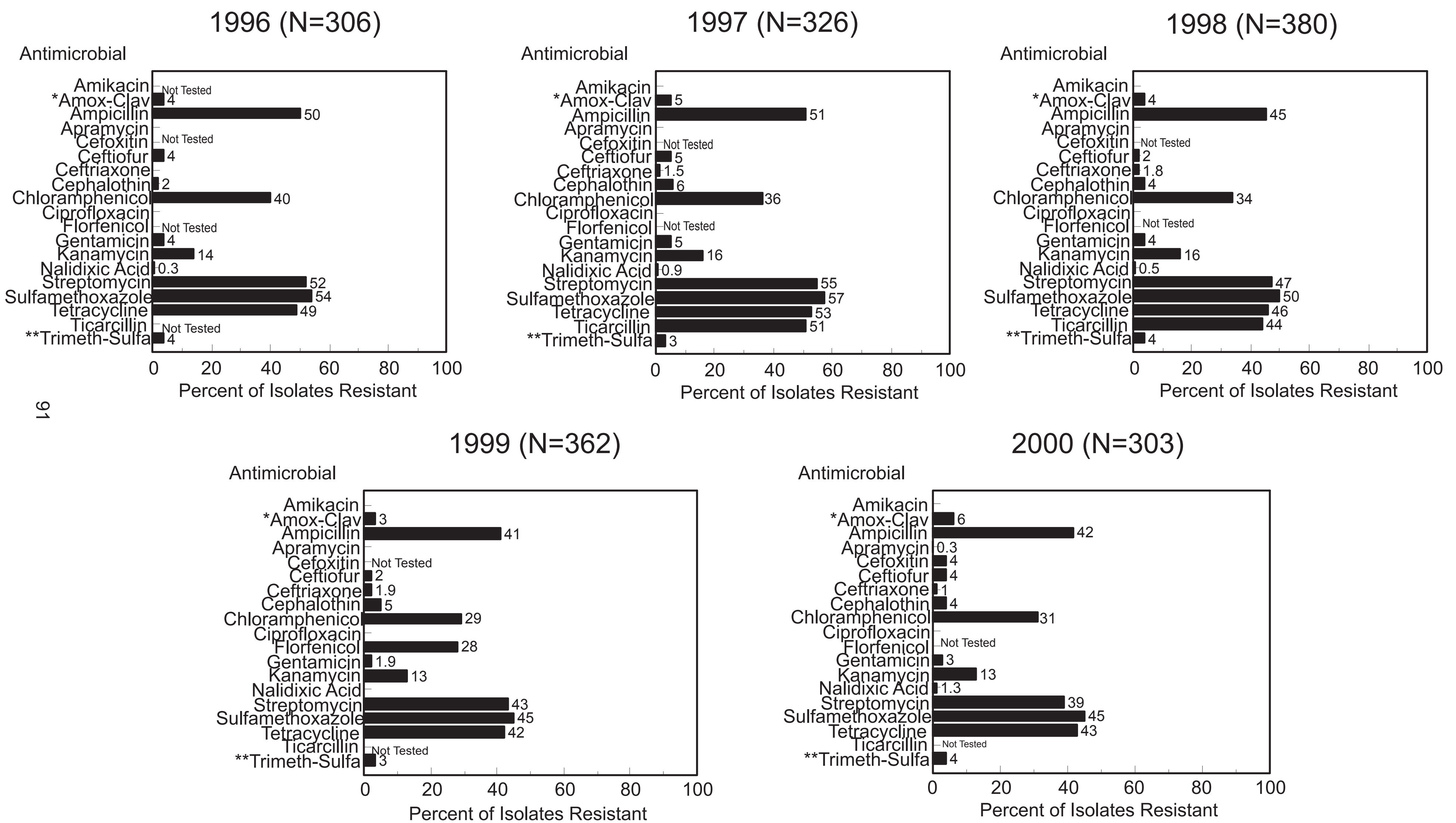
Figure 4o. Resistance among *Salmonella* serotype Typhimurium isolates, 1996 - 2000



*Amox-Clav=Amoxicillin-Clavulanic Acid **Trimeth-Sulfa=Trimethoprim-Sulfamethoxazole

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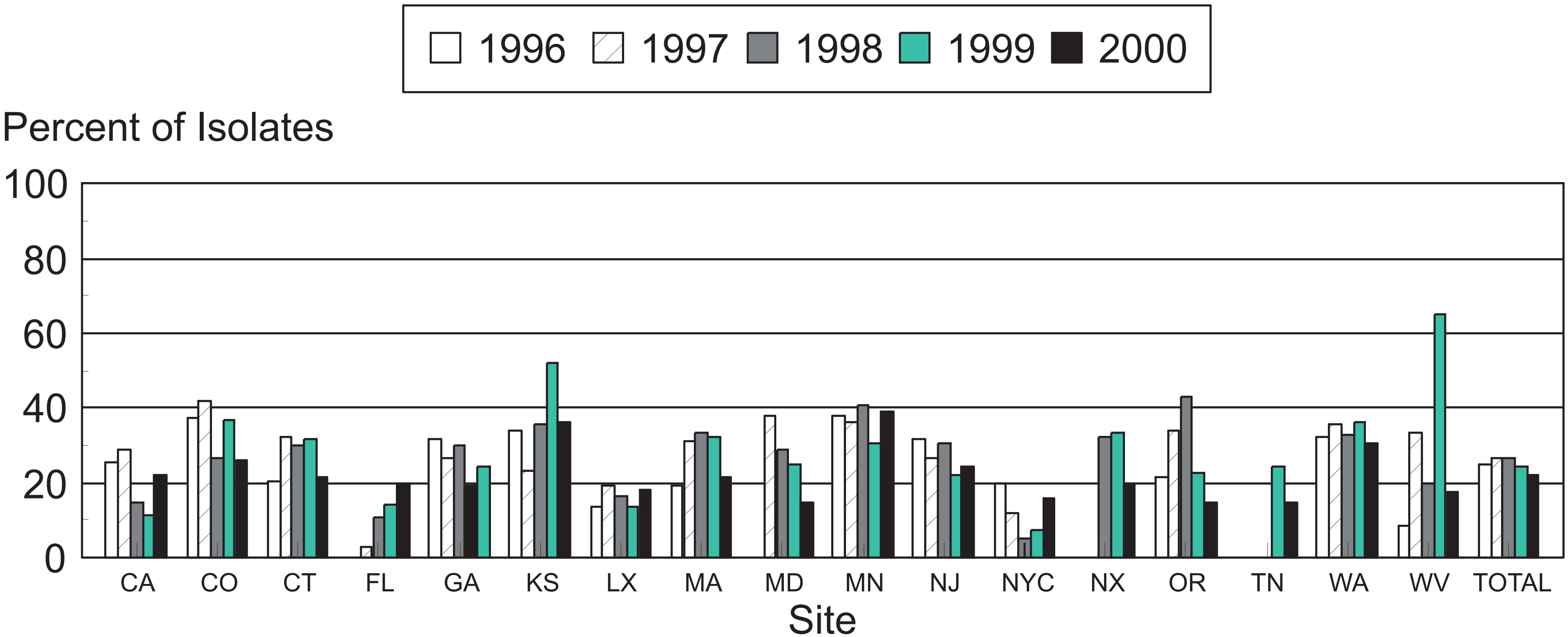
Figure 5. Percent of non-Typhi *Salmonella* isolates that are serotype Typhimurium, by site, 1996 - 2000



Percent Typhimurium for all sites:

1996 - 306/1326 = 23%   1997 - 326/1301 = 25%   1998 - 380/1466 = 26%

1999 - 362/1499 = 24%   2000 - 303/1378 = 22%

CA=Alameda, Contra Costa, and San Francisco counties

NX=excluding New York City

LX=Los Angeles County

NYC= New York

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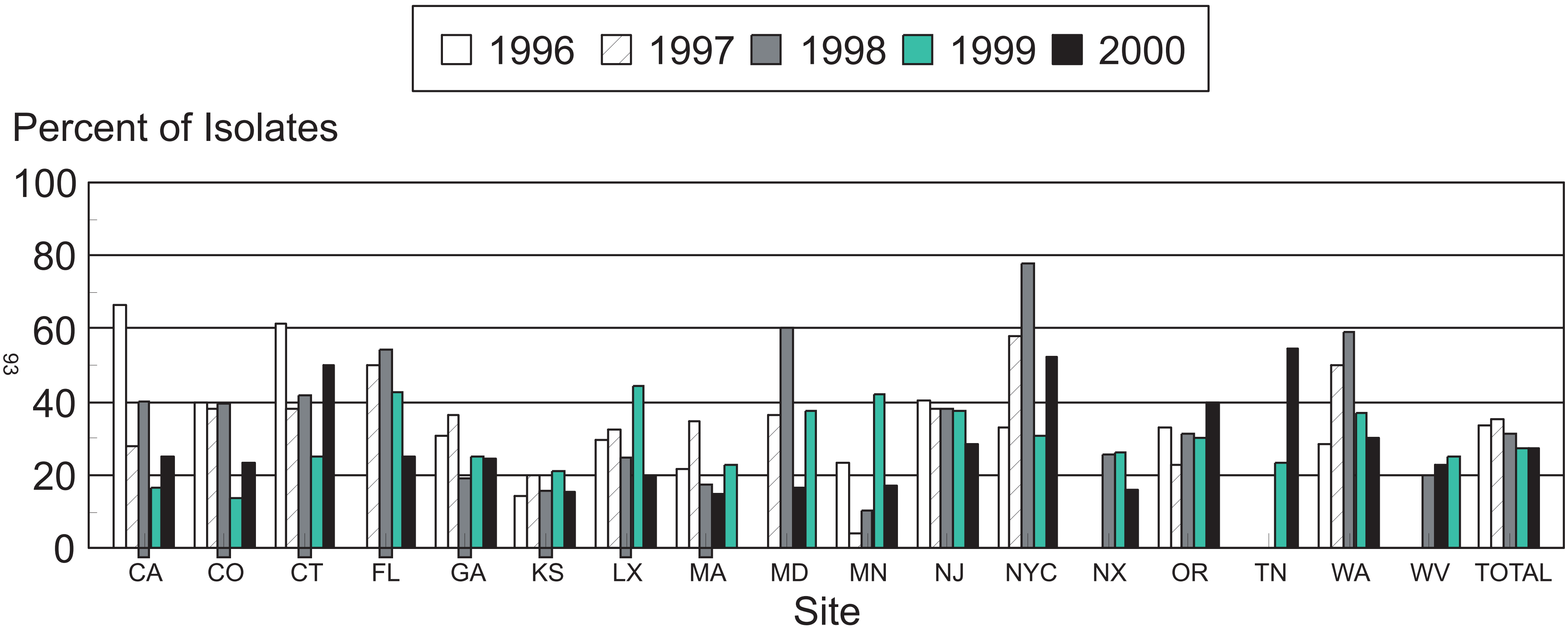
Figure 6. Percent of *Salmonella* Typhimurium isolates that are resistant to at least ampicillin, chloramphenicol, streptomycin, sulfamethoxazole, and tetracycline (ACSSuT), by site, 1996 - 2000



Percent Typhimurium with at least ACSSuT pattern for all sites:
1996 - 103/306 = 34%   1997 - 115/326 = 35%   1998 - 120/380 = 32%
1999 - 102/362 = 28%   2000 - 84/303 = 28%

CA=Alameda, Contra Costa, and San Francisco counties
NX=excluding New York City
LX=Los Angeles County
NYC=New York City

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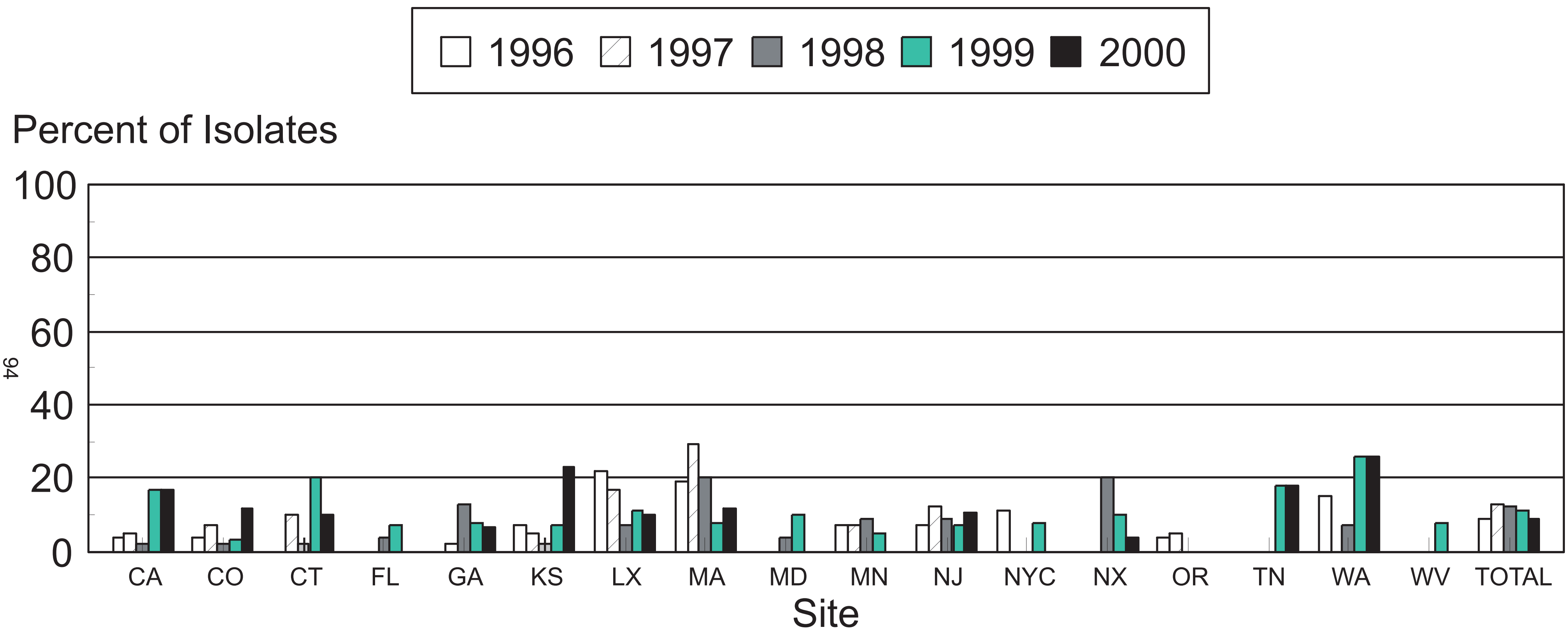
Figure 7. Percent of *Salmonella* Typhimurium isolates that are resistant to at least ampicillin, kanamycin, streptomycin, sulfamethoxazole, and tetracycline (AKSSuT), by site, 1996 - 2000



Percent Typhimurium with at least AKSSuT pattern for all sites:
1996 - 27/306 = 9% 1997 - 41/326 = 13% 1998 - 46/380 = 12%
1999 - 39/362 = 11% 2000 - 28/303 = 9%

CA=Alameda, Contra Costa, and San Francisco counties LX=Los Angeles County
NX=excluding New York City NYC=New York City

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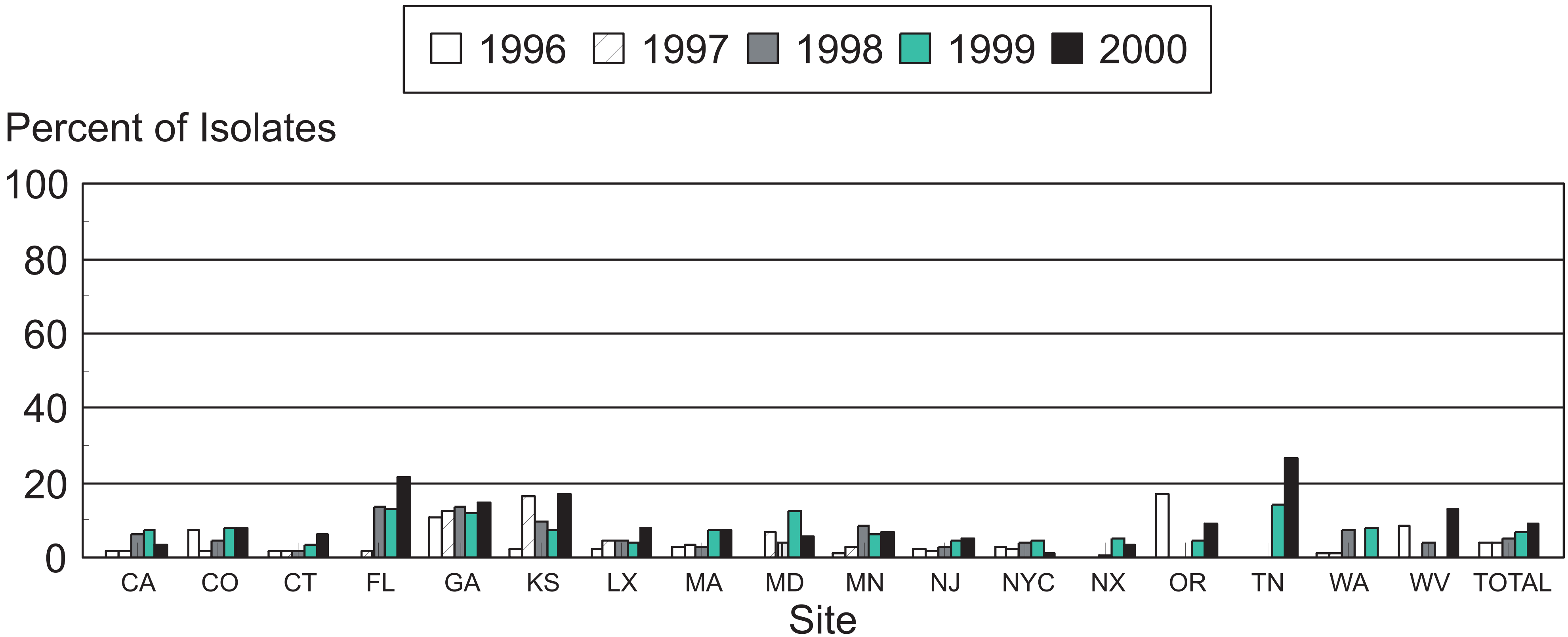
Figure 8. Percent of non-Typhi *Salmonella* isolates that are serotype Newport, by site, 1996 - 2000



Percent Newport for all sites:
1996 - 51/1326 = 4%   1997 - 48/1301 = 4%   1998 - 78/1466 = 5%
1999 - 99/1499 = 7%   2000 - 124/1378 = 9%

CA=Alameda, Contra Costa, and San Francisco counties
NX=excluding New York City

LX=Los Angeles County
NYC=New York City

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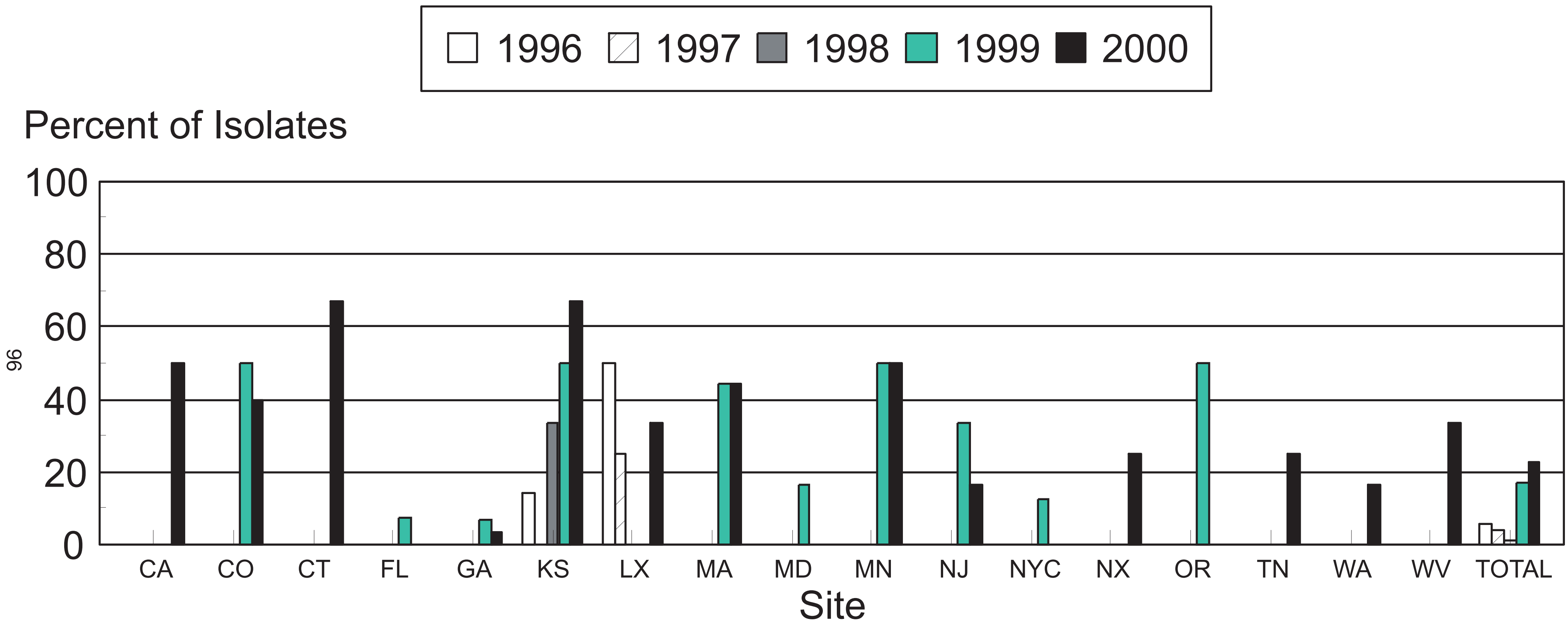
Figure 9. Percent of *Salmonella* Newport isolates that are resistant to at least ampicillin, chloramphenicol, streptomycin, sulfamethoxazole, and tetracycline (ACSSuT), by site, 1996 - 2000



Percent Newport with ACSSuT pattern for all sites:
1996 - 3/51 = 6%   1997 - 2/48 = 4%   1998 - 1/78 = 1%
1999 - 17/99 = 17%   2000 - 28/124 = 23%

CA=Alameda, Contra Costa, and San Francisco counties
LX=Los Angeles County
NX=excluding New York City
NYC=New York City

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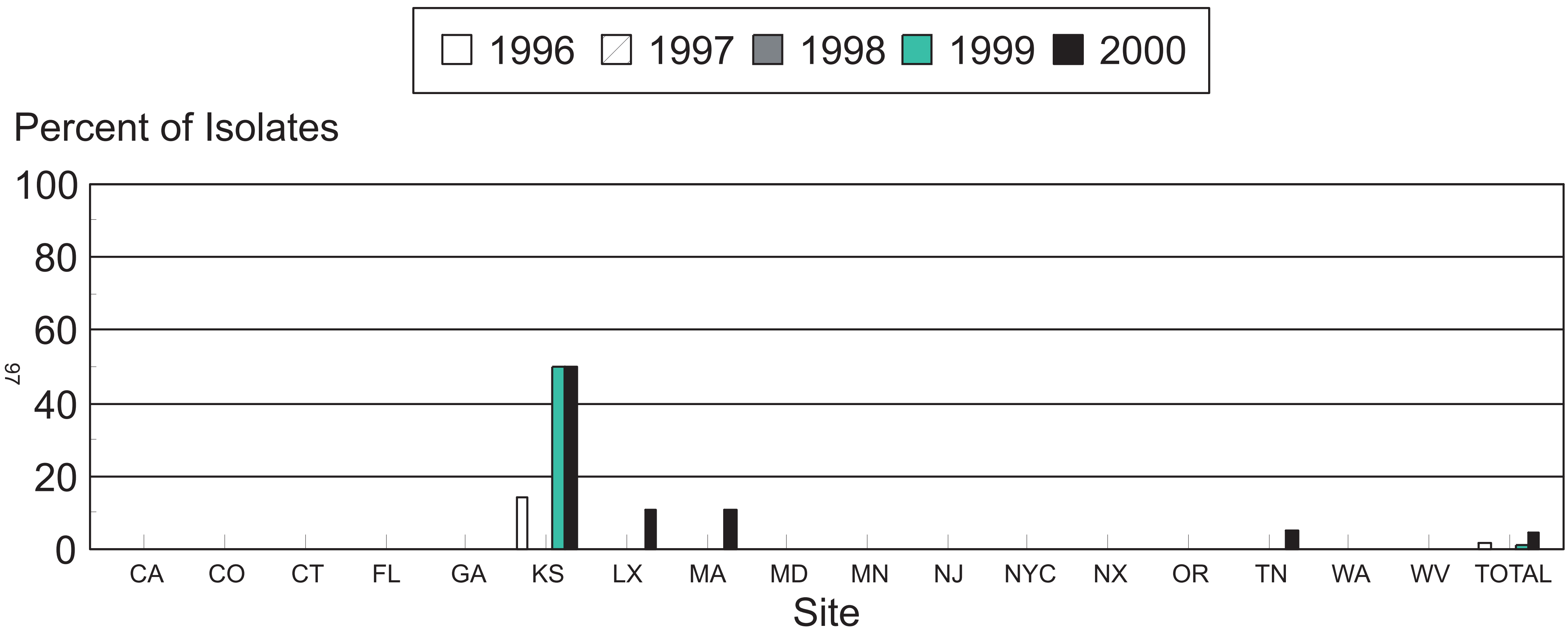
Figure 10. Percent of *Salmonella* Newport isolates that are resistant to at least ampicillin, kanamycin, streptomycin, sulfamethoxazole, and tetracycline (AKSSuT), by site, 1996 - 2000



Percent Newport with AKSSuT pattern for all sites:
1996 - 1/51 = 2%   1997 - 0/48 = 0%   1998 - 0/78 = 0%
1999 - 1/99 = 1%   2000 - 6/124 = 5%

CA=Alameda, Contra Costa, and San Francisco counties
NX=excluding New York City
LX=Los Angeles County
NYC=New York City

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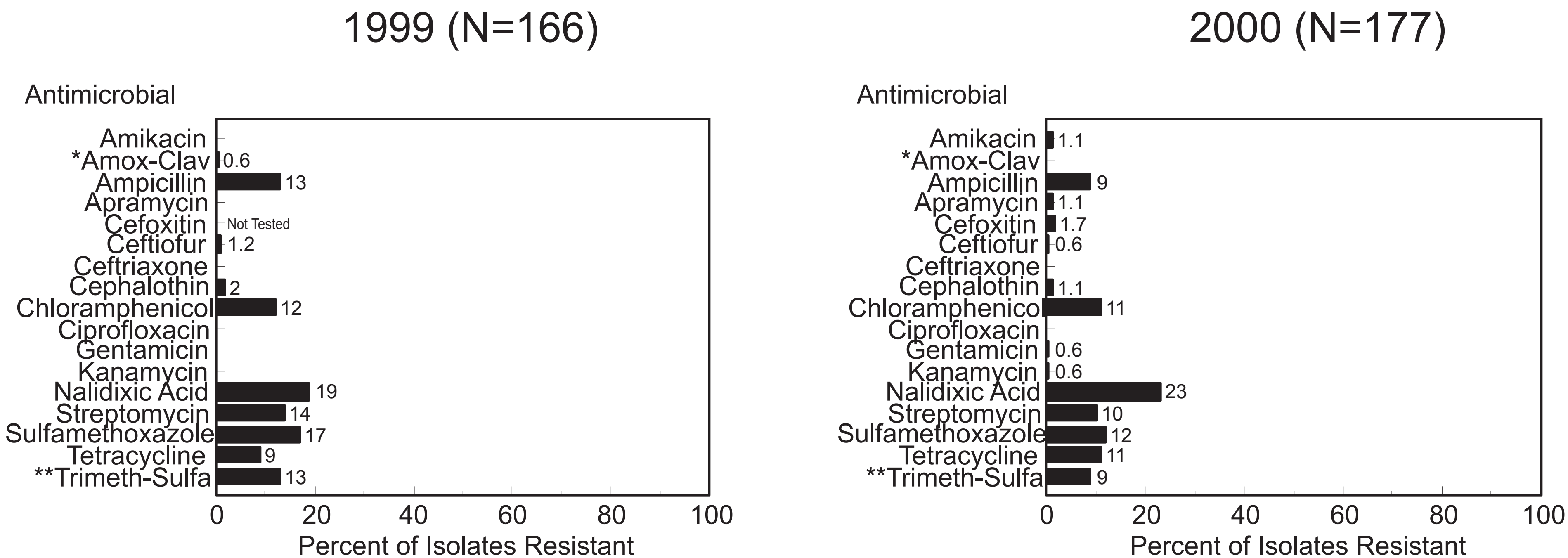
Figure 11. Resistance among *Salmonella* Typhi isolates, 1999 - 2000



*Amox-Clav=Amoxicillin-Clavulanic Acid **Trimeth-Sulfa=Trimethoprim-Sulfamethoxazole

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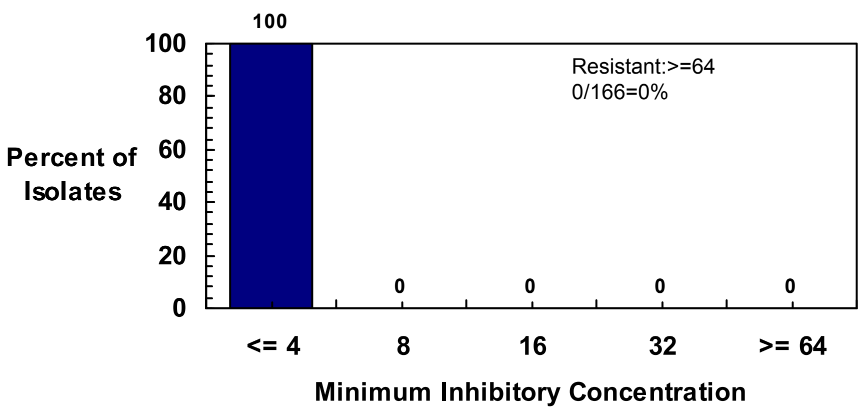
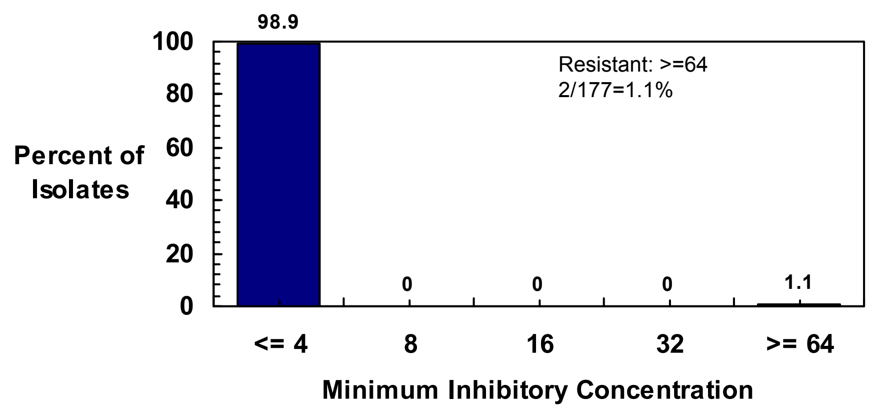
Figure 12a. MICs among *Salmonella* Typhi isolates, by antimicrobial agent, 1999 - 2000

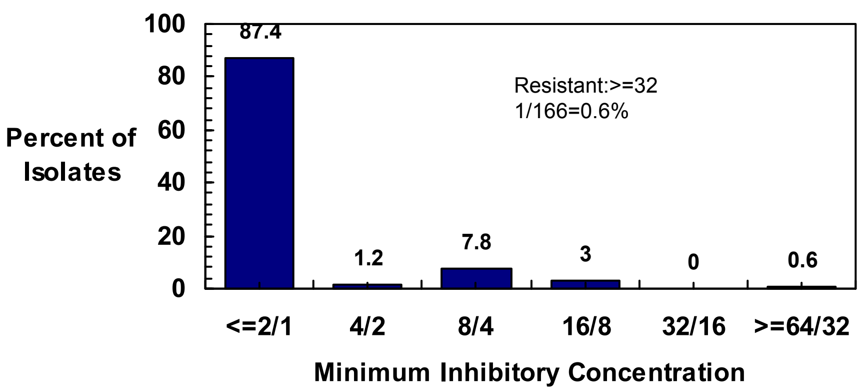
1999 Amikacin



2000 Amikacin



1999 Amoxicillin-Clavulanic Acid



2000 Amoxicillin-Clavulanic Acid

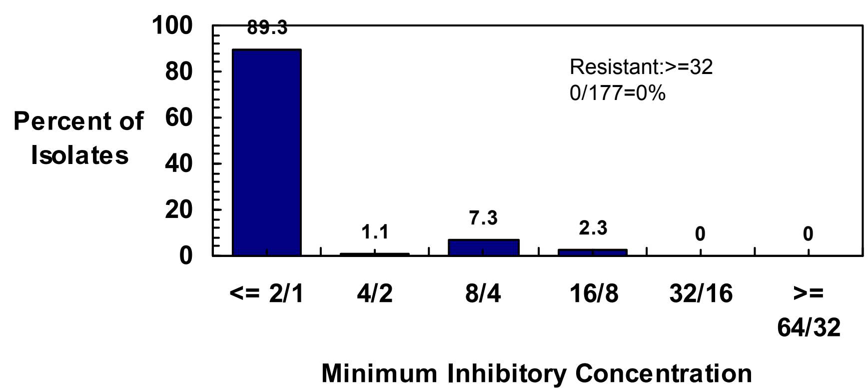


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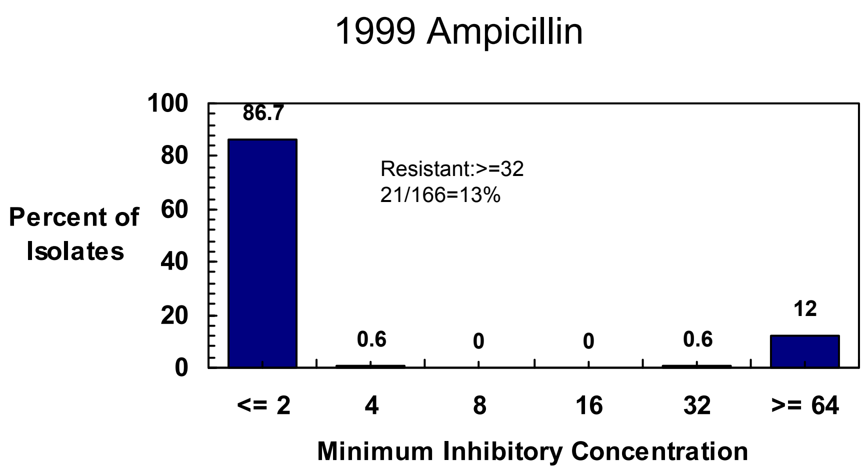
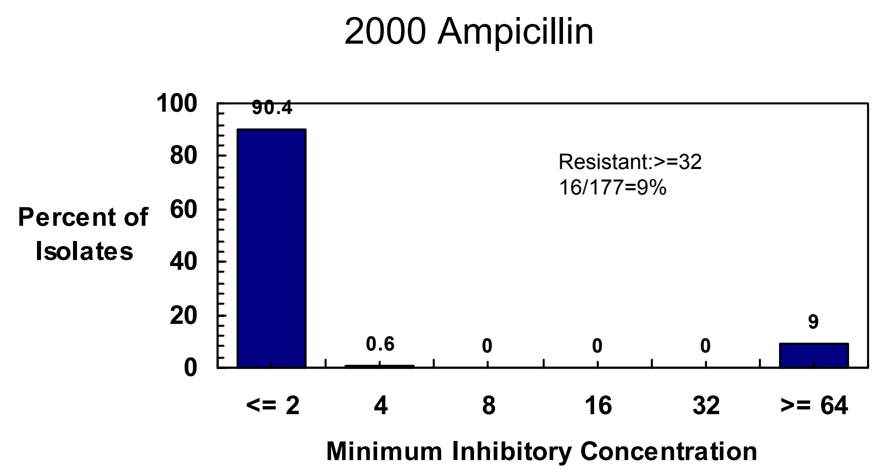
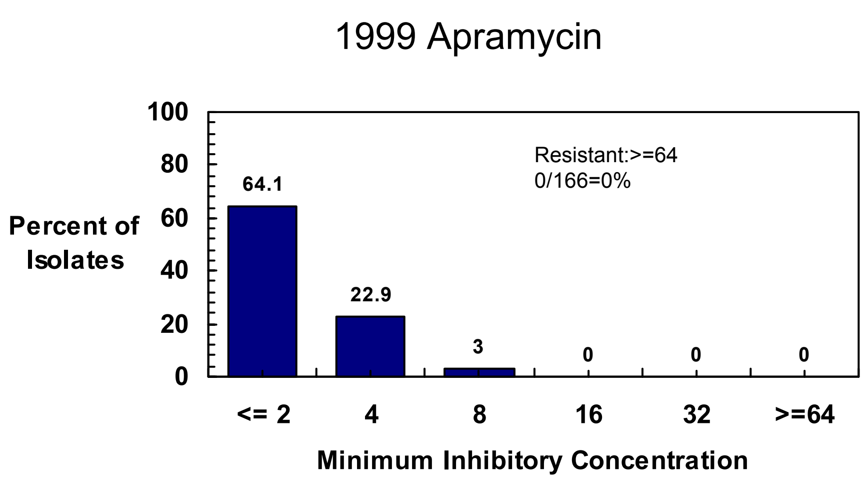
Figure 12b. MICs among *Salmonella* Typhi isolates, by antimicrobial agent, 1999 - 2000







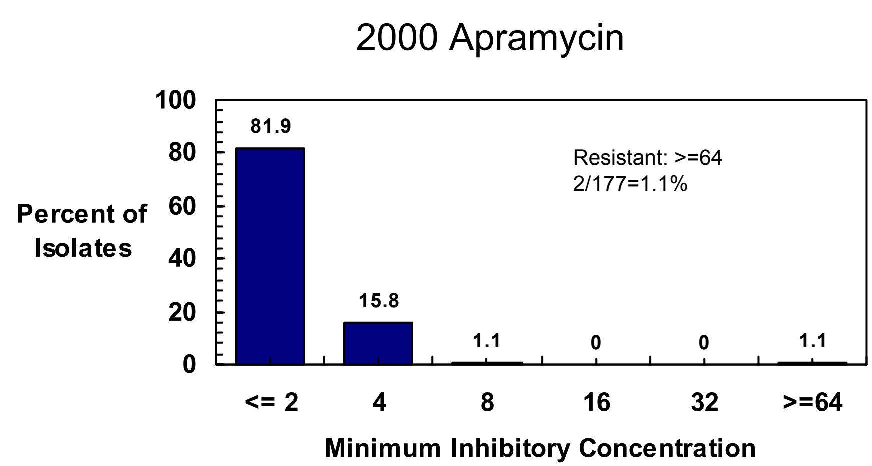


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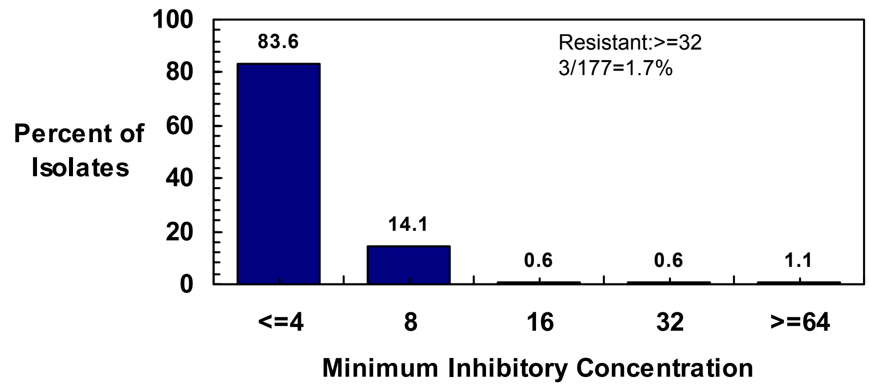
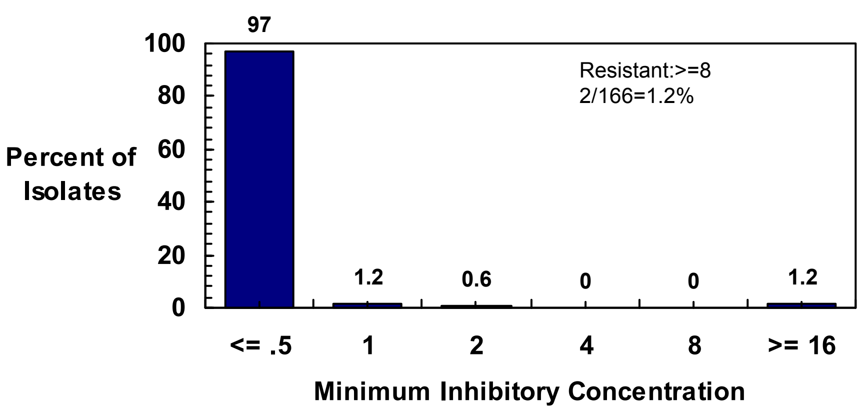
Figure 12c. MICs among *Salmonella* Typhi isolates, by antimicrobial agent, 1999 - 2000

Not tested in 1999

2000 Cefoxitin



1999 Ceftiofur



2000 Ceftiofur

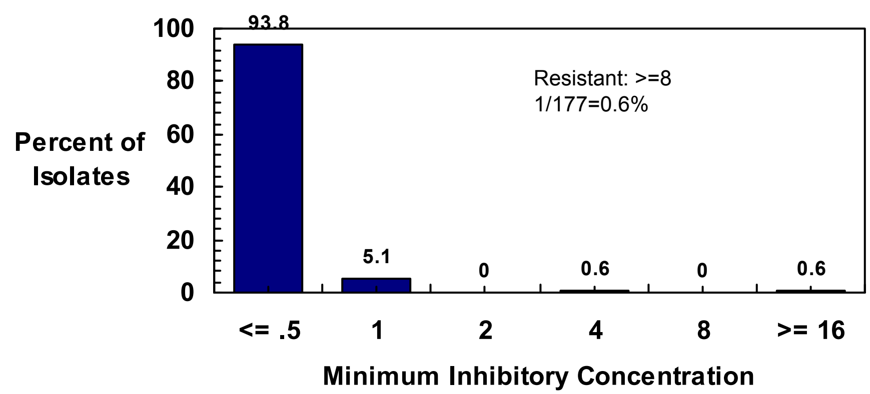


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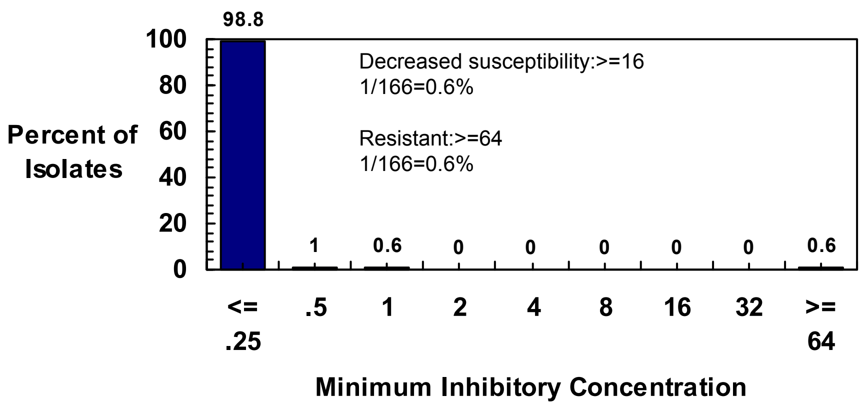
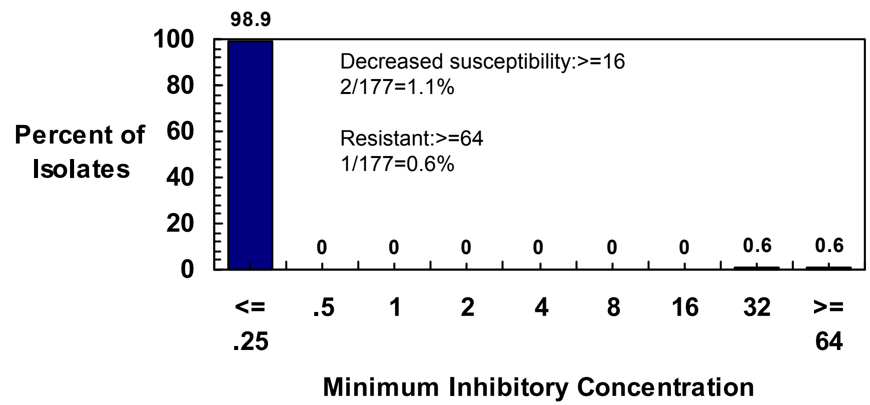
Figure 12d. MICs among *Salmonella* Typhi isolates, by antimicrobial agent, 1999 - 2000

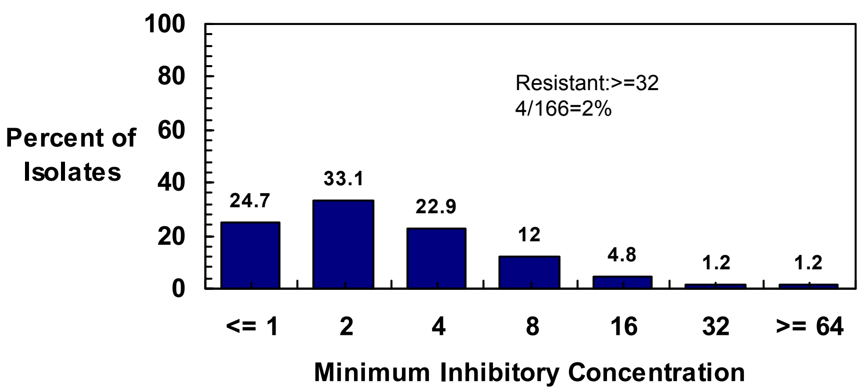
1999 Ceftriaxone*



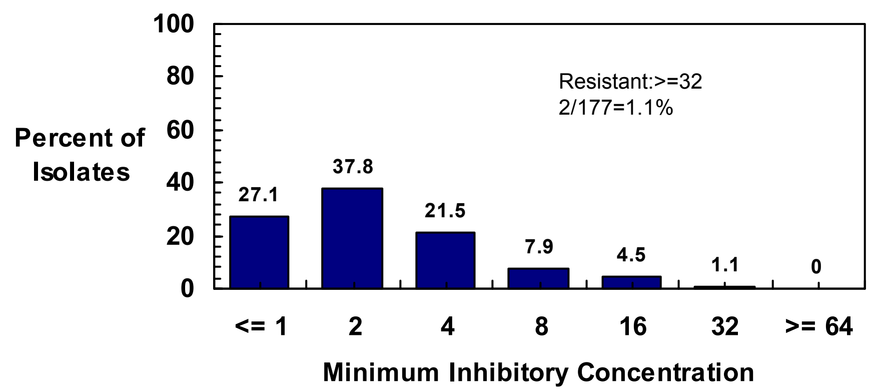
2000 Ceftriaxone*



1999 Cephalothin



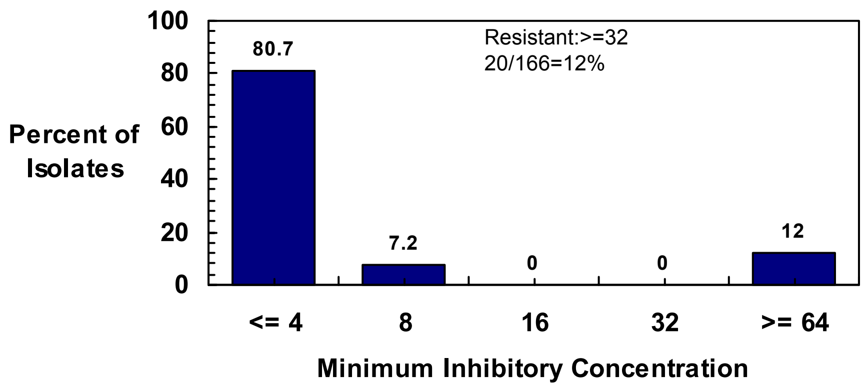
2000 Cephalothin



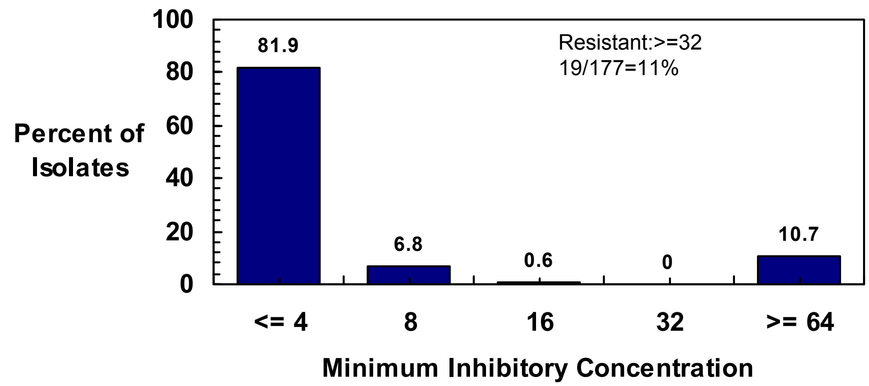
* Sensititre results only, isolates with decreased susceptibility are also tested by E-test

Figure 12e. MICs among *Salmonella* Typhi isolates, by antimicrobial agent, 1999 - 2000

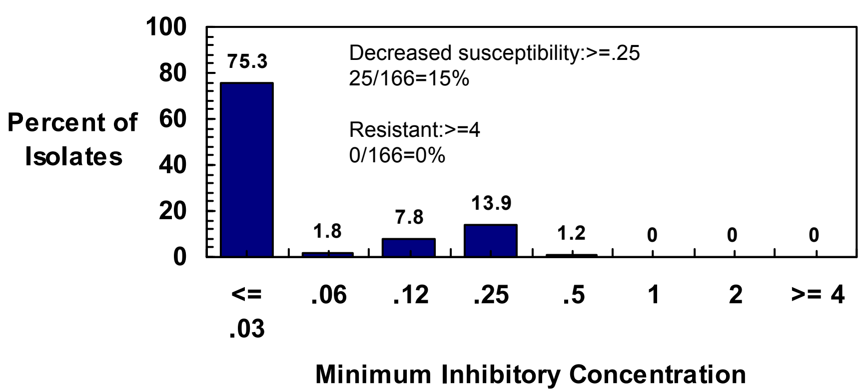
1999 Chloramphenicol



2000 Chloramphenicol



1999 Ciprofloxacin



2000 Ciprofloxacin

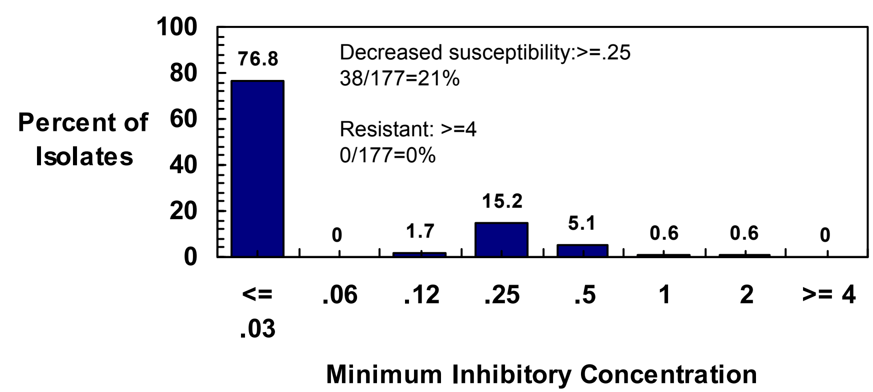


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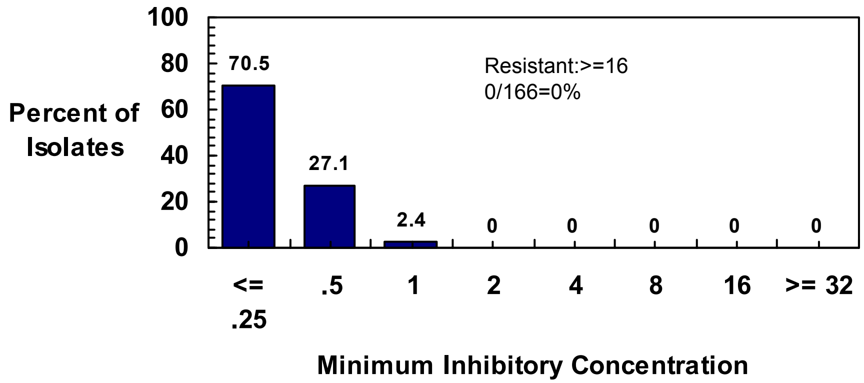
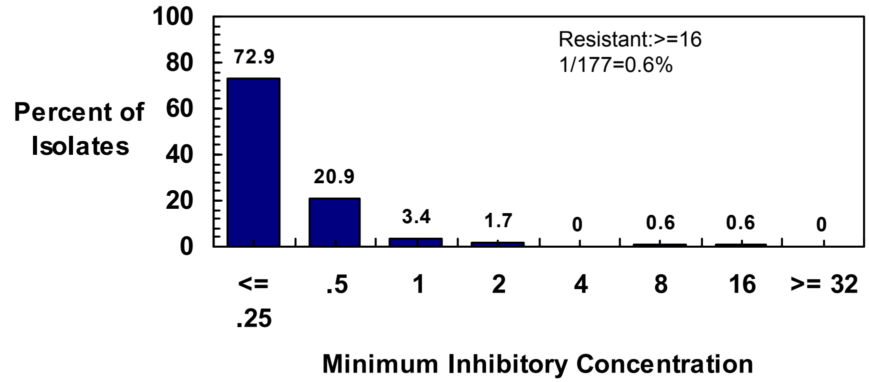
Figure 12f. MICs among *Salmonella* Typhi isolates, by antimicrobial agent, 1999 - 2000

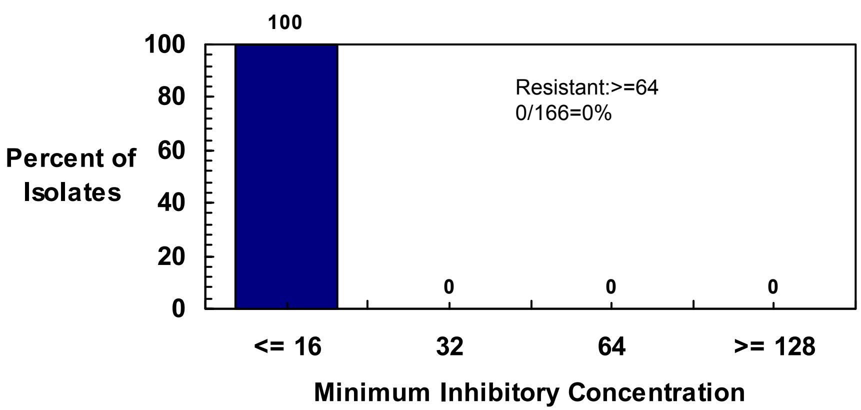
1999 Gentamicin



2000 Gentamicin



1999 Kanamycin



2000 Kanamycin

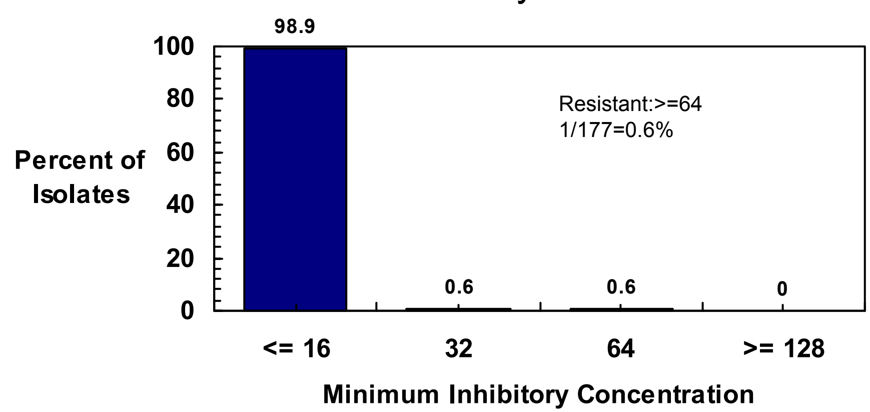


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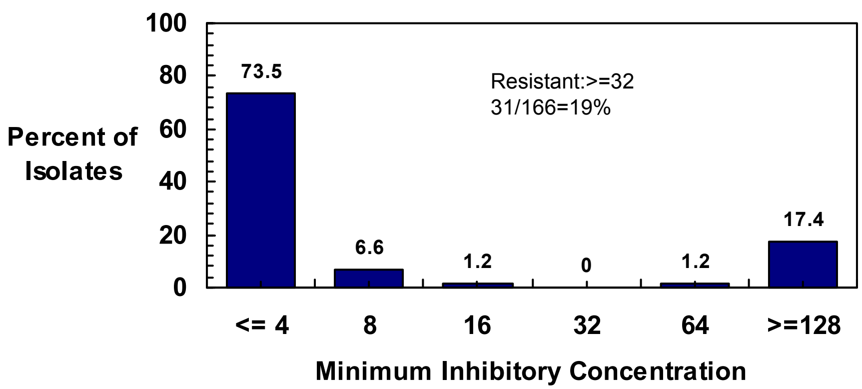
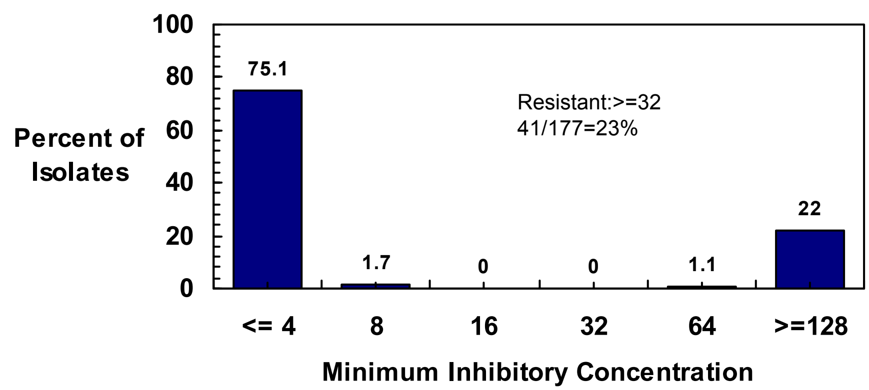
Figure 12g. MICs among *Salmonella* Typhi isolates, by antimicrobial agent, 1999 - 2000

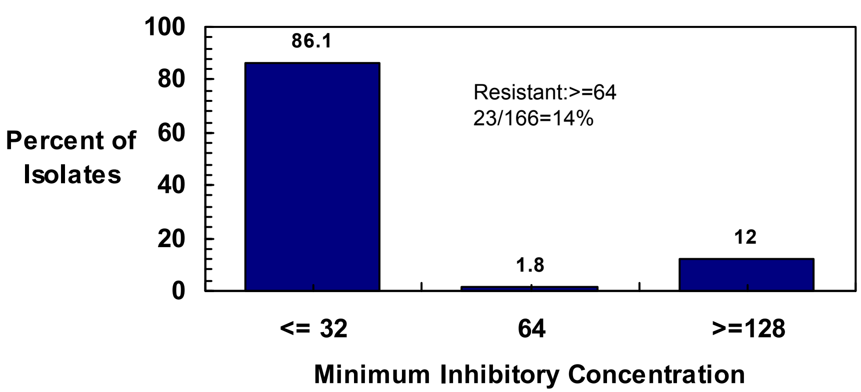
1999 Nalidixic Acid



2000 Nalidixic Acid



1999 Streptomycin



2000 Streptomycin

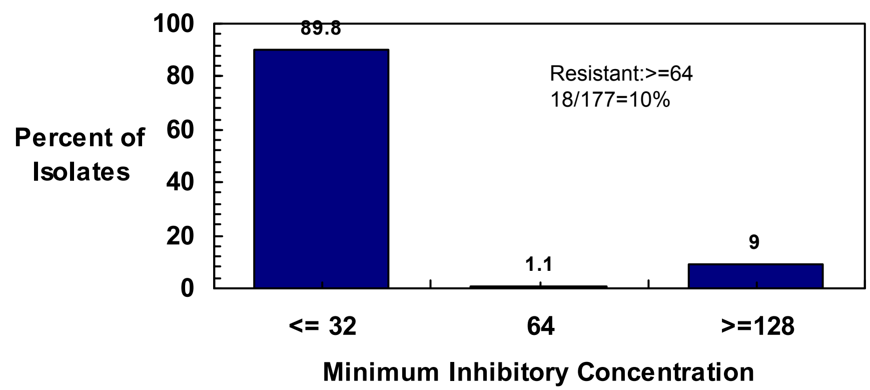


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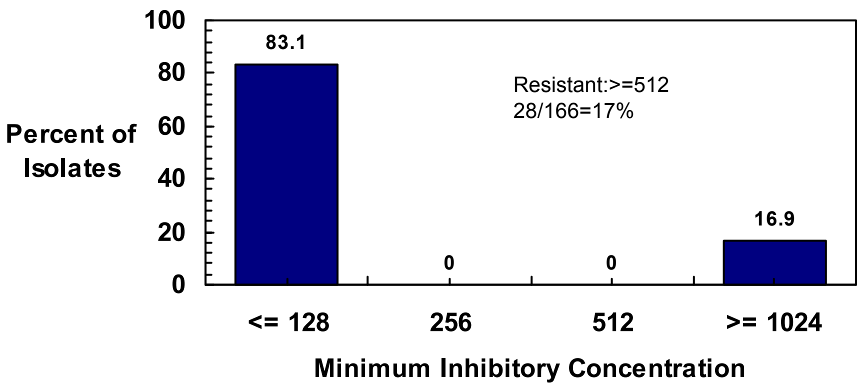
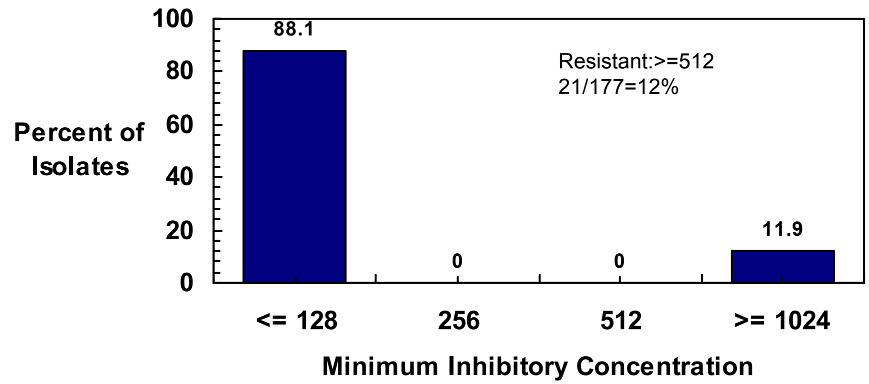
Figure 12h. MICs among *Salmonella* Typhi isolates, by antimicrobial agent, 1999 - 2000

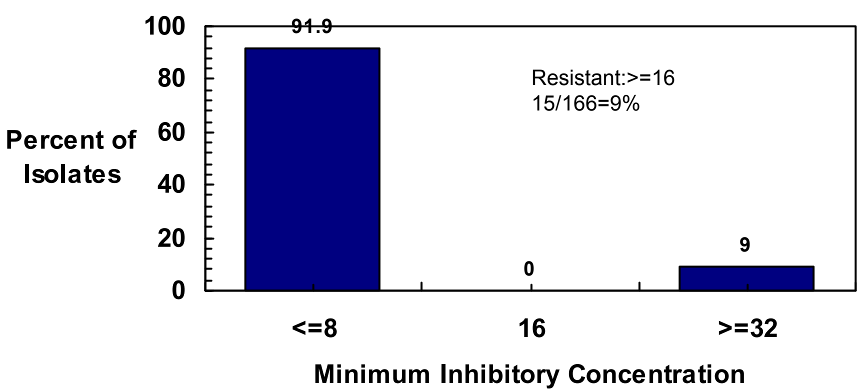
1999 Sulfamethoxazole



2000 Sulfamethoxazole



1999 Tetracycline



2000 Tetracycline

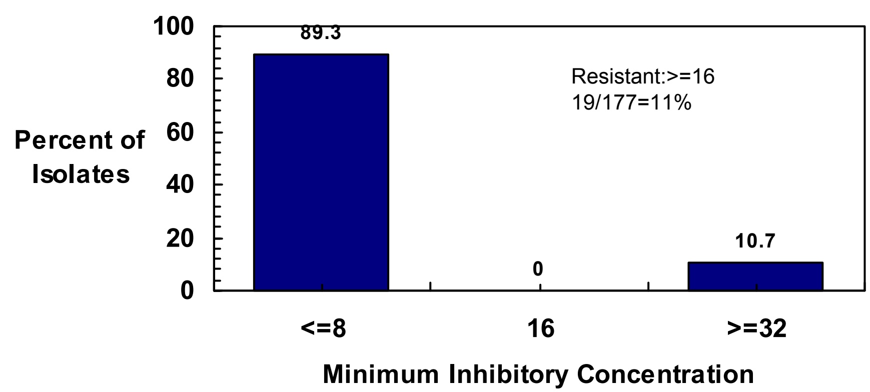


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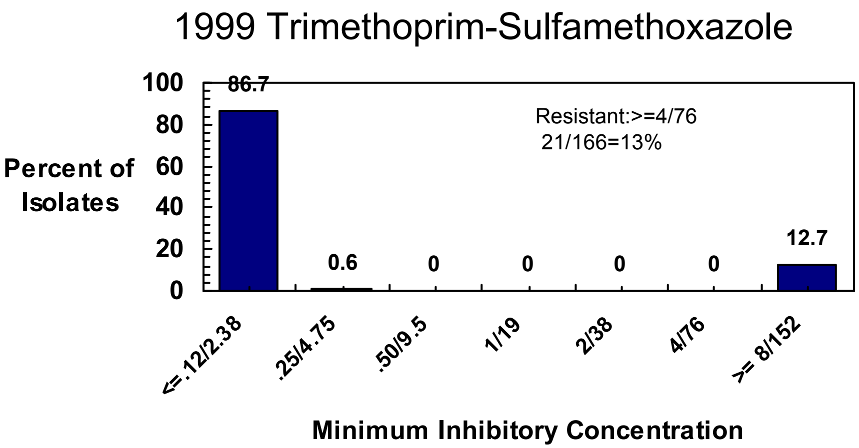
Figure 12i. MICs among *Salmonella* Typhi isolates, by antimicrobial agent, 1999 - 2000



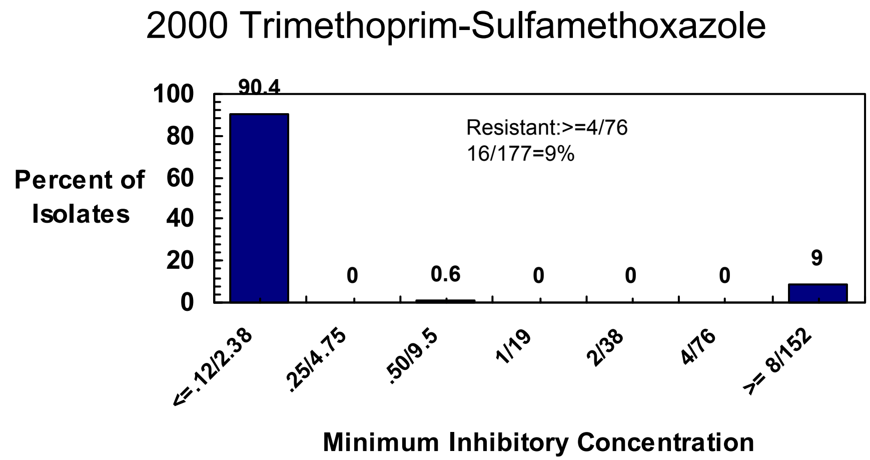


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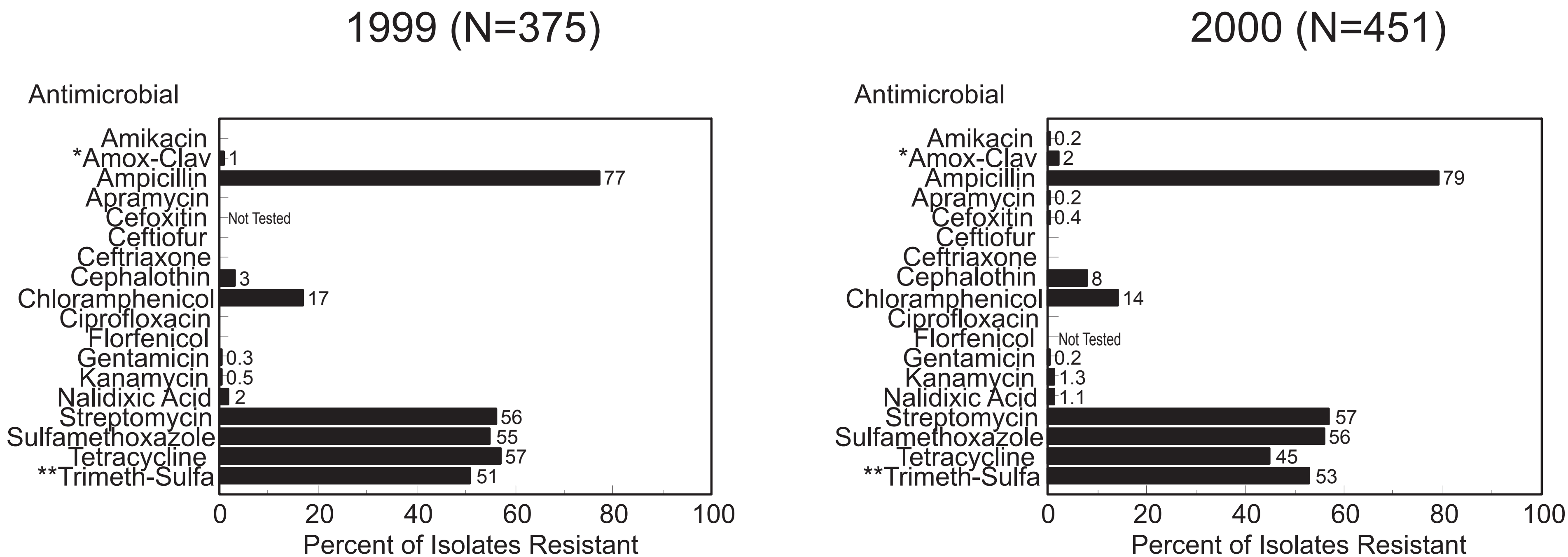
Figure 13. Resistance among *Shigella* isolates, 1999 - 2000



*Amox-Clav=Amoxicillin-Clavulanic Acid **Trimeth-Sulfa=Trimethoprim-Sulfamethoxazole

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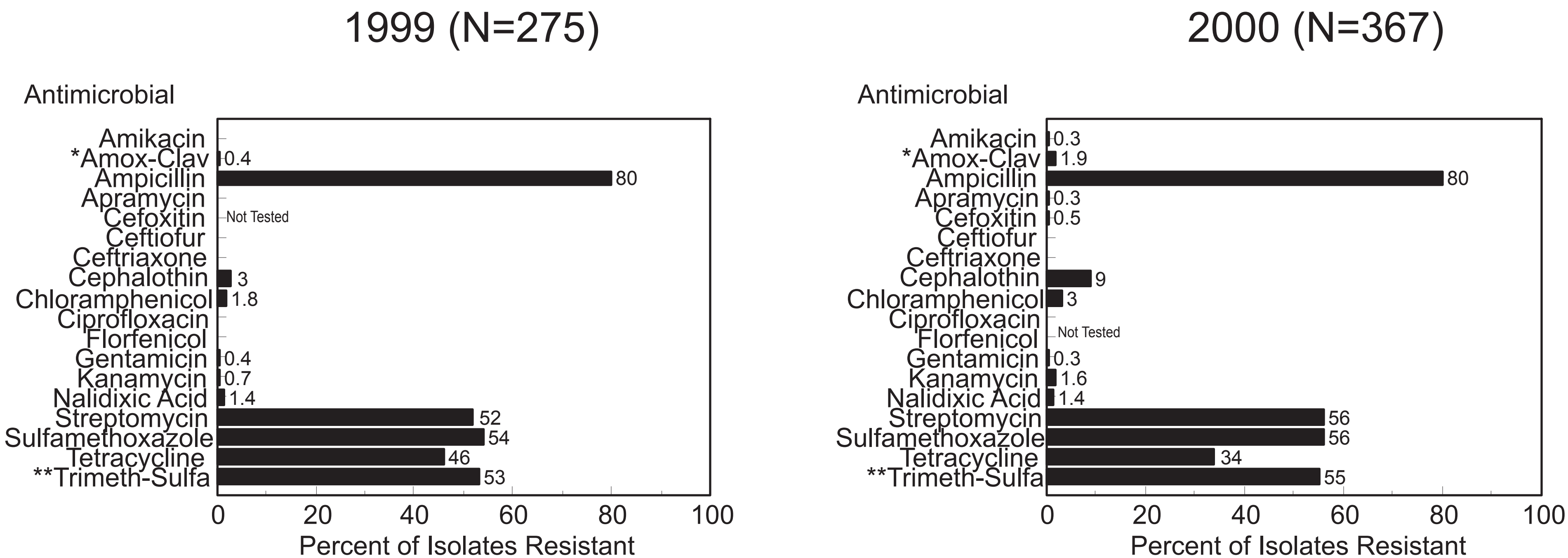
Figure 14a. Resistance among *Shigella sonnei*, 1999 - 2000



*Amox-Clav=Amoxicillin-Clavulanic Acid **Trimeth-Sulfa=Trimethoprim-Sulfamethoxazole

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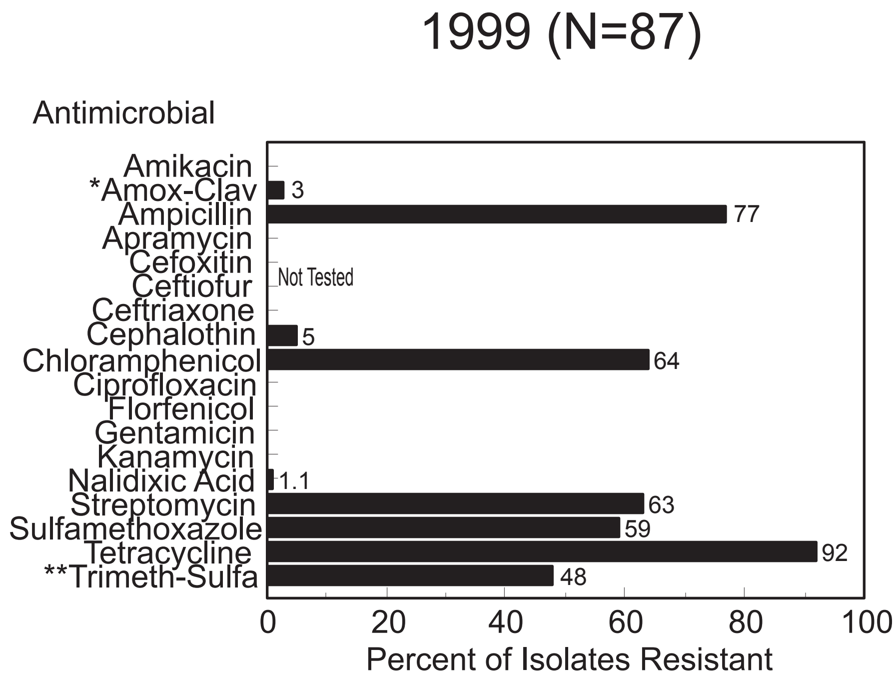
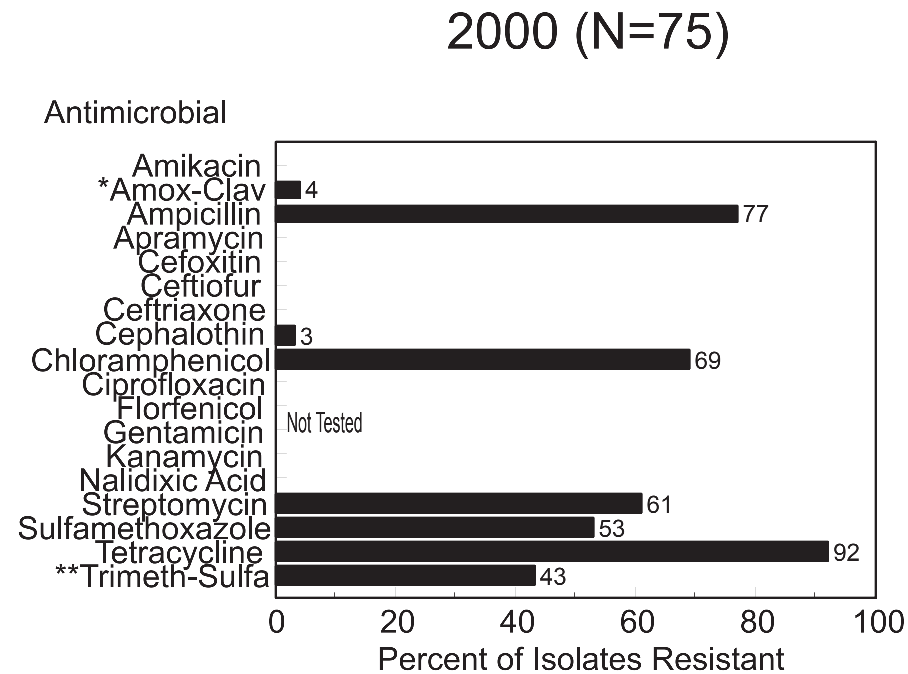
Figure 14b. Resistance among *Shigella flexneri* isolates, 1999 - 2000





*Amox-Clav=Amoxicillin-Clavulanic Acid **Trimeth-Sulfa=Trimethoprim-Sulfamethoxazole

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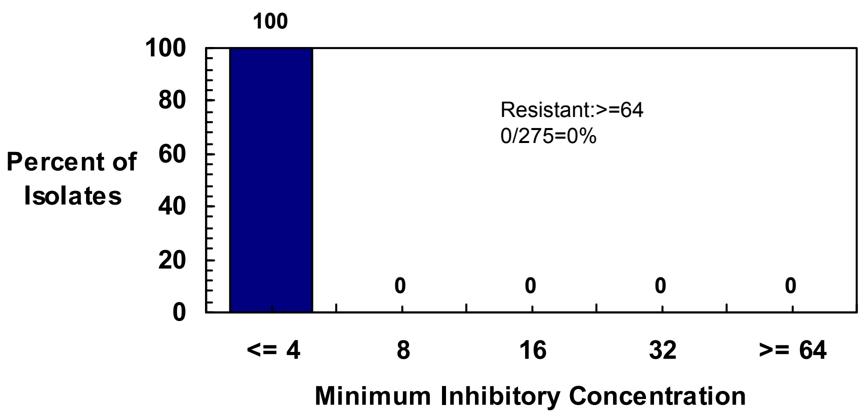
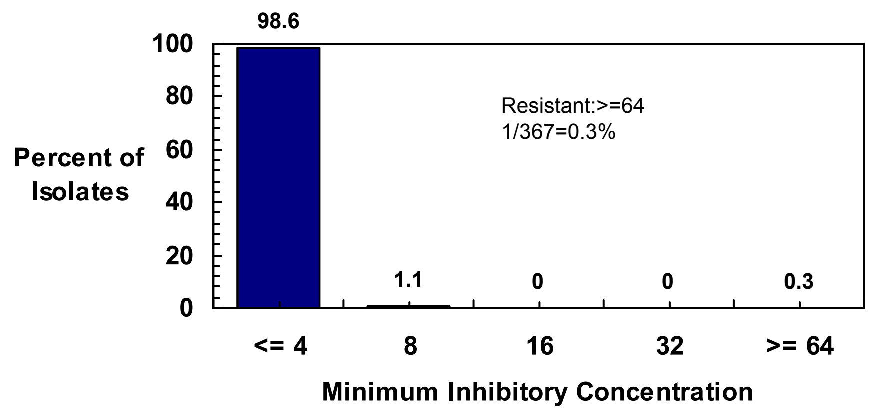
Figure 15a. MICs for amikacin among *Shigella* isolates, by species, 1999 - 2000

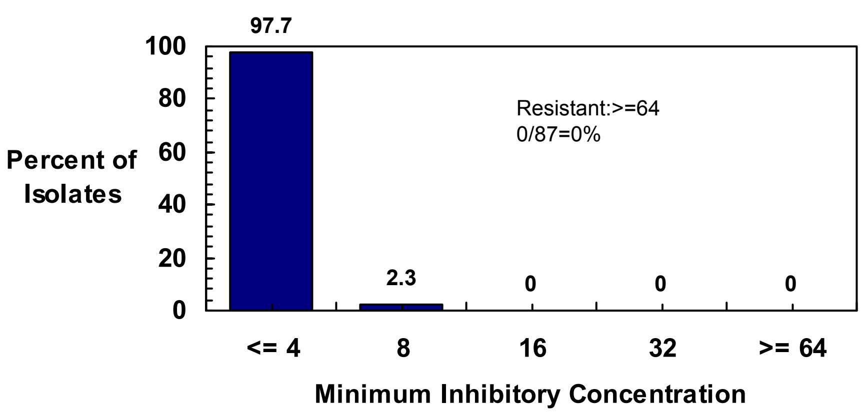
1999 *Shigella sonnei*



2000 *Shigella sonnei*



1999 *Shigella flexneri*



2000 *Shigella flexneri*

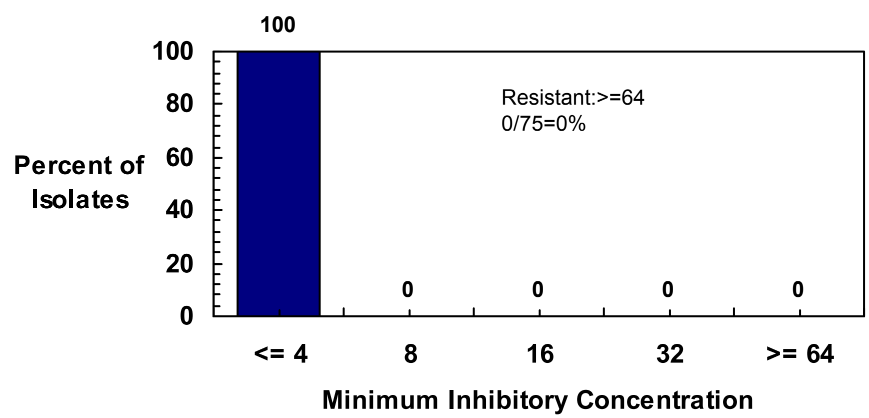


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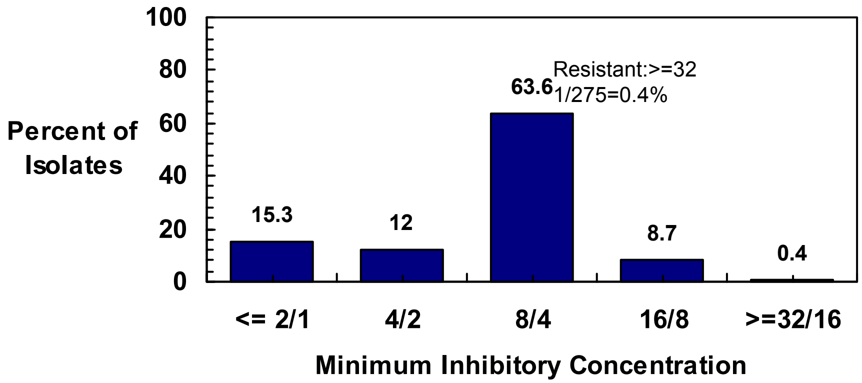
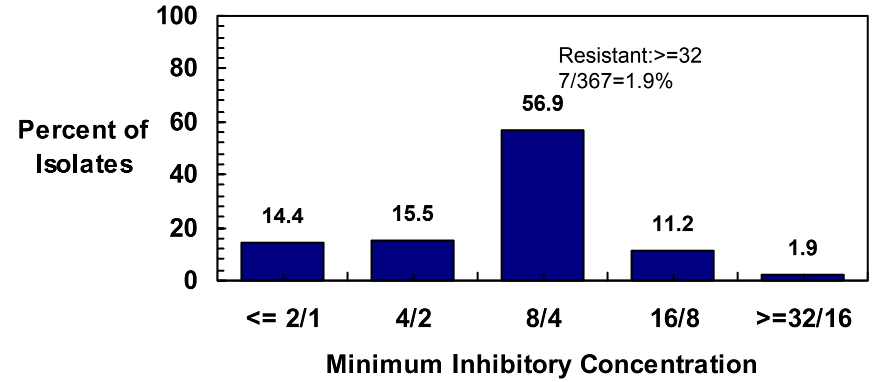
Figure 15b. MICs for amoxicillin-clavulanic acid among *Shigella* isolates, by species, 1999 - 2000

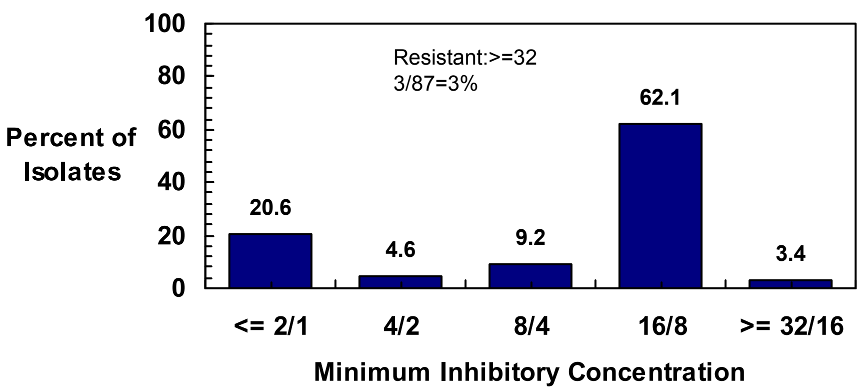
1999 *Shigella sonnei*



2000 *Shigella sonnei*



1999 *Shigella flexneri*



2000 *Shigella flexneri*

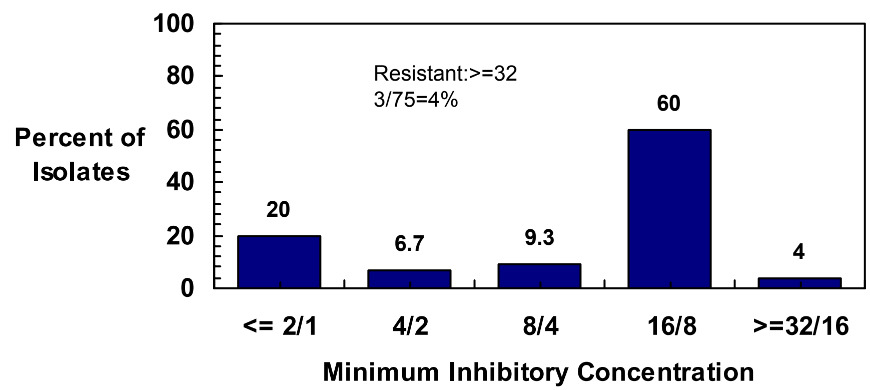


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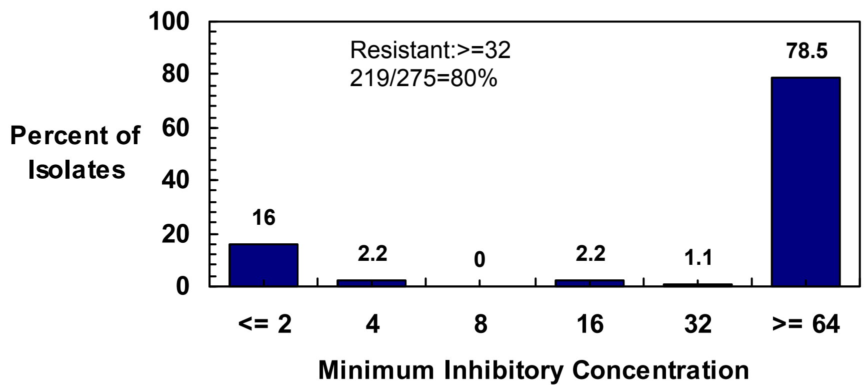
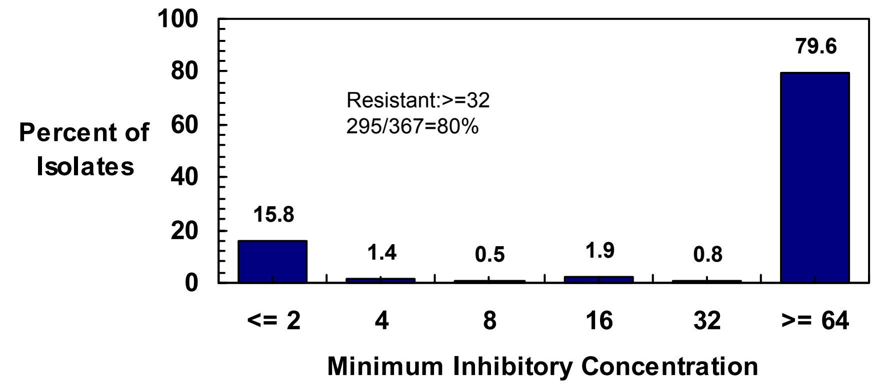
Figure 15c. MICs for ampicillin among *Shigella* isolates, by species, 1999 - 2000

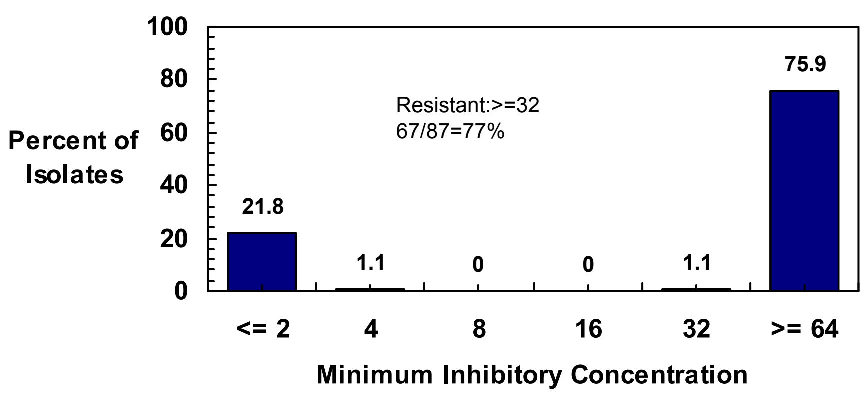
1999 *Shigella sonnei*



2000 *Shigella sonnei*



1999 *Shigella flexneri*



2000 *Shigella flexneri*

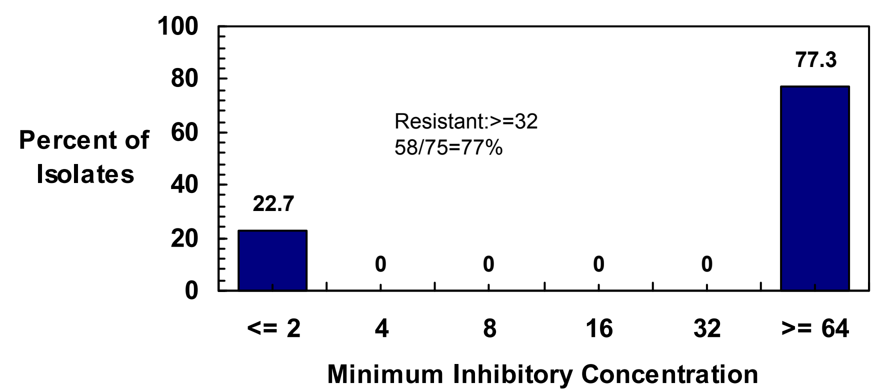


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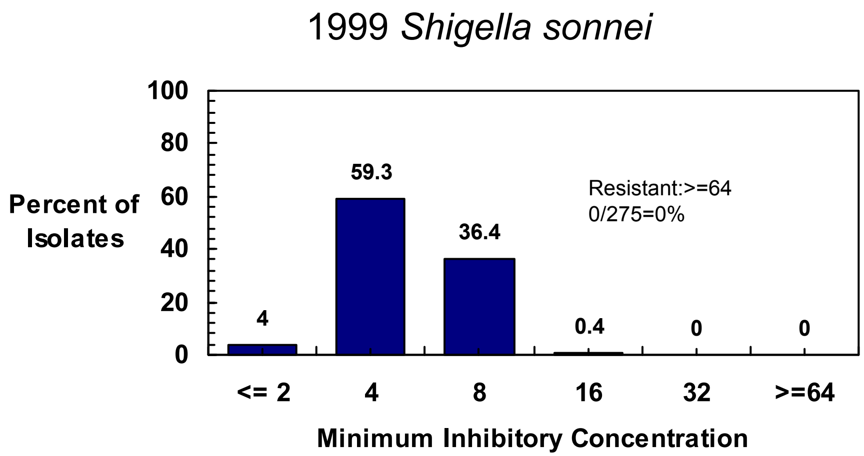
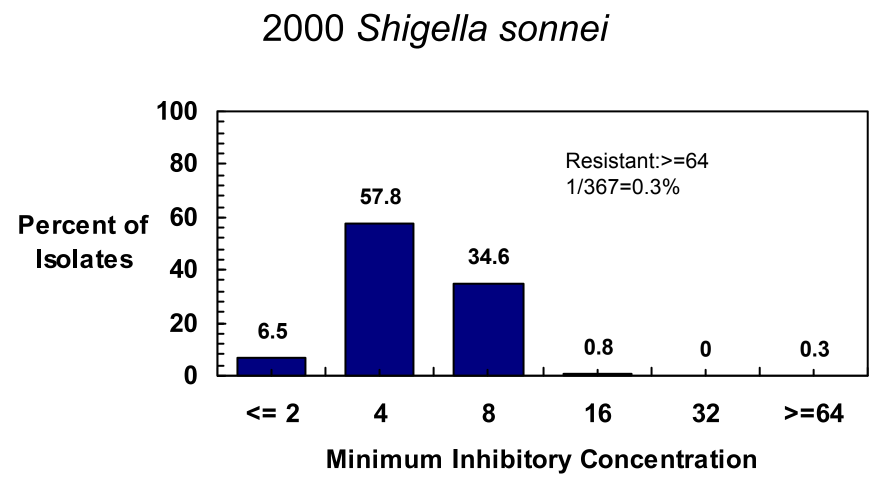
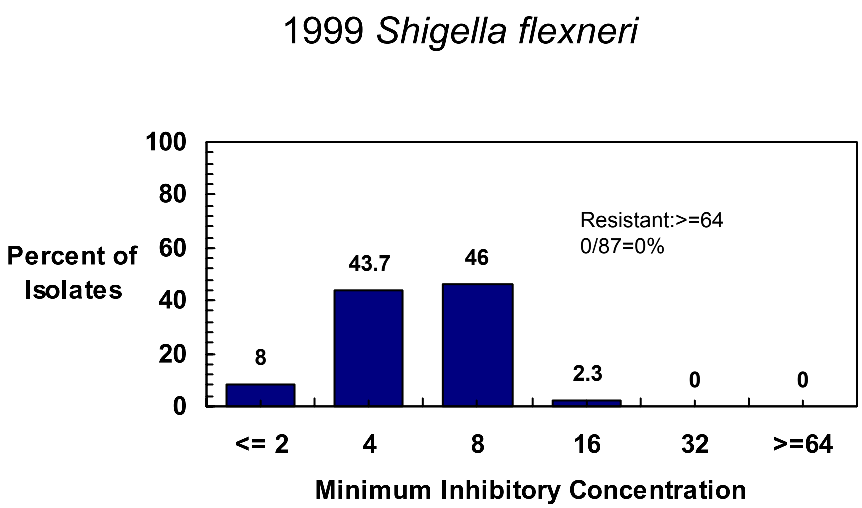
Figure 15d. MICs for apramycin among *Shigella* isolates, by species, 1999 - 2000







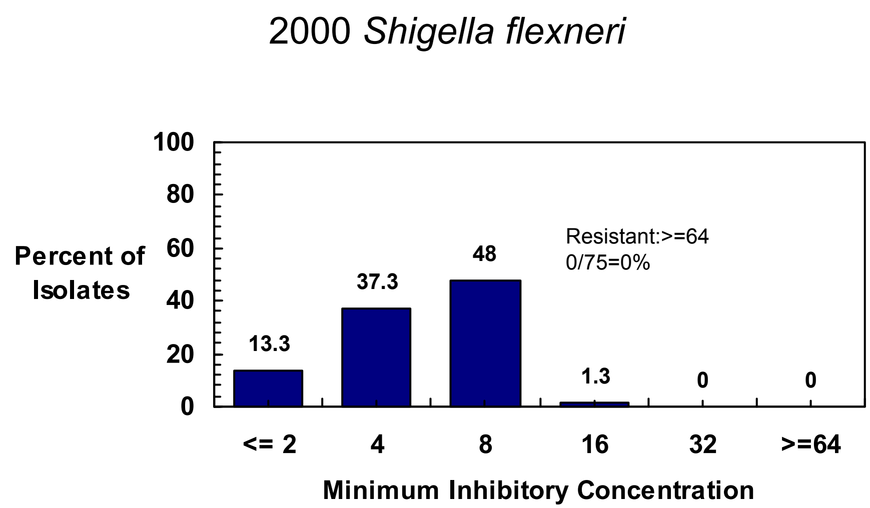


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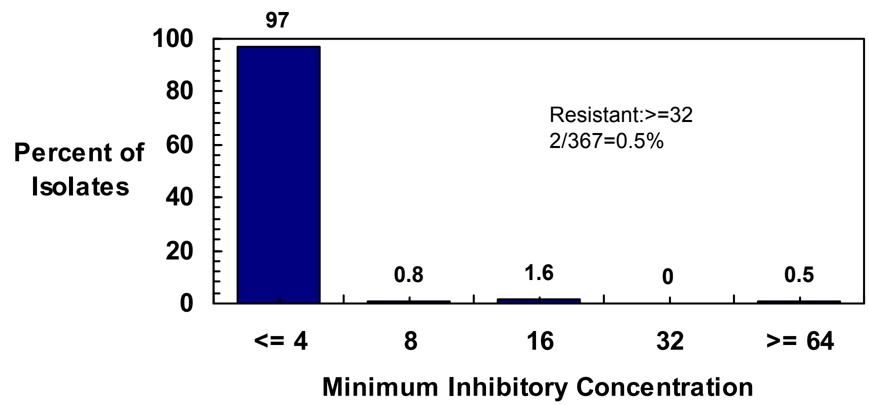
Figure 15e. MICs for cefoxitin among *Shigella* isolates, by species, 1999 - 2000

Not tested in 1999

2000 *Shigella sonnei*



Not tested in 1999

2000 *Shigella flexneri*

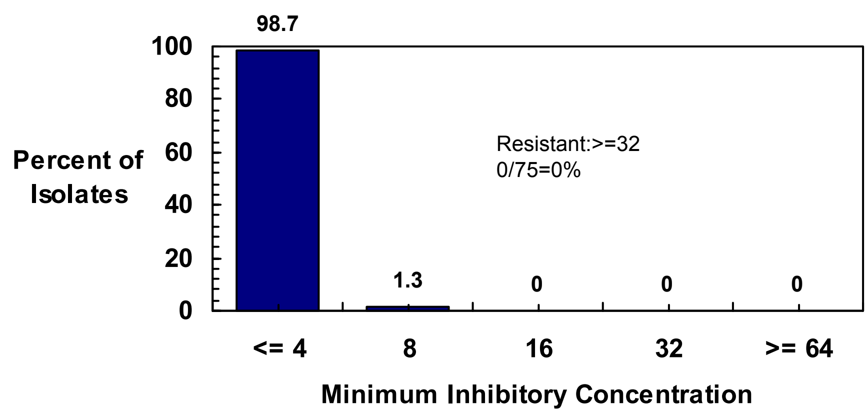


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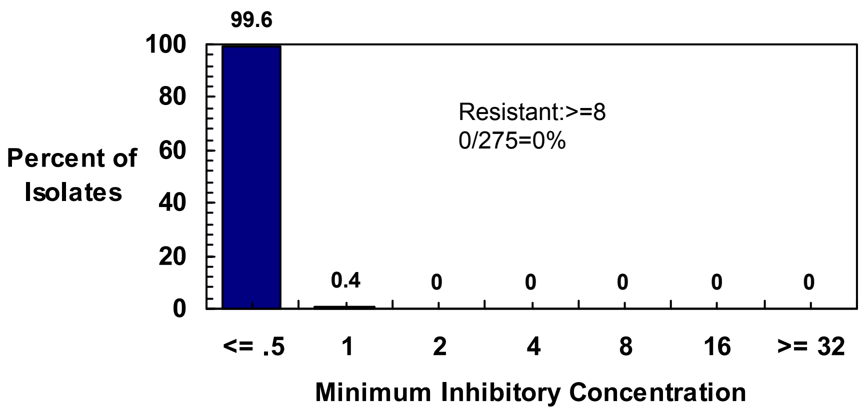
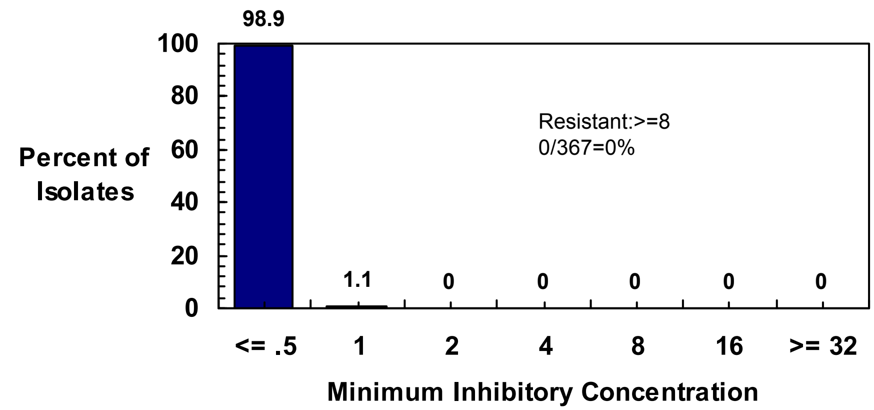
Figure 15f. MICs for ceftiofur among *Shigella* isolates, by species, 1999 - 2000

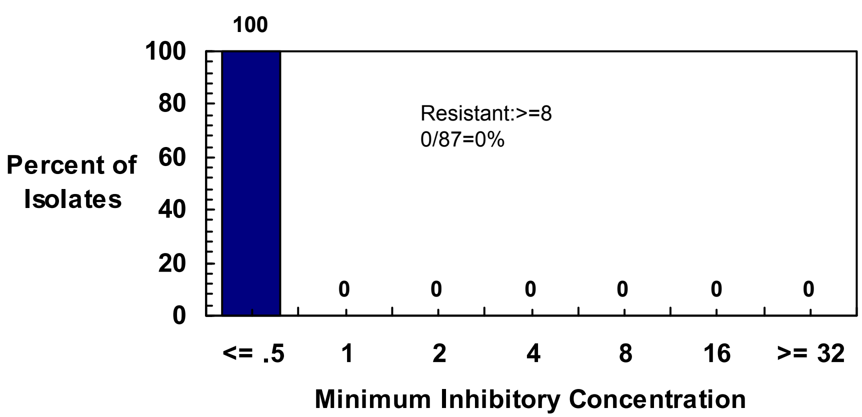
1999 *Shigella sonnei*



2000 *Shigella sonnei*



1999 *Shigella flexneri*



2000 *Shigella flexneri*

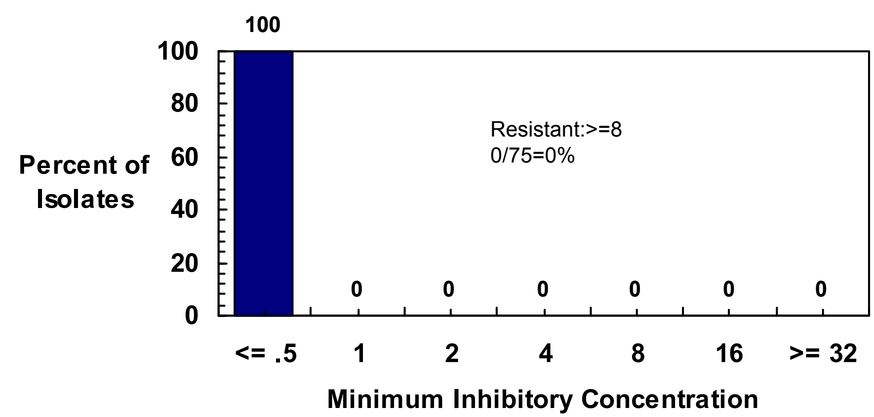


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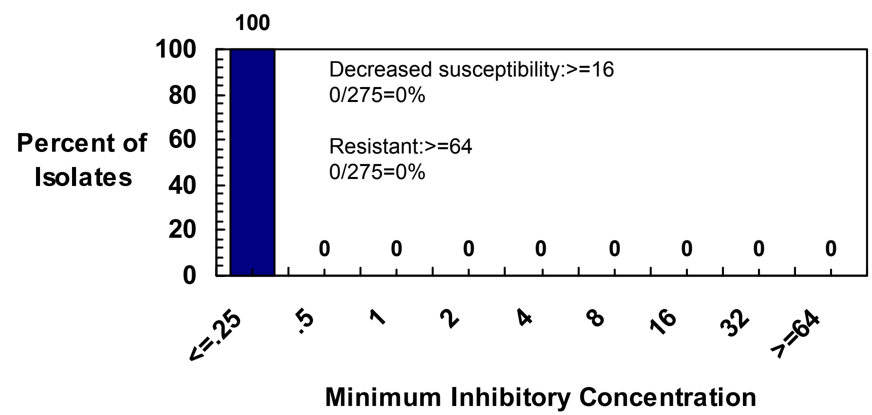
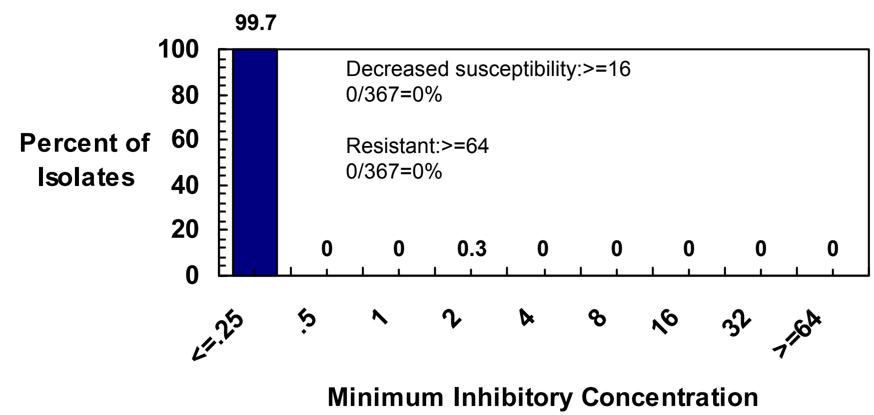
Figure 15g. MICs for ceftriaxone* among *Shigella* isolates, by species, 1999 - 2000

1999 *Shigella sonnei*

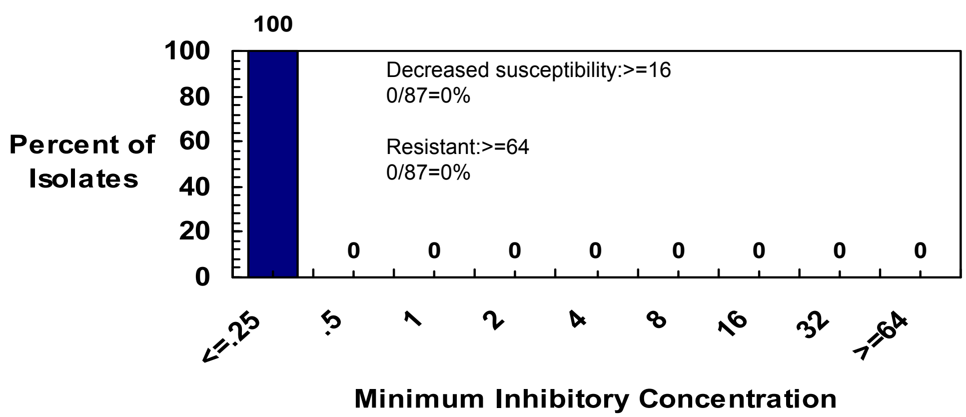
0/275=0%



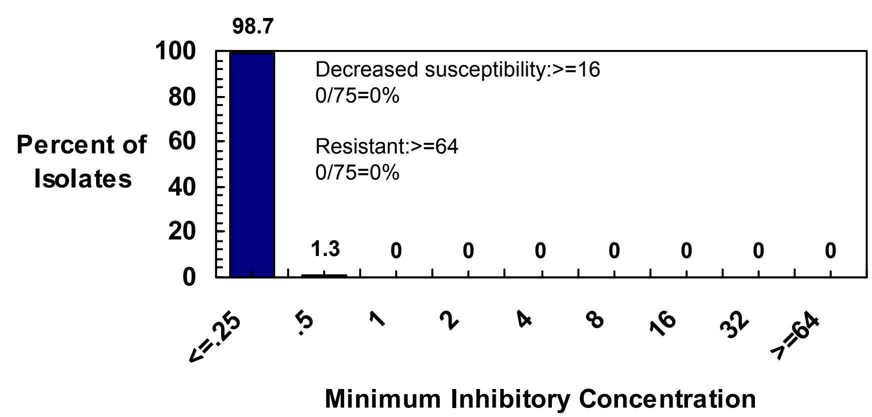
2000 *Shigella sonnei*



1999 *Shigella flexneri*



2000 *Shigella flexneri*



* Sensititre results only, isolates with decreased susceptibility are also tested by E-test

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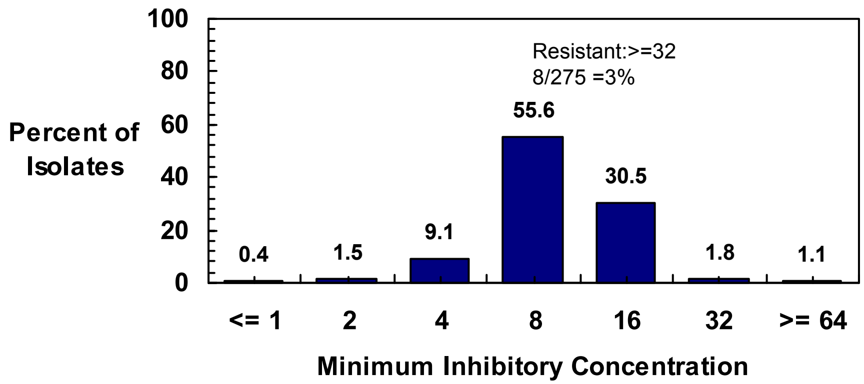
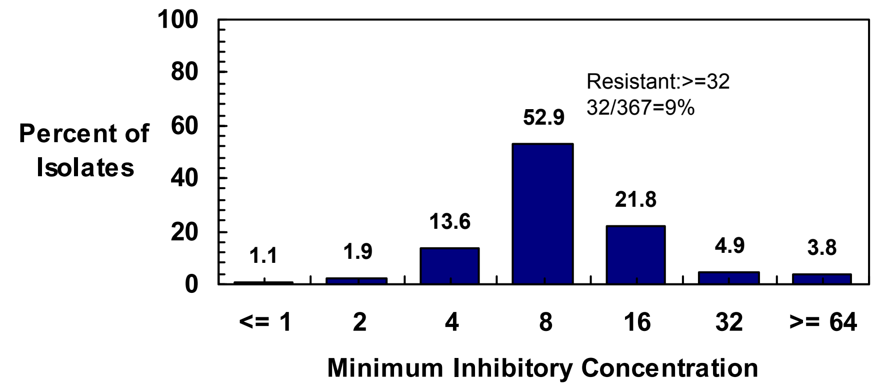
Figure 15h. MICs for cephalothin among *Shigella* isolates, by species, 1999 - 2000

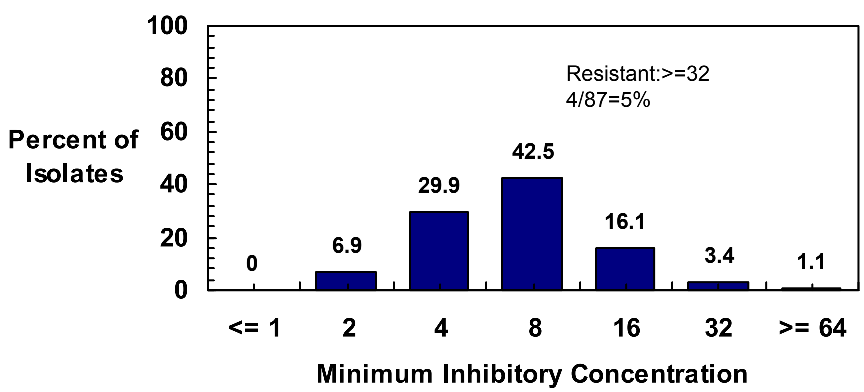
1999 *Shigella sonnei*



2000 *Shigella sonnei*



1999 *Shigella flexneri*



2000 *Shigella flexneri*

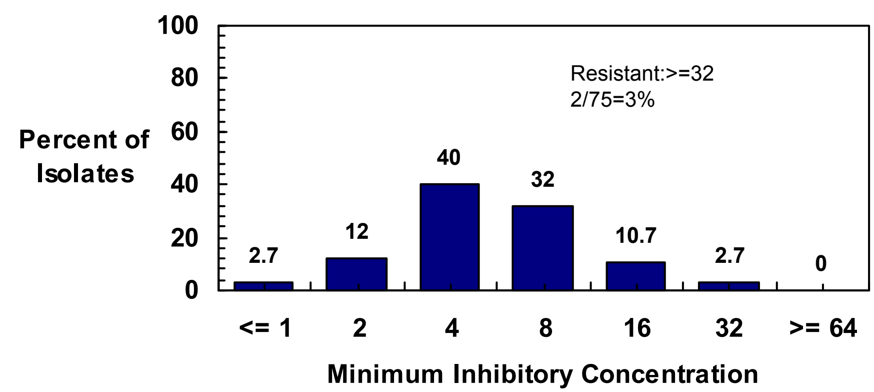
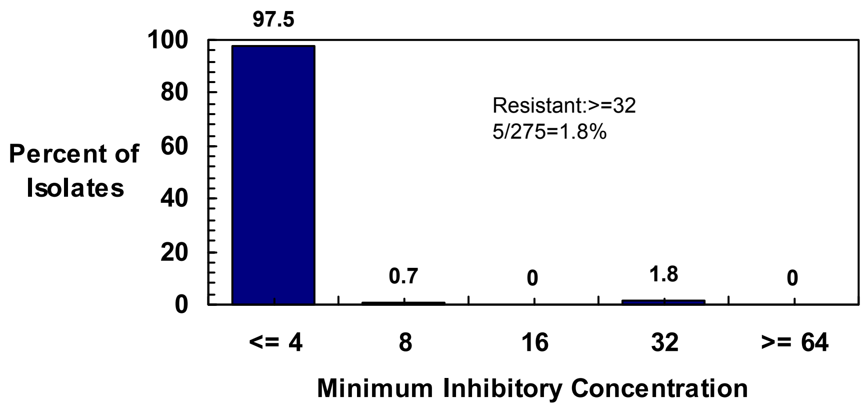
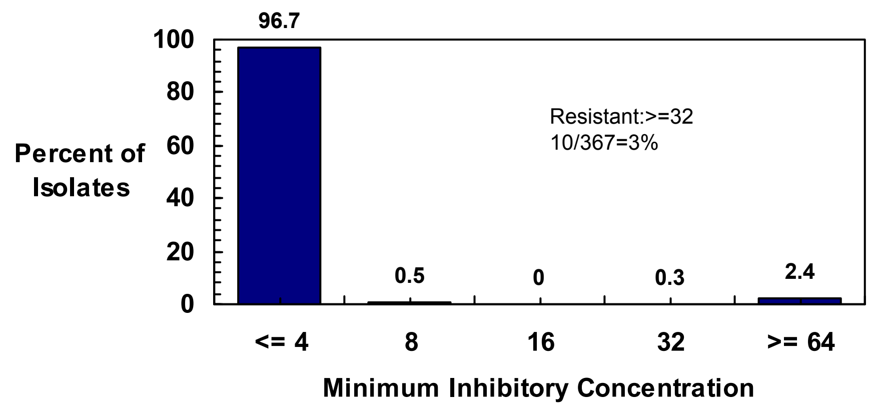


Figure 15i. MICs for chloramphenicol among *Shigella* isolates, by species, 1999 - 2000

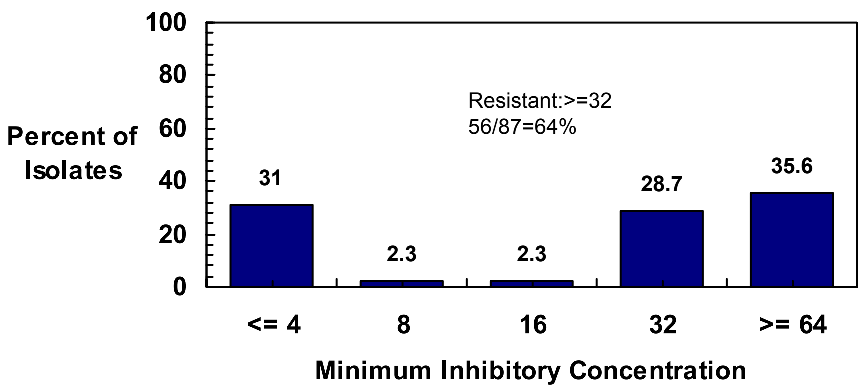
1999 *Shigella sonnei*



2000 *Shigella sonnei*



1999 *Shigella flexneri*



2000 *Shigella flexneri*

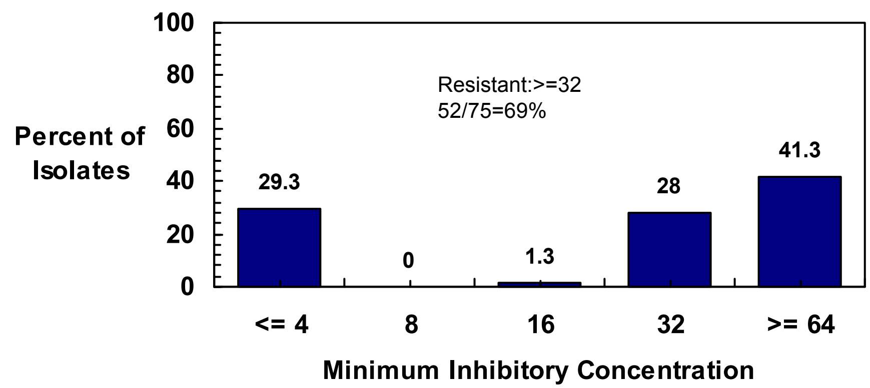


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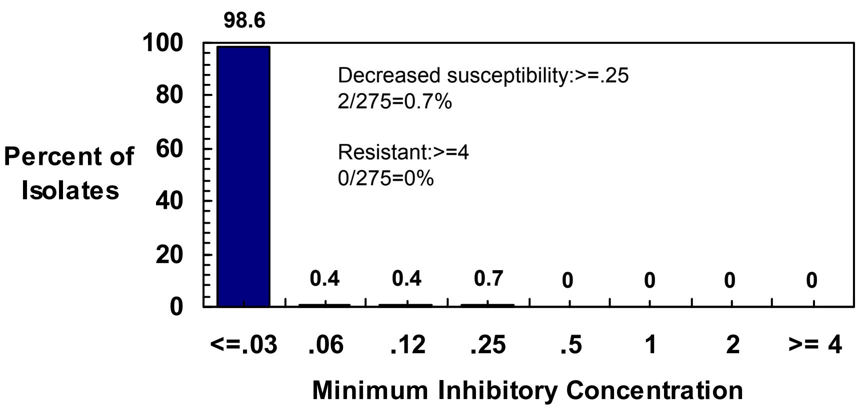
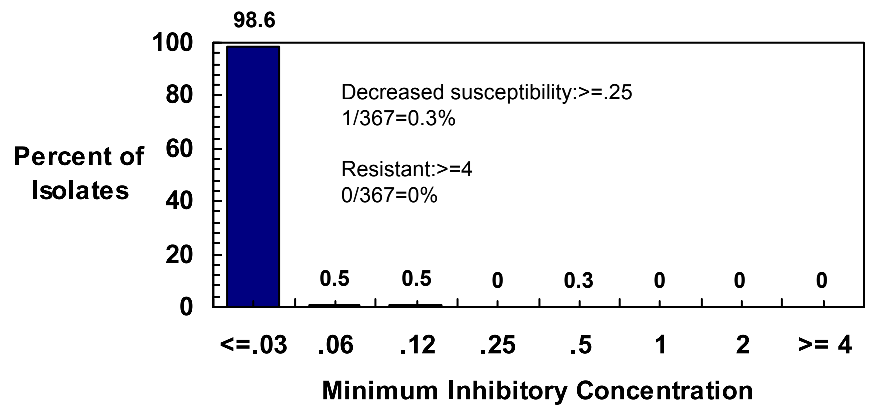
Figure 15j. MICs for ciprofloxacin among *Shigella* isolates, by species, 1999 - 2000

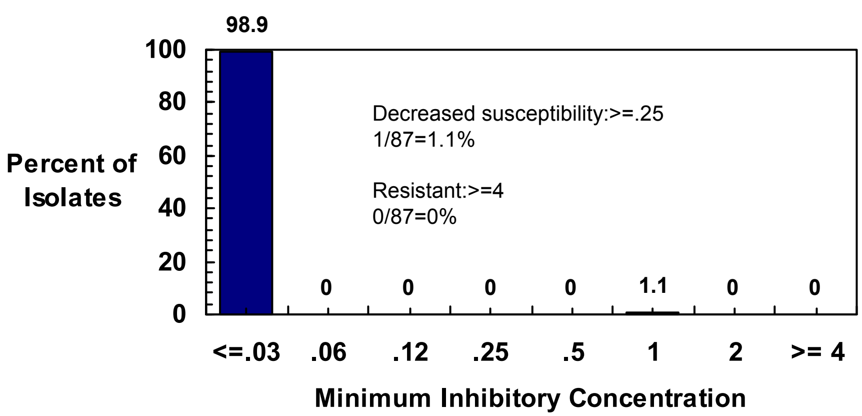
1999 *Shigella sonnei*



2000 *Shigella sonnei*



1999 *Shigella flexneri*



2000 *Shigella flexneri*

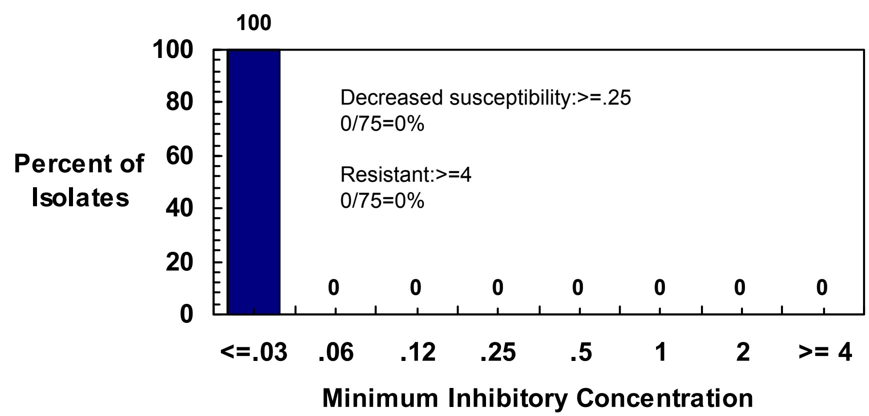


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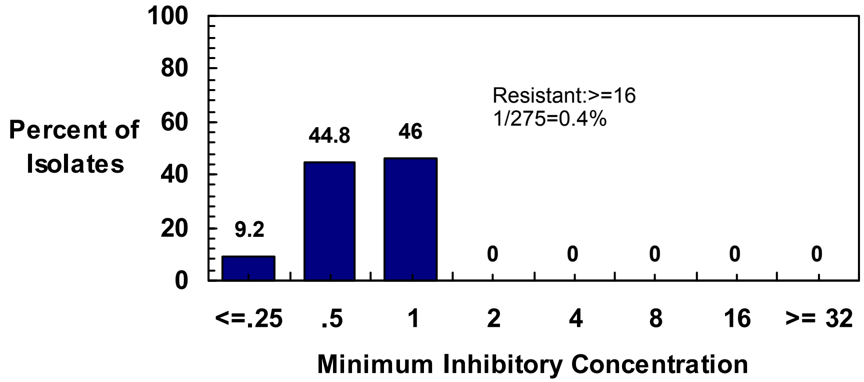
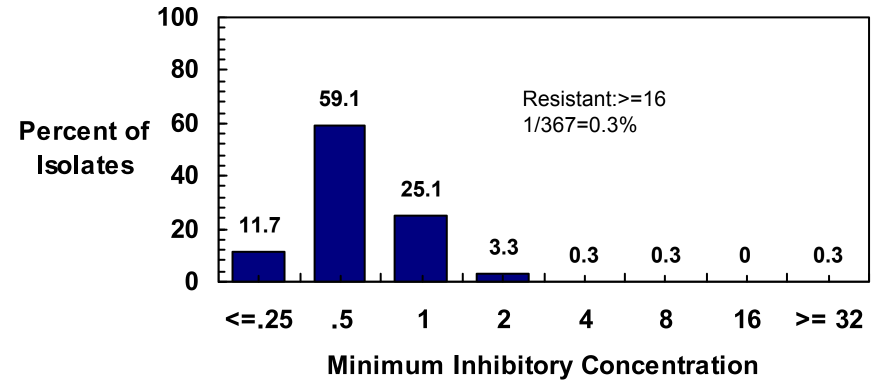
Figure 15k. MICs for gentamicin among *Shigella* isolates, by species, 1999 - 2000

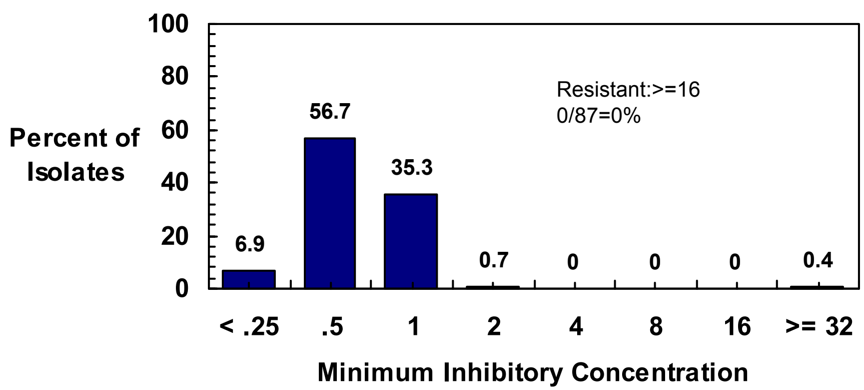
1999 *Shigella sonnei*



2000 *Shigella sonnei*



1999 *Shigella flexneri*



2000 *Shigella flexneri*

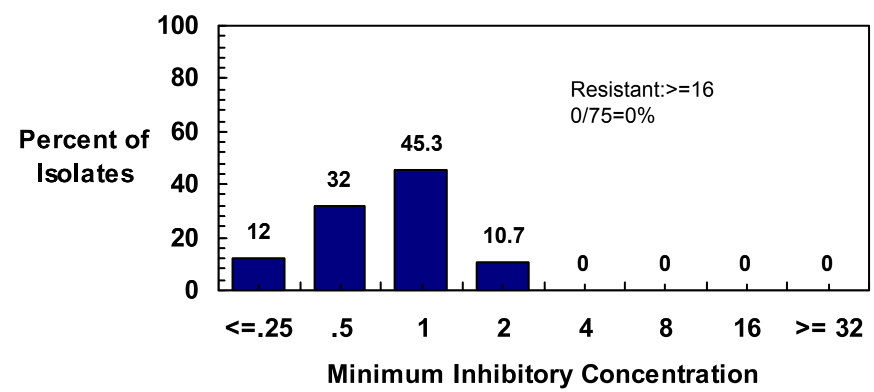


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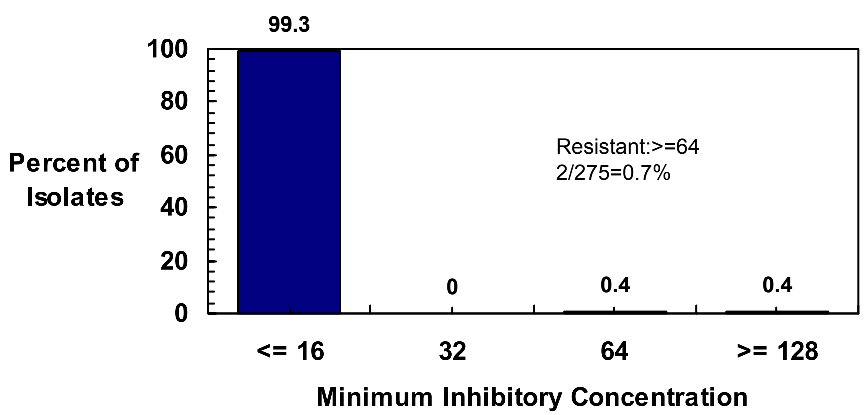
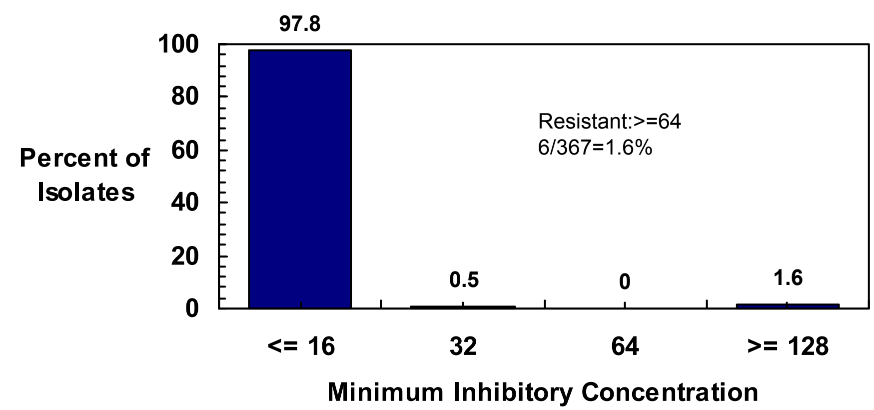
Figure 15I. MICs for kanamycin among *Shigella* isolates, by species, 1999 - 2000

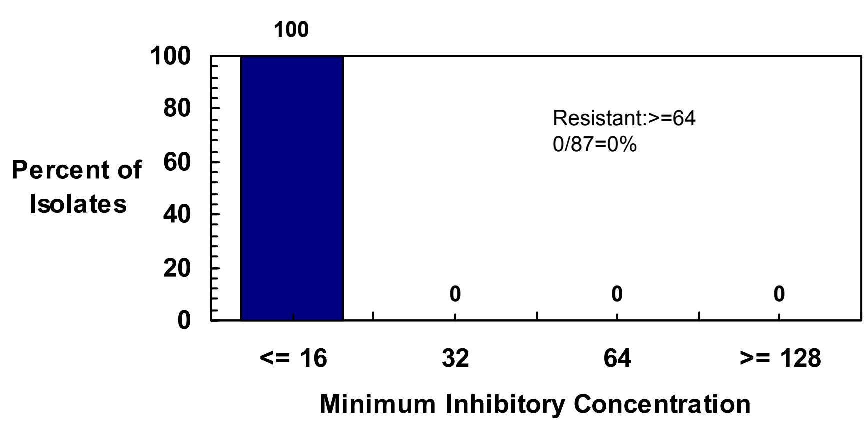
1999 *Shigella sonnei*



2000 *Shigella sonnei*



1999 *Shigella flexneri*



2000 *Shigella flexneri*

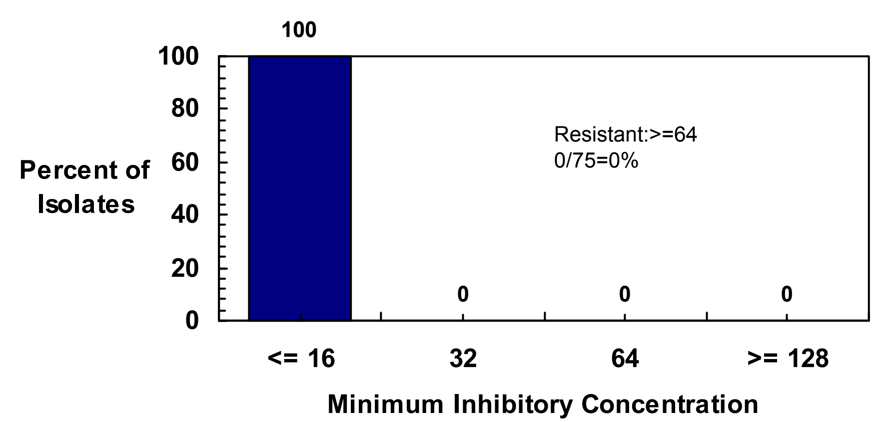


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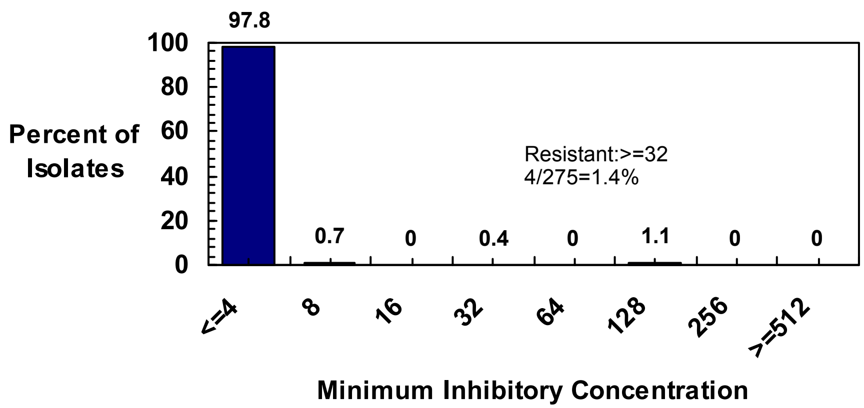
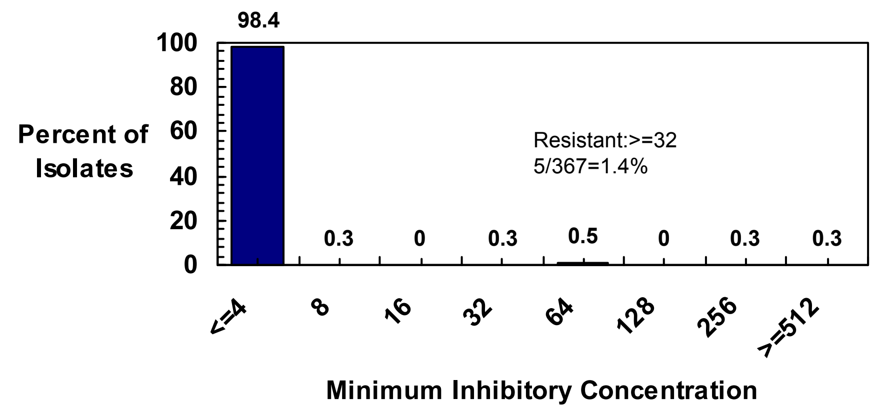
Figure 15m. MICs for nalidixic acid among *Shigella* isolates, by species, 1999 - 2000

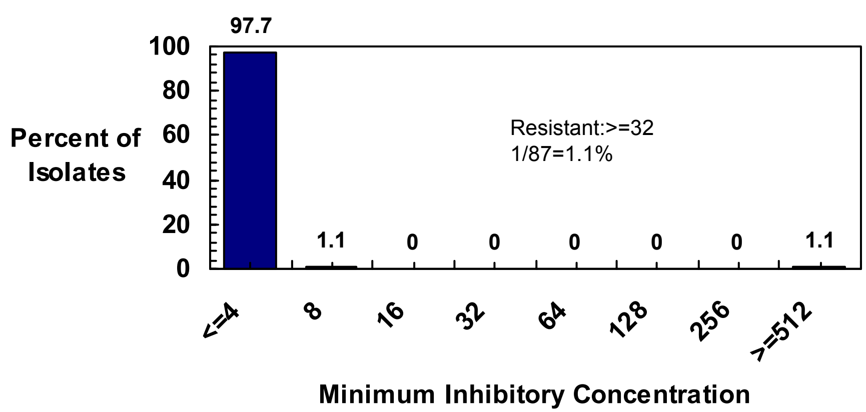
1999 *Shigella sonnei*



2000 *Shigella sonnei*



1999 *Shigella flexneri*



2000 *Shigella flexneri*

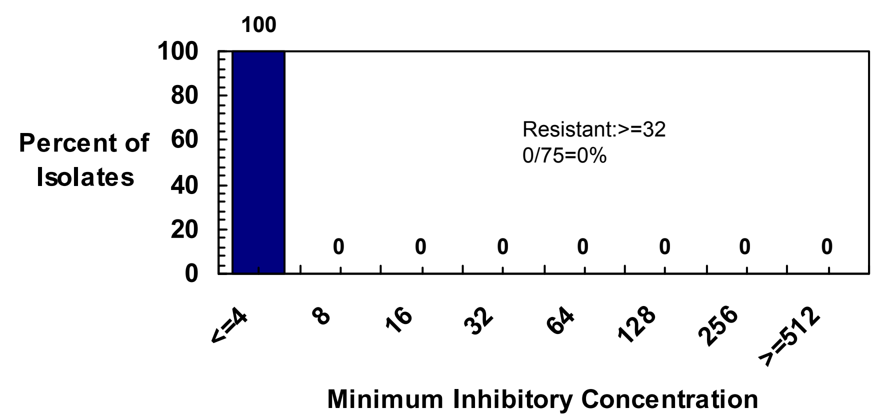


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Figure 15n. MICs for streptomycin among *Shigella* isolates, by species, 1999 - 2000

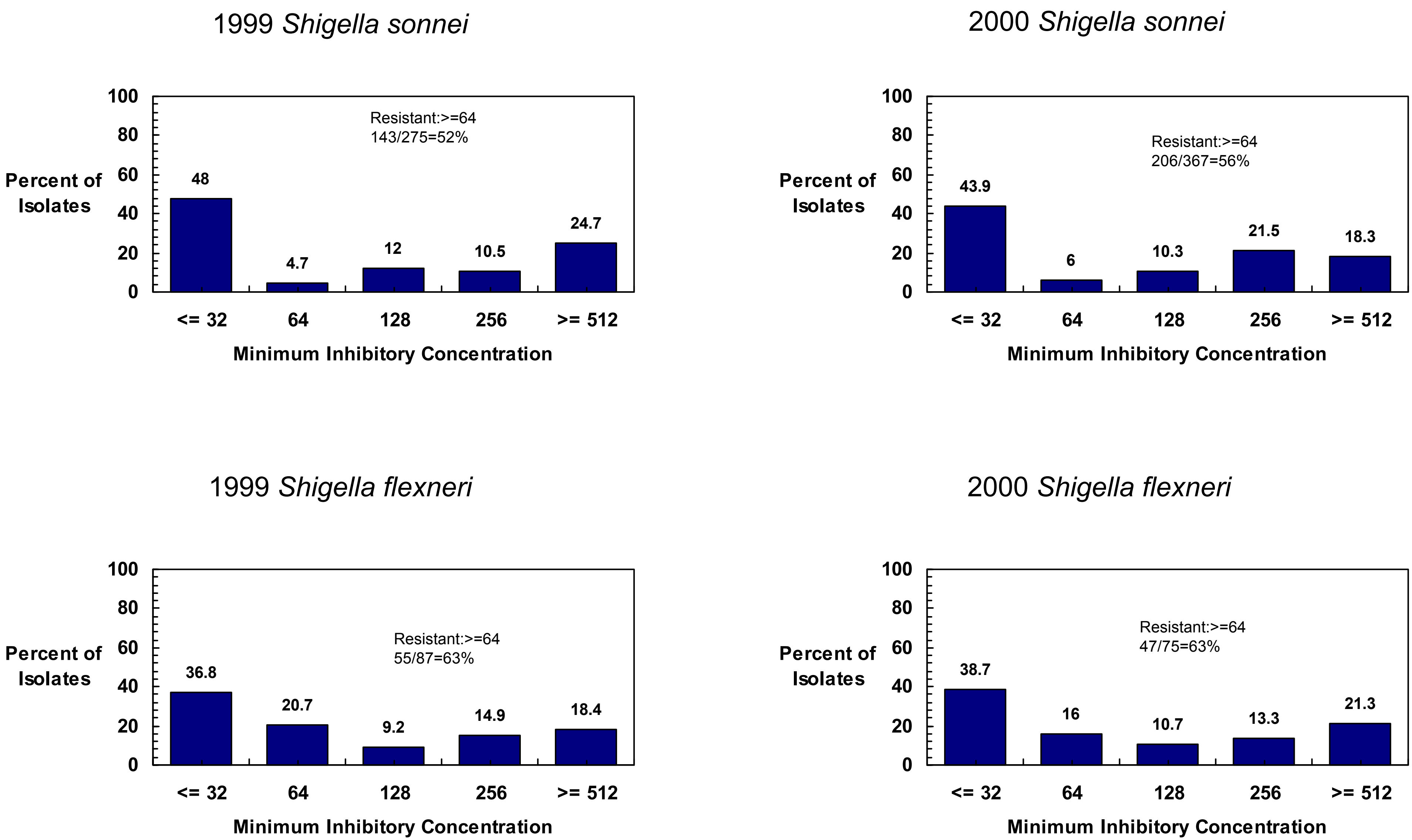

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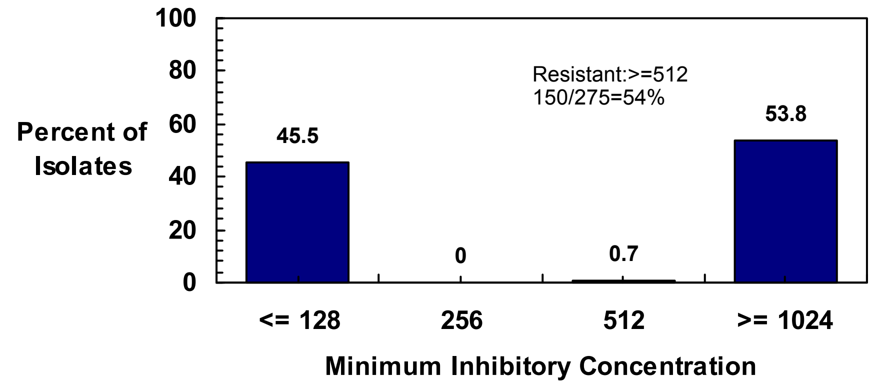
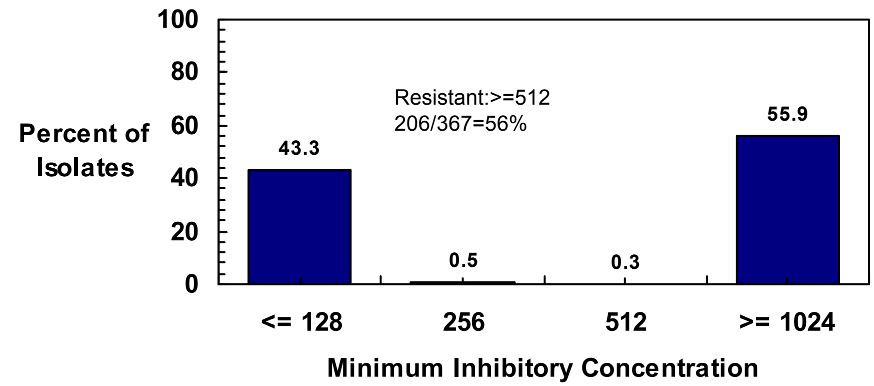
Figure 15o. MICs for sulfamethoxazole among *Shigella* isolates, by species, 1999 - 2000

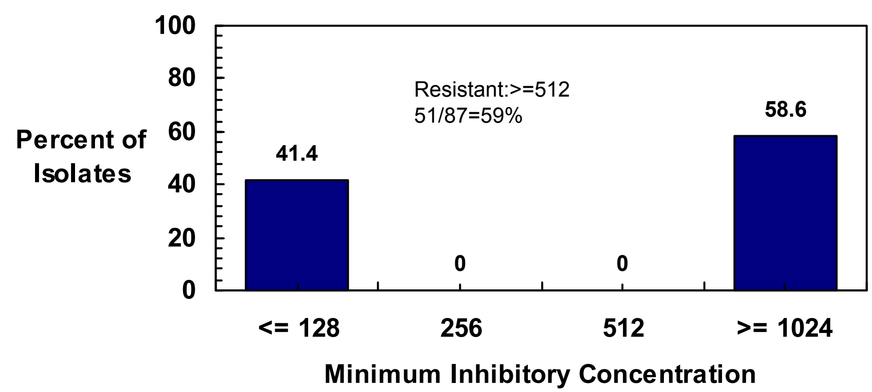
1999 *Shigella sonnei*



2000 *Shigella sonnei*



1999 *Shigella flexneri*



2000 *Shigella flexneri*

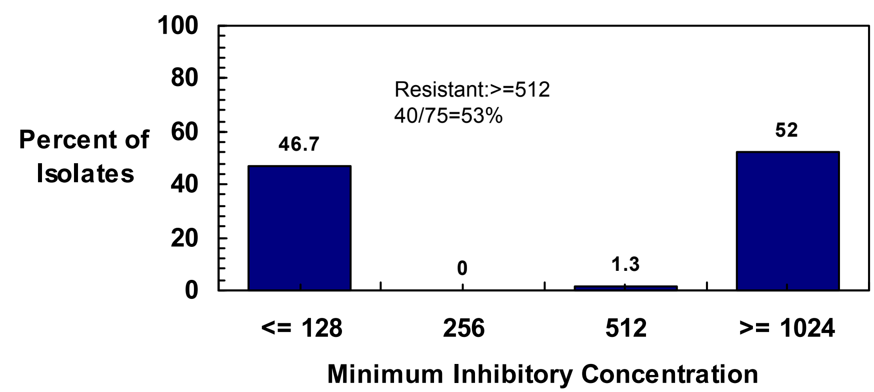


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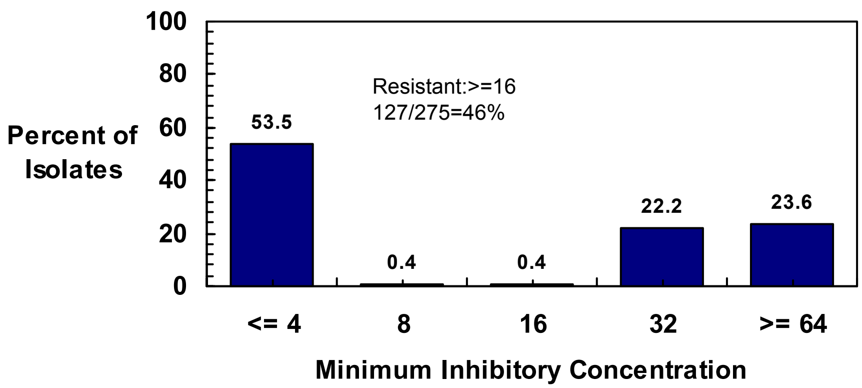
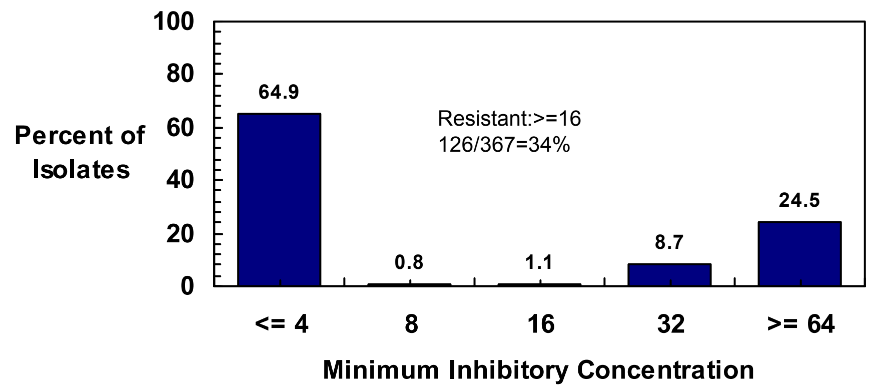
Figure 15p. MICs for tetracycline among *Shigella* isolates, by species, 1999 - 2000

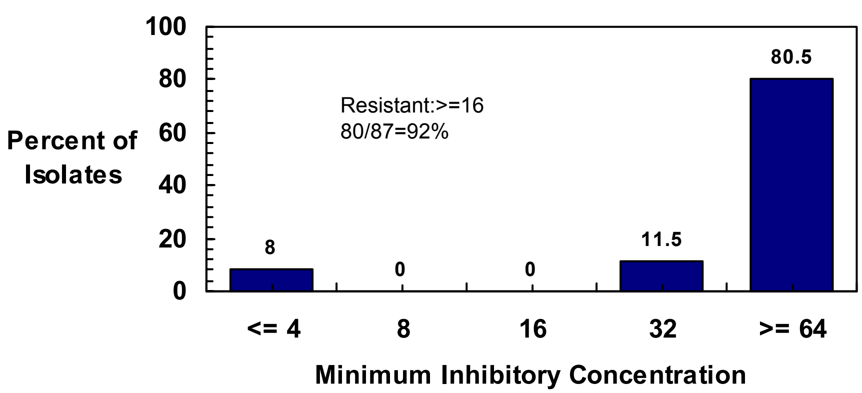
1999 *Shigella sonnei*



2000 *Shigella sonnei*



1999 *Shigella flexneri*



2000 *Shigella flexneri*

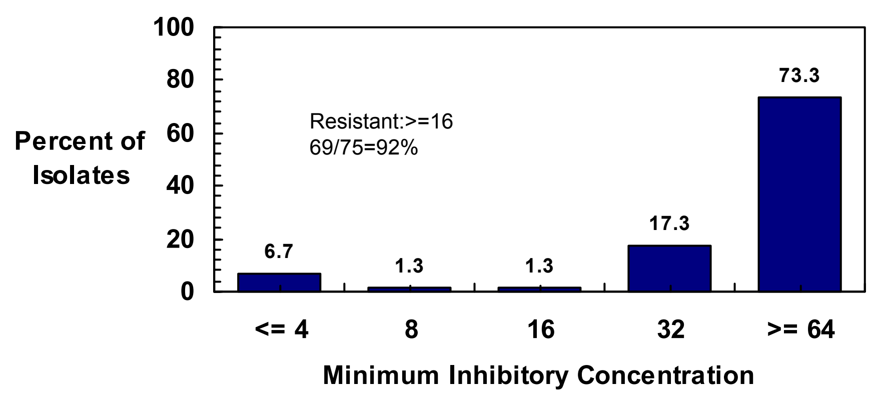


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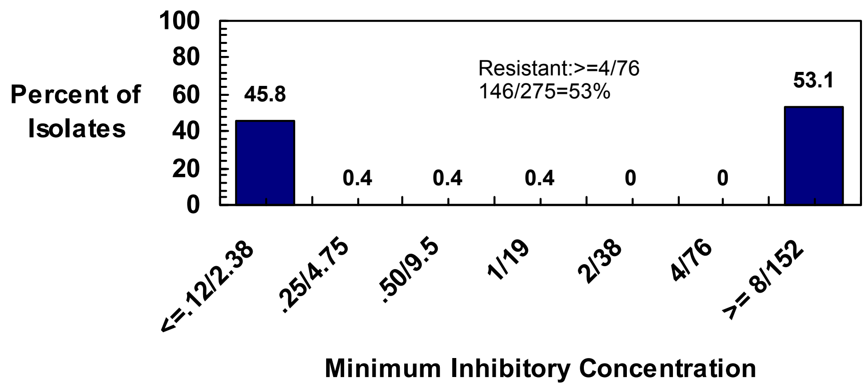
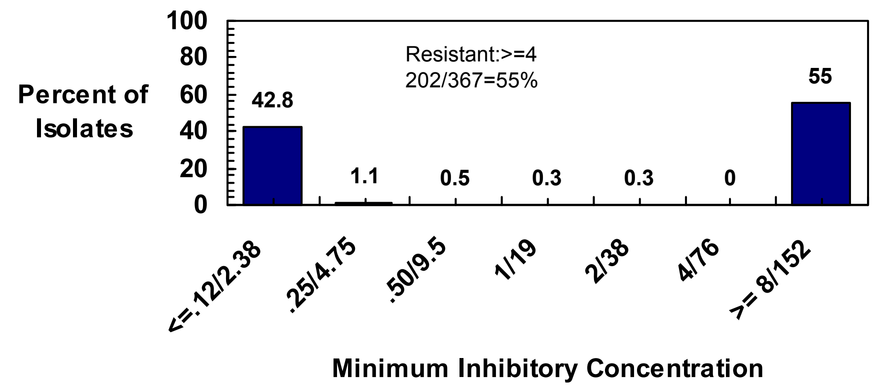
Figure 15q. MICs for trimethoprim-sulfamethoxazole among *Shigella* isolates, by species, 1999 - 2000

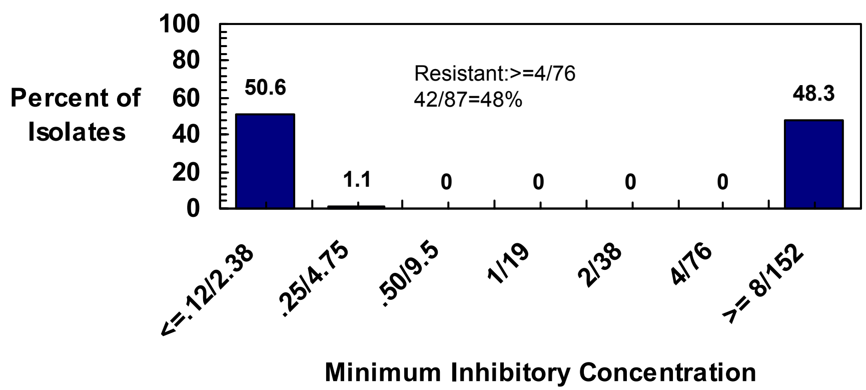
1999 *Shigella sonnei*



2000 *Shigella sonnei*



1999 *Shigella flexneri*



2000 *Shigella flexneri*

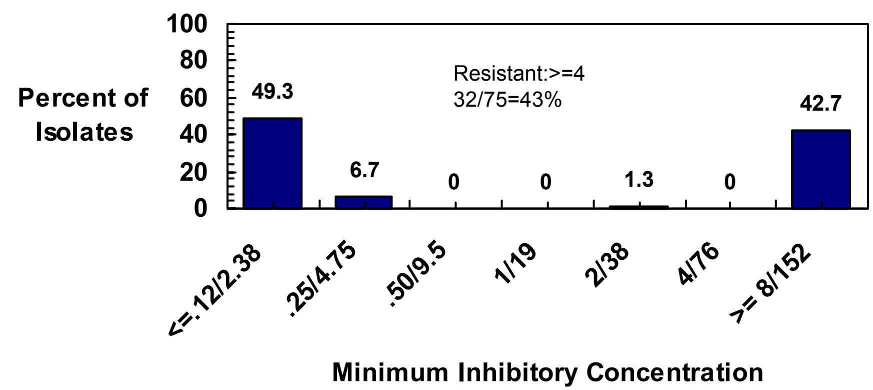


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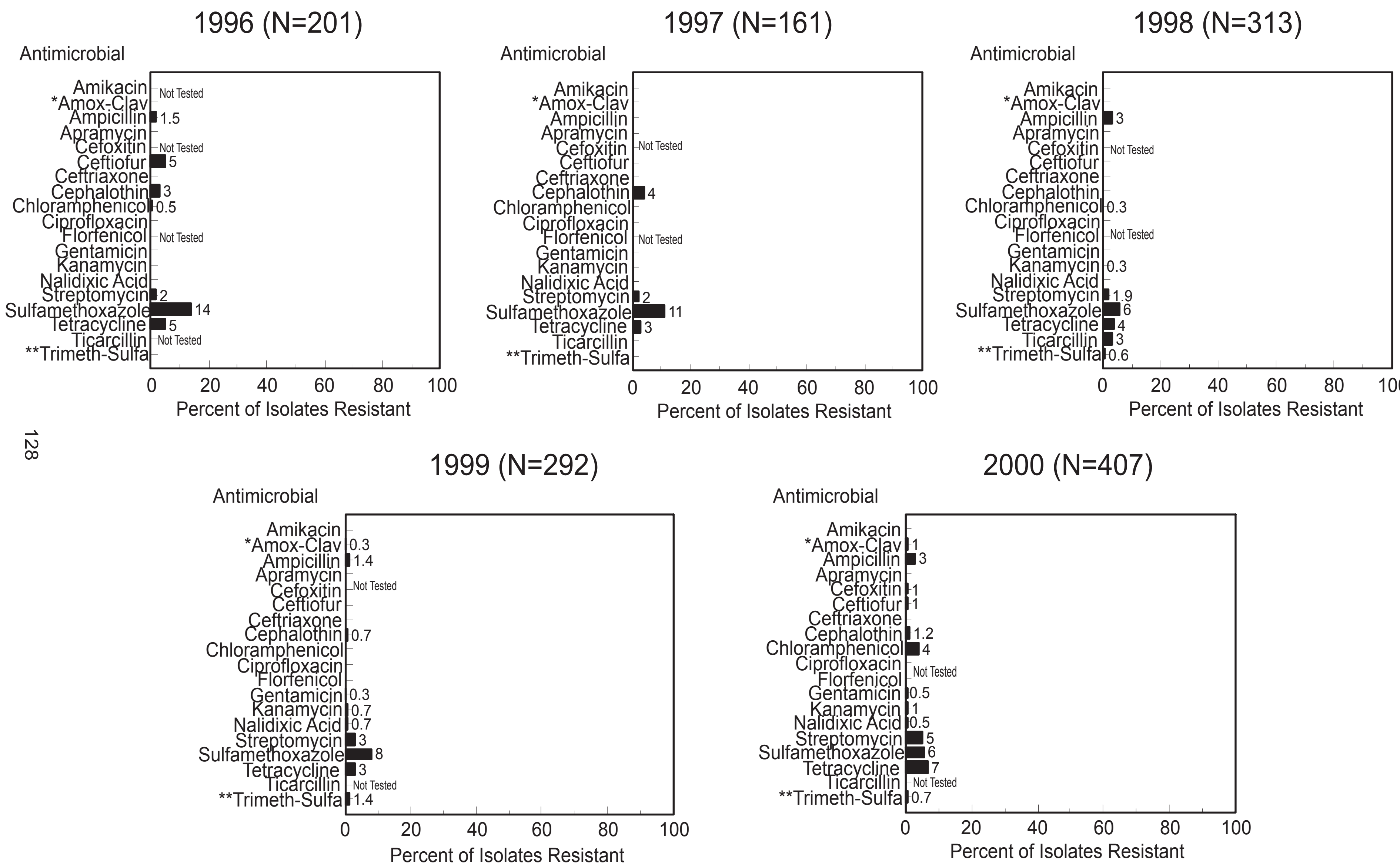
Figure 16. Resistance among *E. coli* O157 isolates, 1996 - 2000



*Amox-Clav=Amoxicillin-Clavulanic Acid **Trimeth-Sulfa=Trimethoprim-Sulfamethoxazole

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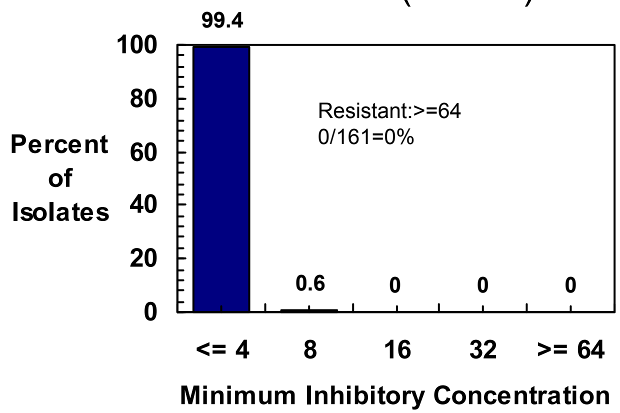
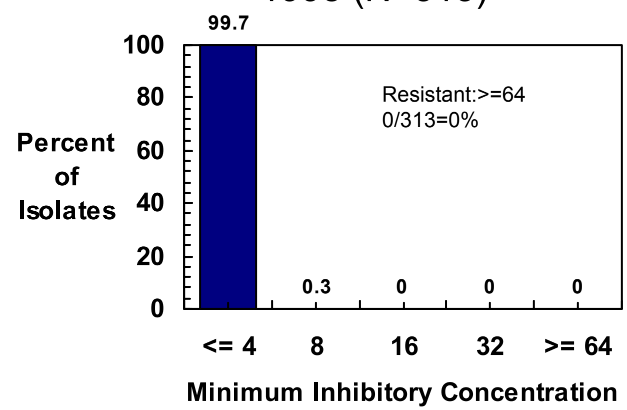
Figure 17a. MICs for amikacin among *E. coli* O157 isolates, 1996 - 2000

Not tested in 1996

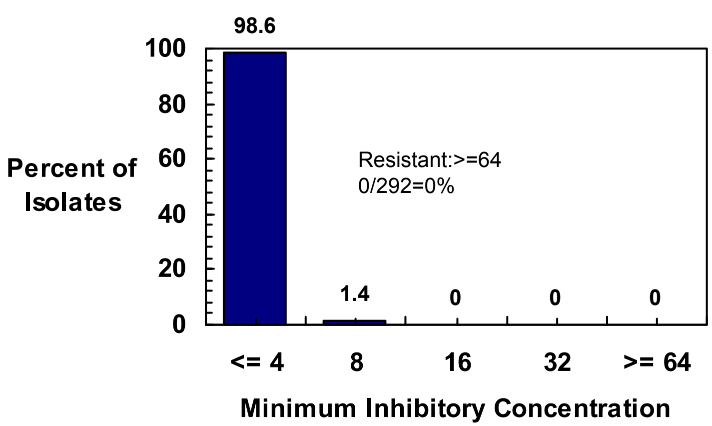
1997 (N=161)



1998 (N=313)



1999 (N=292)



2000 (N=407)

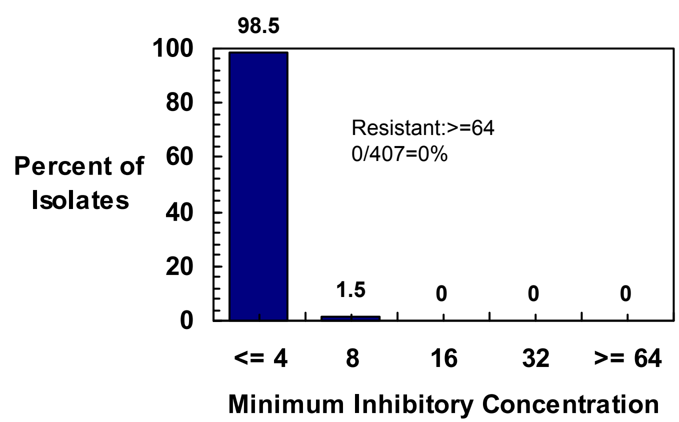


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Figure 17b. MICs for amoxicillin-clavulanic acid among *E. coli* O157 isolates, 1996-2000

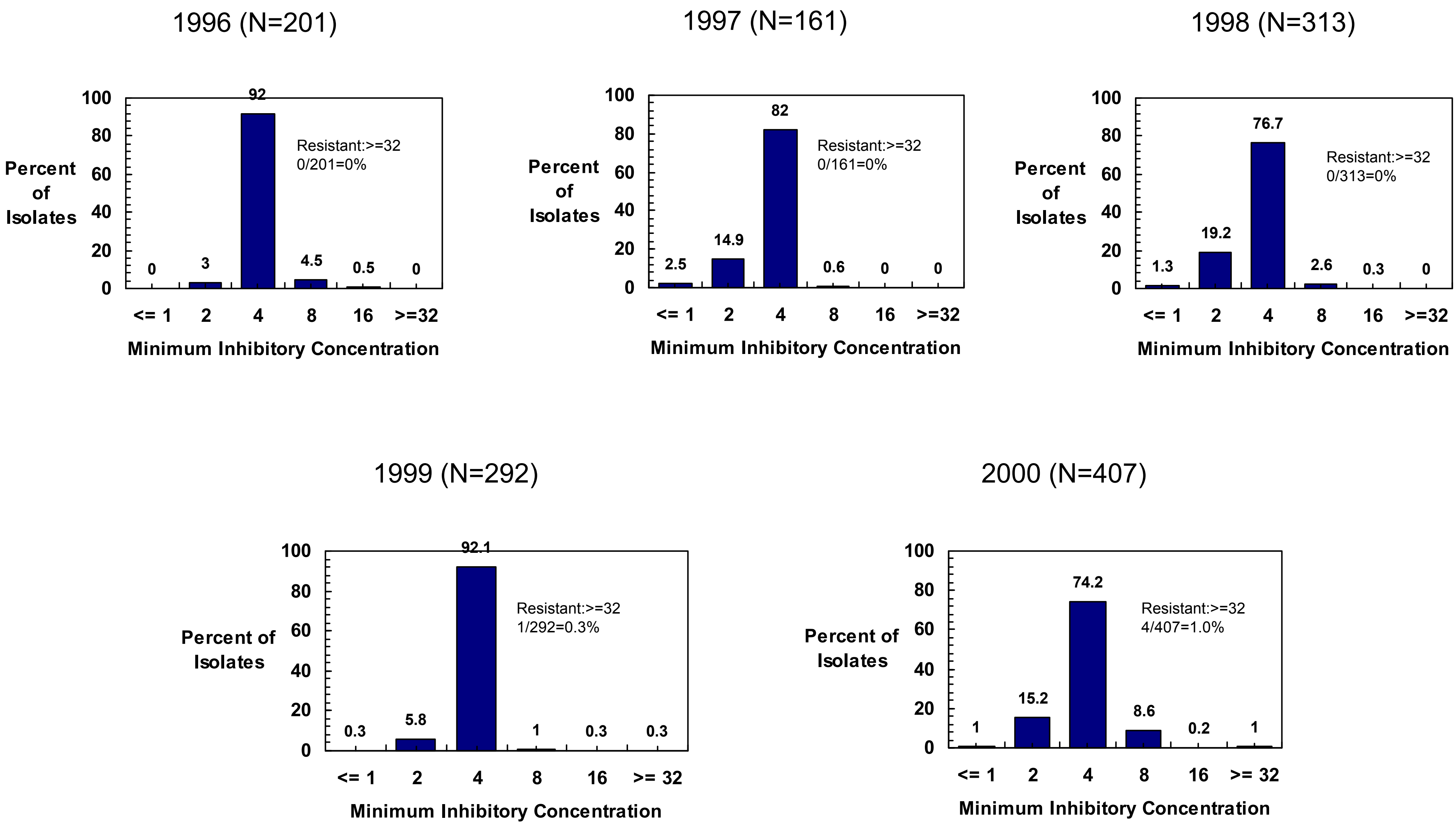

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Figure 17c. MICs for ampicillin among *E. coli* O157 isolates, 1996 - 2000

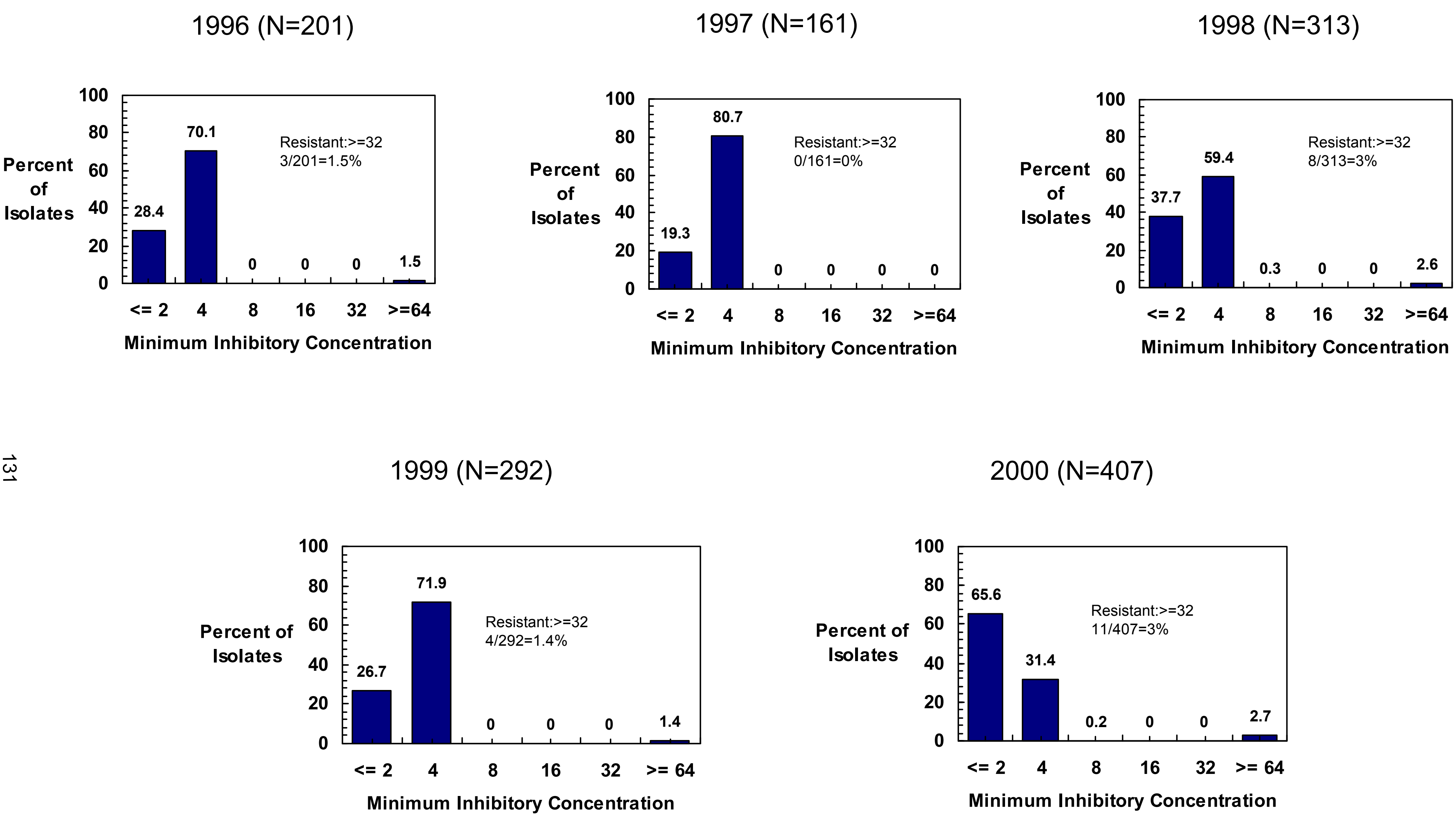

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Figure 17d. MICs for apramycin among *E. coli* O157 isolates, 1996 - 2000

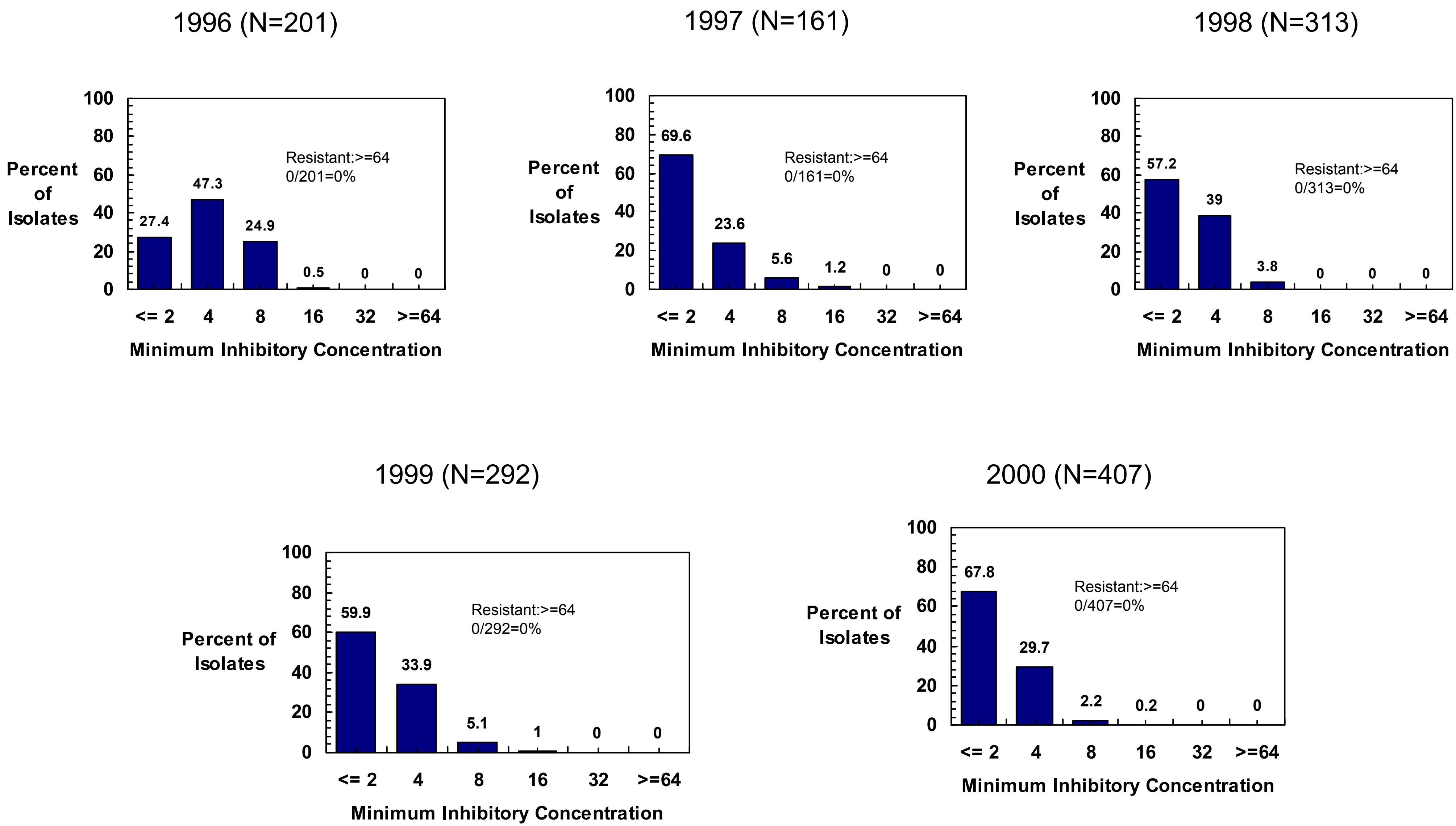

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Figure 17e. MICs for cefoxitin among *E. coli* O157 isolates, 1996 - 2000

Not tested in 1996 - 1999

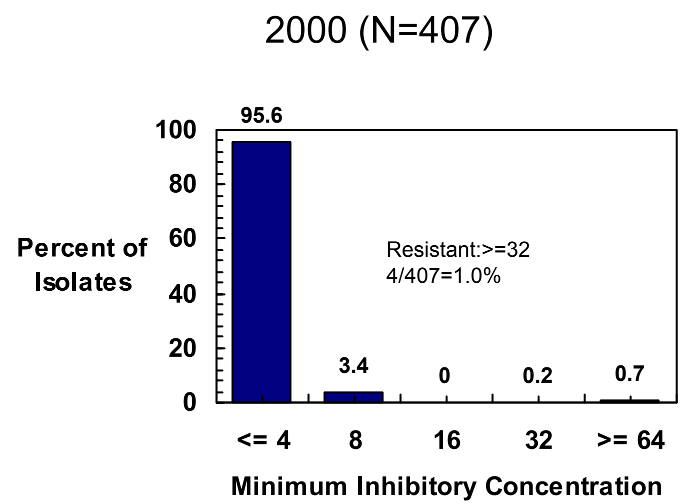

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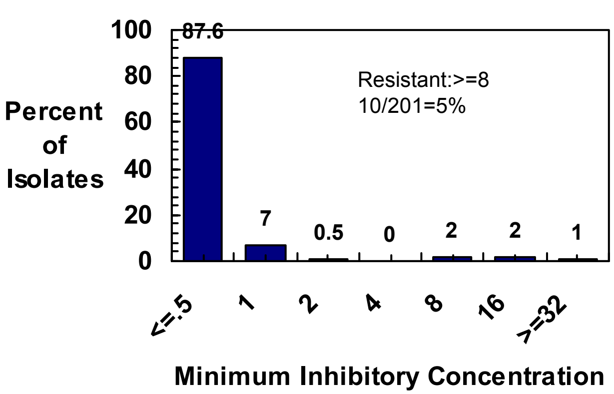
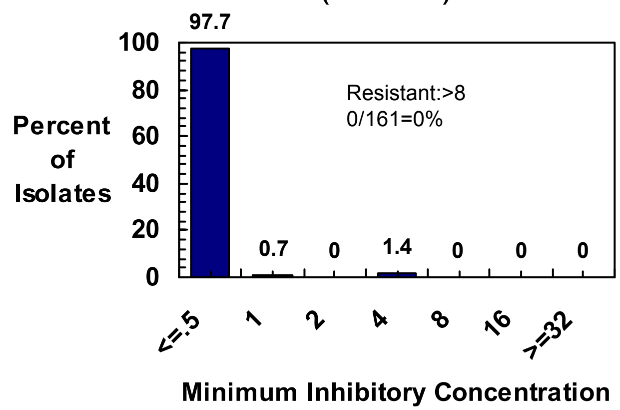
Figure 17f. MICs for ceftiofur among *E. coli* O157 isolates, 1996 - 2000

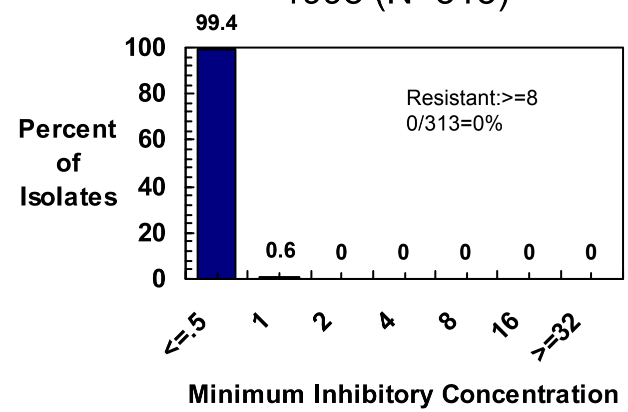
1996 (N=201)



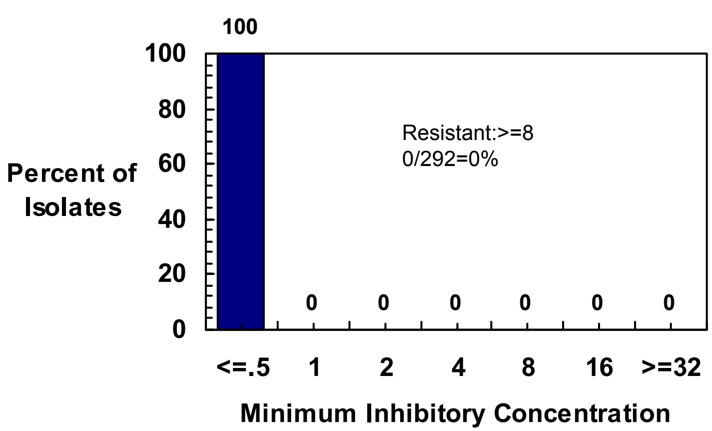
1997 (N=161)



1998 (N=313)



1999 (N=292)



2000 (N=407)

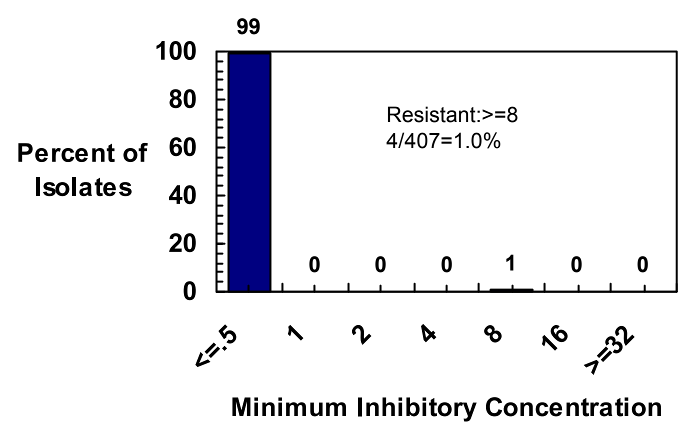


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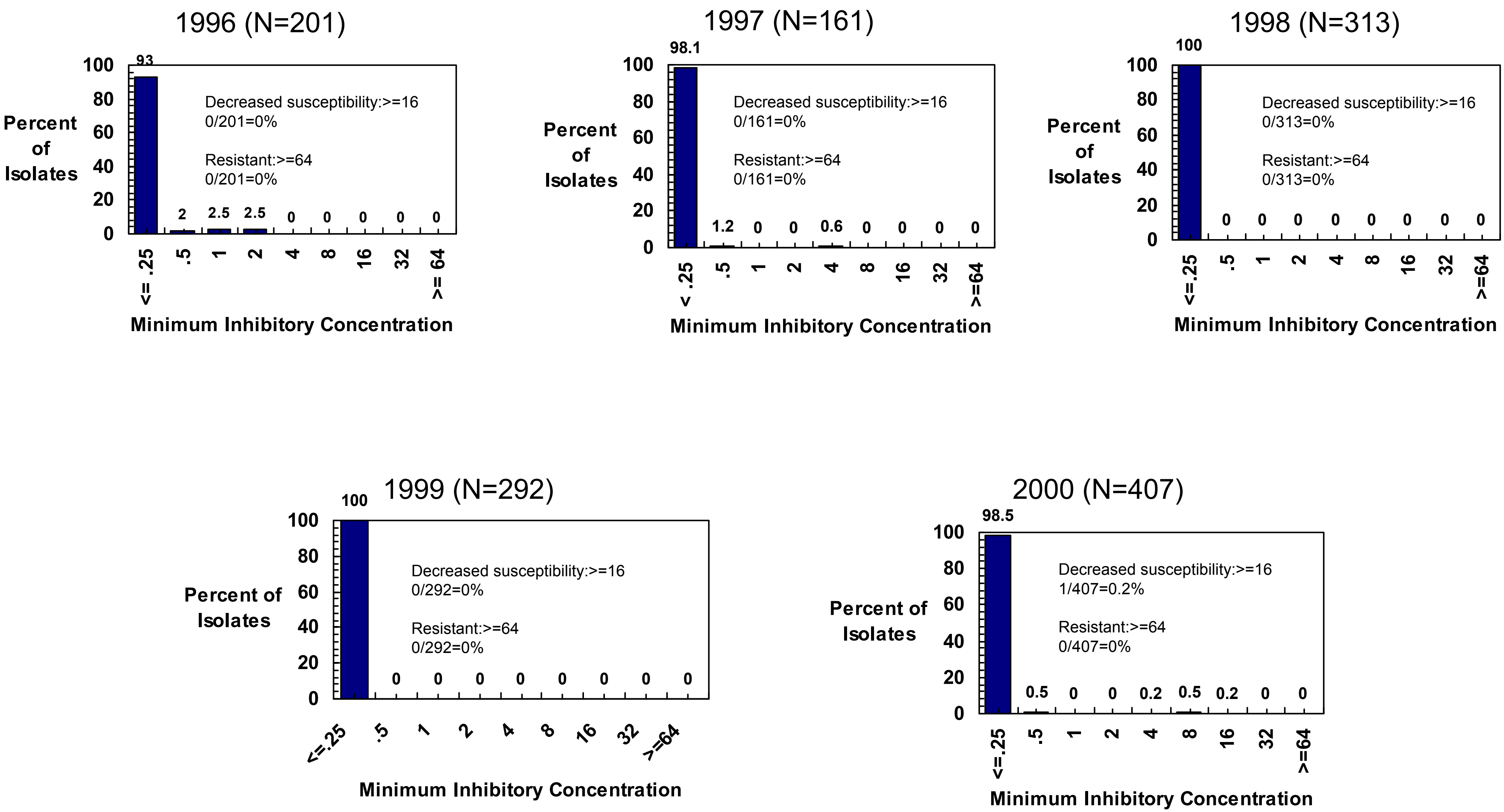
Figure 17g. MICs for ceftriaxone* among *E. coli* O157 isolates, 1996 - 2000



* Sensititre results only, isolates with decreased susceptibility are also tested by E-test

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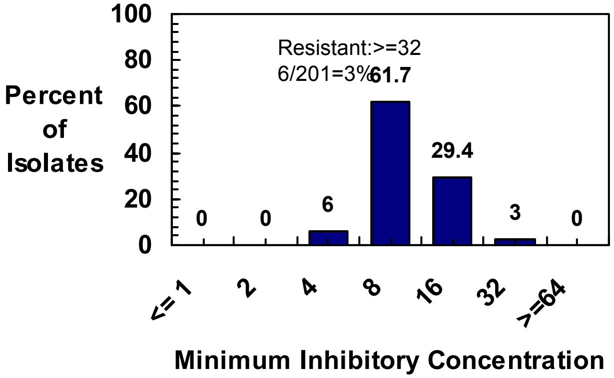
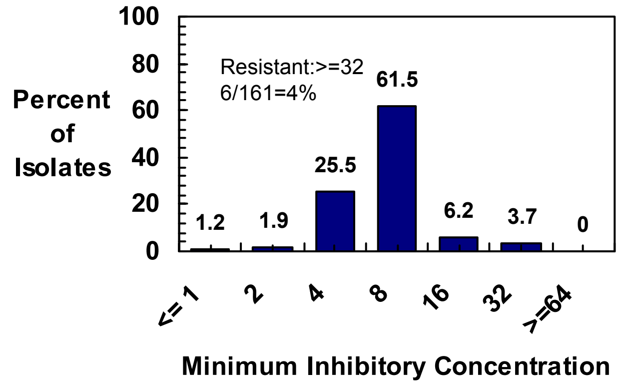
Figure 17h. MICs for cephalothin among *E. coli* O157 isolates, 1996 - 2000

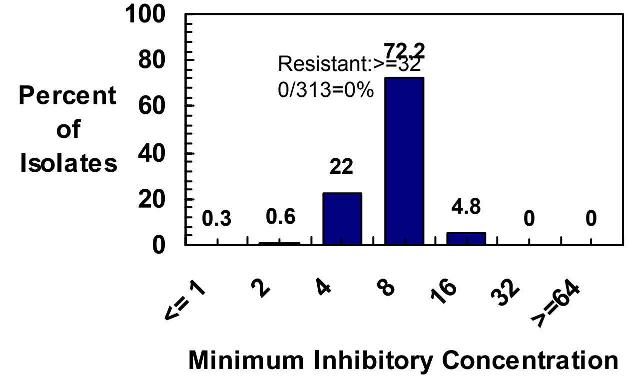
1996 (N=201)



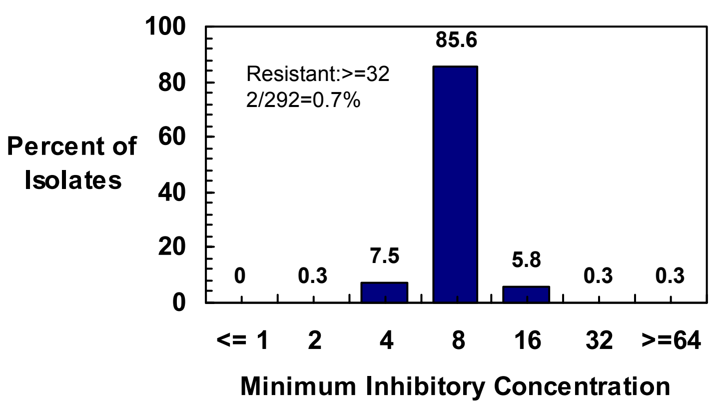
1997 (N=161)



1998 (N=313)



1999 (N=292)



2000 (N=407)

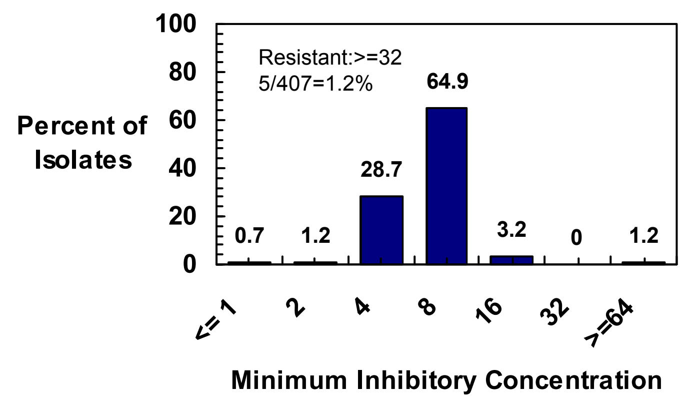


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Figure 17i. MICs for chloramphenicol among *E. coli* O157 isolates, 1996 - 2000

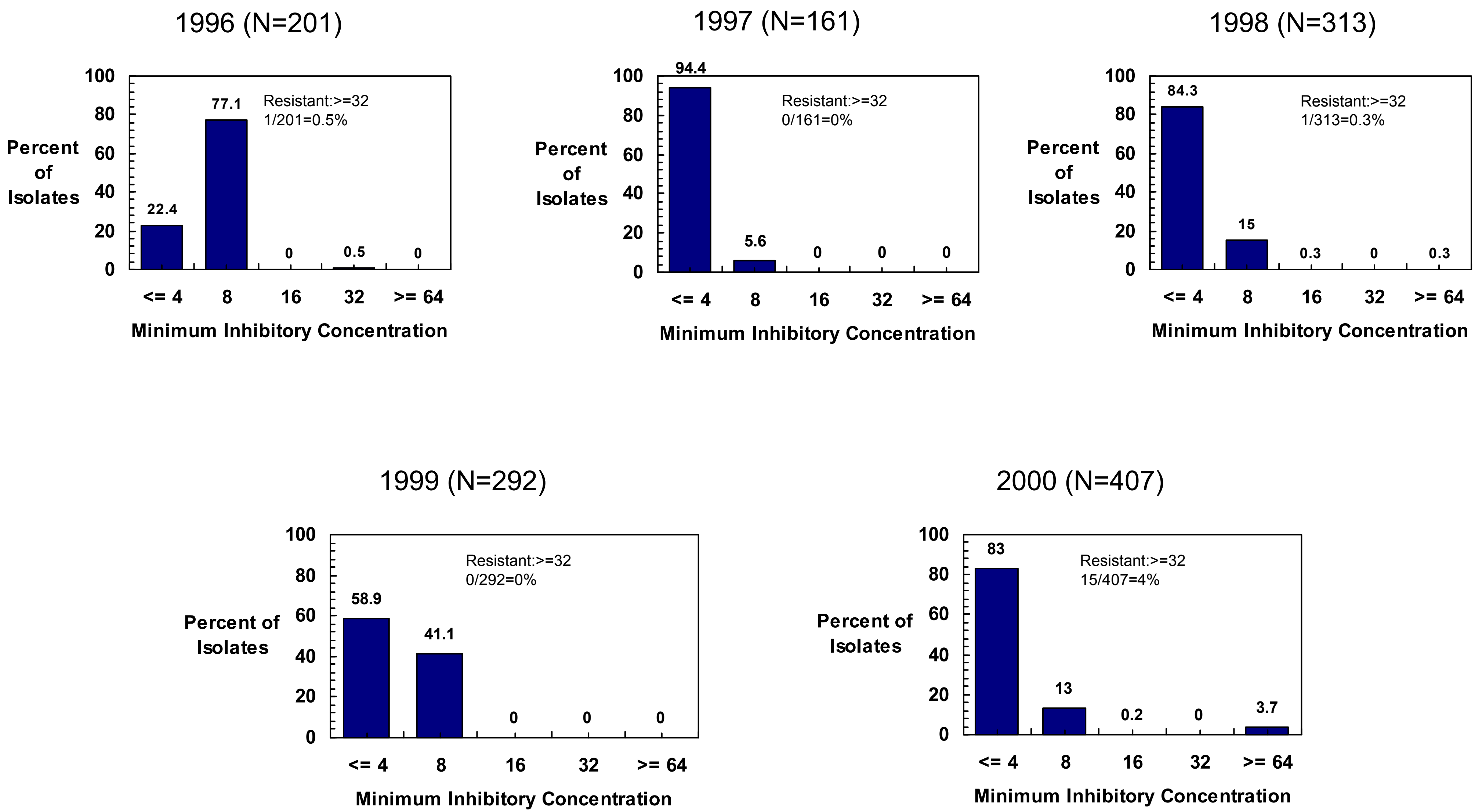

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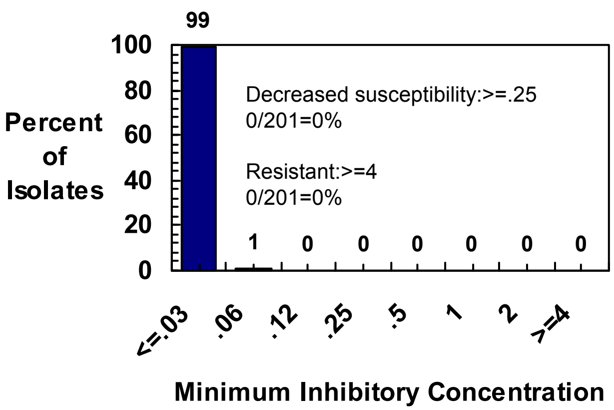
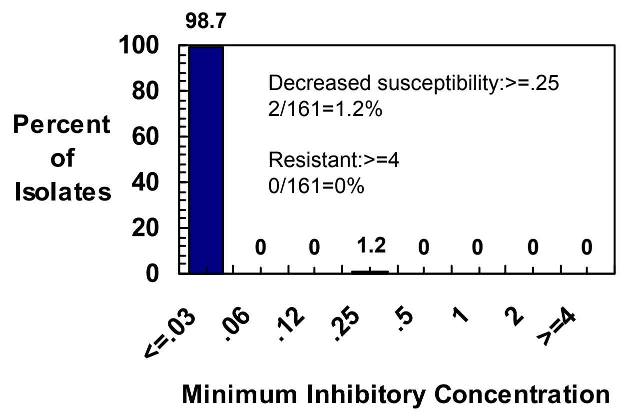
Figure 17j. MICs for ciprofloxacin among *E. coli* O157 isolates, 1996 - 2000

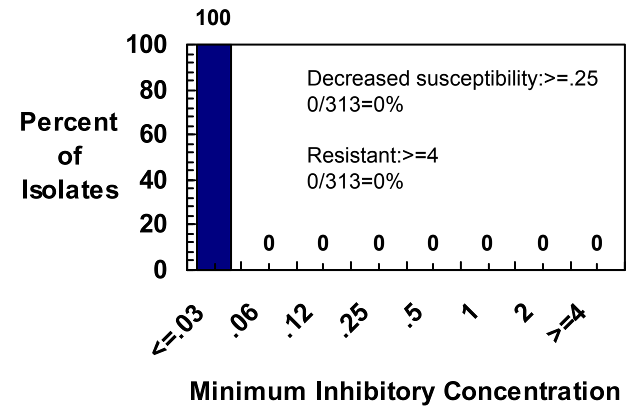
1996 (N=201)



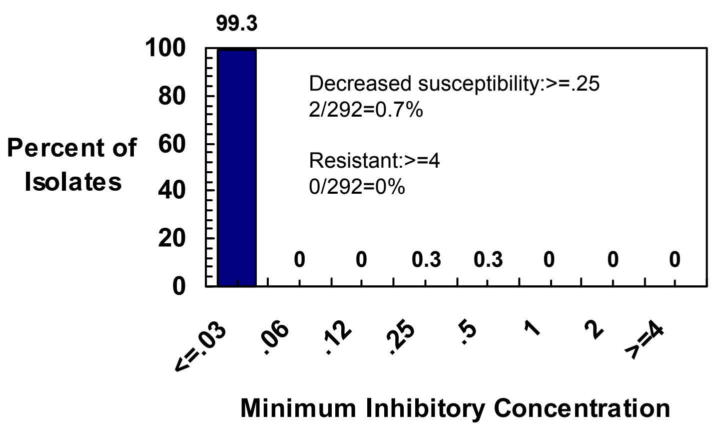
1997 (N=161)



1998 (N=313)



1999 (N=292)



2000 (N=407)

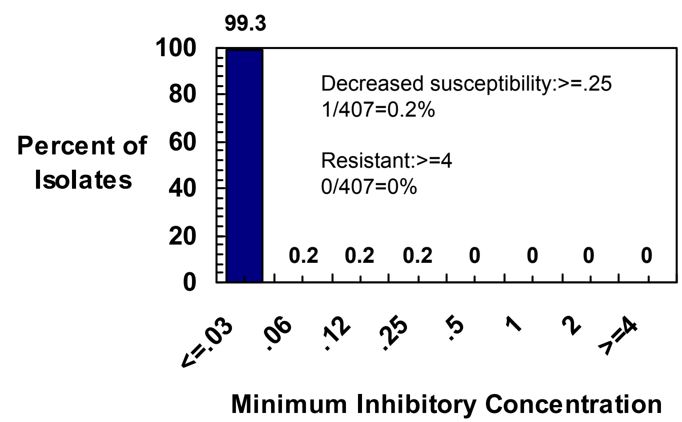


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Figure 17k. MICs for gentamicin among *E. coli* O157 isolates, 1996 - 2000

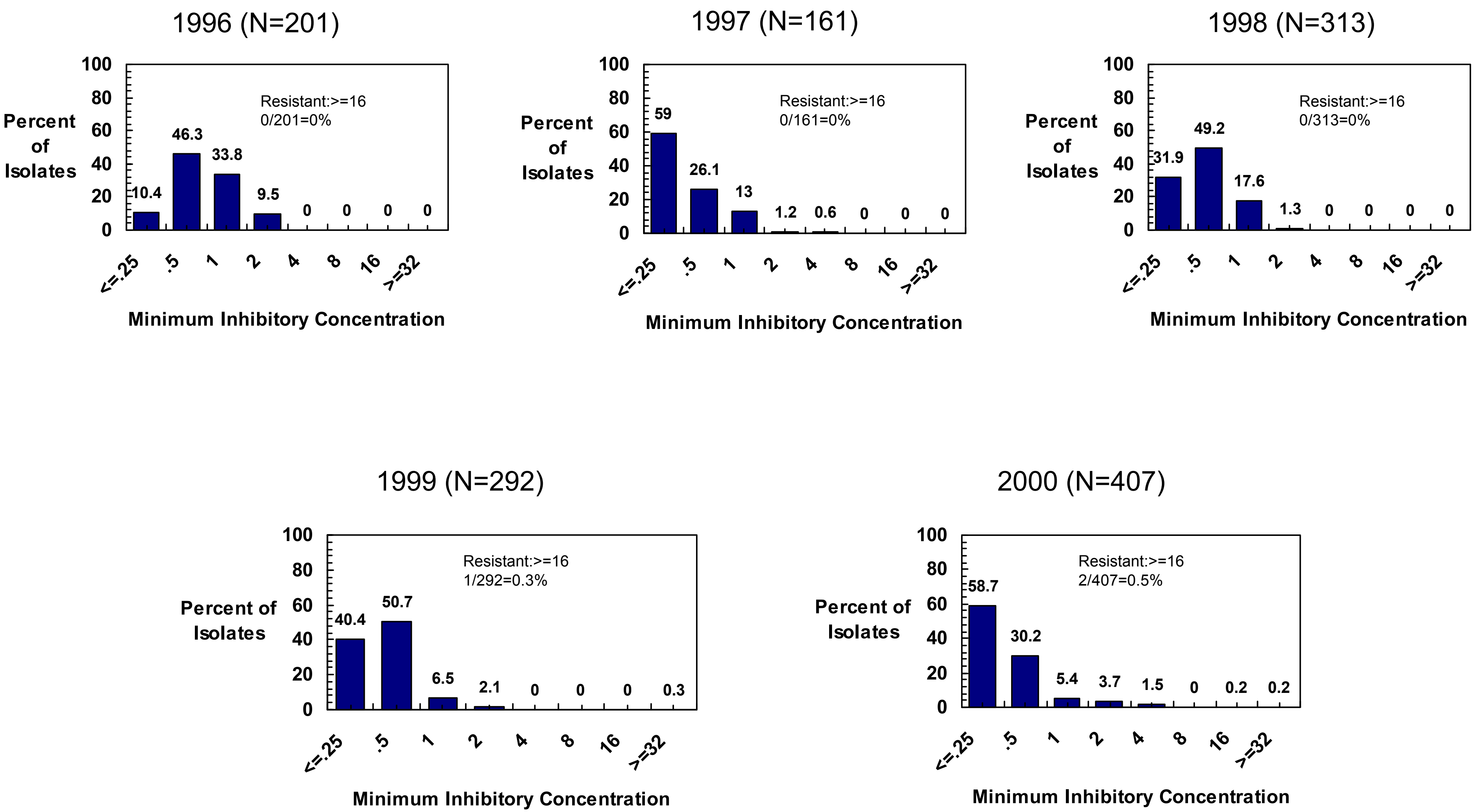

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Figure 17l. MICs for kanamycin among *E. coli* O157 isolates, 1996 - 2000

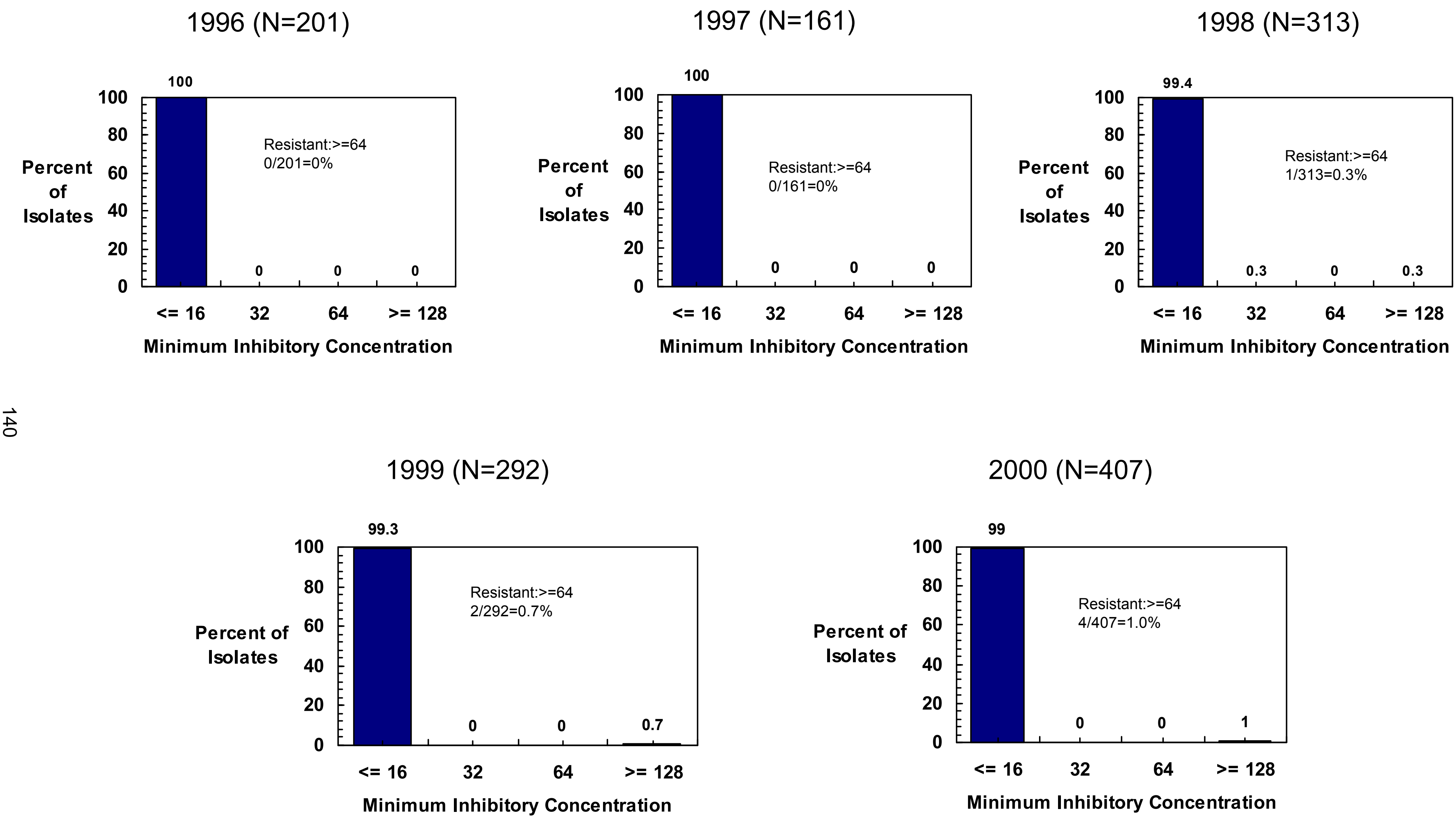

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Figure 17m. MICs for nalidixic acid among *E. coli* O157 isolates, 1996 - 2000

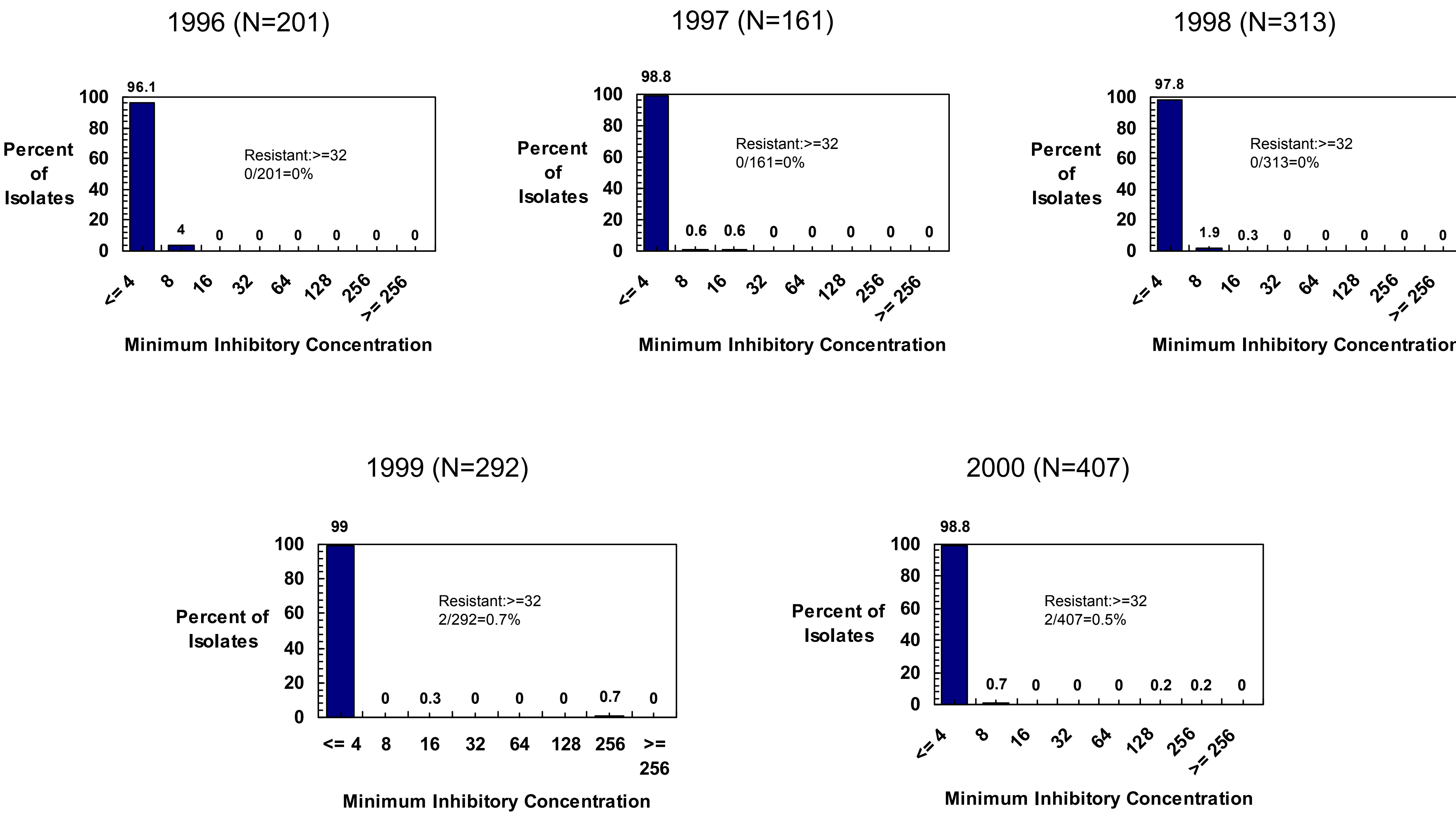

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Figure 17n. MICs for streptomycin among *E. coli* O157 isolates, 1996 - 2000

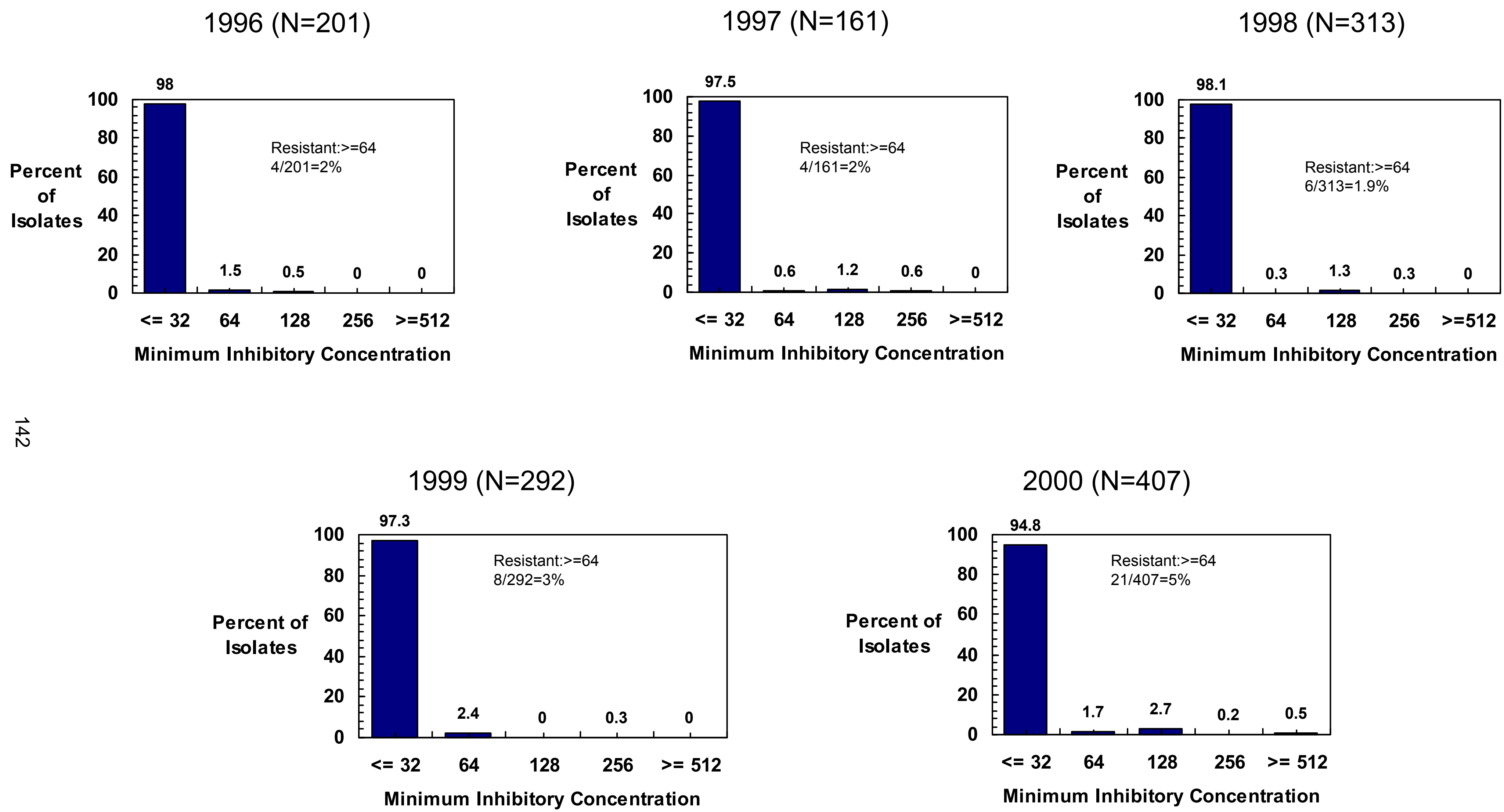

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Figure 17o. MICs for sulfamethoxazole among *E. coli* O157 isolates, 1996 - 2000

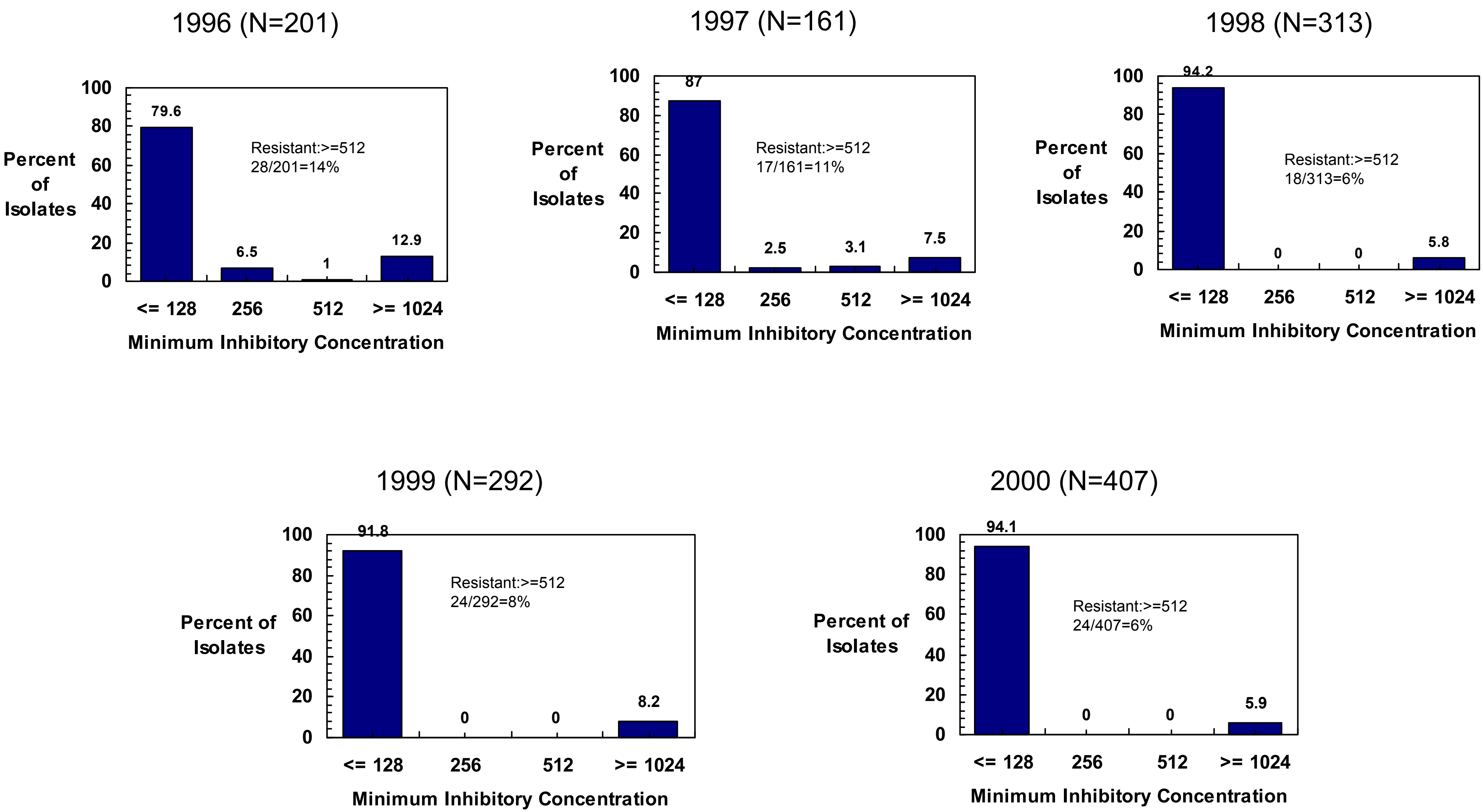

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Figure 17p. MICs for tetracycline among *E. coli* O157 isolates, 1996 - 2000

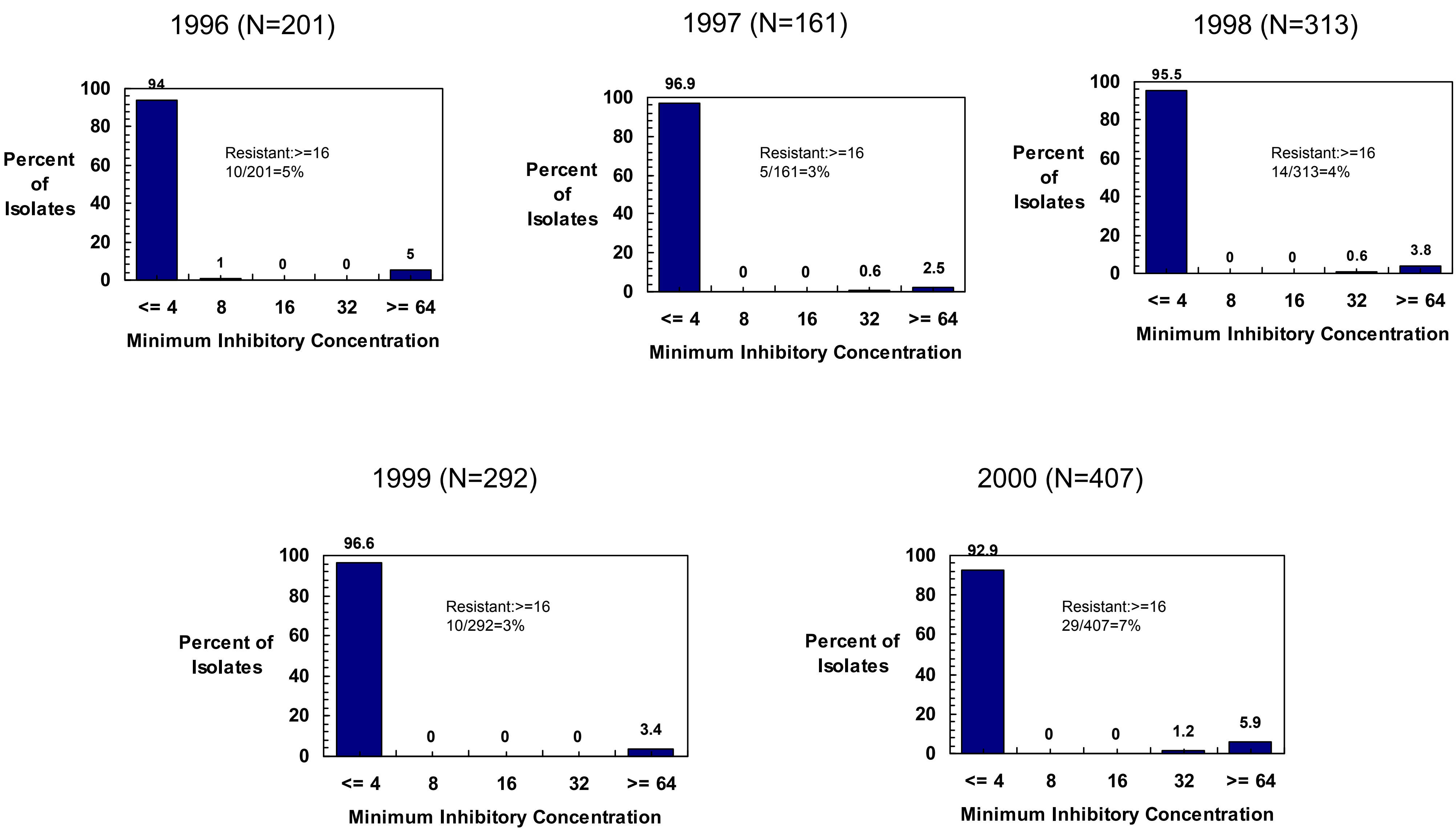

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Figure 17q. MICs for trimethoprim-sulfamethoxazole among *E. coli* O157 isolates, 1996 - 2000

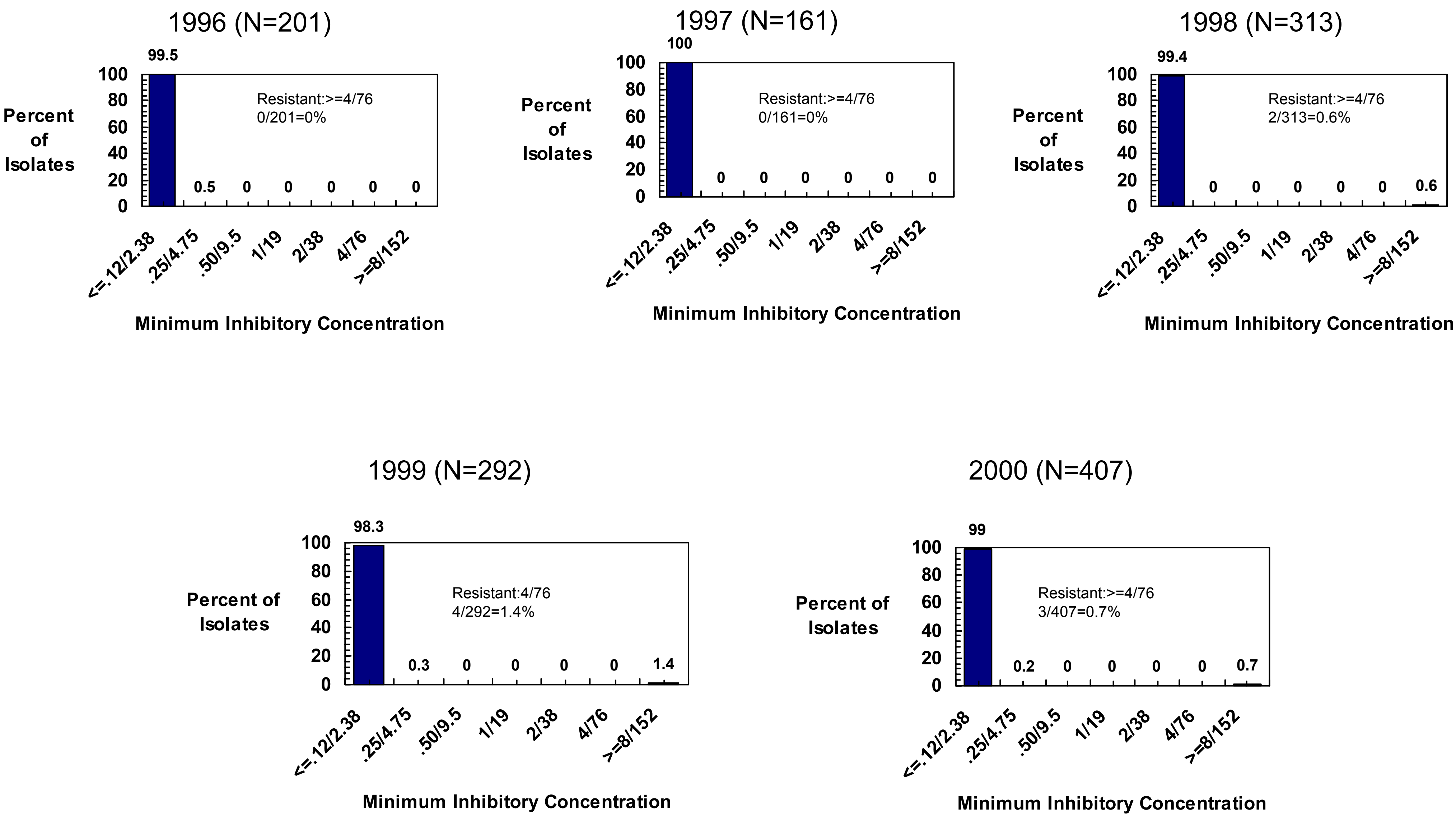

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Figure 18. Resistance among *Campylobacter* isolates, 1997 - 2000

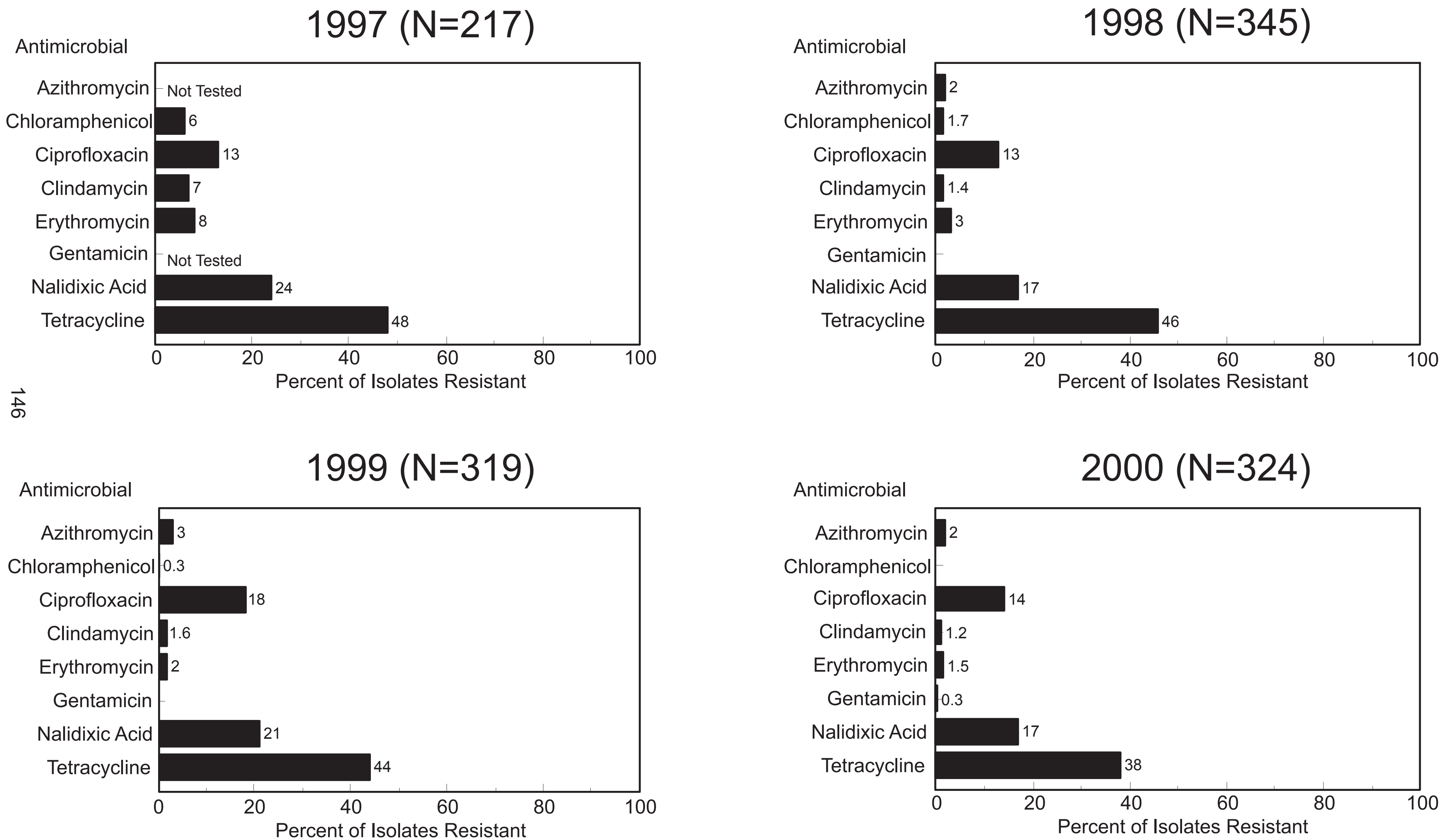

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Figure 19a. Resistance among *Campylobacter jejuni* isolates, 1997 - 2000

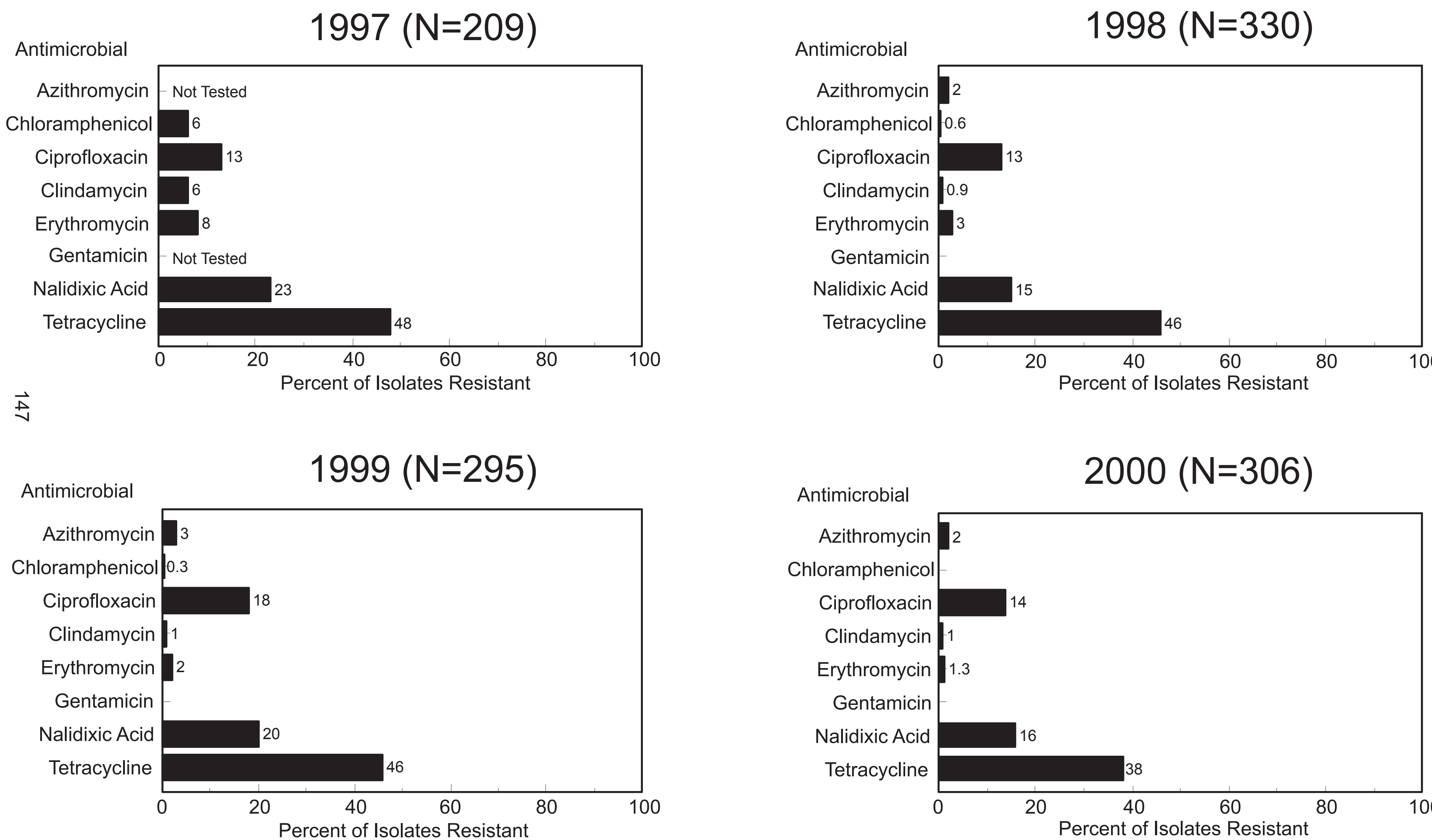

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Figure 19b. Resistance among *Campylobacter coli* isolates, 1997 - 2000

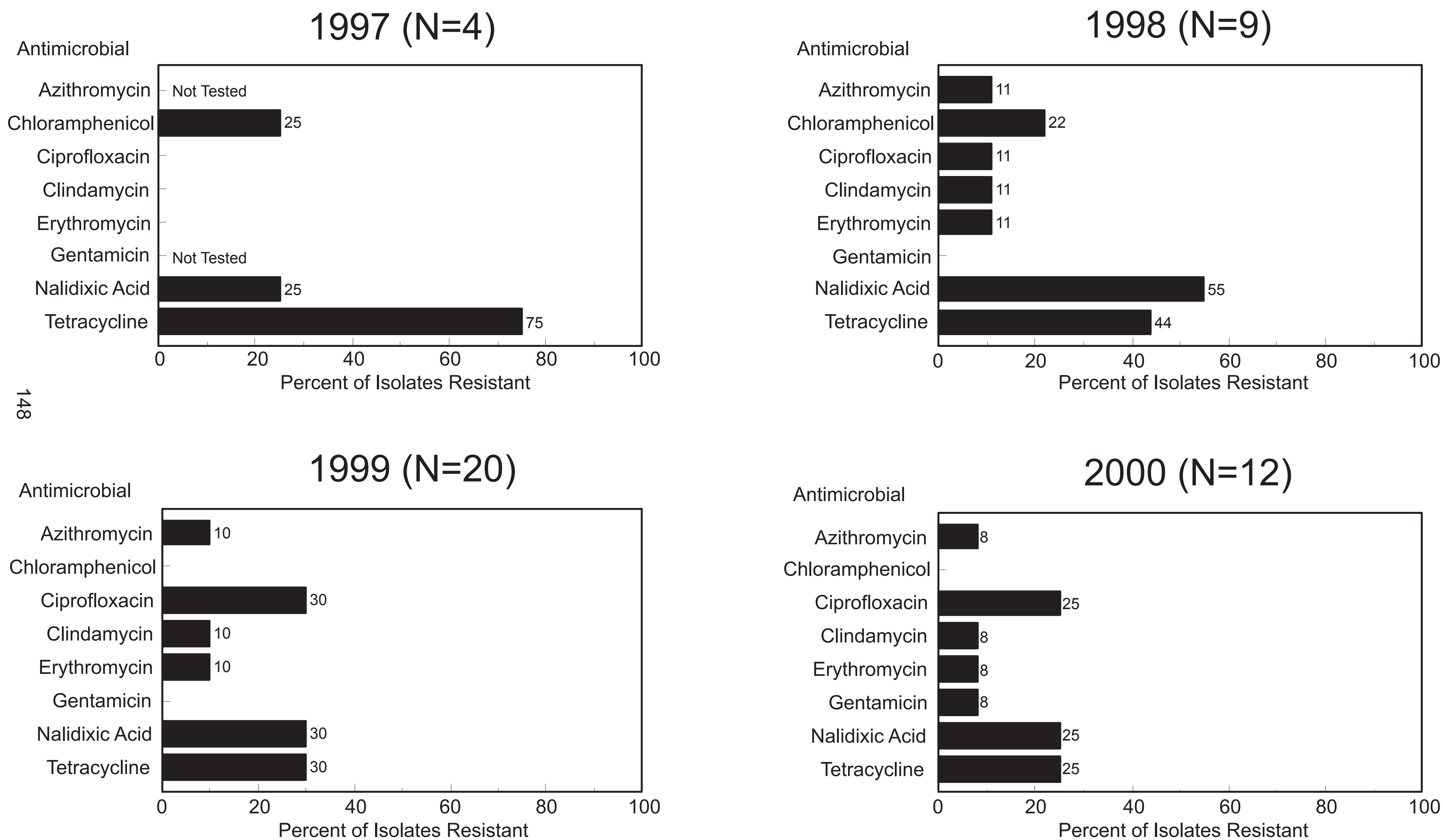

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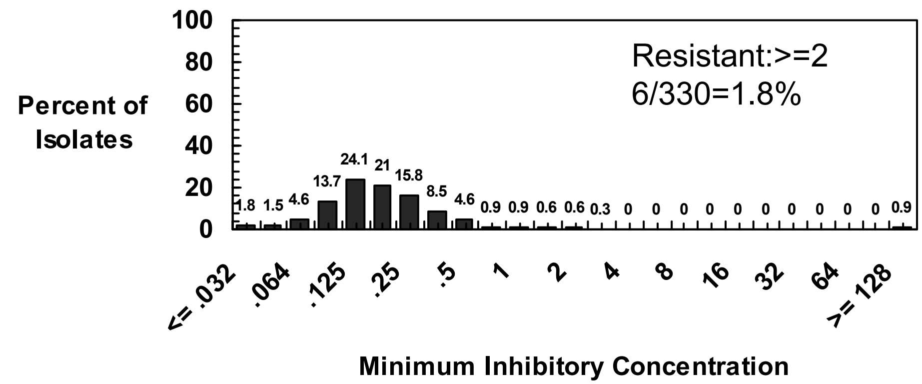
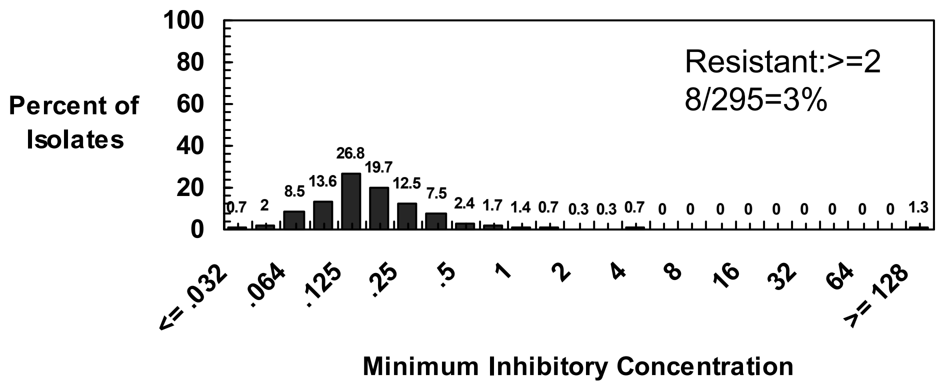
Figure 20a. MICs for azithromycin among *Campylobacter jejuni* isolates, 1997 - 2000

Not tested in 1997

1998 (N=330)



1999 (N=295)



2000 (N=306)

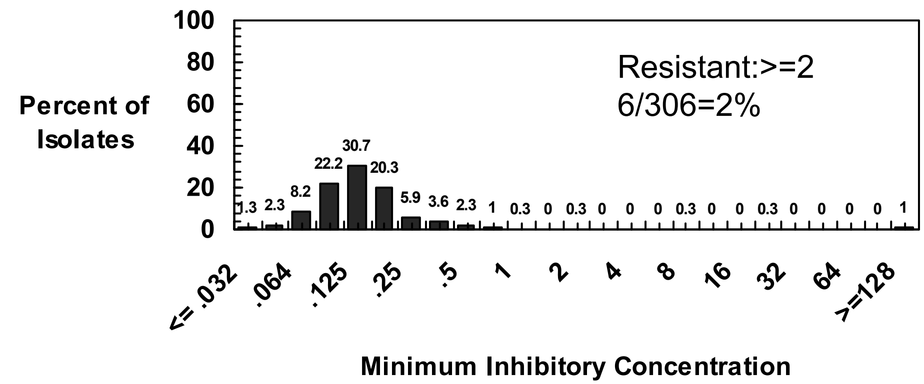


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Figure 20b. MICs for chloramphenicol among *Campylobacter jejuni* isolates, 1997 - 2000

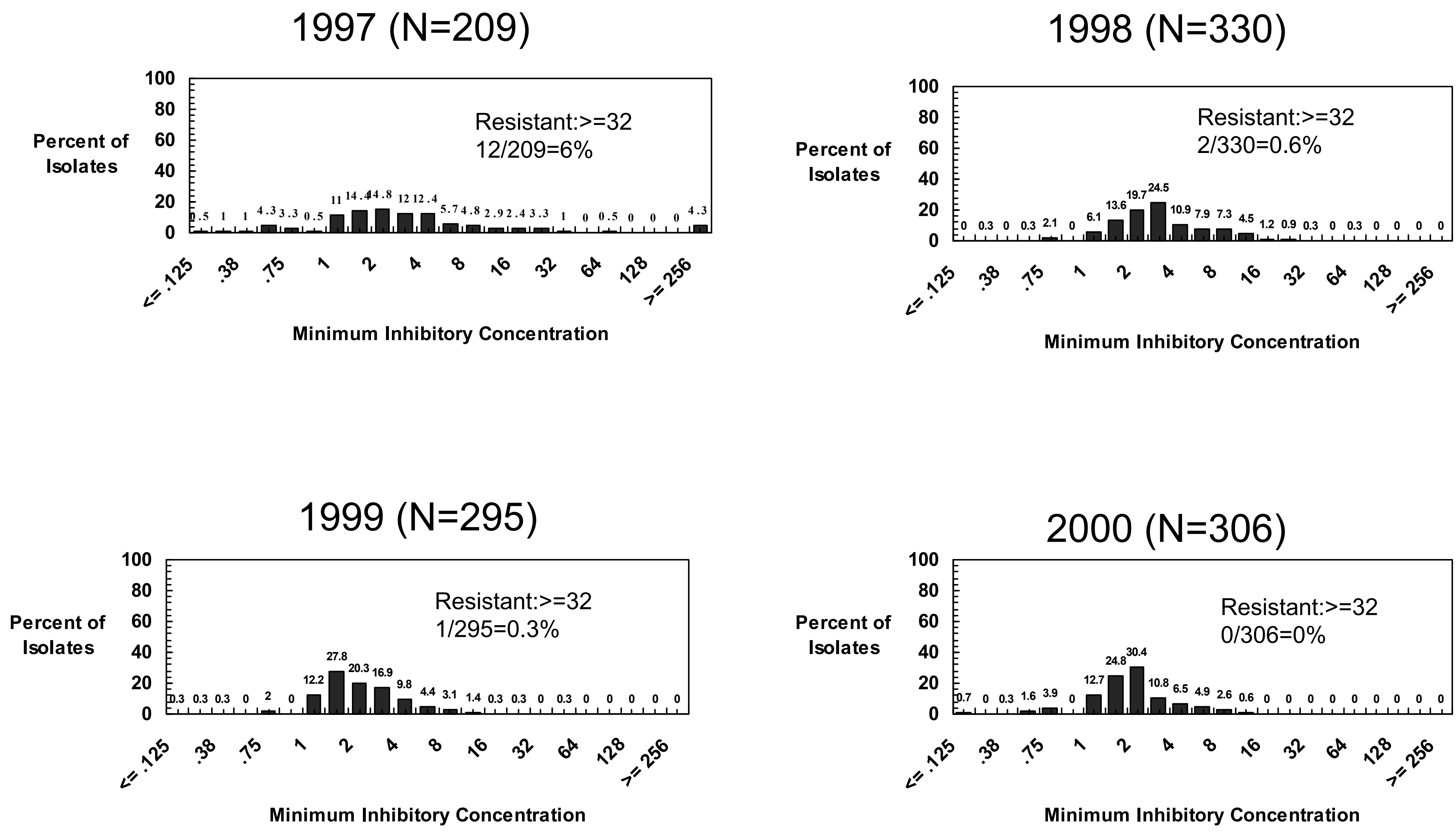

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Figure 20c. MICs for ciprofloxacin among *Campylobacter jejuni* isolates, 1997 - 2000

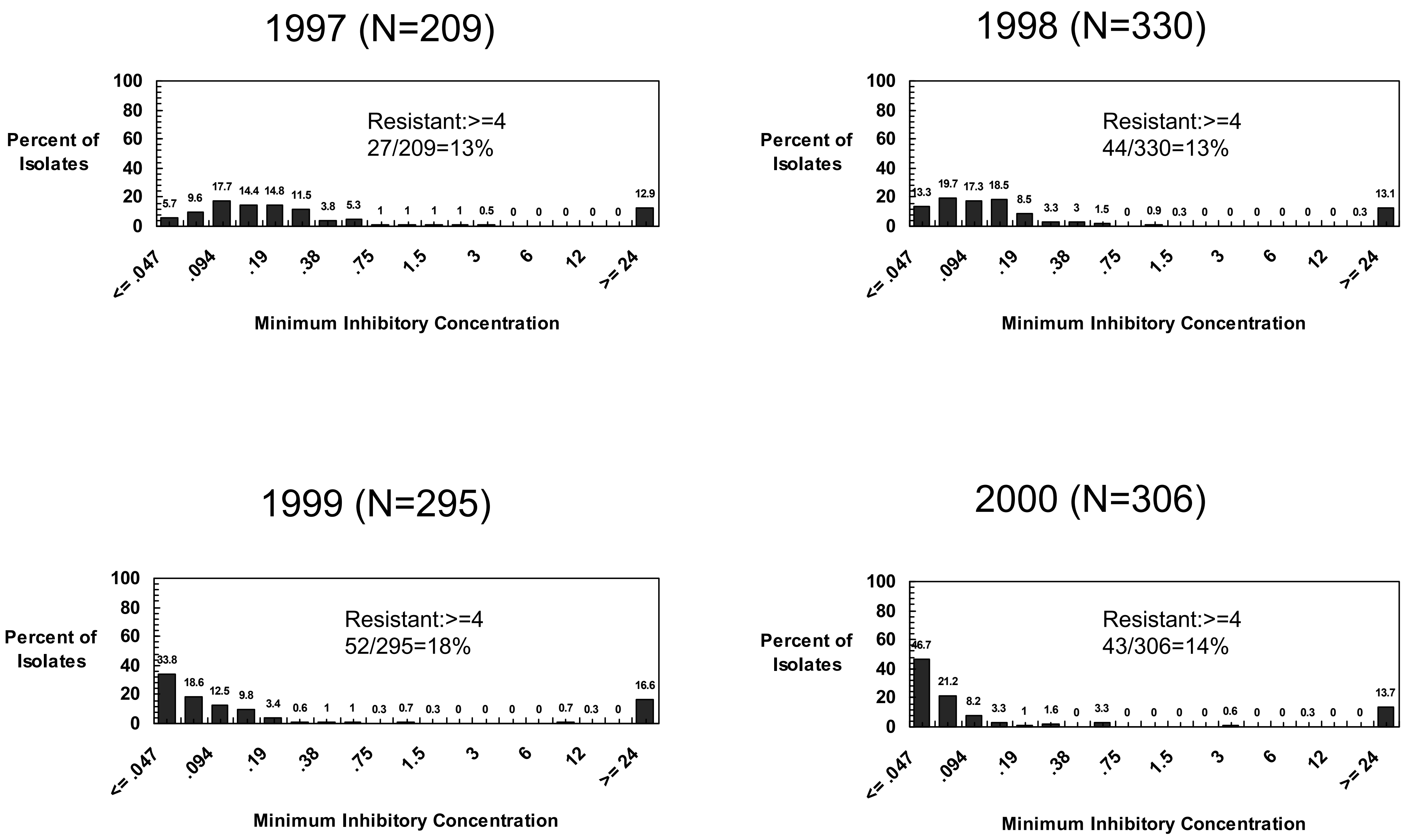

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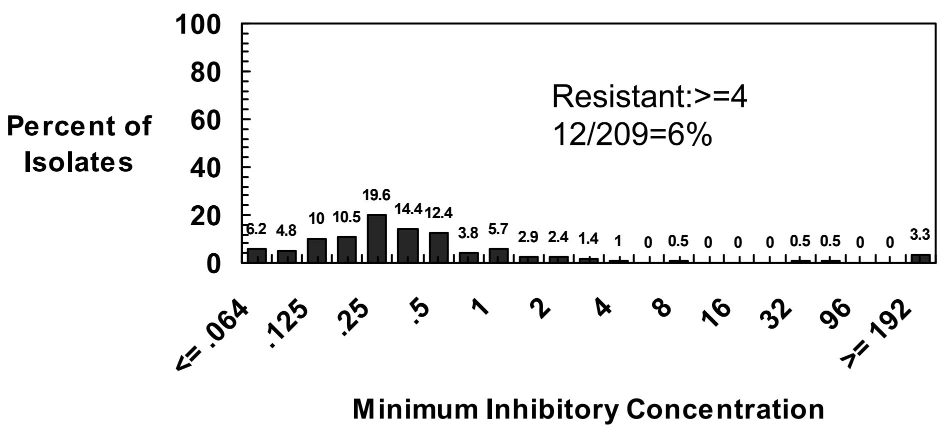
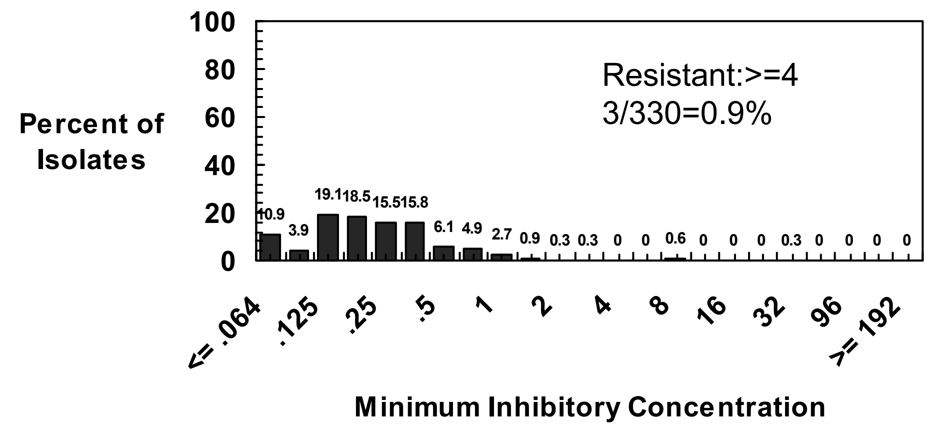
Figure 20d. MICs for clindamycin among *Campylobacter jejuni* isolates, 1997 - 2000

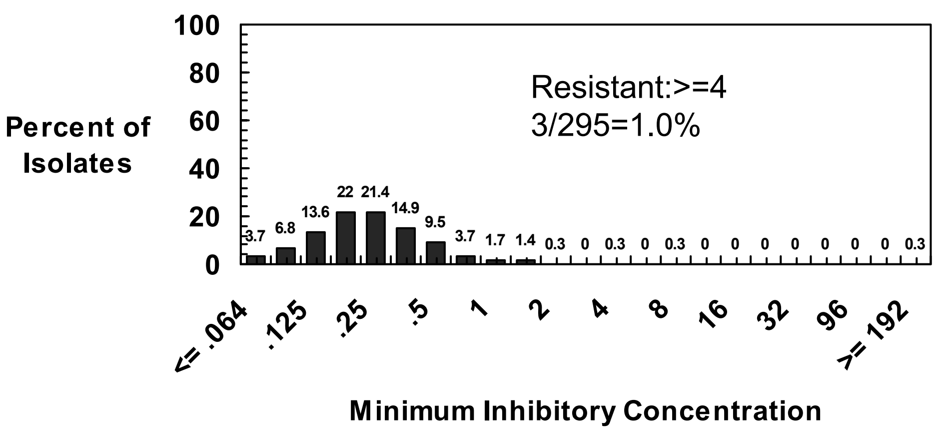
1997 (N=209)



1998 (N=330)



1999 (N=295)



2000 (N=306)

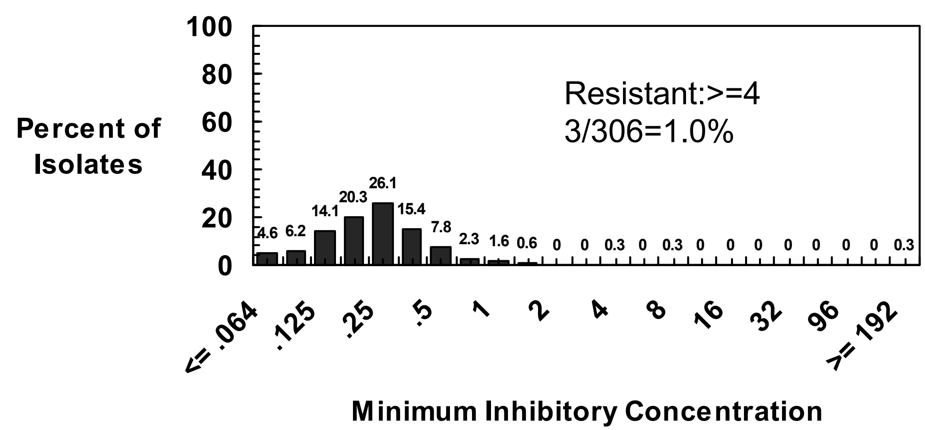


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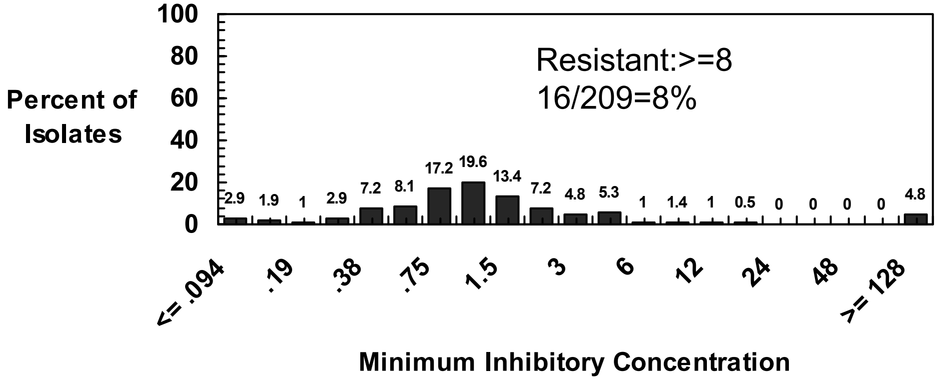
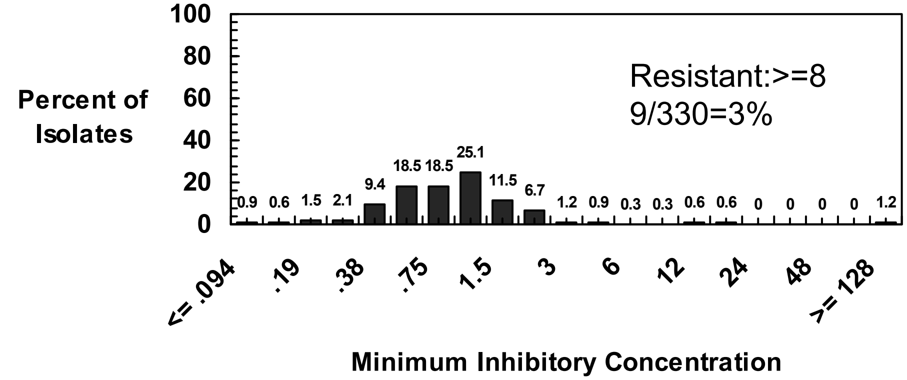
Figure 20e. MICs for erythromycin among *Campylobacter jejuni* isolates, 1997 - 2000

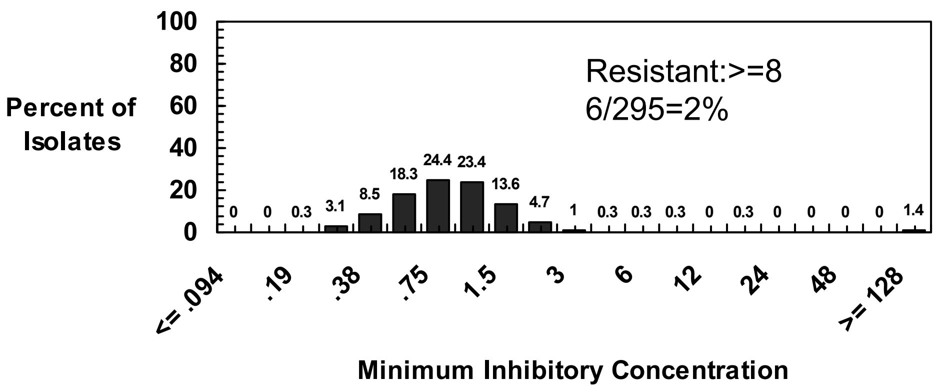
1997 (N=209)



1998 (N=330)



1999 (N=295)



2000 (N=306)

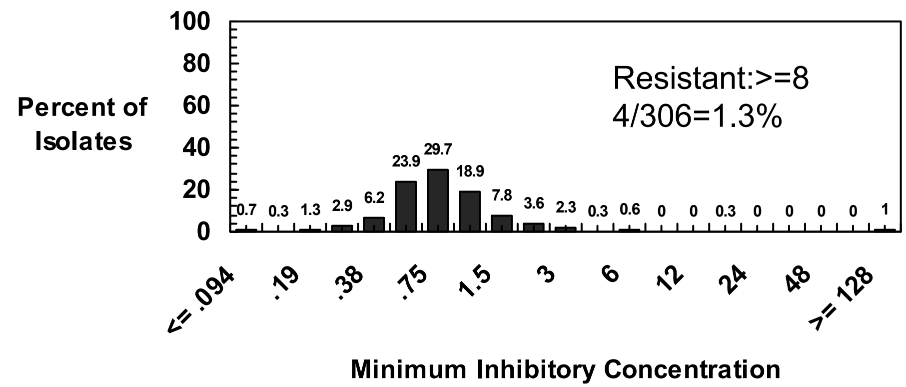


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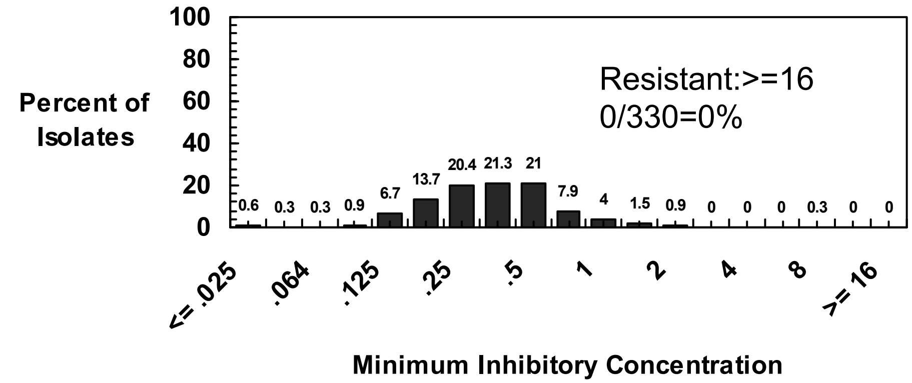
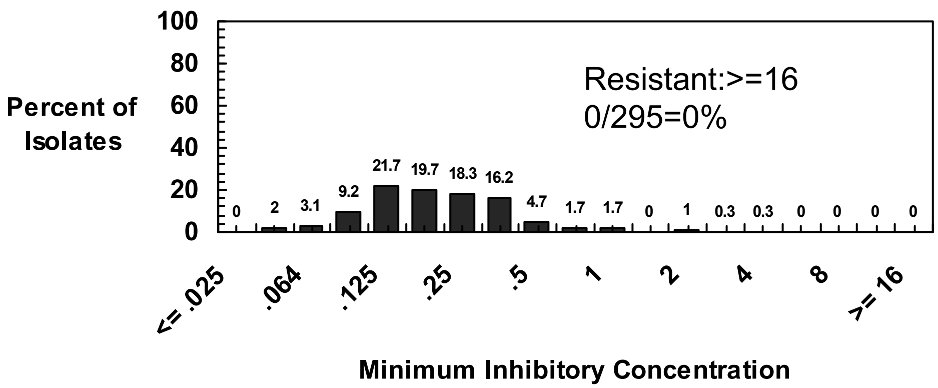
Figure 20f. MICs for gentamicin among *Campylobacter jejuni* isolates, 1997 - 2000

Not tested in 1997

1998 (N=330)



1999 (N=295)



2000 (N=306)

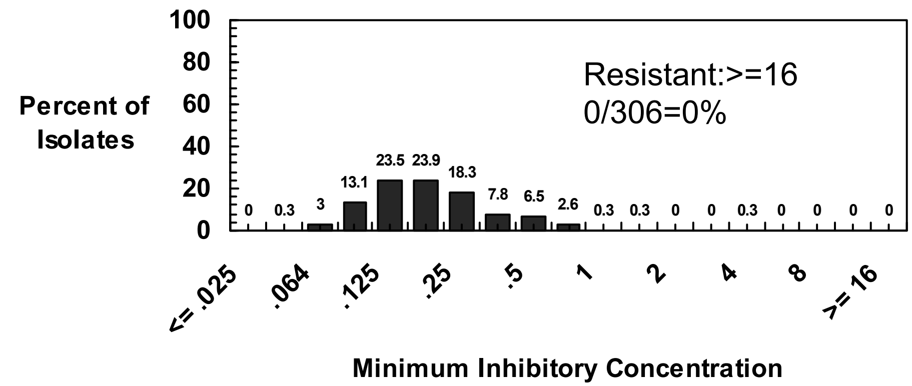


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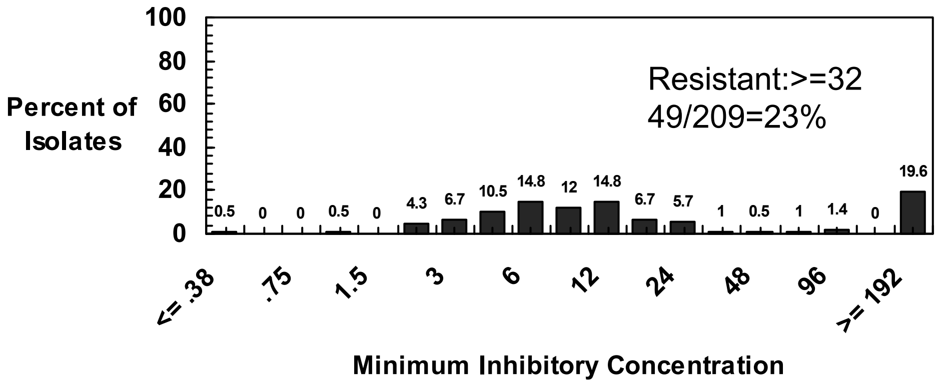
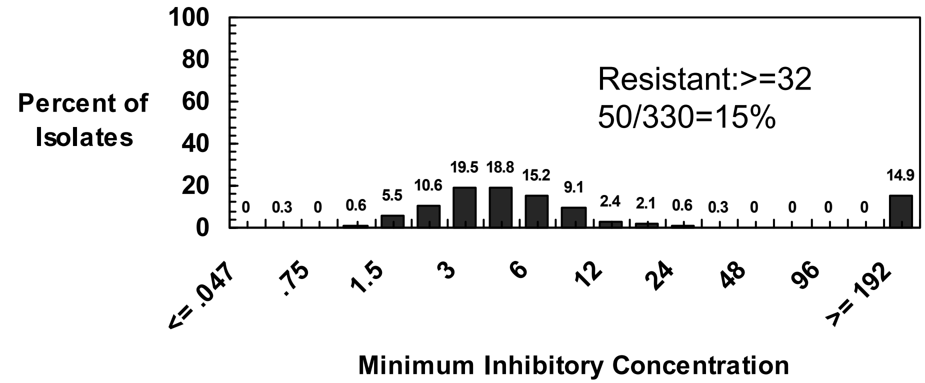
Figure 20g. MICs for nalidixic acid among *Campylobacter jejuni* isolates, 1997 - 2000

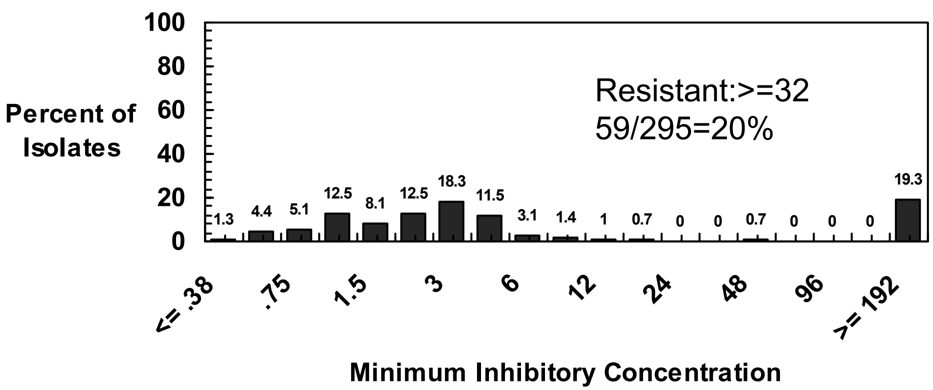
1997 (N=209)



1998 (N=330)



1999 (N=295)



2000 (N=306)

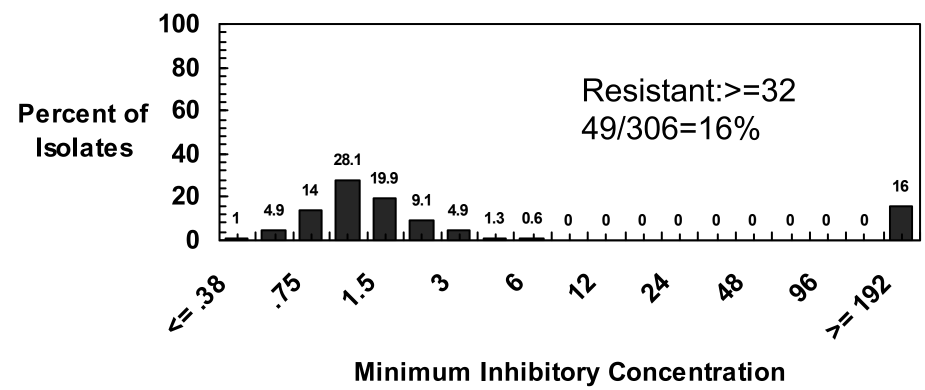


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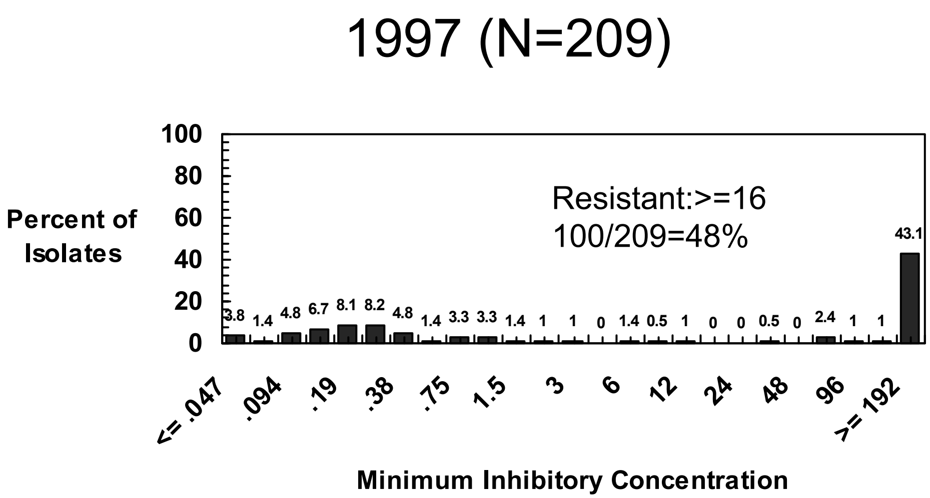
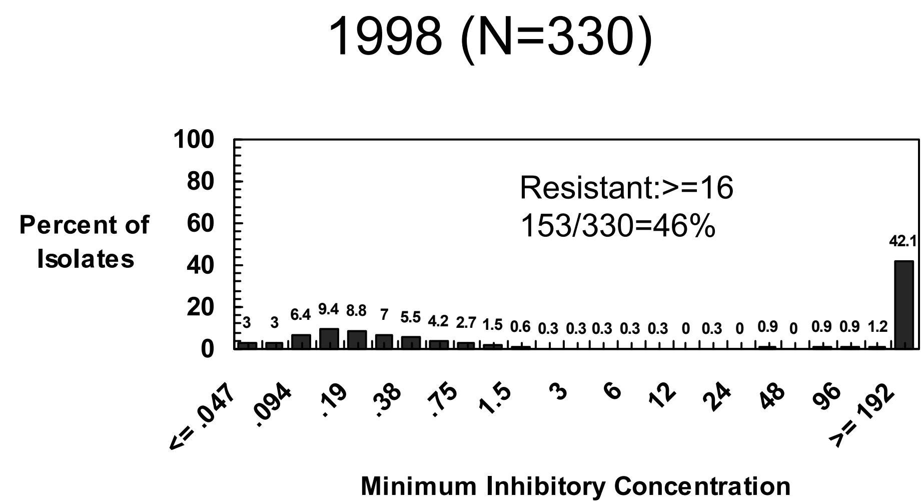
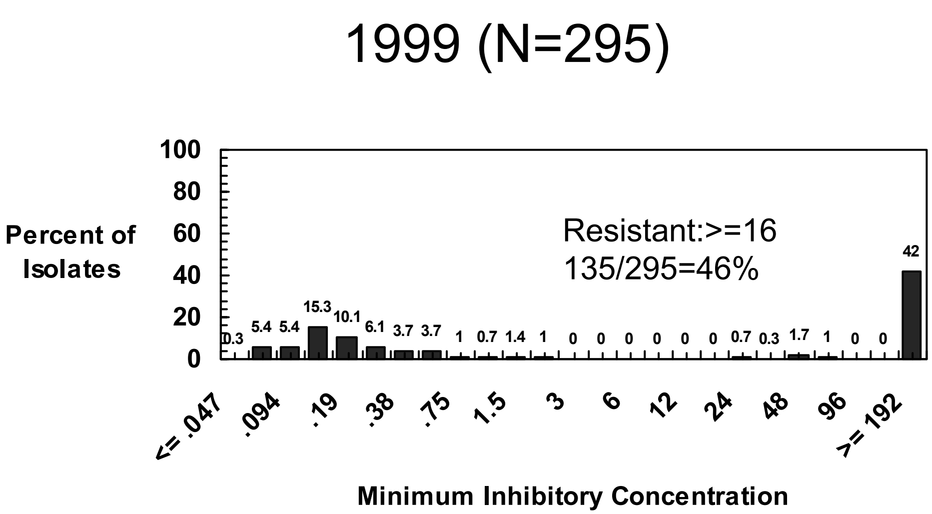
Figure 20h. MICs for tetracycline among *Campylobacter jejuni* isolates, 1997 - 2000







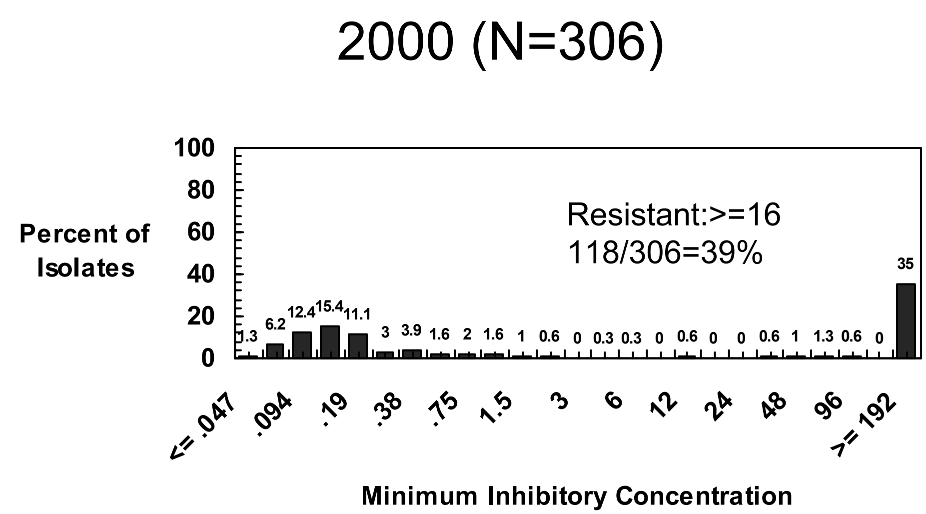


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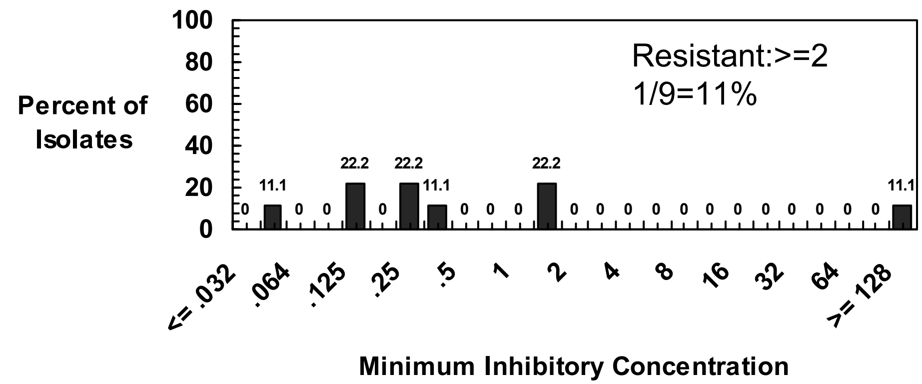
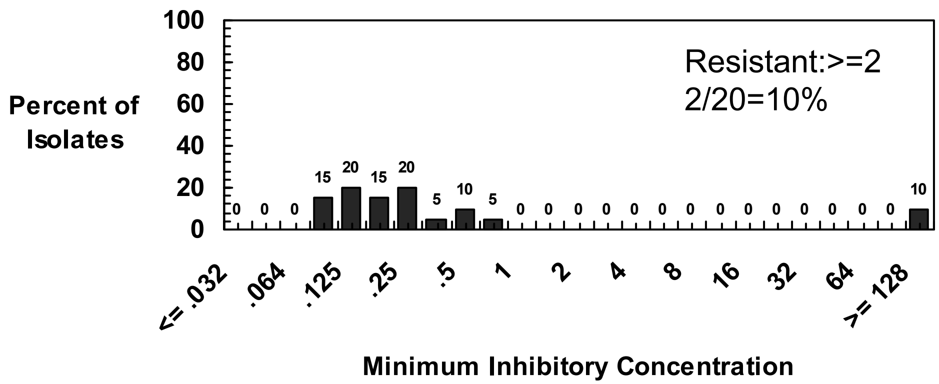
Figure 21a. MICs for azithromycin among *Campylobacter coli* isolates, 1997 - 2000

Not tested in 1997

1998 (N=9)



1999 (N=20)



2000 (N=12)

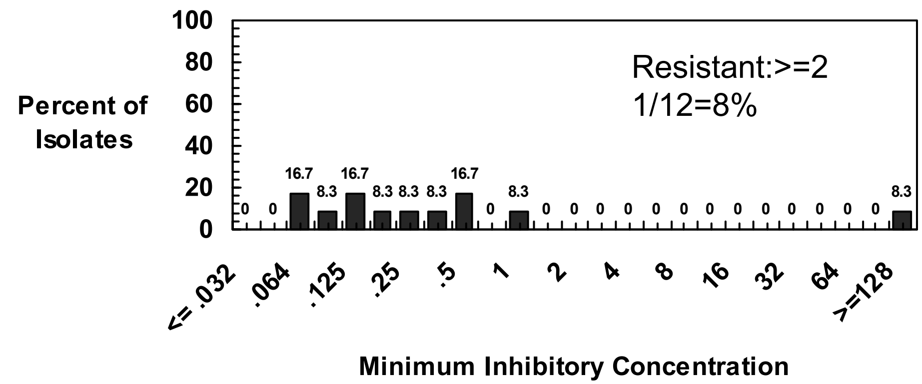


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Figure 21b. MICs for chloramphenicol among *Campylobacter coli* isolates, 1997 - 2000

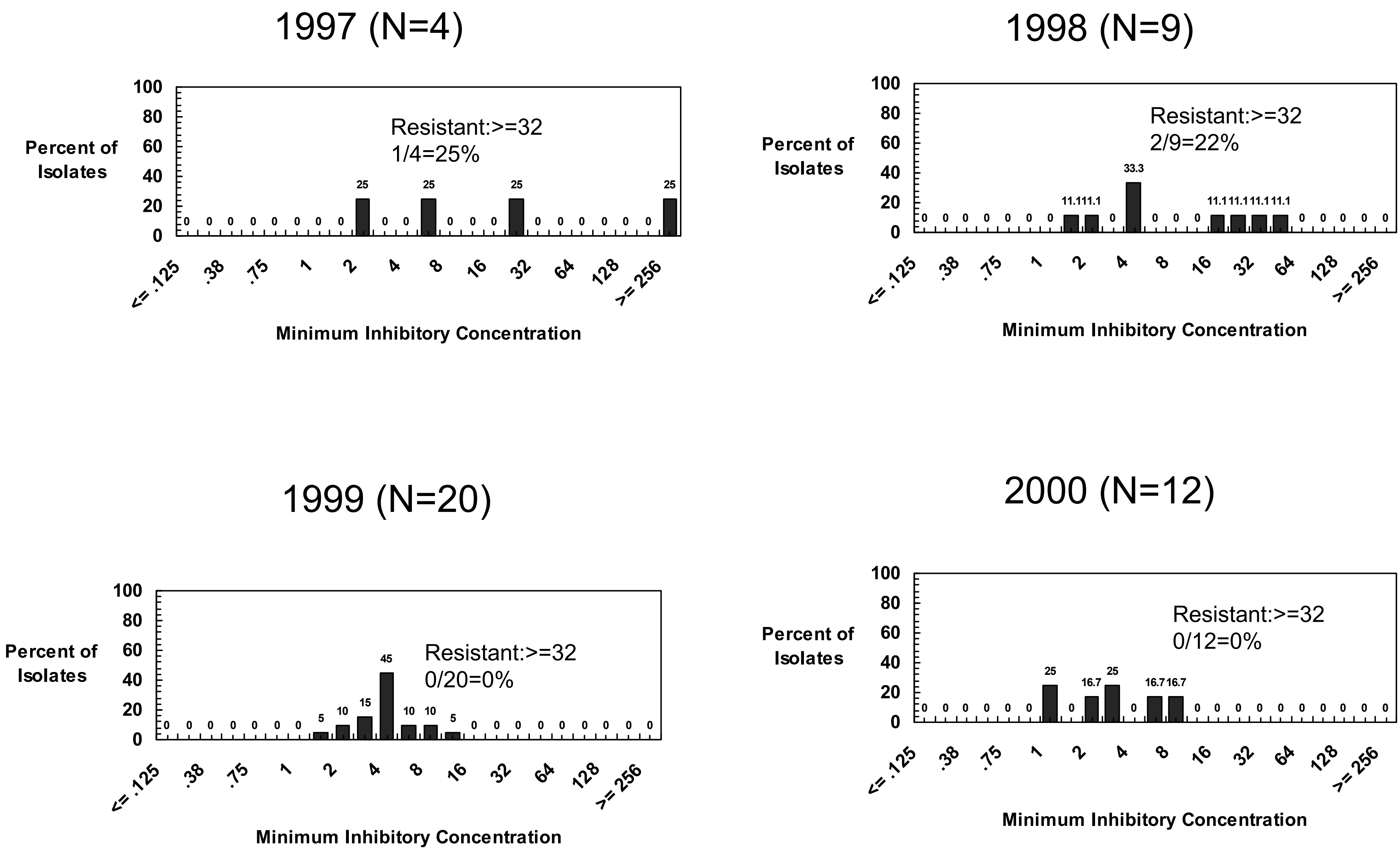

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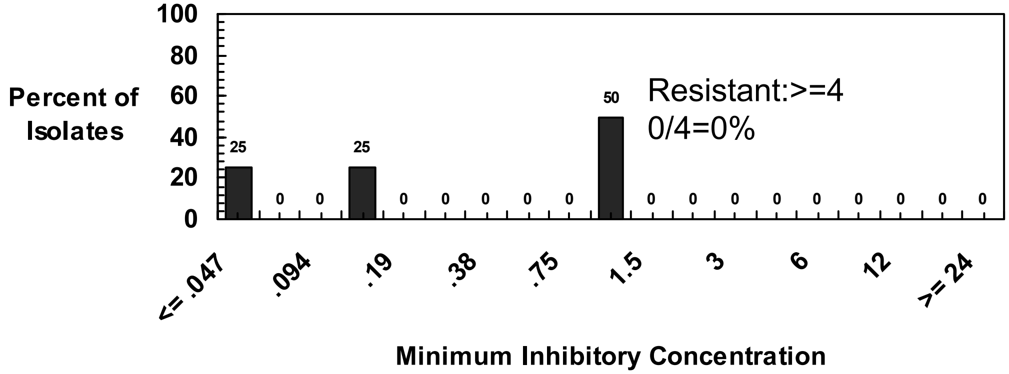
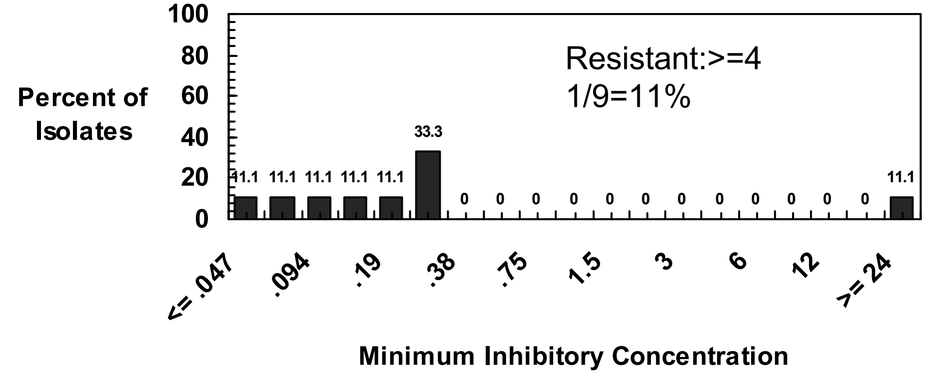
Figure 21c. MICs for ciprofloxacin among *Campylobacter coli* isolates, 1997 - 2000

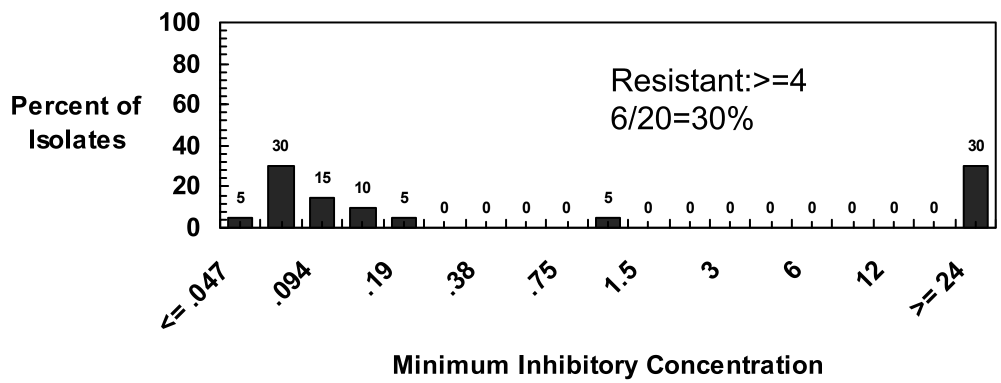
1997 (N=4)



1998 (N=9)



1999 (N=20)



2000 (N=12)

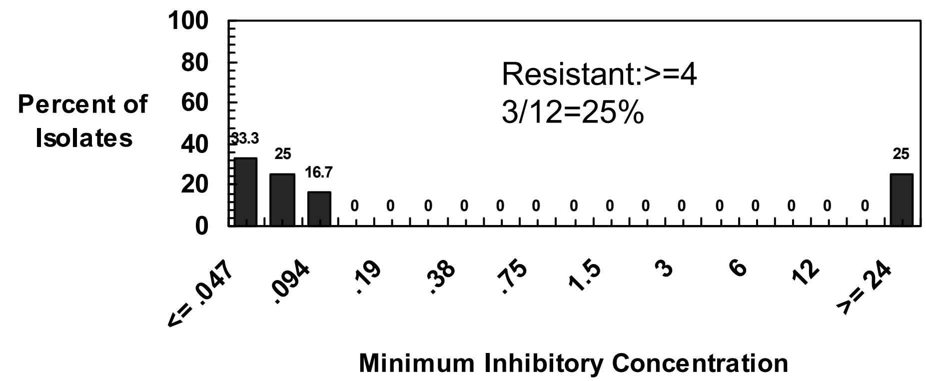


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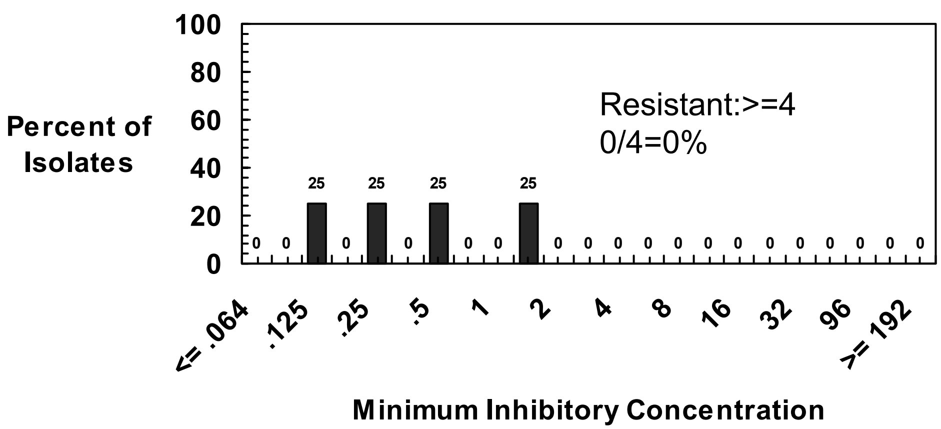
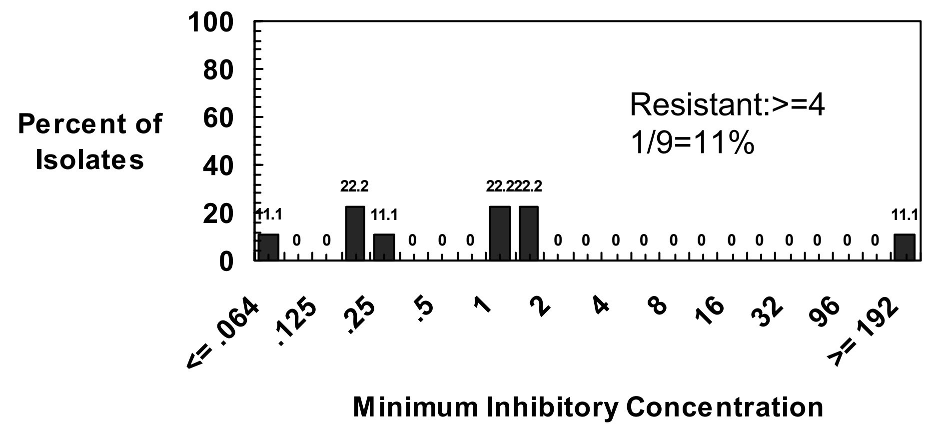
Figure 21d. MICs for clindamycin among *Campylobacter coli* isolates, 1997 - 2000

1997 (N=4)

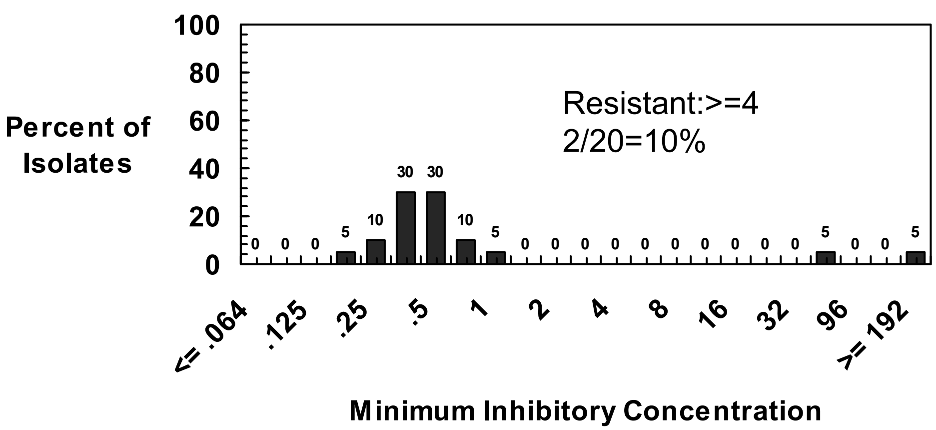


1998 (N=9)



160

1999 (N=20)



2000 (N=12)

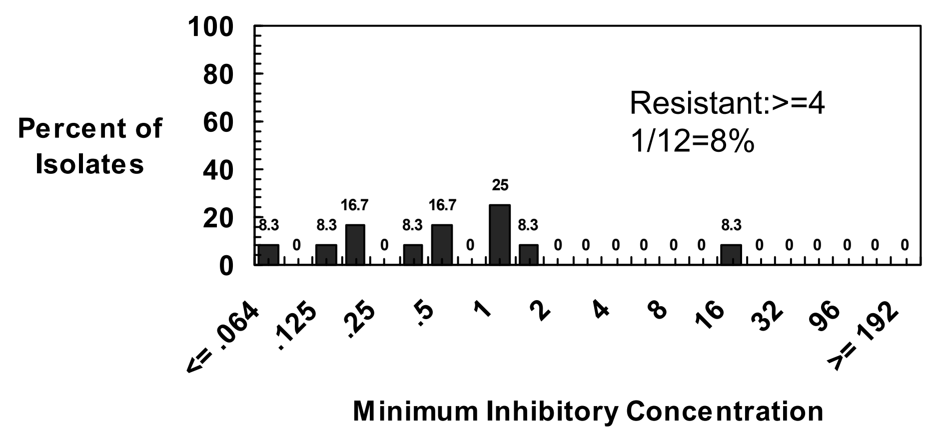


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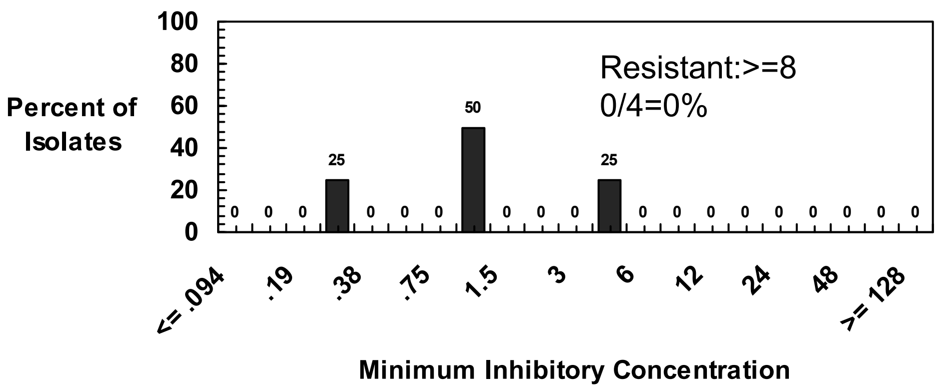
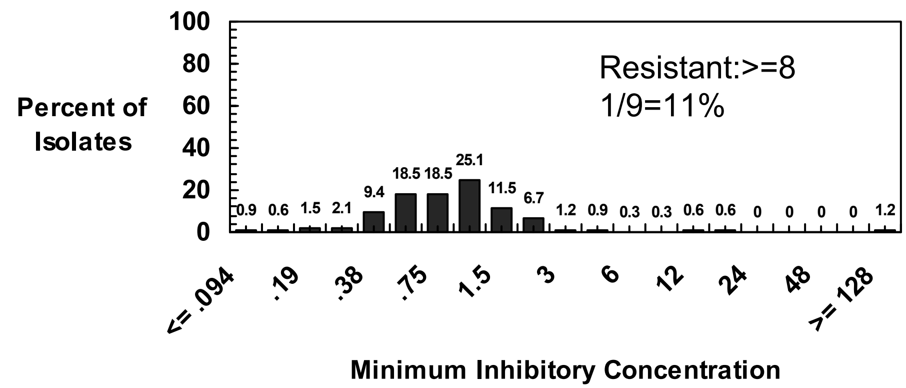
Figure 21e. MICs for erythromycin among *Campylobacter coli* isolates, 1997 - 2000

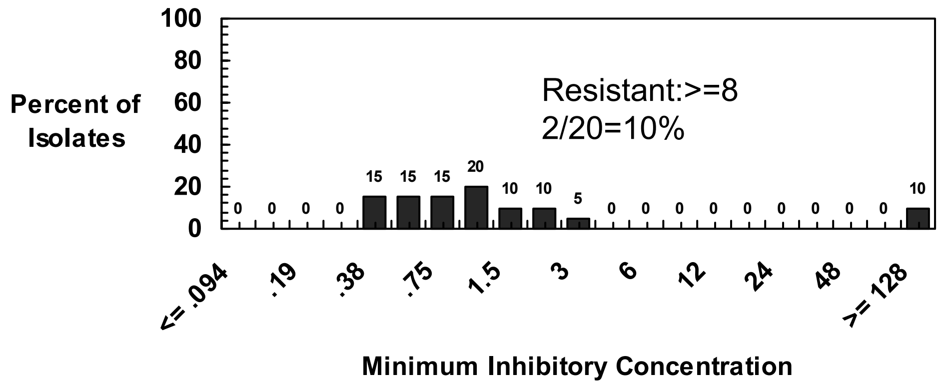
1997 (N=4)



1998 (N=9)



1999 (N=20)



2000 (N=12)

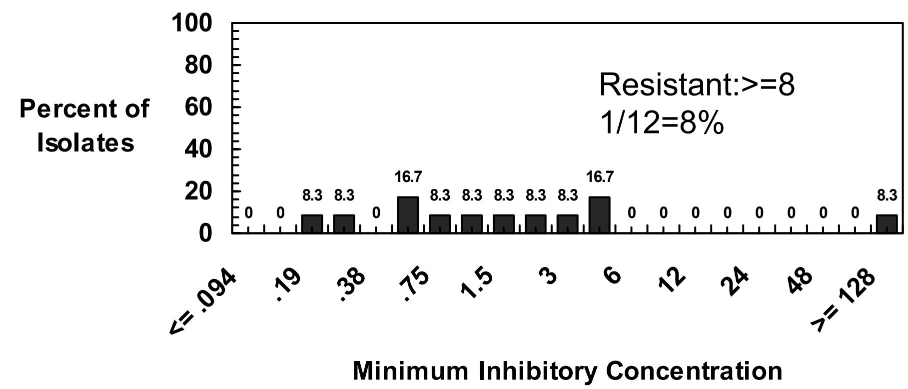


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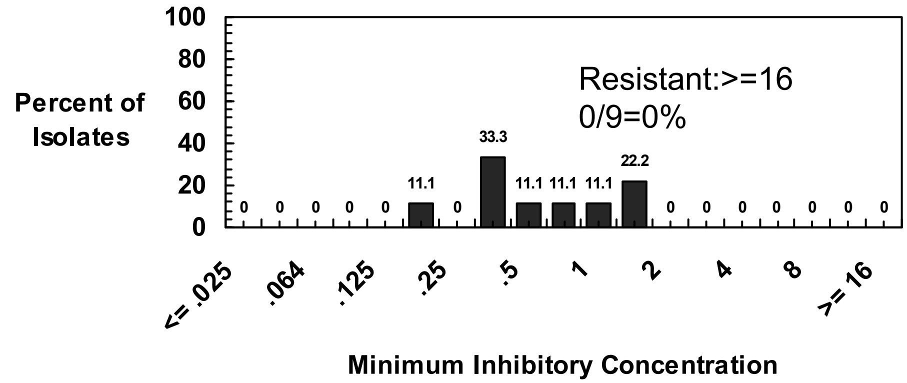
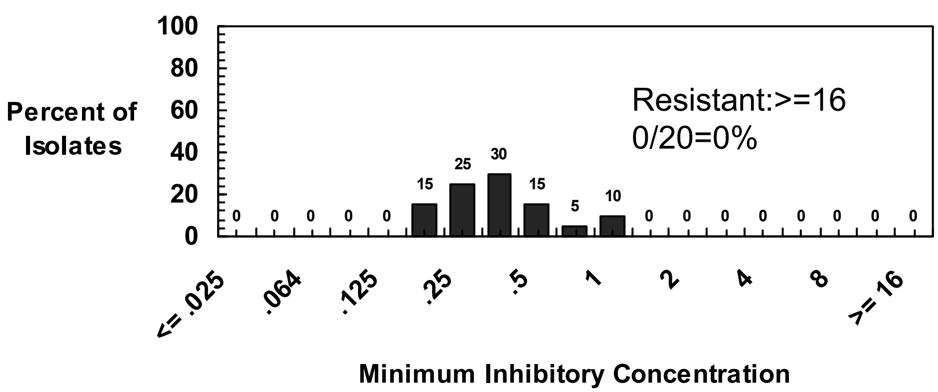
Figure 21f. MICs for gentamicin among *Campylobacter coli* isolates, 1997 - 2000

Not tested in 1997

1998 (N=9)



1999 (N=20)



2000 (N=12)

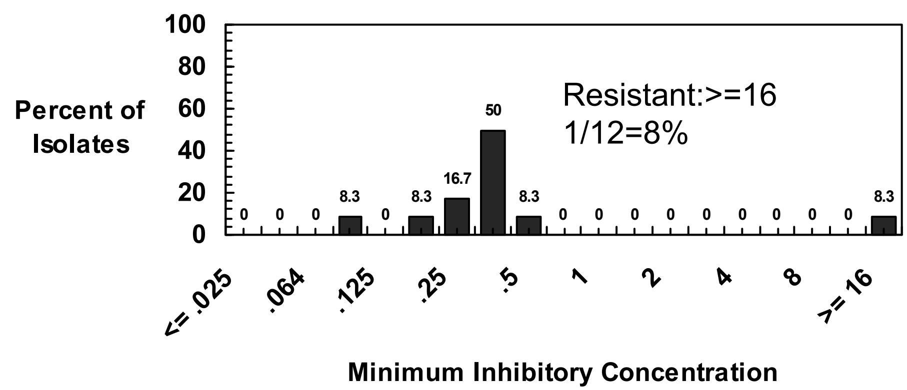


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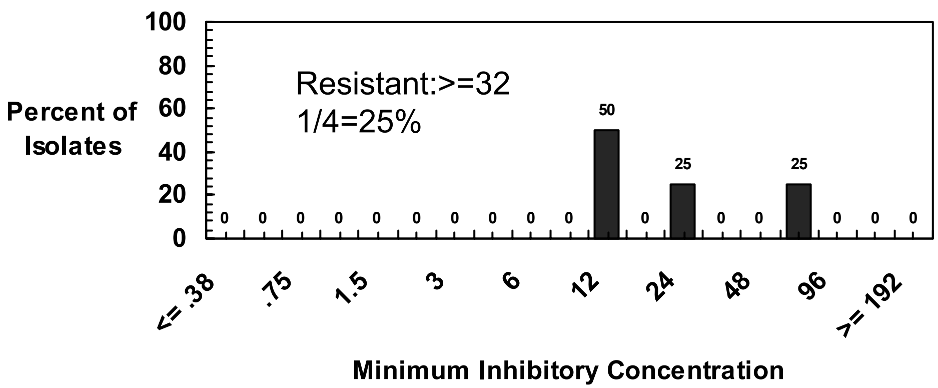
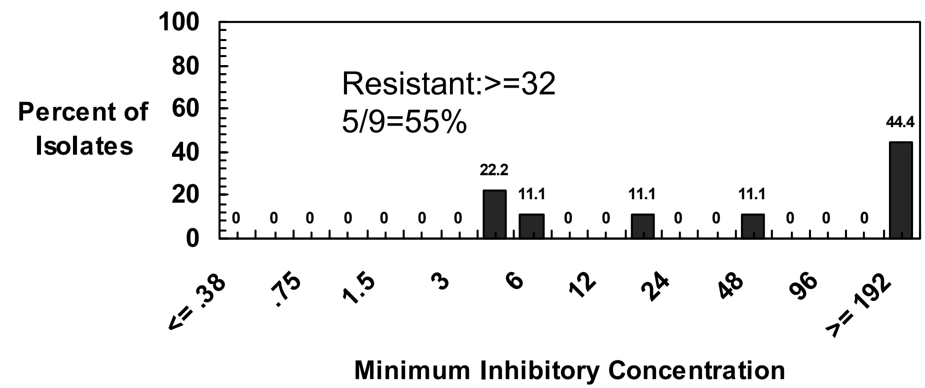
Figure 21g. MICs for nalidixic acid among *Campylobacter coli* isolates, 1997 - 2000

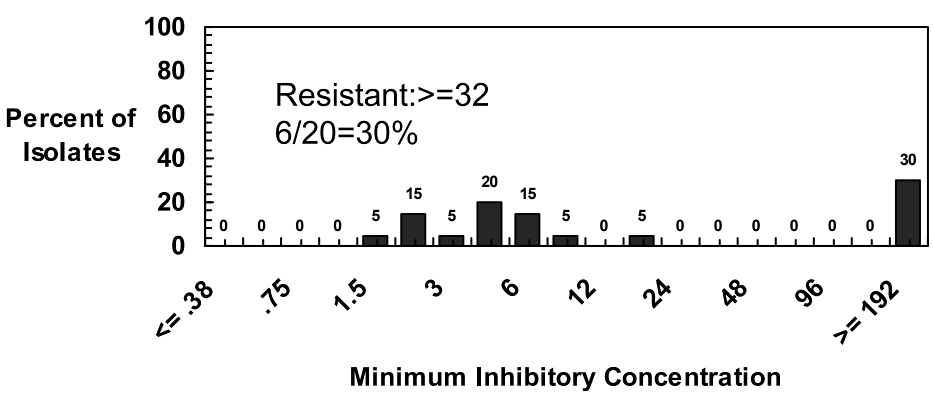
1997 (N=4)



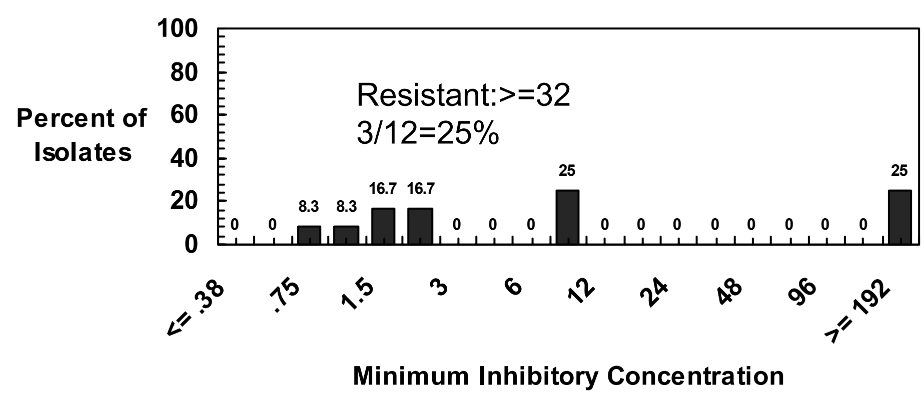
1998 (N=9)



1999 (N=20)



2000 (N=12)



National Antimicrobial Resistance Monitoring System For Enteric Bacteria

Figure 21h. MICs for tetracycline among *Campylobacter coli* isolates, 1997 - 2000