

RESULTS

Of 500 diarrheal stool specimens, 41 Salmonellae, 23 Shigellae and 58 Enteropathogenic Escherichia coli were isolated. Along with the Enterobacteria, 5 isolates of Vibrio El Tor were found. The susceptibility of these enteropathogens were performed with ten antimicrobial agents; ampicillin, oxytetracycline, chloramphenicol, furazolidone, colimycin, neomycin, kanamycin, nalidixic acid, erythromycin and co-trimoxazole. The most effective agents against Salmonella, Shigella and Enteropathogenic Escherichia coli were co-trimoxazole, furazolidone, ampicillin and nalidixic acid. A little inferior to these drugs were neomycin and colimycin, Kanamycin was less effective. The well-known chloramphenicol and oxytetracycline which were previously to be shown excellent in inhibition of the organisms in these three groups, were no longer effective. All the results in this experiment were shown in Tables 5 to 10, and Diagrams 3 to 7.

Table 5

The organisms isolated from 500 diarrheal stool specimens

Organism	No. of isolating organism	Percentage
<u>Aerobacter</u>	31	6.2
<u>Arizona</u>	3	0.6
<u>Citrobacter</u>	8	1.6
<u>Enterococci</u>	18	3.6
<u>Enteropathogenic Escherichia coli</u>	58	11.6
<u>Escherichia (non-pathogenic)</u>	398	79.6
<u>Klebsella</u>	46	9.2
<u>Proteus</u>	84	16.8
<u>Providence</u>	9	1.8
<u>Pseudomonas</u>	52	10.4
<u>Vibrio El. Tor</u>	5	1.0
<u>Salmonella</u>	41	8.2
<u>Shigella</u>	23	4.6

Table 6

Serological examination of Salmonella

Biotype	Number of Organism	Number of agglutinable organisms					Group E (3, 10, 15, 19-O, e - H)
		Poly valent O & H (2-O, a-H)	Group A (4-O, b-H)	Group B (6, 7-O, c-H)	Group C ₁ , C ₂	Group D (9-O, d-H)	
<u>Salmonella</u> spp.	41	+	NA	NA	NA	NA	NA
<u>Salmonella typhi</u>	13	+	-	-	-	+	-
<u>Salmonella paratyphi A</u>	7	+	+	-	-	-	-
<u>Salmonella paratyphi B</u>	11	+	-	+	-	-	-
<u>Salmonella paratyphi C</u>	6	+	-	-	+	-	-
<u>Salmonella gr.E</u>	4	+	-	-	-	-	+

+ = agglutination

- = no agglutination

NA = not available

Table 7

Serological examination of Shigella

Biotype	Number of organism	Shigella dysenteriae		Shigella flexneri polyvalent (1 - 6, X and Y)	Shigella sonnei phase 1 and 2	Shigella boydii polyvalent		
		(1 - 2)	(3 - 10)			(1 - 6)	(7 - 11)	(12 - 15)
<u>Shigella flexneri</u>	12	-	-	+	-	-	-	-
<u>Shigella dysenteriae</u>	2	-	+	-	-	-	-	-
<u>Shigella sonnei</u>	6	-	-	-	+	-	-	-
<u>Shigella boydii 1</u>	1	-	-	-	-	+	-	-
<u>Shigella boydii 2</u>	1	-	-	-	-	-	+	-
<u>Shigella boydii 3</u>	1	-	-	-	-	-	-	+

+ = agglutination

- = no agglutination

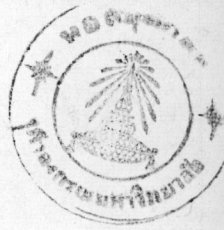


Table 8
 Serological examination of enteropathogenic
Escherichia coli

OB antisera of ente opathogenic <u>Escherichia coli</u>	No.of agglutinate enteropathogenic <u>Escherichia coli</u>
O 25 : B 19 : B 23	24
O 125 : B 15	12
O 86 : B 7	6
O 128 : B 12	5
O 26 : E 6	4
O 112 : B 11	3
O 119 : B 14	3
O 55 : B 5	1

Table 9

Serological examination of Vibrio

Organism	No. of agglutination	
	Inaba	Ogawa
<u>Vibrio El Tor</u>	-	5

Table 10

The relationship between the age groups and enteropathogenic organisms.

Patients	Number of specimens	Salmonella		Shigella		enteropathogenic Escherichia coli		Vibrio		Proteus	
		No.	%	No.	%	No.	%	No.	%	No.	%
New borns	117	5	4.3	0	0	22	18.8	0	0	11	9.4
Children	232	31	13.4	17	7.3	46.	19.8	2.	0.9	58	25.0
Adults	151	5	3.3	6	4.0	0	0	3	1.3	15	9.9

The susceptibility tests. All the enteropathogenic organisms and 84 Proteus isolated were tested for their susceptibility to anti-microbial agents. The results were shown in Table 11 to 20. The anti-microbial agents used were:

1. Ampicillin
2. Chloramphenicol
3. Colimycin
4. Co-trimoxazole
5. Erythromycin
6. Furazolidone
7. Kanamycin
8. Nalidixic acid
9. Neomycin
10. Oxytetracycline

Diagram 3

Percentage of susceptibility of 58 Enteropathogenic

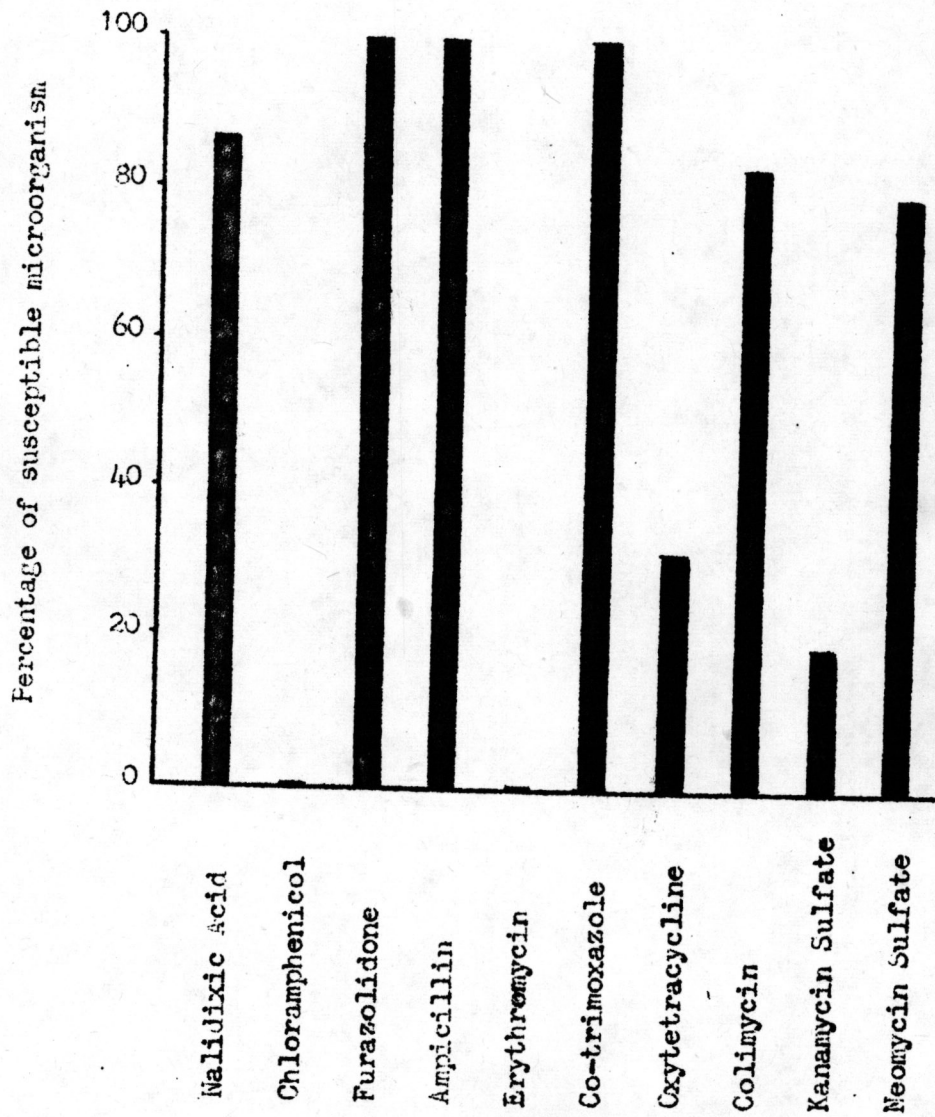
Escherichia coli isolates

Diagram 4

Percentage of susceptibility of 41 Salmonella isolates

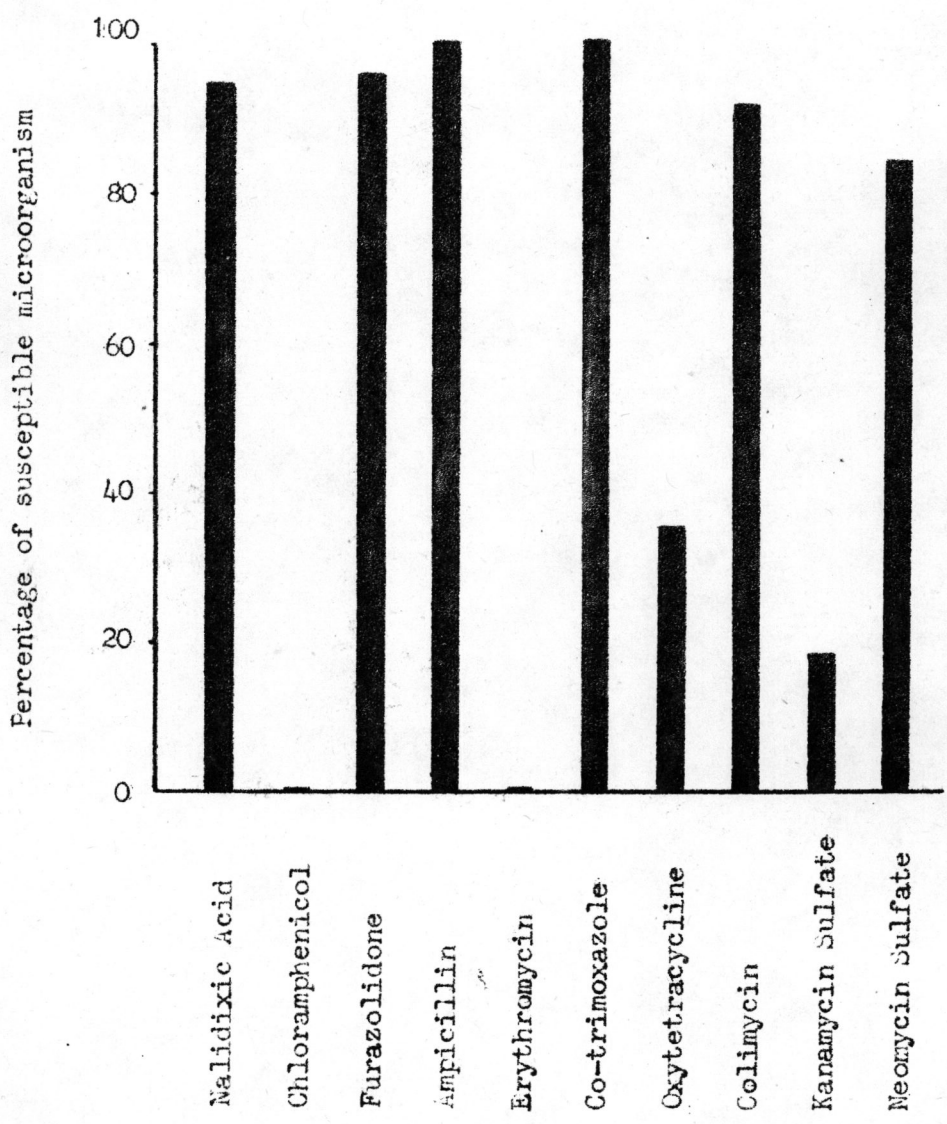


Diagram 5

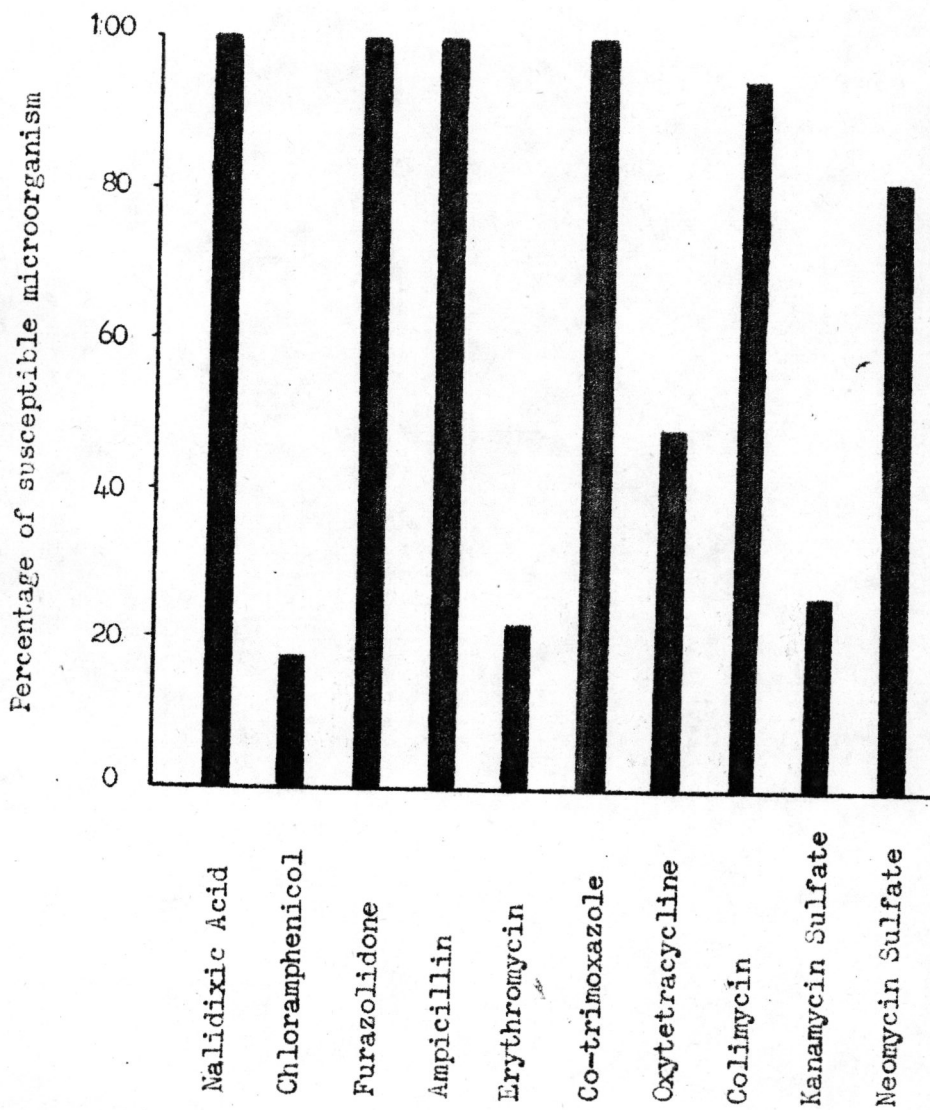
Percentage of susceptibility of 23 Shigella isolates

Diagram 6

Percentage of susceptibility of 5 Vibrio isolates

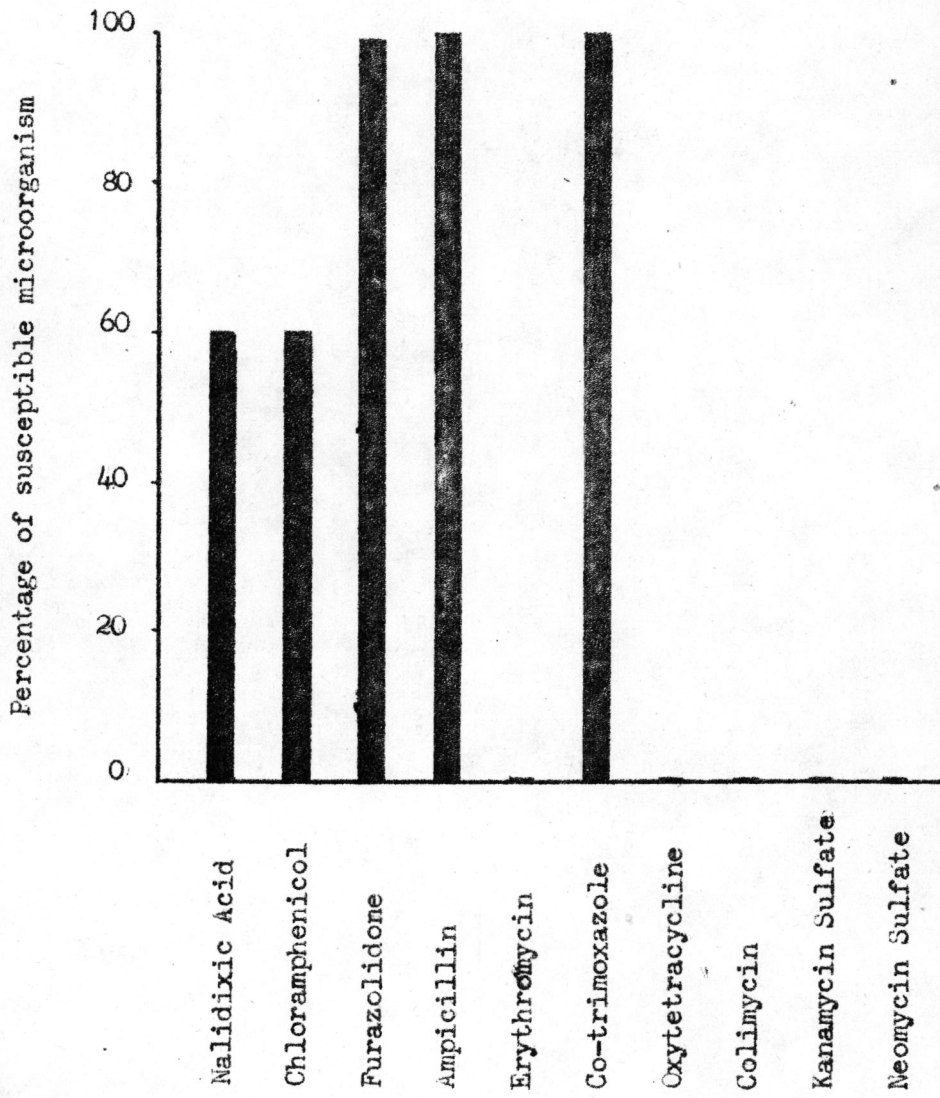


Diagram 7

Percentage of susceptibility of 84 Proteus isolates

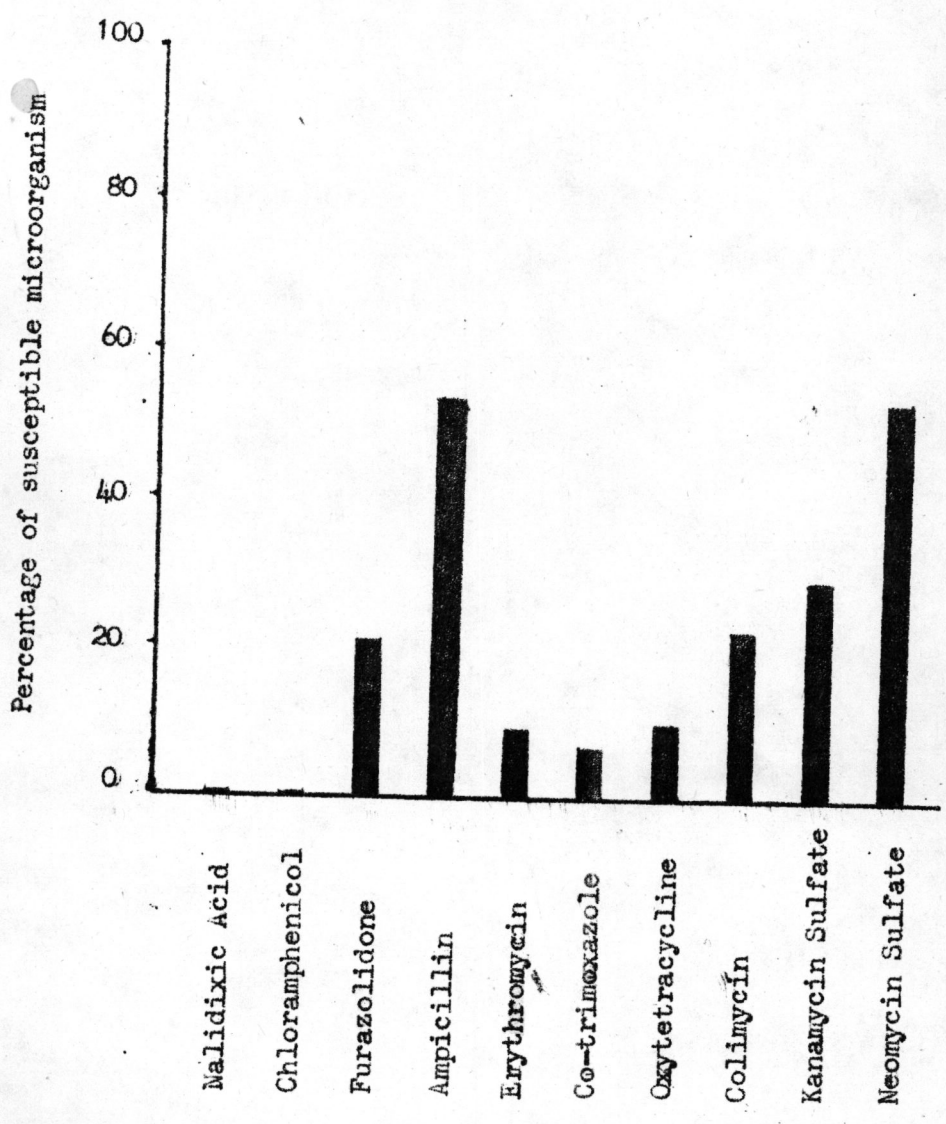


TABLE 11

Sensitivity of organisms to Ampicillin

(1 July 1972 to 28 February 1973)

Organisms	No of Strain Tested	Inhibited at mcg/ml										
		0.390	0.781	1.563	3.126	6.251	12.5	25	50	100	200	over 200
<u>Salmonella paratyphi A</u>	7	-	-	3	3	1	-	-	-	-	-	-
<u>Salmonella paratyphi B</u>	11	5	-	4	2	-	-	-	-	-	-	-
<u>Salmonella paratyphi C</u>	6	2	-	3	1	-	-	-	-	-	-	-
<u>Salmonella typhi</u>	13	9	-	4	-	-	-	-	-	-	-	-
<u>Salmonella gr. E</u>	4	-	-	4	-	-	-	-	-	-	-	-
<u>Shigella flexneri 1-5</u>	9	-	-	9	-	-	-	-	-	-	-	-
<u>Shigella flexneri 6</u>	3	1	-	2	-	-	-	-	-	-	-	-
<u>Shigella dysenteriae</u>	2	-	-	2	-	-	-	-	-	-	-	-
<u>Shigella sonnei</u>	6	-	-	4	2	-	-	-	-	-	-	-
<u>Shigella boydii</u>	3	-	-	3	-	-	-	-	-	-	-	-
<u>Escherichia coli</u>												
O 25 : B 19 : B 23	24	2	8	9	3	2	-	-	-	-	-	-
O 26 : B 6	4	1	2	1	-	-	-	-	-	-	-	-
O 55 : B 5	1	-	-	1	-	-	-	-	-	-	-	-
O 86 : B 7	6	1	-	-	4	1	-	-	-	-	-	-
O 112 : B 11	3	-	1	-	2	-	-	-	-	-	-	-
O 128 : B 12	5	2	-	1	-	1	1	-	-	-	-	-
O 119 : B 14	3	-	-	3	-	-	-	-	-	-	-	-
O 125 : B 15	12	2	-	4	-	5	1	-	-	-	-	-
<u>Proteus mirabilis</u>	58	15	-	7	6	-	3	3	9	4	3	8
<u>Proteus vulgaris</u>	13	4	-	-	-	-	-	-	-	1	1	7
<u>Proteus rettgeri</u>	4	1	-	-	2	1	-	-	-	-	-	-
<u>Proteus morgani</u>	9	5	-	-	-	-	-	-	-	2	-	2
<u>Vibrio El Tor</u>	5	-	-	-	-	5	-	-	-	-	-	-

TABLE 12

Sensitivity of organisms to Chloramphenicol

(1 July 1972 to 28 February 1973)

Organisms	No of Strain tested	Inhibited at mcg/ml											
		0.39	0.78	1.56	3.12	6.25	12.5	25	50	100	200	over 200	
<u>Salmonella paratyphi A</u>	7	-	-	-	-	-	-	-	-	-	-	2	5
<u>Salmonella paratyphi B</u>	11	-	-	-	-	-	-	1	5	3	-	2	
<u>Salmonella paratyphi C</u>	6	-	-	-	-	-	-	-	1	1	1	3	
<u>Salmonella typhi</u>	13	-	-	-	-	-	-	2	6	3	-	2	
<u>Salmonella gr.E</u>	4	-	-	-	-	-	-	-	2	-	1	1	
<u>Shigella flexneri 1-5</u>	9	-	-	-	-	-	1	3	1	-	1	3	
<u>Shigella flexneri 6</u>	3	-	-	-	-	-	-	-	2	-	-	1	
<u>Shigella dysenteriae</u>	2	-	-	-	-	-	2	-	-	-	-	-	
<u>Shigella sonnei</u>	6	-	-	-	-	-	1	-	1	2	1	1	
<u>Shigella boydii</u>	3	-	-	-	-	-	-	1	-	1	-	1	
<u>Escherichia coli</u>													
O 25 : B 19 : B 23	24	-	-	-	-	-	-	1	3	4	7	9	
O 26 : B 6	4	-	-	-	-	-	-	-	2	1	1	-	
O 55 : B 5	1	-	-	-	-	-	-	-	-	1	-	-	
O 86 : B 7	6	-	-	-	-	-	-	-	-	1	1	4	
O 112 : B 11	3	-	-	-	-	-	-	-	-	1	1	1	
O 128 : B 12	5	-	-	-	-	-	-	-	-	2	1	2	
O 119 : B 14	3	-	-	-	-	-	-	-	-	1	2	-	
O 125 : B 15	12	-	-	-	-	-	-	-	4	-	2	6	
<u>Proteus mirabilis</u>	58	-	-	-	-	-	-	-	-	-	14	44	
<u>Proteus vulgaris</u>	13	-	-	-	-	-	-	-	-	-	-	13	
<u>Proteus rettgeri</u>	4	-	-	-	-	-	-	-	-	-	1	3	
<u>Proteus morgani</u>	9	-	-	-	-	-	-	-	-	2	2	5	
<u>Vibrio El Tor</u>	5	-	-	-	-	-	3	-	-	1	1	-	

TABLE 14

Sensitivity of organisms to Co-trimoxazole

(1 July 1972 to 28 February 1973)

Organisms	No of Strain Tested	Inhibited at mcg/ml										
		0.39	0.78	1.56	3.12	6.25	12.5	25	50	100	200	over 200
<u>Salmonella paratyphi A</u>	7	4	-	-	3	-	-	-	-	-	-	-
<u>Salmonella paratyphi B</u>	11	11	-	-	-	-	-	-	-	-	-	-
<u>Salmonella paratyphi C</u>	6	6	-	-	-	-	-	-	-	-	-	-
<u>Salmonella typhi</u>	13	8	-	5	-	-	-	-	-	-	-	-
<u>Salmonella gr.E</u>	4	4	-	-	-	-	-	-	-	-	-	-
<u>Shigella flexneri 1-5</u>	9	2	2	5	-	-	-	-	-	-	-	-
<u>Shigella flexneri 6</u>	3	1	-	2	-	-	-	-	-	-	-	-
<u>Shigella dysenteriae</u>	2	1	-	-	1	-	-	-	-	-	-	-
<u>Shigella sonnei</u>	6	3	-	2	1	-	-	-	-	-	-	-
<u>Shigella boydii</u>	3	1	-	2	-	-	-	-	-	-	-	-
<u>Escherichia coli</u>												
O 25 : B 19 : B 23	24	9	7	6	1	1	-	-	-	-	-	-
O 26 : B 6	4	2	-	1	1	-	-	-	-	-	-	-
O 55 : B 5	1	1	-	-	-	-	-	-	-	-	-	-
O 86 : B 7	6	2	1	2	-	1	-	-	-	-	-	-
O 112 : B 11	3	1	-	2	-	-	-	-	-	-	-	-
O 128 : B 12	5	4	1	-	-	-	-	-	-	-	-	-
O 119 : B 14	3	2	-	1	-	-	-	-	-	-	-	-
O 125 : B 15	12	4	4	1	3	-	-	-	-	-	-	-
<u>Proteus mirabilis</u>	58	-	-	-	-	-	-	15	25	10	8	-
<u>Proteus vulgaris</u>	13	-	-	-	-	-	-	-	7	6	-	-
<u>Proteus rettgeri</u>	4	-	-	-	-	-	1	-	-	2	2	-
<u>Proteus morgani</u>	9	-	-	-	-	1	3	-	5	-	-	-
<u>Vibrio El Tor</u>	5	1	1	1	2	-	-	-	-	-	-	-

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Trimethoprim + Sulphamethoxazole.

TABLE 15

Sensitivity of organisms to Erythromycin

(1 July 1972 to 28 February 1973)

Organisms	No of Strain Tested	Inhibited at mcg/ml										
		0.39	0.78	1.56	3.12	6.25	12.5	25	50	100	200	over 200
<u>Salmonella paratyphi A</u>	7	-	-	-	-	-	-	3	4	-	-	-
<u>Salmonella paratyphi B</u>	11	-	-	-	-	-	-	-	-	7	2	2
<u>Salmonella paratyphi C</u>	6	-	-	-	-	-	-	-	-	5	-	1
<u>Salmonella typhi</u>	13	-	-	-	-	-	-	1	12	-	-	-
<u>Salmonella gr.E</u>	4	-	-	-	-	-	-	-	4	-	-	-
<u>Shigella flexneri 1-5</u>	9	-	-	-	-	-	-	9	-	-	-	-
<u>Shigella flexneri 6</u>	3	-	-	1	-	-	-	2	-	-	-	-
<u>Shigella dysenteriae</u>	2	-	-	-	1	-	-	1	-	-	-	-
<u>Shigella sonnei</u>	6	-	-	-	-	2	-	3	-	-	1	-
<u>Shigella boydii</u>	3	-	-	-	1	-	-	2	-	-	-	-
<u>Escherichia coli</u>												
O 25 : B 19 : B 23	24	-	-	-	-	-	-	-	-	5	3	16
O 26 : B 6	4	-	-	-	-	-	-	-	1	2	1	-
O 55 : B 5	1	-	-	-	-	-	-	-	-	1	-	-
O 86 : B 7	6	-	-	-	-	-	-	-	-	3	2	1
O 112 : B 11	3	-	-	-	-	-	-	-	2	1	-	-
O 128 : B 12	5	-	-	-	-	-	-	-	3	1	1	-
O 119 : B 14	3	-	-	-	-	-	-	-	2	-	1	-
O 125 : B 15	12	-	-	-	-	-	-	-	4	-	6	2
<u>Proteus mirabilis</u>	58	-	-	1	-	-	2	-	-	-	2	53
<u>Proteus vulgaris</u>	13	-	-	-	-	-	-	-	-	1	2	10
<u>Proteus rettgeri</u>	4	-	-	-	-	-	-	-	-	-	-	4
<u>Proteus morganii</u>	9	-	-	4	-	-	-	-	-	-	4	1
<u>Vibrio El Tor</u>	5	-	-	-	-	-	-	2	-	2	1	-

TABLE 17

Sensitivity of organisms to Kanamycin Sulfate
(1 July 1972 to 28 February 1973)

Organisms	No of Strain Tested	Inhibited at mcg/ml										
		0.390	0.781	1.56	3.12	6.25	12.5	25	50	100	200	over 200
<i>Salmonella paratyphi</i> A	7	-	-	-	-	-	-	4	2	1	-	-
<i>Salmonella paratyphi</i> B	11	-	-	-	-	1	-	1	3	2	4	-
<i>Salmonella paratyphi</i> C	6	-	-	-	-	-	-	1	3	2	-	-
<i>Salmonella typhi</i>	13	-	-	-	2	1	2	3	3	2	-	-
<i>Salmonella gr.E</i>	4	-	-	-	-	-	2	2	-	-	-	-
<i>Shigella flexneri</i> 1-5	9	-	-	-	-	-	2	2	2	3	-	-
<i>Shigella flexneri</i> 6	3	-	-	-	-	-	-	1	1	-	1	-
<i>Shigella dysenteriae</i>	2	-	-	-	-	-	-	1	-	1	-	-
<i>Shigella sonnei</i>	6	-	-	-	-	1	2	1	1	1	-	-
<i>Shigella boydii</i>	3	-	-	-	-	-	1	1	1	-	-	-
<i>Escherichia coli</i>												
O 25 : B 19 : B 23	24	-	-	3	-	-	-	2	-	7	3	9
O 26 : B 6	4	-	-	-	-	1	-	-	2	1	-	-
O 55 : B 5	1	-	-	-	-	-	-	-	1	-	-	-
O 86 : B 7	6	-	-	-	-	-	-	-	-	-	2	4
O 112 : B 11	3	-	-	-	-	-	-	-	-	-	1	2
O 128 : B 12	5	-	-	2	1	-	-	-	-	1	-	1
O 119 : B 14	3	-	-	-	-	-	-	-	-	1	-	2
O 125 : B 15	12	-	-	-	-	3	-	-	-	1	3	6
<i>Proteus mirabilis</i>	58	-	-	-	4	8	4	-	3	4	4	31
<i>Proteus vulgaris</i>	13	-	-	-	2	-	-	2	-	-	-	9
<i>Proteus rettgeri</i>	4	-	-	1	-	2	-	-	-	-	-	1
<i>Proteus morganii</i>	9	-	-	-	-	1	2	-	4	2	-	-
<i>Vibrio El Tor</i>	5	-	-	-	-	-	-	-	-	2	3	-

TABLE 18

Sensitivity of organisms to Nalidixic Acid
(1 July 1972 to 28 February 1973)

Organisms	No of Strain Tested	Inhibited at mcg/ml										
		0.3	0.78	1.56	3.12	6.25	12.5	25	50	100	200	over 200
<u>Salmonella paratyphi A</u>	7	-	-	-	-	-	2	5	-	-	-	-
<u>Salmonella paratyphi B</u>	11	-	-	-	-	7	4	-	-	-	-	-
<u>Salmonella paratyphi C</u>	6	-	-	-	-	5	1	-	-	-	-	-
<u>Salmonella typhi</u>	13	-	-	-	1	4	8	-	-	-	-	-
<u>Salmonella gr.E</u>	4	-	-	-	-	2	2	-	-	-	-	-
<u>Shigella flexneri 1-5</u>	9	-	-	6	3	-	-	-	-	-	-	-
<u>Shigella flexneri 6</u>	3	-	-	2	-	1	-	-	-	-	-	-
<u>Shigella dysenteriae</u>	2	1	-	1	-	-	-	-	-	-	-	-
<u>Shigella sonnei</u>	6	-	-	4	2	-	-	-	-	-	-	-
<u>Shigella boydii</u>	3	1	-	2	-	-	-	-	-	-	-	-
<u>Escherichia coli</u>												
O 25 : B 19 : B 23	24	-	-	-	12	4	6	-	-	-	-	2
O 26 : B 6	4	-	2	-	1	1	-	-	-	-	-	-
O 55 : B 5	1	-	1	-	-	-	-	-	-	-	-	-
O 86 : B 7	6	-	1	-	3	-	2	-	-	-	-	-
O 112 : B 11	3	-	2	-	1	-	-	-	-	-	-	-
O 128 : B 12	5	-	2	-	3	-	-	-	-	-	-	-
O 119 : B 14	3	-	3	-	-	-	-	-	-	-	-	-
O 125 : B 15	12	-	4	-	3	-	4	1	-	-	-	-
<u>Proteus mirabilis</u>	58	-	-	-	-	-	-	-	-	-	12	46
<u>Proteus vulgaris</u>	13	-	-	-	-	-	-	-	-	-	-	13
<u>Proteus rettgeri</u>	4	-	-	-	-	-	-	-	-	-	2	2
<u>Proteus morgani</u>	9	-	-	-	-	-	-	-	-	-	3	6
<u>Vibrio El Tor</u>	5	-	-	-	-	-	3	2	-	-	-	-

TABLE 20

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Sensitivity of organisms to Oxytetracycline

(1 July 1972 to 28 February 1973)

Organisms	No of Strain Tested	Inhibited at mcg/ml										
		0.3	0.78	1.5	3.1	6.2	12.5	25	50	100	200	over 200
<u>Salmonella paratyphi A</u>	7	-	-	-	-	1	1	2	-	1	1	1
<u>Salmonella paratyphi B</u>	11	-	-	-	-	4	2	-	1	-	1	3
<u>Salmonella paratyphi C</u>	6	-	-	-	-	3	-	1	1	-	-	1
<u>Salmonella typhi</u>	13	-	-	-	-	2	2	5	1	-	1	2
<u>Salmonella gr.E</u>	4	-	-	-	-	-	-	3	-	-	1	-
<u>Shigella flexneri 1-5</u>	9	-	-	1	3	1	-	2	1	-	-	1
<u>Shigella flexneri 6</u>	3	-	-	-	1	-	1	-	-	-	1	-
<u>Shigella dysenteriae</u>	2	-	-	-	2	-	-	-	-	-	-	-
<u>Shigella sonnei</u>	6	-	-	-	1	-	-	3	1	-	1	-
<u>Shigella boydii</u>	3	-	-	1	-	-	-	-	-	-	1	1
<u>Escherichia coli</u>												
O 25 : B 19 : B 23	24	-	-	-	-	2	-	3	1	-	3	15
O 26 : B 6	4	-	-	-	-	-	-	1	-	1	2	-
O 55 : B 5	1	-	-	-	-	-	-	1	-	-	-	-
O 86 : B 7	6	-	-	-	-	-	-	-	-	1	1	4
O 112 : B 11	3	-	-	-	-	-	-	-	-	1	-	2
O 128 : B 12	5	-	-	-	-	-	-	1	-	1	-	3
O 119 : B 14	3	-	-	-	-	-	-	-	-	-	-	3
O 125 : B 15	12	-	-	-	-	-	-	-	-	1	3	8
<u>Proteus mirabilis</u>	58	-	-	-	2	-	-	-	-	2	43	11
<u>Proteus vulgaris</u>	13	-	-	-	-	-	-	-	-	-	-	13
<u>Proteus rettgeri</u>	4	-	-	-	-	-	-	-	-	-	4	-
<u>Proteus morgani</u>	9	-	-	-	6	-	-	-	-	-	3	-
<u>Vibrio El Tor</u>	5	-	-	-	-	-	-	-	3	2	-	-