

TABLE A43. ANALYSIS OF 1977 LAKE PONTCHARTRAIN DATA BY RAINFALL (DRY VERSUS WET PERIODS)

| Characteristic | Relatively Dry Period | Relatively Wet Period |
|---|----------------------------|---------------------------------|
| Trial Numbers | 1, 3, 4, 5, 6 | 7, 8, 9, 19, 11, 12, 13, 15, 16 |
| Period | 7/9 — 7/24 | 7/30—8/28 |
| Rainfall ¹ | .128 in/day | .433 in/day |
| Indicator Densities/100 ml ² | | |
| Roped-off Area | Enterococcus 253 | Enterococcus 22.7 |
| Bayou | 362 | 66.3 |
| Total | 301 | 38.8 |
| GI Symptom Rates | | |
| Total | Swim 123.2 ³ | Swim 86.6 ⁵ |
| Highly Credible | Nonswim 17.0 | Nonswim 60.7 ⁶ |
| | | <i>E. coli</i> 2074 |
| | | 2219 |
| | | 2145 |
| | | ▲ 25.9 |
| | | 22.4** |

¹ Total rainfall for the interval starting 6 days before the first trial and ending with the trial date divided by the number of days in the interval.

² Geometric mean for all samples collected on the trial dates.

³ N=1282; ⁴ N=528; ⁵ N=993; ⁶ N=511.

p<.01; *p<.001.

TABLE A44. GASTROINTESTINAL SYMPTOM RATES FOR 1977 LAKE PONTCHARTRAIN TRIALS CLUSTERED BY INDICATOR DENSITIES

| Indicator | Density/100 ml | | N | | Gastrointestinal Symptoms ▲ | | Highly Credible Symptoms | |
|----------------|-------------------|-----------|------|---------|-----------------------------|---------|--------------------------|---------|
| | Mean | Range | Swim | Nonswim | Swim | Nonswim | Swim | Nonswim |
| Enterococci | 44 ¹ | 9.7-88 | 874 | 451 | 85.8 | 51.0 | 32.0 | 11.1 |
| | 224 ² | 190-249 | 720 | 456 | 108.0 | 50.4 | 31.9 | 8.8 |
| | 495 ³ | 344-711 | 895 | 464 | 108.0 | 53.9 | 35.8 | 8.6 |
| <i>E. coli</i> | 44 ⁴ | 33-54 | 372 | 222 | 132 | 45.0 | 32.3 | 9.0 |
| | 161 ⁵ | 112-221 | 910 | 306 | 119.8 | 65.4 | 52.7 | 22.8 |
| | 497 ⁶ | 433-556 | 574 | 307 | 85.4 | 45.6 | 32.9 | 13.0 |
| | 3091 ⁷ | 1033-4267 | 419 | 204 | 88.3 | 83.3 | 31.0 | 4.9 |

Trials clustered—¹7, 8, 9, 11, 12, 13, 15, 16; ²1, 3, 4, 10; ³5, 6; ⁴3, 4; ⁵1, 5, 6; ⁶8, 12, 15, 16; ⁷7, 9, 10, 11, 13.

*p<0.05; **p<0.01

TABLE A45. GASTROINTESTINAL SYMPTOM FOR THE FOUR, 1977 LAKE PONTCHARTRAIN TRIALS WITH THE HIGHEST *E. coli* AND ENTEROCOCCUS DENSITIES

| Trials | Density Per 100 ml | | Rate for Symptoms Per 1000 Persons | | | | | |
|--------|--------------------|--------------|------------------------------------|---------|--------|--------------------|---------|--------|
| | <i>E. coli</i> | Enterococcus | Total Gastrointestinal | | | Highly Credible GI | | |
| | | | Swim | Nonswim | ▲ | Swim | Nonswim | ▲ |
| 7 | 3390 | 37.0 | | | | | | |
| 9 | 4267 | 59.0 | | | | | | |
| 11 | 4366 | 39.0 | | | | | | |
| 13 | 2401 | 9.7 | | | | | | |
| Ave. | 3606 | 36.2 | 86.7 | 62.5 | 24.2 | 30.0 | 6.9 | 24.2 |
| 5 | 149 | 711 | | | | | | |
| 6 | 112 | 344 | | | | | | |
| 3 | 54 | 249 | | | | | | |
| 1 | 221 | 246 | | | | | | |
| Ave. | 134 | 388 | 116.2 | 65.8 | 50.4** | 48.4 | 18.4 | 30.0** |

**p<0.01.

TABLE A46. CLUSTERING OF TRIALS FOR THE CALCULATION OF GASTROINTESTINAL SYMPTOM RATES FOR 1978 TRIALS AT LEVEE BEACH, LAKE PONTCHARTRAIN

| Trial | Date | Rainfall | Indication Density/100 ml | | | Clustering for Enterococcus | Clustering for <i>E. coli</i> |
|-------|------|----------|---------------------------|---|------------------------------|--------------------------------|----------------------------------|
| | | | Enterococcus Bayou | Enterococcus Roped Area ¹ | <i>E. coli</i> Roped Area | | |
| 1 | 6/10 | .45 | 42 | 45 | 400 | 367 | Eliminated ² |
| 2 | 6/11 | .72 | 34 | 3 | 198 | 214 | Eliminated |
| 3 | 6/17 | .05 | 127 | 17 | 79 | 32 | H ³ |
| 4 | 6/18 | .02 | 122 | 17 | 142 | 105 | H |
| 5 | 6/24 | .01 | 292 | 239 | 117 | 89 | H |
| 6 | 6/25 | .02 | 25 | 18 | 70 | 57 | L ⁴ |
| 7 | 7/11 | .00 | 67 | 67 | 37 | 64 | H |
| 8 | 7/2 | .14 | 18 | 29 | 45 | 83 | L |
| 9 | 7/8 | .02 | 17 | 14 | 32 | 52 | L |
| 10 | 7/9 | .00 | 9 | 37 | 25 | 15 | L |
| 11 | 7/15 | .09 | 3 | 5 | 27 | 8 | L |
| 12 | 7/16 | 1.47 | 442 | 717 | 286 | 67 | Eliminated |

¹ Roped-off area.

² Trial eliminated from analysis; see text for basis.

³ Trial assigned to high indicator density cluster.

⁴ Trial assigned to low indicator density cluster.

TABLE A47. GASTROINTESTINAL SYMPTOM RATES AND CORRESPONDING MEAN INDICATOR DENSITIES FOR 1978 TRIALS AT LAKE PONTCHARTRAIN

| Indicator | Density/100 ml Mean Range | N | | Rate for 1000 Persons for Gastrointestinal Symptoms ▲ | | Rate for 1000 Persons for Highly Credible GI Symptoms ▲ | |
|----------------|---------------------------------|------|---------|--|---------|--|---------|
| | | Swim | Nonswim | Swim | Nonswim | Swim | Nonswim |
| Enterococcus | 11.1 3-30 | 1230 | 415 | 75 | 34 | 36.6 | 14.5 |
| | 14.4 ¹ 3-325 | 248 | 303 | 82 | 63 | 44.3 | 23.1 |
| | 142 67-303 | 801 | 322 | 112 | 50 | 42.4 | 15.5 |
| <i>E. coli</i> | 9.0 ¹ 1-23 | 248 | 303 | 81 | 63 | 44.3 | 23.1 |
| | 32.6 17-87 | 1123 | 383 | 78 | 44 | 38.3 | 20.9 |
| | 93.7 53-177 | 918 | 355 | 103 | 36 | 39.2 | 8.5 |

¹ Fontainebleau Beach.

*p<0.05; **p<0.001

TABLE A48. SYMPTOM RATES FOR REVERE AND NAHANT BEACHES DURING 1978 BOSTON HARBOR STUDY

| Symptom Group | Rate Per 1000 Persons At | | | |
|--------------------|---------------------------|---------|---------------------------|---------|
| | Revere Beach ¹ | | Nahant Beach ² | |
| | Swim | Nonswim | Swim | Nonswim |
| Gastrointestinal | 89.0 | 70.0 | 69.6 | 63.7 |
| Respiratory | 82.7 | 72.3 | 98.2 | 102.8 |
| Other | 83.8 | 68.5 | 82.3 | 102.8 |
| Ear, Eyes, Nose | 95.8 | 99.0 | 87.7 | 109.2 |
| Highly Credible GI | 27.0 | 12.0 | 33.0 | 28.0 |
| Severe GI | 34.8 | 29.8 | 26.5 | 28.2 |

¹ N=919 swimmers; 905 nonswimmers.

² N=1150 swimmers; 1099 nonswimmers.

TABLE A49. GASTROINTESTINAL SYMPTOM RATES AND CORRESPONDING INDICATOR DENSITIES FOR REVERE AND NAHANT BEACHES FOR 1978 BOSTON HARBOR STUDY

| Beach | Indicator Density/100 ml | | Rate for GI ¹ Symptoms Per 1000 Persons | | Rate for HCGI ² Symptoms Per 1000 Persons | |
|---------------------|--------------------------|----------------------|--|----------------------|--|---------|
| | Enterococci Mean | <i>E. coli</i> Range | Swim ³ | Nonswim ⁴ | Swim | Nonswim |
| Revere ⁵ | 6.3 | 2-12 | 89 | 70 | 27 | 10 |
| Nahant ⁶ | 7.3 | 6-9 | 70 | 64 | 33 | 28 |
| | | 4-22 | | 6 | | 5 |

¹ Gastrointestinal; ² highly credible gastrointestinal; ³ swimmers; ⁴ nonswimmers; ⁵ data from four trials (days); N for swimmers 919; for nonswimmers 905; ⁶ data from four trials (days); N for swimmers 1150; for nonswimmers 1099.

TABLE A50. GASTROINTESTINAL SYMPTOM RATES AND CORRESPONDING INDICATOR DENSITIES FOR CLUSTERED TRIALS DURING 1978 BOSTON HARBOR STUDY

| Indicator | Density/100 ml | | Beach | | N | | Gastrointestinal Symptoms Per 1000 Persons | | Highly Credible Symptoms Per 1000 Persons | |
|----------------|-------------------|-------|-------|--------|------|---------|--|---------|---|---------|
| | Mean | Range | Swim | Beach | Swim | Nonswim | Swim | Nonswim | Swim | Nonswim |
| Enterococci | 4.3 ¹ | 2-6 | 697 | Revere | 529 | 17 | 83 | 66 | 23 | 11 |
| | 7.3 ² | 6-9 | 1130 | Nahant | 1099 | 4 | 71 | 67 | 33 | 28 |
| | 12.0 ³ | 12 | 222 | Revere | 376 | 34* | 108 | 74 | 41 | 13 |
| <i>E. coli</i> | 5.5 ⁴ | 4-7 | 541 | Nahant | 874 | 9 | 72 | 63 | 39 | 29 |
| | 7.0 ⁵ | 5-9 | 477 | Revere | 410 | 18 | 86 | 68 | 23 | 9.8 |
| | 17.5 ⁶ | 13-22 | 589 | Nahant | 225 | 3 | 70 | 67 | 27 | 27 |
| | 29.5 ⁷ | 28-31 | 442 | Revere | 495 | 22 | 93 | 71 | 32 | 14 |

Trials clustered—¹ 1, 3, 4; ² 1, 2; ³ 1, 2; ⁴ 1, 2; ⁵ 1, 3; ⁶ 3, 4; ⁷ 2, 4.

*p<0.05.

TABLE A51. 95% CONFIDENCE LIMITS FOR SWIMMING-ASSOCIATED GASTROINTESTINAL SYMPTOM RATES PREDICTED FROM THE OBSERVED MEAN ENTEROCOCCUS DENSITIES (TRIALS CLUSTERED BY INDICATOR DENSITIES)

| Enterococcus Density Per 100 ml | Total GI Symptoms | | | HCGI ¹ Symptoms | | |
|---------------------------------|----------------------------|----------------|-------|----------------------------|----------------|-------|
| | Predict. ² Rate | 95% Conf. Lim. | | Predict. Rate | 95% Conf. Lim. | |
| | | Lower | Upper | | Lower | Upper |
| 3.6 | 8.4 | -0.8 | 17.6 | 6.9 | 1.0 | 12.8 |
| 4.3 | 10.2 | 1.6 | 18.9 | 7.8 | 2.3 | 13.4 |
| 5.7 | 13.2 | 5.3 | 21.0 | 9.3 | 4.3 | 14.4 |
| 7.0 | 15.4 | 8.0 | 22.7 | 10.4 | 5.7 | 15.1 |
| 7.3 | 15.8 | 8.6 | 23.0 | 10.7 | 6.0 | 15.3 |
| 11.1 | 20.2 | 13.9 | 26.4 | 12.9 | 8.9 | 16.9 |
| 12.0 | 21.0 | 14.9 | 27.1 | 13.3 | 9.0 | 17.2 |
| 13.5 | 22.3 | 16.3 | 28.2 | 13.9 | 10.1 | 17.7 |
| 14.4 | 22.9 | 17.1 | 28.8 | 14.3 | 10.5 | 18.0 |
| 20.3 | 26.5 | 21.1 | 32.0 | 16.1 | 12.6 | 19.6 |
| 21.8 | 27.3 | 21.8 | 32.7 | 16.5 | 13.0 | 20.0 |
| 31.5 | 31.2 | 25.7 | 36.7 | 18.4 | 14.9 | 22.0 |
| 44.0 | 34.7 | 28.8 | 40.5 | 20.2 | 16.5 | 24.0 |
| 91.2 | 42.3 | 35.0 | 49.7 | 24.1 | 19.4 | 28.8 |
| 142.0 | 47.0 | 38.4 | 55.5 | 26.4 | 21.0 | 31.9 |
| 154.0 | 47.8 | 39.0 | 56.3 | 26.9 | 21.2 | 32.5 |
| 224.0 | 51.8 | 41.8 | 61.7 | 28.9 | 22.5 | 35.3 |
| 495.0 | 60.1 | 47.5 | 72.7 | 33.1 | 25.0 | 41.2 |

¹ Highly credible gastrointestinal.

² Rates predicted from Y on X regression lines.

TABLE A52. 95% CONFIDENCE LIMITS FOR MEAN ENTEROCOCCUS DENSITIES PREDICTED FROM THE OBSERVED SWIMMING-ASSOCIATED GI SYMPTOM RATES

| Total GI Per 1000 Persons | Enterococcus Density/100 ml 95% Conf. Lim. | | | HCGI ¹ Per 1000 Persons | Enterococcus Density/100 ml 95% Conf. Lim. | | |
|---------------------------------|---|-------|-------|--|---|-------|-------|
| | Predict. ² | Lower | Upper | | Predict. | Lower | Upper |
| 4 | 5.1 | 2.5 | 10.4 | -0.5 | 3.8 | 1.4 | 10.3 |
| 8 | 6.6 | 3.4 | 12.5 | 3.4 | 5.7 | 2.5 | 13.3 |
| 17 | 11.7 | 7.1 | 19.5 | 3.6 | 5.9 | 2.5 | 13.5 |
| 18 | 12.5 | 7.6 | 20.5 | 5.0 | 6.8 | 3.1 | 14.8 |
| 20 | 14.2 | 8.9 | 22.9 | 7.4 | 8.8 | 4.4 | 17.5 |
| 22 | 16.2 | 10.3 | 25.5 | 12.0 | 14.4 | 8.2 | 25.1 |
| 25 | 19.7 | 12.7 | 30.4 | 13.6 | 17.0 | 10.1 | 28.8 |
| 29 | 29.0 | 16.6 | 39.0 | 15.2 | 20.2 | 12.2 | 33.5 |
| 34 | 35.2 | 22.6 | 54.8 | 18.1 | 27.6 | 16.8 | 45.2 |
| 35 | 37.5 | 23.9 | 58.9 | 20.9 | 37.2 | 22.0 | 62.9 |
| 41 | 55.4 | 33.1 | 92.6 | 21.2 | 38.4 | 22.6 | 65.3 |
| 48 | 87.1 | 46.8 | 162.0 | 22.1 | 42.3 | 24.4 | 73.2 |
| 54 | 128.0 | 61.9 | 266.0 | 23.1 | 47.1 | 26.6 | 83.4 |
| 58 | 166.0 | 74.0 | 373.0 | 26.9 | 70.6 | 35.6 | 140.0 |
| 62 | 215.0 | 88.4 | 524.0 | 27.2 | 72.9 | 36.3 | 146.0 |
| | | | | 28.0 | 79.5 | 38.5 | 164.0 |
| | | | | 28.4 | 82.9 | 39.6 | 174.0 |
| | | | | 34.5 | 159.0 | 59.5 | 426.0 |

¹ Highly credible GI symptom

² Predicted from X on Y regression lines.