

Proposed Ticarcillin Disk Control Values for *Escherichia coli* and *Pseudomonas aeruginosa*: Multicenter Cooperative Study

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In a multicenter cooperative controlled study, individual test, accuracy, and precision control values were determined for 75- μ g ticarcillin disks with *Escherichia coli* ATCC 25922 and *Pseudomonas aeruginosa* ATCC 27853.

Recently, investigators (4) have shown that use of 100- μ g carbenicillin disks was unreliable in predicting ticarcillin resistance for *Pseudomonas aeruginosa* and have suggested that a separate ticarcillin disk is needed. Also, Prior and Fass (5), comparing ticarcillin and carbenicillin activity against a population of *P. aeruginosa* skewed with carbenicillin-resistant strains, have shown that 75- μ g ticarcillin disks are better than 100- μ g carbenicillin disks in predicting ticarcillin susceptibilities. Because the use of 75-

and *P. aeruginosa* ATCC 27853. The 100- μ g carbenicillin disks were also tested at the same time and served as a control. In addition, the Mueller-Hinton agar routinely used by each laboratory was used in this study.

A total of 505 tests with each disk was performed, and the results were forwarded to the Division of Infectious Diseases Laboratory, The Ohio State University, for statistical analysis. Data received from each laboratory for 100- μ g carbenicillin disks with *E. coli* ATCC 25922 were

TABLE 1. Summary of data obtained by nine laboratories each using 75- μ g ticarcillin and 100- μ g carbenicillin disks against *E. coli* ATCC 25922 and *P. aeruginosa* ATCC 27853 standard assay microorganisms

Antimicrobial agent	Disk content (μ g)	Assay microorganism	Sample size	Zone diam (mm)	
				Mean	SD ^a
Ticarcillin	75	<i>E. coli</i> ATCC 25922	505	27.1	1.63
Carbenicillin	100	<i>E. coli</i> ATCC 25922	505	26.5	1.44
Ticarcillin	75	<i>P. aeruginosa</i> ATCC 27853	505	24.3	1.44
Carbenicillin	100	<i>P. aeruginosa</i> ATCC 27853	505	22.2	1.13

^a SD, Standard deviation.

μ g ticarcillin disks will, therefore, presumably increase, this study was undertaken to establish values for monitoring quality control when performing the disk diffusion test.

Nine laboratories (participating investigators: Peter C. Fuchs, St. Vincent Hospital, Portland, Ore.; Thomas L. Gavan, Cleveland Clinic Foundation, Cleveland, Ohio; E. Hugh Gerlach, St. Francis Hospital, Wichita, Kan.; Ronald Jones, Kaiser Foundation Laboratory, Clackamas, Ore.; James C. McLaughlin, Hartford Hospital, Hartford, Conn.; A. S. Crawford, Bristol Memorial Hospital, Bristol, Tenn.; Carol Quinter, Kettering Medical Center, Kettering, Ohio; and Harold C. Neu, Columbia University, New York, N.Y.) performed the disk diffusion test described by Bauer et al. (2) and later modified (3) by using 75- μ g ticarcillin disks and standard assay microorganisms *Escherichia coli* ATCC 25922

first analyzed separately and compared with the currently recommended control limits (3) to insure proper performance of the disk diffusion test. All participating laboratories obtained values within the control limits, thus assuring proper control between laboratories. The test data for 75- μ g ticarcillin disks were then pooled and analyzed with a Hewlett-Packard 9825A programmable calculator, and the control values were determined by the methods described in the American Society for Testing and Materials manual of quality control procedures (1).

The data obtained by the nine participating laboratories are summarized in Table 1 and these values were subsequently used to calculate the individual test, accuracy, and precision control limits for both disks. The proposed control limits for monitoring accuracy and precision in groups of five consecutive separate observations

TABLE 2. Proposed control limits for monitoring accuracy and precision of inhibitory zone diameters (mm) obtained in groups of five separate observations^a

Antimicrobial agent	Disk content (μg)	Assay microorganism	Individual test control ^b zone diam (mm)	Accuracy control: zone diam (mm) ^c	Precision control ^d	
					Maximum	Average
Ticarcillin	75	<i>E. coli</i> ATCC 25922	24-30	24.9-29.3	8	3.8
Carbenicillin	100	<i>E. coli</i> ATCC 25922	24-29	24.6-28.4	7	3.3
Ticarcillin	75	<i>P. aeruginosa</i> ATCC 27853	21-27	22.4-26.2	7	3.3
Carbenicillin	100	<i>P. aeruginosa</i> ATCC 27853	20-25	20.7-23.7	6	2.6

^a A complete description on usage of the accuracy and precision limits for quality control when performing the disk diffusion test may be found on page 7 of reference 3.

^b 99% confidence limits, nearest whole millimeter.

^c Mean of five values.

^d Range of five values.

with 75-μg ticarcillin disks and two standard microbial strains are shown in Table 2. Control values for 100-μg carbenicillin disks for both assay strains are also shown in Table 2 and represent updated and additional control data supplementing those data previously obtained with these disks (3).

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