

3920.0500 STATISTICAL ANALYSIS TEST.

Subpart 1. **Scope.** This part applies to a jurisdiction with more than three male-dominated classes.

Subp. 2. **Criteria for statistical analysis test.** To pass this test, analysis of the jurisdiction's implementation report must show:

A. an underpayment ratio of 80.0 percent or more; or

B. an underpayment ratio less than 80.0 percent, and:

(1) for a jurisdiction with six or more male-dominated classes and with one or more salary ranges, an average pay difference which is the same for male-dominated and female-dominated classes or which does not represent a disadvantage for female-dominated classes;

(2) for a jurisdiction with six or more male-dominated classes and with one or more salary ranges, an average pay difference which represents a disadvantage for female-dominated classes, and a determination that the difference is not statistically significant; or

(3) for a jurisdiction with fewer than six male-dominated classes, and for a jurisdiction that has no salary ranges for any of its classes, a determination that the jurisdiction meets the alternative analysis test described in part 3920.0600.

Subp. 3. **Steps in statistical analysis.** For each jurisdiction with more than three male-dominated classes, the department must conduct a statistical analysis. The analysis includes determining and analyzing the following data: predicted pay, underpayment ratio, average pay difference, and statistical significance of the average pay difference as described in subparts 4 to 9. All operations in this part are based on unrounded data, except when otherwise specified.

Subp. 4. **Determining predicted pay.** The department must determine predicted pay for each male-dominated and female-dominated class in the jurisdiction. Predicted pay means predicted salary for those jurisdictions which do not have different benefits for male-dominated and female-dominated classes of comparable work value, as described in part 3920.0300, subpart 6. For those jurisdictions which do have different benefits for male-dominated and female-dominated classes of comparable work value, predicted pay means the total predicted amount of salary plus benefits contribution limits.

The department must determine predicted pay by creating a window, drawing a regression line within the window, and identifying a predicted pay point on the regression

line. The process described in items A to D is continued until pay has been predicted for each male-dominated and female-dominated class in the jurisdiction.

A. Creating a window. The analysis creates a window around the class. The window defines classes of comparable work value for purposes of the statistical analysis. Except as provided in item B, each window represents 20 percent of the total range of job evaluation ratings in the jurisdiction. The total range of evaluation ratings is determined by subtracting the lowest rating assigned to any class from the highest rating assigned to any class. The result is then multiplied by 20 and divided by 100. In addition, the window must meet the criteria in subitems (1) to (4).

(1) The lower limit of the window is below the evaluation rating of the class being analyzed by ten percent of the total range of evaluation ratings, except when the class being analyzed is in the bottom ten percent or the top ten percent of the total range of evaluation ratings. The upper limit of the window is above the evaluation rating of the class being analyzed by ten percent of the total range of evaluation ratings, except when the class being analyzed is in the top ten percent or the bottom ten percent of the total range of evaluation ratings.

(a) If the evaluation rating of the class being analyzed is in the bottom ten percent of the total range of evaluation ratings, the lower limit of the window is the lowest rating assigned to any class in the jurisdiction and the upper limit of the window is 20 percent above the lower limit.

(b) If the evaluation rating of the class being analyzed is in the top ten percent of the total range of evaluation ratings, the upper limit of the window is the highest rating assigned to any class in the jurisdiction and the lower limit of the window is 20 percent below the upper limit.

(2) The window must include at least three male-dominated job classes. When analyzing a male-dominated job class, the class being analyzed is counted as one of the three male-dominated job classes.

(3) The window must include at least two male-dominated job classes with different job evaluation ratings. When analyzing a male-dominated job class, the class being analyzed is counted as one of the two male-dominated job classes with different ratings.

(4) The window must include at least 20 percent of all the male-dominated classes in the jurisdiction.

B. Expanding the window. If any of the criteria in item A, subitems (2) to (4), are not met, the window is expanded in increments of five percent of the total range of evaluation ratings on both sides of the previous window, except as provided in subitems (1) and (2). That is, in the first expansion the lower limit becomes the rating level 15 percent below the class being analyzed and the upper limit becomes the rating level 15 percent above

the class being analyzed. The window is increased using these five percent increments as many times as necessary until the criteria in item A, subitems (2) to (4), are met.

(1) If the expansion results in a lower limit below the lowest rating assigned to any class in the jurisdiction, then the lower limit is the lowest rating assigned to any class in the jurisdiction. The upper limit is above the lower limit by the total length of the expanded window, that is, 30 percent in the first expansion, 40 percent in the second expansion, and so forth. The window is expanded until the criteria in item A, subitems (2) to (4), are met.

(2) If the expansion results in an upper limit above the highest rating assigned to any class in the jurisdiction, then the upper limit is the highest rating assigned to any class in the jurisdiction. The lower limit is below the upper limit by the total length of the expanded window, that is, 30 percent in the first expansion, 40 percent in the second expansion, and so forth. The window is expanded until the criteria in item A, subitems (2) to (4), are met.

C. Drawing a line. Using conventional statistical regression techniques, the analysis fits a linear regression line to all male-dominated classes in the window. The line is weighted to reflect the number of employees in each male-dominated class. The regression line represents the relationship between job evaluation ratings and salary, or between job evaluation ratings and salary plus benefits in the case of jurisdictions with different benefits for male-dominated and female-dominated classes of comparable work value, as explained in part 3920.0300, subpart 6.

D. Predicting pay. The analysis predicts pay for the class being analyzed by determining the dollar value on the regression line which corresponds to the job evaluation rating of the class being analyzed.

Subp. 5. **Determining underpayment ratio.** The analysis tabulates the number of female-dominated and male-dominated classes which are paid below predicted pay for their job evaluation ratings. The analysis then calculates female-dominated classes paid below predicted pay as a percentage of all female-dominated classes in the jurisdiction, and male-dominated classes paid below predicted pay as a percentage of all male-dominated classes in the jurisdiction, as follows:

A. the number of male-dominated classes which are paid below predicted pay is divided by the total number of male-dominated classes, and the result is multiplied by 100;

B. the number of female-dominated classes which are paid below predicted pay is divided by the total number of female-dominated classes, and the result is multiplied by 100; and

C. the result from item A is divided by the result from item B, and the quotient is multiplied by 100 and rounded to one decimal place. This is the underpayment ratio.

Subp. 6. **Analyzing underpayment ratio.** If the underpayment ratio is 80.0 percent or more, the department must find that the jurisdiction passes the statistical analysis test. If the underpayment ratio is less than 80.0 percent, the department must continue the compliance review as explained in items A to C.

A. If the underpayment ratio is less than 80.0 percent, and the jurisdiction has fewer than six male-dominated classes, the department must use the alternative analysis test described in part 3920.0600. The department must not continue the statistical analysis as described in subparts 7 to 9.

B. If the underpayment ratio is less than 80.0 percent, and the jurisdiction has no salary ranges for any of its classes, the department must use the alternative analysis test described in part 3920.0600. The department must not continue the statistical analysis as described in subparts 7 to 9.

C. If the underpayment ratio is less than 80.0 percent, and the jurisdiction has six or more male-dominated classes and one or more salary ranges, the department must continue the statistical analysis as described in subparts 7 to 9.

Subp. 7. **Determining average pay difference.** For a jurisdiction described in subpart 6, item C, the department must determine and analyze the average pay difference. The average pay difference is the dollar amount of the average difference from predicted pay, calculated as follows:

A. The number of employees in each female-dominated class is multiplied by the dollar amount of the difference from predicted pay for that class. Both positive amounts (above predicted pay) and negative amounts (below predicted pay) are included.

B. The sum of the amounts in item A is divided by the total number of employees in female-dominated classes and rounded to the nearest whole dollar. The result is the average difference from predicted pay for female-dominated classes.

C. The process explained in items A and B is repeated for male-dominated classes. The result is the average difference from predicted pay for male-dominated classes.

Subp. 8. **Analyzing average pay difference.** The department must evaluate the average pay difference as explained in items A and B.

A. If the average pay difference is the same for male-dominated and female-dominated classes, or if the average pay difference does not represent a disadvantage for female-dominated classes, the department must find that the jurisdiction passes the statistical analysis test.

B. If the average pay difference represents a disadvantage for female-dominated classes, the department must continue the analysis as described in subpart 9.

Subp. 9. **Significance of average pay difference (t-test).** If the average pay difference represents a disadvantage for female-dominated classes, a standard test of statistical significance called the t-test must be applied to this finding. The department must evaluate the results as explained in items A and B.

A. The t-test of pooled variance is applied using conventional statistical techniques. Significance is determined at the five percent level for a one-tailed test. The statistical analysis rounds the value of t to three decimal places. The sample t table is taken from a standard statistical text: Blalock, Social Statistics, Second Edition 1972, published by McGraw-Hill, page 559. The degrees of freedom is the total number of employees in male-dominated and female-dominated classes, minus two. To be significant, the value of t for a jurisdiction must be at or above the level listed, except that for degrees of freedom not listed, the required level of t is taken from a standard normal distribution table.

Distribution of t (five percent significance)

Degrees of Freedom	Value of t
1	6.314
2	2.920
3	2.353
4	2.132
5	2.015
6	1.943
7	1.895
8	1.860
9	1.833
10	1.812
11	1.796
12	1.782
13	1.771
14	1.761
15	1.753
16	1.746

17	1.740
18	1.734
19	1.729
20	1.725
21	1.721
22	1.717
23	1.714
24	1.711
25	1.708
26	1.706
27	1.703
28	1.701
29	1.699
30	1.697
40	1.684
60	1.671
120	1.658
infinity	1.645

B. If the t-test is not significant, the department must find that the jurisdiction has passed the statistical analysis test. If the t-test is significant, the department must find that the jurisdiction has failed the statistical analysis test and is not in compliance.

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