## High School Wrestling Weight Class Study

In the past few years, there has been great debate on whether high school wrestling should go to twelve weight classes rather than keep it at the current number - fourteen. The discussion has been quite heated at times. It is not an easy decision - there are good arguments on both sides of the issue.

I have been given data on high school wrestlers from Minnesota, North Dakota, South Dakota and Wisconsin over the past three years. It includes information on North and South Dakota from the 2002-03 season, from Minnesota for 2002-03 and 2005-06, and for Wisconsin from 2005-06. The data for 2003 came from approximately 10,000 high school wrestlers spread across the Dakotas and Minnesota, and the 2006 data from approximately 17,500 high school wrestlers in Minnesota and Wisconsin.

Why the reduction to twelve, rather than another number? This has been a much discussed topic amongst Minnesota coaches. Two polls have been taken - one in 2003 and another in 2006. In both polls, the coaches overwhelmingly chose to go to twelve weight classes. This argument is not unique to Minnesota - other states like Pennsylvania and Ohio have made similar proposals.

After receiving the data in 2003, I conducted a study to determine a new set of weight classes to be used in high school wrestling. My goal in performing the study was to examine the current system of weights to determine how well it fit our wrestlers, as well as look at some alternatives. The data analysis showed that the weight classes in use did not fit very well. So, an alternative proposal based on the data analysis was submitted to the National Federation of State High School Associations for approval. The NFHS chose not to act on the proposal, and it was tabled.

In the time since then, I've added another study based on high school wrestlers from Minnesota and Wisconsin during the 2005-06 season. I wanted to determine if the results changed much from year to year. I found that they did not, which lends credence to the argument that these new weights fit our kids much better than the current system. Minnesota coaches and the Minnesota State High School League are exploring the possibility of breaking from the NFHS on this issue and trying the new set of weights. Wisconsin coaches are now also exploring the same possibility.

This report is a summary and comparison of the studies from 2003 and 2006.

The best fitting set of weights will be the one with the lowest standard deviation.

## Distribution by Actual Weight (Current Wts., MN, ND, SD)

| Weight | No. | Pct. |
| :---: | :---: | :---: |
| 103 | 605 | $6.22 \%$ |
| 112 | 647 | $6.65 \%$ |
| 119 | 580 | $5.96 \%$ |
| 125 | 646 | $6.64 \%$ |
| 130 | 589 | $6.05 \%$ |
| 135 | 605 | $6.22 \%$ |
| 140 | 689 | $7.08 \%$ |
| 145 | 601 | $6.18 \%$ |
| 152 | 856 | $8.80 \%$ |
| 160 | 815 | $8.37 \%$ |
| 171 | 826 | $8.49 \%$ |
| 189 | 873 | $8.97 \%$ |
| 215 | 723 | $7.43 \%$ |
| 275 | 677 | $6.96 \%$ |
| Total: | 9732 |  |



Total: 9732
Standard Deviation:
105.4337978

## Comments

Using actual weights (taken at the beginning of a season) is a more accurate snapshot of where kids are wrestling. With 14 weights, each class should have about $7 \%$ of the wrestlers. A variation of only $3 \%$ means some weights have up to 300 more kids than others.

## Most Equal Distribution (12 Weights, MN, ND, SD)

| Weight | No. | Pct. |
| :---: | :---: | :---: |
| 106 | 830 | $8.53 \%$ |
| 117 | 814 | $8.36 \%$ |
| 125 | 834 | $8.57 \%$ |
| 132 | 828 | $8.51 \%$ |
| 138 | 746 | $7.67 \%$ |
| 144 | 769 | $7.90 \%$ |
| 151 | 856 | $8.80 \%$ |
| 159 | 853 | $8.76 \%$ |
| 169 | 792 | $8.14 \%$ |
| 184 | 798 | $8.20 \%$ |
| 209 | 798 | $8.20 \%$ |
| 275 | 814 | $8.36 \%$ |
| Total: | 9732 |  |



Standard Deviation:
32.57718108

## Comments

Using 12 weight classes produces a good, even distribution. The gap between weights is better and it would be easier for smaller schools to fill out a roster. It will improve the competition, but it may cause problems when breaking ties in dual meet competition. The goal is to get as close as possible to equal numbers of competitors in each weight class.

# High School Wrestling Weight Class Study 2005-06 Data (Includes MN only) 

The best fitting set of weights will be the one with the lowest standard deviation.

87.28131228

## Comments

This is the distribution using the actual weights at certification for all the high school wrestlers in Minnesota in 2005-06. The standard deviation is a statistical measure of how closely data is distributed. Note the very large discrepancy between the $152-189$ pound classes and all the others.

8.635287014

## Comments

The overwhelming majority of coaches in Minnesota are in favor of going to twelve weight classes. This is the best-fitting distribution for twelve weights using the Minnesota high school wrestlers in 2005-06. The low standard deviation indicates that the numbers are very close.

# High School Wrestling Weight Class Study 2005-06 Data (Includes WI only) 

The best fitting set of weights will be the one with the lowest standard deviation.

## Current Distribution (14 Weights, Wisconsin, 2005-06)

| Weight | No. | Pct. |
| :---: | :---: | :---: |
| 103 | 356 | $3.66 \%$ |
| 112 | 476 | $4.89 \%$ |
| 119 | 567 | $5.83 \%$ |
| 125 | 620 | $6.37 \%$ |
| 130 | 573 | $5.89 \%$ |
| 135 | 689 | $7.08 \%$ |
| 140 | 662 | $6.81 \%$ |
| 145 | 634 | $6.52 \%$ |
| 152 | 901 | $9.26 \%$ |
| 160 | 813 | $8.36 \%$ |
| 171 | 868 | $8.92 \%$ |
| 189 | 929 | $9.55 \%$ |
| 215 | 833 | $8.56 \%$ |
| 285 | 806 | $8.29 \%$ |
| Total | 9727 |  |



Total: 9727
Standard Deviation:
170.3007198

## Comments

This is the distribution using the actual weights at certification for all the high school wrestlers in Wisconsin in 2005-06.

Best Distribution (12 Weights, Wisconsin, 2005-06)

| Weight | No. | Pct. |
| :---: | :---: | :---: |
| 112 | 832 | $8.55 \%$ |
| 121 | 788 | $8.10 \%$ |
| 129 | 849 | $8.73 \%$ |
| 135 | 812 | $8.35 \%$ |
| 141 | 788 | $8.10 \%$ |
| 147 | 764 | $7.85 \%$ |
| 154 | 873 | $8.98 \%$ |
| 163 | 830 | $8.53 \%$ |
| 174 | 813 | $8.36 \%$ |
| 190 | 790 | $8.12 \%$ |
| 216 | 807 | $8.30 \%$ |
| 285 | 781 | $8.03 \%$ |
| Total: | 9727 |  |



Standard Deviation:
31.21322078

## Comments

Using 12 weight classes produces a good, even distribution. Notice how the minimum weight class jumps from 103 to 112.

# High School Wrestling Weight Class Study 2005-06 Data (MN/WI Combined) 

The best fitting set of weights will be the one with the lowest standard deviation.
Current Distribution (MN \& WI Combined, 2005-06)

| Weight | No. | Pct. |
| :---: | :---: | :---: |
| 103 | 829 | $4.73 \%$ |
| 112 | 1019 | $5.81 \%$ |
| 119 | 1063 | $6.06 \%$ |
| 125 | 1113 | $6.35 \%$ |
| 130 | 1043 | $5.95 \%$ |
| 135 | 1208 | $6.89 \%$ |
| 140 | 1171 | $6.68 \%$ |
| 145 | 1118 | $6.38 \%$ |
| 152 | 1561 | $8.90 \%$ |
| 160 | 1479 | $8.43 \%$ |
| 171 | 1552 | $8.85 \%$ |
| 189 | 1648 | $9.40 \%$ |
| 215 | 1413 | $8.06 \%$ |
| 285 | 1319 | $7.52 \%$ |
| Total: | 17536 |  |



Standard Deviation:
245.360869

Comments
This is how the distribution looks when the data from Minnesota and Wisconsin is combined.
Notice the low percentage of kids in the bottom two weights.

Best Distribution (12 Weights, MN \& WI Combined, 2005-06)

| Weight | No. | Pct. |
| :---: | :---: | :---: |
| 108 | 1409 | $8.03 \%$ |
| 118 | 1361 | $7.76 \%$ |
| 126 | 1493 | $8.51 \%$ |
| 133 | 1551 | $8.84 \%$ |
| 139 | 1408 | $8.03 \%$ |
| 145 | 1381 | $7.88 \%$ |
| 152 | 1568 | $8.94 \%$ |
| 160 | 1466 | $8.36 \%$ |
| 170 | 1426 | $8.13 \%$ |
| 185 | 1443 | $8.23 \%$ |
| 210 | 1510 | $8.61 \%$ |
| 285 | 1520 | $8.67 \%$ |
| Total: | 17536 |  |



Standard Deviation:
67.37997185

## Comments

This is a very good distribution. It also is much more representative of the current high school wrestling population.

# High School Wrestling Weight Class Study 2005-06 Data (MN/WI Combined) 

The best fitting set of weights will be the one with the lowest standard deviation.
Current Distribution(MN \& WI Combined, 2005-06, Adjusted Weights)

| Weight | No. | Pct. |
| :---: | :---: | :---: |
| 103 | 1229 | $7.01 \%$ |
| 112 | 1182 | $6.74 \%$ |
| 119 | 1231 | $7.02 \%$ |
| 125 | 1222 | $6.97 \%$ |
| 130 | 1327 | $7.57 \%$ |
| 135 | 1172 | $6.68 \%$ |
| 140 | 1158 | $6.60 \%$ |
| 145 | 1171 | $6.68 \%$ |
| 152 | 1405 | $8.01 \%$ |
| 160 | 1296 | $7.39 \%$ |
| 171 | 1402 | $7.99 \%$ |
| 189 | 1483 | $8.46 \%$ |
| 215 | 1238 | $7.06 \%$ |
| 285 | 1020 | $5.82 \%$ |
| Total | 17536 |  |



Total: 17536
Standard Deviation:
120.7073475

## Comments

Using adjusted weights for each wrestler is an attempt to account for the weight loss that each wrestler experiences at the beginning of the season while 'Getting in shape.' An amount equal to $3 \%$ was deducted from each wrestler's actual weight at certification.

Best Distribution (12 Wts, MN \& WI Combined, 2005-06, Adjusted Wts)

| Weight | No. | Pct. |
| :---: | :---: | :---: |
| 105 | 1470 | $8.38 \%$ |
| 115 | 1435 | $8.18 \%$ |
| 123 | 1559 | $8.89 \%$ |
| 129 | 1471 | $8.39 \%$ |
| 135 | 1428 | $8.14 \%$ |
| 141 | 1380 | $7.87 \%$ |
| 147 | 1375 | $7.84 \%$ |
| 155 | 1515 | $8.64 \%$ |
| 165 | 1484 | $8.46 \%$ |
| 180 | 1466 | $8.36 \%$ |
| 204 | 1454 | $8.29 \%$ |
| 285 | 1499 | $8.55 \%$ |
| Total: | 17536 |  |



## Comments

Using adjusted weights for each wrestler is an attempt to account for the weight loss that each wrestler experiences at the beginning of the season while 'Getting in shape.' An amount equal to $3 \%$ was deducted from each wrestler's actual weight at certification.

## High School Wrestling Weight Class Study

## Summary \& Conclusion

Below is a comparison of all the results from the three studies. Notice that the 2003 and 2006 studies from Minnesota turned out identical, except for one weight class. I think the explanation for differences between Wisconsin and Minnesota in the 2006 studies is that Minnesota can use 7th and 8th graders on their varsity teams. In other words, more young kids means more light kids.

There is a reason for using twelve weights rather than another number.
The Minnesota coaches have gone through a long, thorough discussion on the topic and decided (through voting) that twelve was best.

The table below summarizes the results of the three studies using 12 weights:

| $\underline{\text { 2003 Study }}$ | $\underline{\text { 2006 Study (MN) }}$ | $\underline{\text { 2006 Study (WI) }}$ | $\underline{\text { 2006 Study }}$ <br> (Combined) |
| :---: | :---: | :---: | :---: |
| 106 | 106 | 112 | 108 |
| 117 | 117 | 121 | 118 |
| 125 | 125 | 129 | 126 |
| 132 | 132 | 135 | 133 |
| 138 | 138 | 141 | 139 |
| 144 | 144 | 147 | 145 |
| 151 | 151 | 154 | 152 |
| 159 | 159 | 163 | 160 |
| 169 | 169 | 174 | 170 |
| 184 | 184 | 190 | 185 |
| $\mathbf{2 0 9}$ | $\mathbf{2 0 8}$ | 216 | 210 |
| 275 | 285 | 285 | 285 |

This list shows what the weights would be if the weight of each wrestler were adjusted $3 \%$ downward:
$105,115,123,129,135,141,147,155,165,180,204,285$
This is an attempt to account for the weight loss that every wrestler experiences during the first few weeks of the wrestling season. This weight loss is due only to increased intensity and activity levels in their training. I believe it is a more accurate picture of where kids would actually be competing.

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