

Levels of Health-Related Physical Fitness  
in Texas School Children (2011 to 2014)

*A Report from the Texas Youth Fitness Project*

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Overview and Summary of Key Findings

There is considerable interest in the levels of health-related physical fitness in children - by school administrators, policy-makers, researchers and public health leaders. The *Texas Youth Fitness Project*, represents the largest and most comprehensive evaluation of health-related fitness in youth to date. Data from across the state of Texas have been compiled by age and gender to provide descriptive information about the levels and patterns of health-related physical fitness in youth. Data on the percent of youth that attain the established FITNESSGRAM health standards provides a useful summary of the current status of fitness in youth. Evaluation of the patterns can provide an indicator of changes in levels of fitness over time.

The report summarizes outcomes of the past four years of FITNESSGRAM data compiled by the Texas Education Association (2010/2011, 2011/2012, 2012/2013, and 2013/2014). The data were screened for outliers and processed to ensure that data from schools were sufficiently representative to be included in the aggregated results. The resulting sample included data from 2,902,854 youth in 2011, 2,269,481 youth in 2012, 4,039,365 youth in 2013, and 3,264,390 youth in 2014. The percentage of youth achieving the Healthy Fitness Zone (HFZ) were examined by age and gender (and also across years) to provide insights about how fitness varies over time.

The results provide valuable baseline information to understand the current levels of health-related fitness in youth. The percent of youth achieving the Healthy Fitness Zone varied by test, grade and gender and these results were summarized with both narrative descriptions and figures. There were small but consistent increases in the average percent of youth achieving the HFZ between 2011 and 2014 but additional work is needed to better understand the school level factors that may explain variability in the population and over time. The results document the value of standardized collection of FITNESSGRAM data for youth fitness surveillance.

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## Methods and Results

Senate Bill 530 (SB 530) requires all Texas schools to conduct fitness testing with FITNESSGRAM annually. This report summarizes the levels and patterns of health-related fitness from 3<sup>rd</sup> to 12<sup>th</sup> grade across the whole state using the aggregated grade-level data from the past four school years (2011-2014). The data were first screened to ensure that the data submitted from the individual schools were representative of their sample population of students. The screening procedures were designed to optimize the available sample size while minimizing the potential of bias within the sample<sup>1</sup>. The final criteria required that schools have at least 10 students from each grade but this was done separately for boys and girls to enable gender-specific analyses. This resulted in grade level observations from 6,798, 6,251, 6,228, and 5,943 schools included in the final dataset for 2011, 2012, 2013, and 2014, respectively. The evaluation focused on the percent of children that attained the established Healthy Fitness Zone (HFZ) by grade, gender and year. An overview of the number of students who achieved the HFZ for 6 out of 6 test items is also presented. Key summaries are provided below:

- Group level aerobic capacity HFZ achievement ranged from 63% to 93% in boys and from 67% to 89% in girls across grades ([Figure 1](#)). The average percent of youth achieving the standard declined with boys from 4<sup>th</sup> to 12<sup>th</sup> grade but this pattern was not evident in girls. Comparisons across years in each grade show clear evidence of increases in HFZ achievement from 2011 to 2014. The average % change from 2011 to 2014 was 6.6% in boys and 7.2% in girls. Only aerobic capacity data submitted via the Texas Education Agency's (TEA) Physical Fitness Assessment Initiative (PFAI) was included for SY 2014 (approximately 2,400,000 youth; 2/3 of Texas schools), in order to ensure that data were compared using the same health-related standards and calculations (v9).
- Group level BMI HFZ achievement ranged from 47% to 59% in boys and from 52% to 68% in girls ([Figure 2](#)). The average percent of youth achieving the standard declined from 3<sup>rd</sup> to 5<sup>th</sup> grade and then increased from 6<sup>th</sup> grade through 12<sup>th</sup> grade in boys and girls. There were increases in the percent achieving the HFZ for both boys and girls from 2011 to 2014 (boys 1.9%; girls 2.0%).
- Group level upper body strength and endurance HFZ achievement ranged from 58% to 78% in boys and from 63% to 80% in girls ([Figure 3](#)). The average percentage of HFZ achievement declined consistently for boys from the 3<sup>rd</sup> through the 12<sup>th</sup> grade. The average achievement rates for girls varied across the four school years, but generally decreases were observed from 3<sup>rd</sup> to 5<sup>th</sup> grade with increases from 6<sup>th</sup> to 8<sup>th</sup> grade. The patterns over time reveal declines in HFZ achievement from 2011 to 2014 in 3<sup>rd</sup> to 5<sup>th</sup> graders but increases in 6<sup>th</sup> to 12<sup>th</sup> grades for both boys (average % change = 1.9%) and girls (average % change = 3.0%).
- Group level flexibility HFZ achievement ranged from 61% to 73% in boys and from 63% to 77% in girls ([Figure 4](#)). The average percentage of HFZ achievement tends to increase from elementary years to middle school years in both boys and girls. Achievement rates tended to decline in girls from middle school to high school but values remained stable for boys from 2011 to 2013, but in 2014 decreases were observed for 3<sup>rd</sup> to 7<sup>th</sup> grade students. Increases in the average percent of HFZ achievement were evident from 2011 to 2014 (boys = 1.0%; girls = 1.1%). However, the pattern was inconsistent with slightly lower achievement noted in 2012 and 2014.

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<sup>1</sup> The data screening procedures were based on methods used in the processing of data from the NFL PLAY 60 FITNESSGRAM Partnership Project (Saint-Maurice, et al., 2014). The refined method developed for this project will help to ensure standardization of outcomes and analyses while also facilitating comparisons with other state-level data.

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- Group level abdominal strength and endurance HFZ achievement ranged from 67% to 83% in boys and from 66% to 81% in girls ([Figure 5](#)). The average percentage of HFZ achievement remained stable across grade levels in both boys and girls except for slight declines in the high school years. The average HFZ achievement remained stable from 2011 to 2014 in 3<sup>rd</sup> to 7<sup>th</sup> graders and increases were observed in higher grades (10<sup>th</sup> - 12<sup>th</sup> grades) for both boys (average % change = 0.7%) and girls (average % change = 1.2%).
- Group level trunk extensor strength and flexibility HFZ achievement ranged from 79% to 92% in boys and from 82% to 93% in girls ([Figure 6](#)). The average percent of youth achieving the standard declined slightly from 3<sup>rd</sup> to 5<sup>th</sup> grade and then increased slightly from 6<sup>th</sup> grade through 12<sup>th</sup> grade in both boys and girls. There was no evidence of any clear appreciable changes in HFZ achievement between 2011 and 2014 for boys (average % change = -0.6%) or girls (average % change = 0.0%).
- Group level HFZ achievement for 6 out of 6 test items ranged from 16% to 26% in boys and 17% to 28% in girls ([Figure 7](#)). The average percent of HFZ achievement for 6 out of 6 test items was similar among 3<sup>rd</sup> to 12<sup>th</sup> graders within each school year.

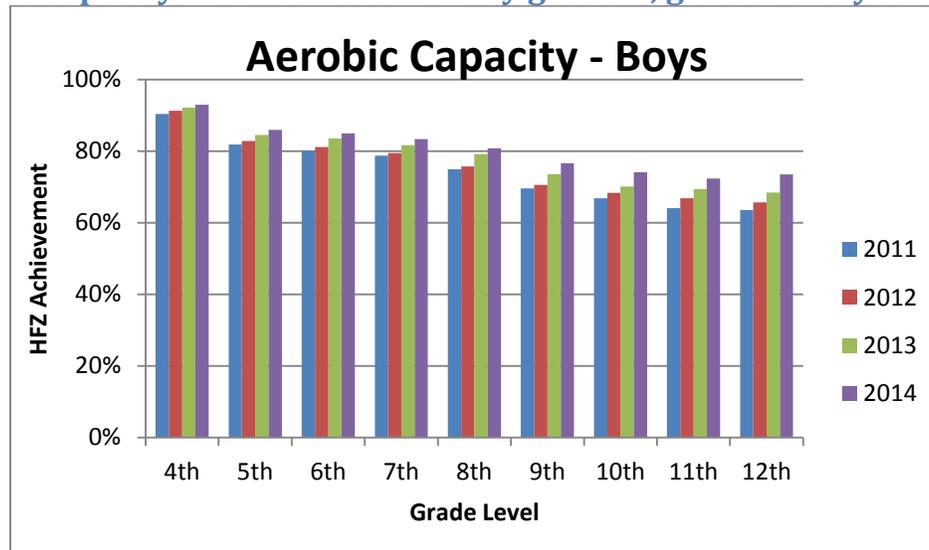
The descriptive data reported above provide useful reference values to characterize health-related fitness levels of Texas youth. There are no comparable state or national data to compare these values to so it is not possible to draw inferences about the magnitude of the values. It is also not possible to directly compare these values from 2011 – 2014 to previous published reports from the Texas Youth Fitness Project (Welk et al., 2010) due to changes in the standards used to evaluate both aerobic capacity and body composition. The current report includes data compared using the same Healthy Fitness Zone standards (FITNESSGRAM v9). The primary value of these results is to document the range of HFZ achievement on the various assessments and to examine changes in age and gender patterns. **It is important to note, however, that age and gender patterns reflect differences in HFZ achievement and not necessarily actual differences in fitness.** For example, it is possible for girls to have higher HFZ achievement than boys due to differences in the levels defined in the criterion health standards. It is also possible for age-related differences to suggest declines in fitness when in reality, fitness levels may have increased with age. This can (and will) occur because the criterion standards also vary by age/grade. The standards for aerobic capacity and body composition have been demonstrated to have clear utility for evaluating potential risk for metabolic syndrome (Laurson et al., 2011; Welk et al.). Therefore, the distributions and patterns for these assessments have the strongest utility for evaluating health status in Texas youth.

The results of these analyses provide preliminary views of the changes in HFZ achievement over the past 4 years. In general, there was evidence of small but consistent increases for most of the assessments over time although patterns varied by grade and gender. It is important to recognize that these patterns reflect secular changes in the average rates of HFZ achievement over the four years. The same screening and processing procedures were applied in all four years, however the results are cross sectional in nature and do not reflect longitudinal patterns. There were differences in the number and characteristics of schools submitting data each year so it is possible for differences to be due to variability in the sample. It is also possible for values to increase due to improved communication, familiarization with tests or increased motivation from students. Therefore, it is premature to draw inferences of increased health-related fitness based on these results. Additional analyses of longitudinal relationships (using data from matched schools) will enable patterns to be evaluated in more detail. Emphasis in these analyses will be placed on identifying factors that may account for improvements so that effective school level programming and policies can be disseminated to other schools.

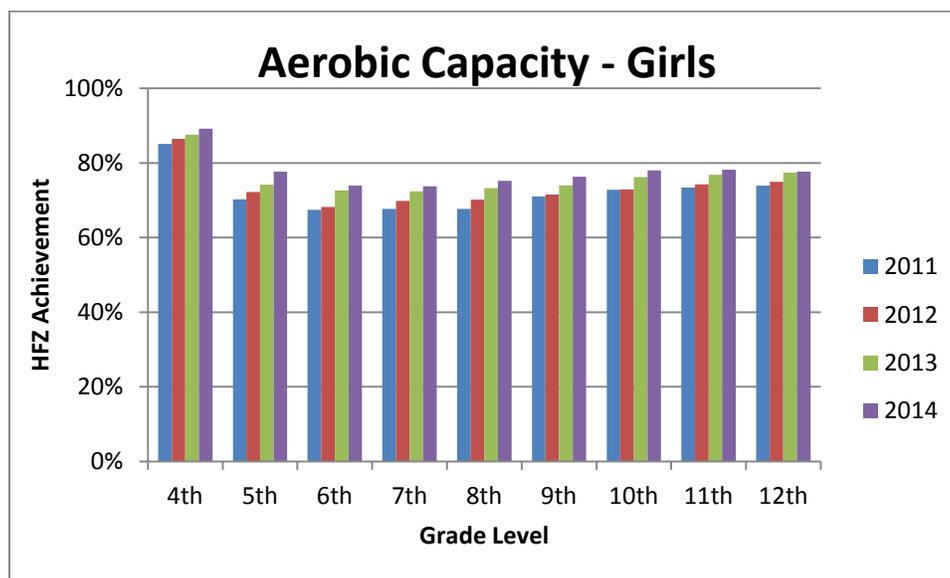
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## Healthy Fitness Zone Achievement (HFZ)

Figure 1. Aerobic Capacity HFZ\* achievement by grade\*\*, gender and year



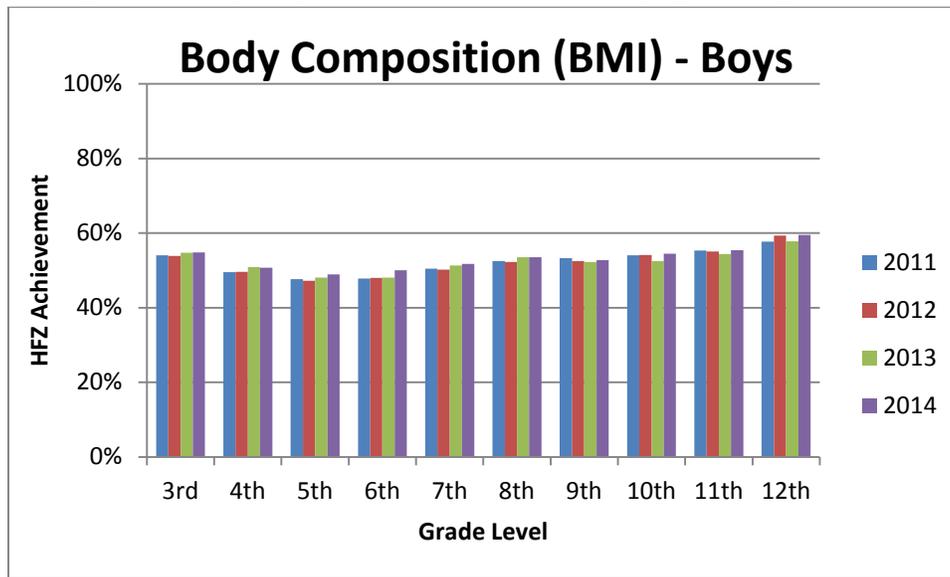
	4th	5th	6th	7th	8th	9th	10th	11th	12th
<b>2011</b>	90.5	81.9	80.1	78.7	75.0	69.6	66.8	64.1	63.6
<b>2012</b>	91.3	82.8	81.2	79.5	75.7	70.6	68.4	66.9	65.7
<b>2013</b>	92.2	84.6	83.6	81.7	79.2	73.6	70.2	69.4	68.5
<b>2014</b>	93.0	86.0	85.0	83.4	80.8	76.6	74.1	72.4	73.5



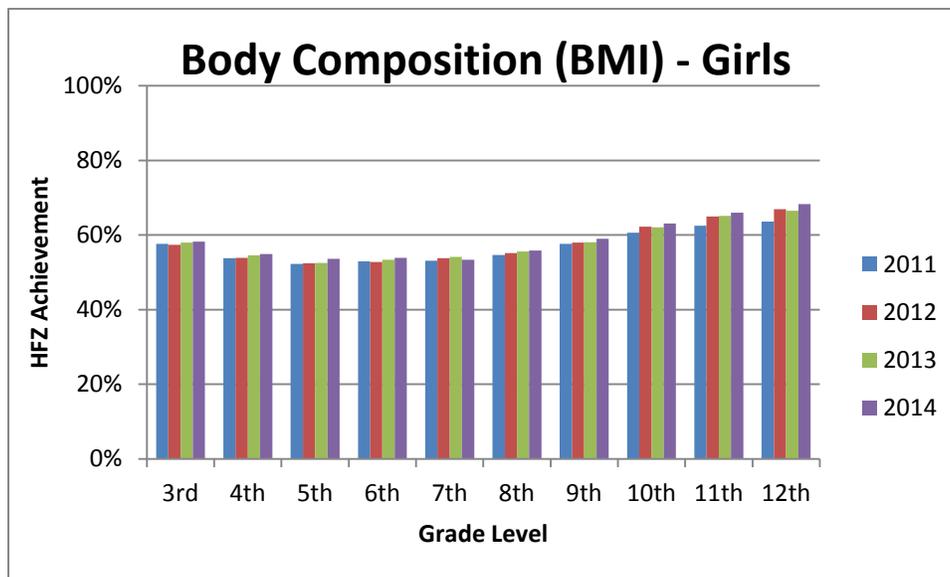
	4th	5th	6th	7th	8th	9th	10th	11th	12th
<b>2011</b>	85.1	70.3	67.4	67.7	67.7	71.0	72.8	73.4	73.9
<b>2012</b>	86.5	72.2	68.2	69.8	70.2	71.6	72.9	74.2	74.9
<b>2013</b>	87.6	74.2	72.7	72.4	73.2	74.0	76.2	76.8	77.4
<b>2014</b>	89.2	77.7	73.9	73.8	75.2	76.3	78.0	78.2	77.7

# Levels of Health-Related Fitness in Texas School Children

**Figure 2. Body Composition (BMI)\* HFZ Achievement by grade, gender and year**



	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th
<b>2011</b>	54.1	49.5	47.6	47.8	50.4	52.5	53.2	54.0	55.3	57.7
<b>2012</b>	53.8	49.6	47.2	47.9	50.2	52.2	52.5	54.1	55.1	59.3
<b>2013</b>	54.7	50.9	48.1	48.1	51.3	53.6	52.3	52.5	54.4	57.8
<b>2014</b>	54.8	50.7	48.9	50.0	51.7	53.5	52.8	54.5	55.4	59.5

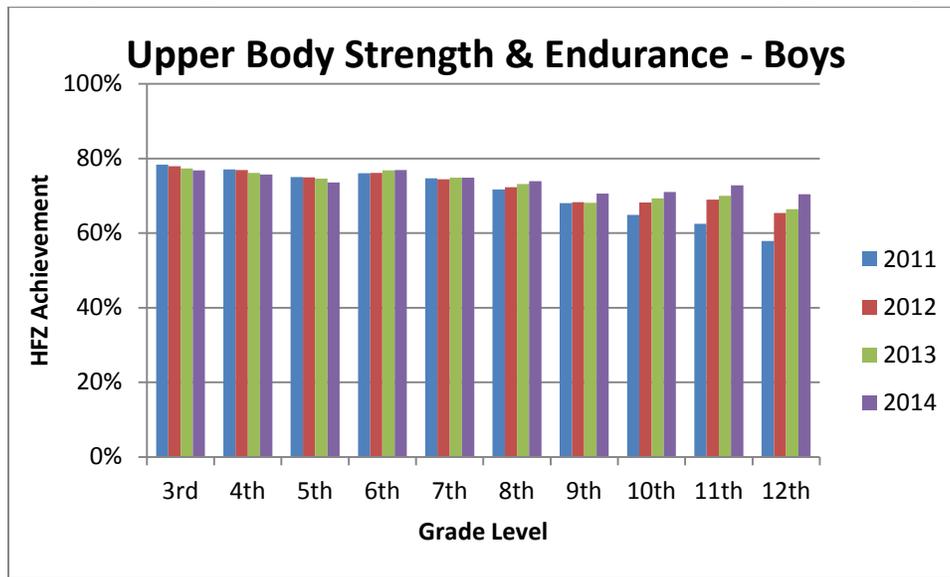


	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th
<b>2011</b>	57.7	53.8	52.3	52.9	53.1	54.6	57.7	60.7	62.5	63.6
<b>2012</b>	57.4	53.9	52.4	52.7	53.8	55.1	58.0	62.3	65.0	66.9
<b>2013</b>	58.0	54.5	52.5	53.4	54.1	55.6	58.0	62.1	65.1	66.5
<b>2014</b>	58.2	54.9	53.6	53.9	53.4	55.8	59.0	63.1	66.0	68.3

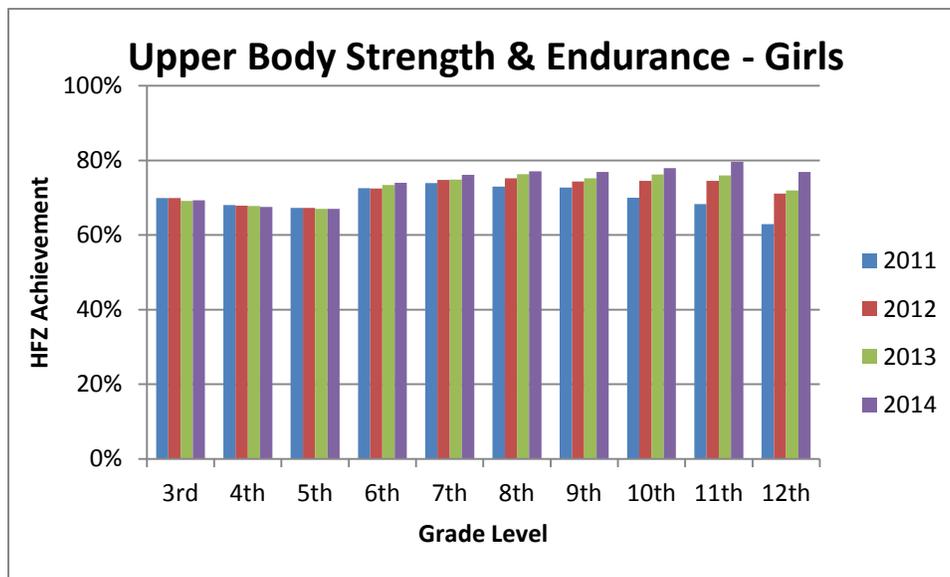
\*Higher rates of Healthy Fitness Zone achievement in body composition, equates to more students having a healthy body composition for their age and gender.

## Levels of Health-Related Fitness in Texas School Children

**Figure 3. Upper Body Strength & Endurance HFZ Achievement by grade, gender and year**



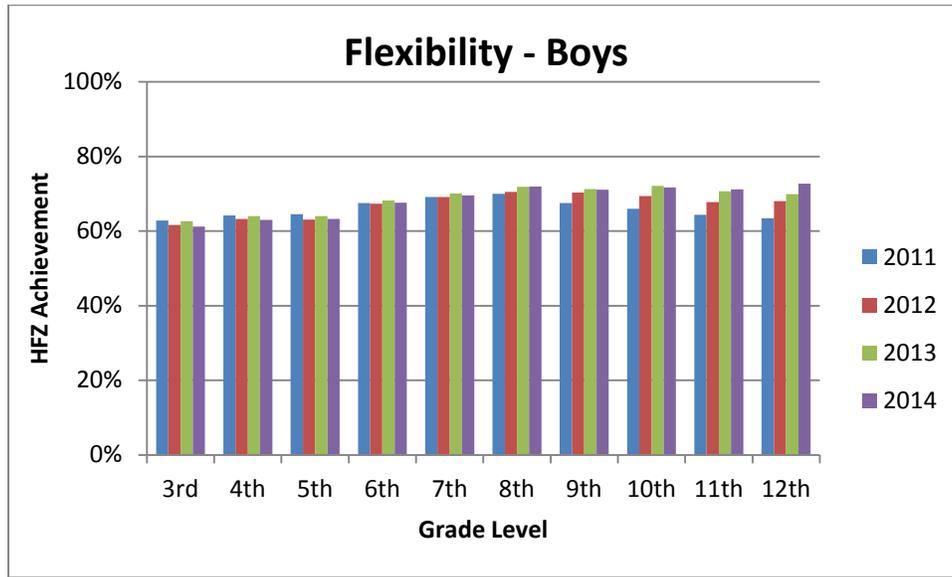
	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th
<b>2011</b>	78.4	77.1	75.1	76.1	74.7	71.7	68.0	64.8	62.5	57.9
<b>2012</b>	78.0	76.9	75.0	76.1	74.4	72.3	68.3	68.2	68.9	65.4
<b>2013</b>	77.3	76.2	74.6	76.8	74.8	73.1	68.1	69.3	70.0	66.4
<b>2014</b>	76.8	75.7	73.6	76.9	74.9	73.9	70.6	71.0	72.8	70.4



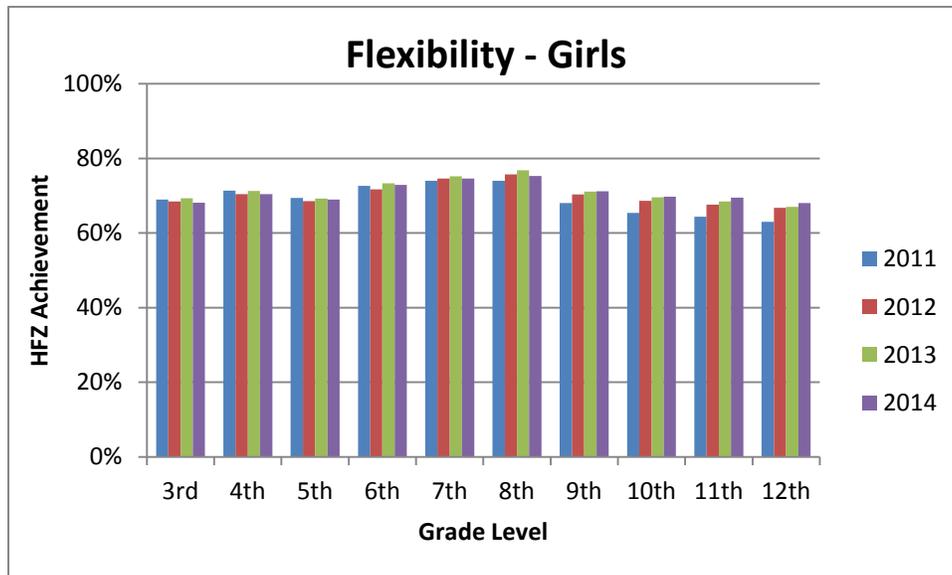
	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th
<b>2011</b>	69.9	68.0	67.3	72.6	74.0	73.0	72.7	70.0	68.3	62.9
<b>2012</b>	69.9	67.8	67.2	72.5	74.8	75.2	74.3	74.5	74.5	71.1
<b>2013</b>	69.1	67.8	67.1	73.4	74.9	76.3	75.2	76.2	76.0	72.0
<b>2014</b>	69.3	67.5	67.0	74.0	76.1	77.1	76.9	77.9	79.6	76.9

# Levels of Health-Related Fitness in Texas School Children

**Figure 4. Flexibility HFZ Achievement by grade, gender and year**



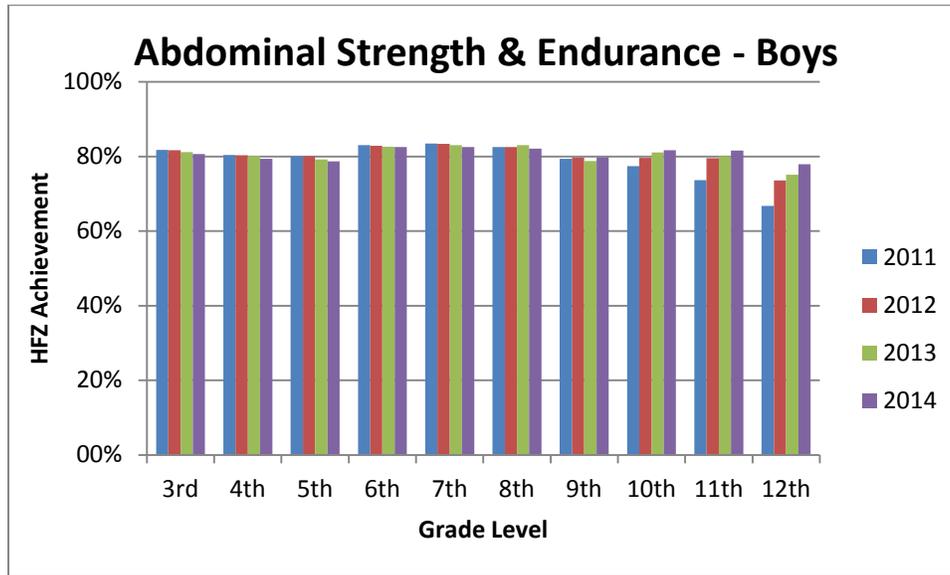
	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th
<b>2011</b>	62.8	64.2	64.6	67.6	69.1	70.0	67.5	66.0	64.4	63.5
<b>2012</b>	61.7	63.2	63.1	67.3	69.2	70.5	70.4	69.4	67.8	68.0
<b>2013</b>	62.7	64.0	64.0	68.2	70.1	71.9	71.3	72.1	70.7	69.9
<b>2014</b>	61.2	63.0	63.3	67.6	69.6	72.0	71.1	71.7	71.2	72.7



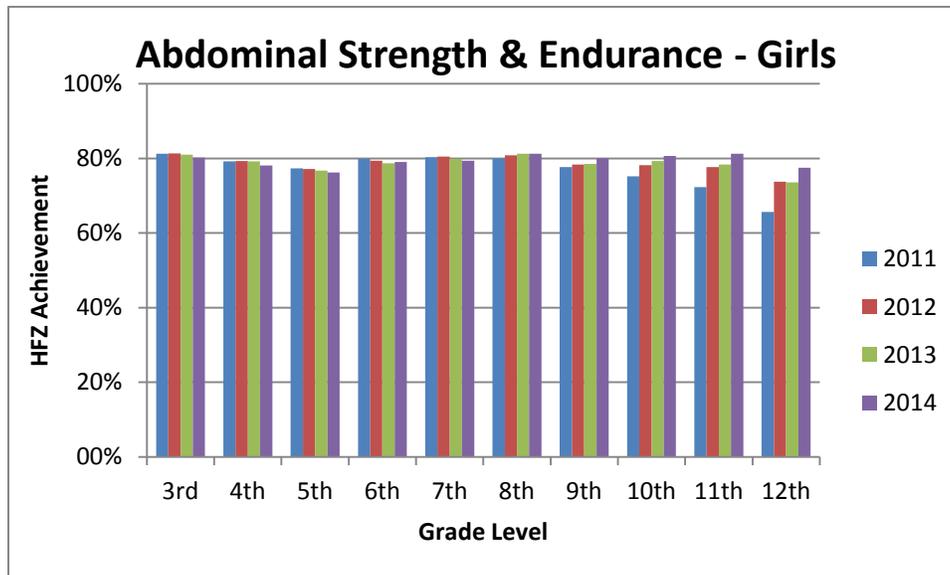
	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th
<b>2011</b>	69.0	71.4	69.4	72.6	74.0	74.0	68.1	65.4	64.3	63.0
<b>2012</b>	68.4	70.4	68.5	71.7	74.6	75.7	70.3	68.6	67.6	66.7
<b>2013</b>	69.3	71.3	69.2	73.3	75.2	76.8	71.1	69.6	68.5	67.0
<b>2014</b>	68.1	70.4	69.0	72.9	74.6	75.3	71.2	69.7	69.5	68.0

# Levels of Health-Related Fitness in Texas School Children

**Figure 5. Abdominal Strength & Endurance HFZ Achievement by grade, gender and year**



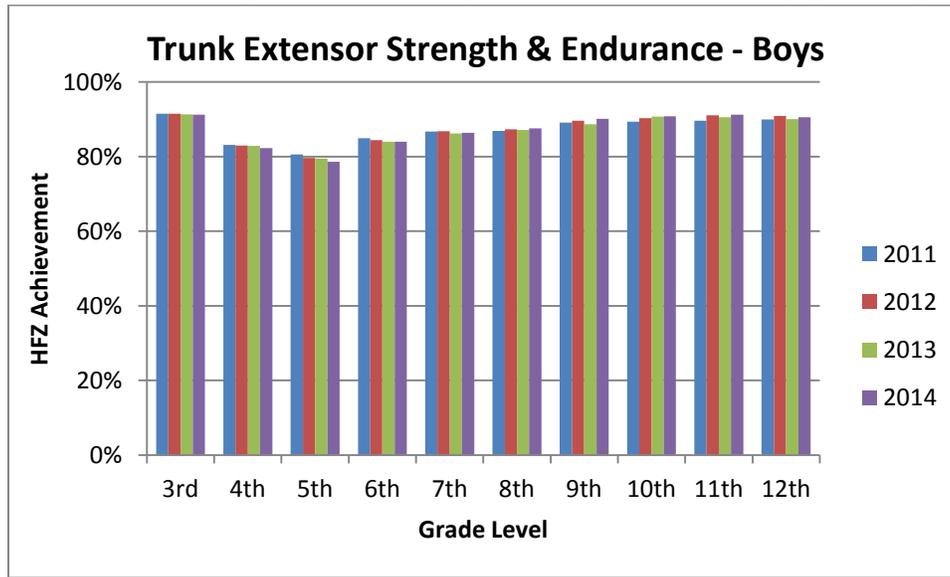
	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th
<b>2011</b>	81.8	80.4	80.1	83.1	83.4	82.5	79.3	77.4	73.6	66.7
<b>2012</b>	81.7	80.3	80.1	82.9	83.4	82.6	79.7	79.7	79.5	73.6
<b>2013</b>	81.1	80.2	79.2	82.7	83.0	83.1	78.8	81.1	80.0	75.1
<b>2014</b>	80.7	79.4	78.7	82.5	82.5	82.1	79.8	81.7	81.6	77.9



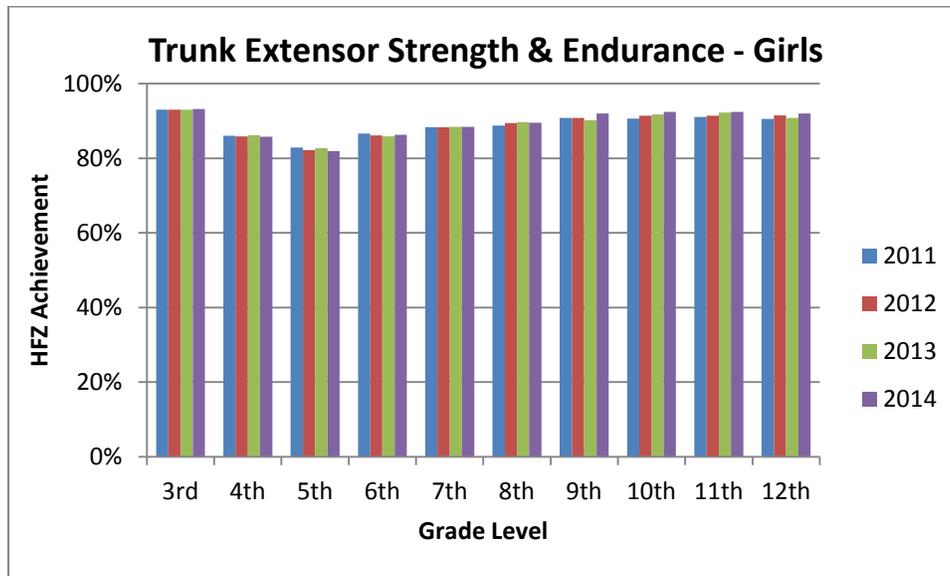
	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th
<b>2011</b>	81.2	79.3	77.3	79.9	80.3	80.0	77.7	75.2	72.3	65.6
<b>2012</b>	81.3	79.3	77.2	79.4	80.5	80.8	78.4	78.2	77.7	73.8
<b>2013</b>	81.0	79.2	76.8	78.7	79.9	81.3	78.5	79.3	78.4	73.5
<b>2014</b>	80.2	78.1	76.2	79.0	79.4	81.3	80.1	80.7	81.3	77.5

# Levels of Health-Related Fitness in Texas School Children

**Figure 6. Trunk Extensor Strength & Flexibility HFZ Achievement by grade, gender and year**



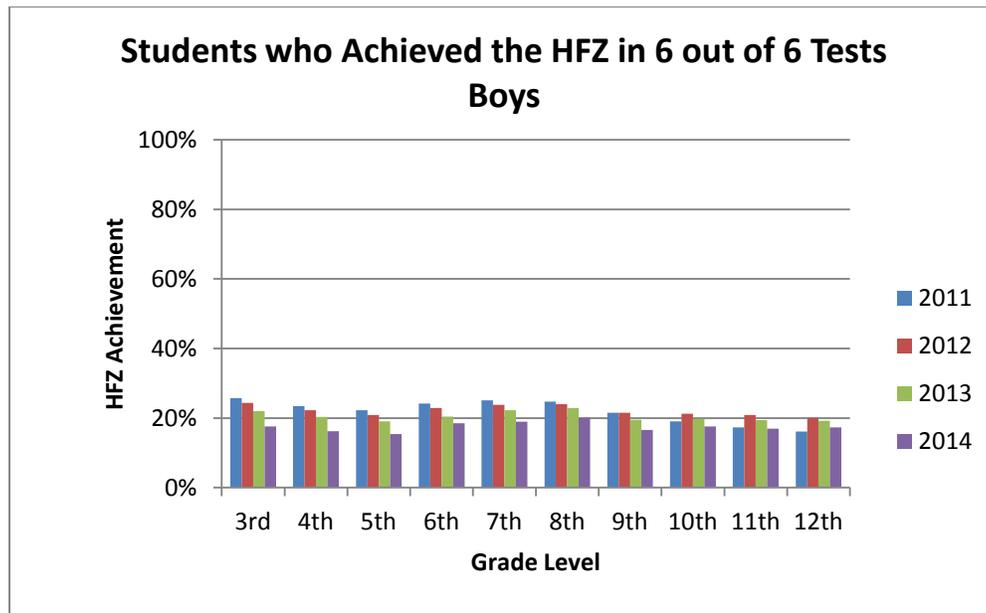
	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th
<b>2011</b>	91.5	83.1	80.6	84.9	86.7	86.9	89.1	89.4	89.6	90.0
<b>2012</b>	91.5	83.0	79.7	84.4	86.8	87.3	89.6	90.3	91.1	90.9
<b>2013</b>	91.3	82.9	79.5	84.0	86.2	87.1	88.6	90.7	90.6	90.0
<b>2014</b>	91.2	82.3	78.6	84.0	86.4	87.6	90.1	90.8	91.2	90.6



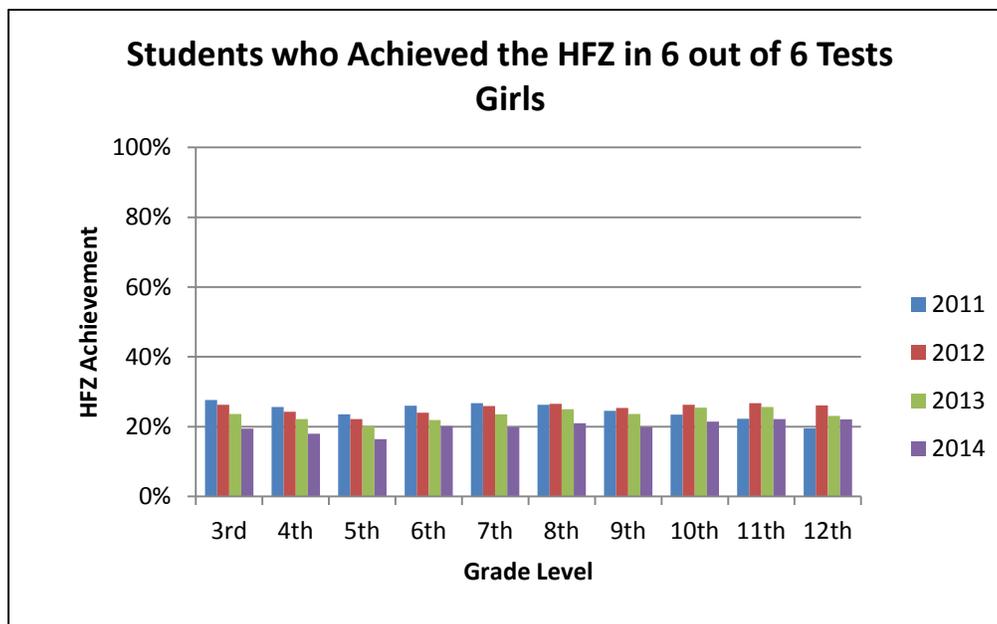
	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th
<b>2011</b>	93.0	86.0	82.9	86.7	88.3	88.7	90.8	90.6	91.1	90.6
<b>2012</b>	93.1	85.9	82.2	86.1	88.3	89.5	90.8	91.4	91.4	91.5
<b>2013</b>	93.1	86.2	82.7	85.9	88.4	89.7	90.2	91.7	92.3	90.8
<b>2014</b>	93.2	85.8	81.9	86.3	88.4	89.5	92.0	92.4	92.4	92.0

# Levels of Health-Related Fitness in Texas School Children

Figure 7. Students who achieved the HFZ in 6 out of 6 tests by grade, gender and year



	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th
<b>2011</b>	25.8	23.4	22.3	24.2	25.0	24.7	21.6	19.0	17.3	16.1
<b>2012</b>	24.3	22.3	20.8	22.9	23.8	24.0	21.5	21.2	20.9	20.1
<b>2013</b>	22.0	20.3	19.1	20.4	22.2	22.9	19.5	19.7	19.4	19.2
<b>2014</b>	17.6	16.2	15.3	18.5	18.9	20.1	16.6	17.6	16.9	17.3



	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th
<b>2011</b>	27.7	25.6	23.5	26.0	26.7	26.3	24.5	23.4	22.3	19.6
<b>2012</b>	26.3	24.3	22.1	24.0	25.9	26.5	25.4	26.3	26.7	26.1
<b>2013</b>	23.7	22.2	20.2	21.9	23.6	25.0	23.6	25.5	25.6	23.1
<b>2014</b>	19.5	17.9	16.4	20.1	19.8	21.0	19.8	21.5	22.2	22.1