

OFFICE OF SUPERINTENDENT OF PUBLIC INSTRUCTION K-12 SCHOOL CONSTRUCTION FUNDING FORMULA & ENROLLMENT STUDY

Task Force Meeting – October 15, 2008

Enrollment Projections – Preliminary Analysis and Findings

OVERVIEW

Legislative Proviso

The appropriation in this section is provided solely for OSPI to contract with a research organization to conduct an evaluation of the accuracy and reliability of the current method used for forecasting school district enrollment for determining eligibility for the school assistance program. This evaluation must also include a review of different methodologies used by school districts in projecting their enrollment for capital planning and budgeting purposes. A final report resulting from this evaluation must be submitted by January 1, 2009.

(Chapter 328, Laws of 2008, Section 5016, Enrollment Projections Evaluation Study)

Tasks Completed to Date

1. Documented OSPI's Current Enrollment Projection Formula
2. Reviewed and Assessed the Findings and Applicability of OSPI's September 1990 Enrollment Projection Study
3. Evaluated the Accuracy and Reliability of OSPI's Current Method used for Forecasting School District Enrollment
4. Reviewed Various Methodologies used by School Districts in Projecting their Enrollment for Capital Planning and Budgeting Purposes
 - Reviewed Enrollment Projection and Demographic Analysis Submitted by School Districts with SCAGP Proposals
 - Interviewed Evergreen, Vancouver, and Spokane School Districts
 - Interviewed the Washington State Caseload Forecast Council and the Office of Financial Management Forecasting Group
5. Reviewed School Enrollment Forecast Methods used in Other States
 - Documented methodologies used in California, Oregon, Colorado, and Nevada
 - Interviewed Colorado (interviews pending with other states)
6. Identified Methods to Test and Conducted a Comparative Analysis



Presentation Outline

1. OSPI Current Methodology – K Linear Cohort Survival
2. Testing the Accuracy of K Linear Cohort Projection
3. Testing Other Methods
4. Preliminary Recommendations
5. Next Steps & Questions

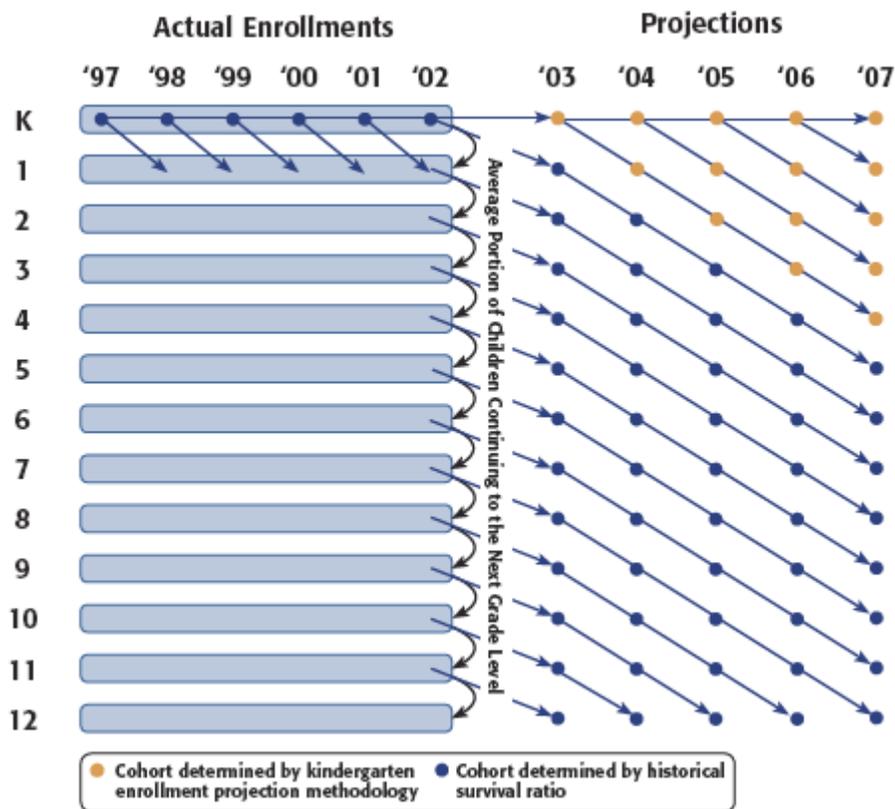
1. OSPI CURRENT METHODOLOGY – K LINEAR COHORT SURVIVAL

Description of K Linear Cohort Projection

- Projects kindergarten enrollment based on an historical average kindergarten enrollment trend.
- Projects enrollments in grades 1-12 based on an historical average grade progression rate.
- OSPI uses either a three year or five year average to project future enrollments (in growing districts it uses whichever yields a higher projection, and in declining districts it uses whichever yields a lower projection).

Exhibit 1

Illustrative Example of K Linear Cohort Survival Enrollment Projection Method



Source: Berk & Associates, 2008

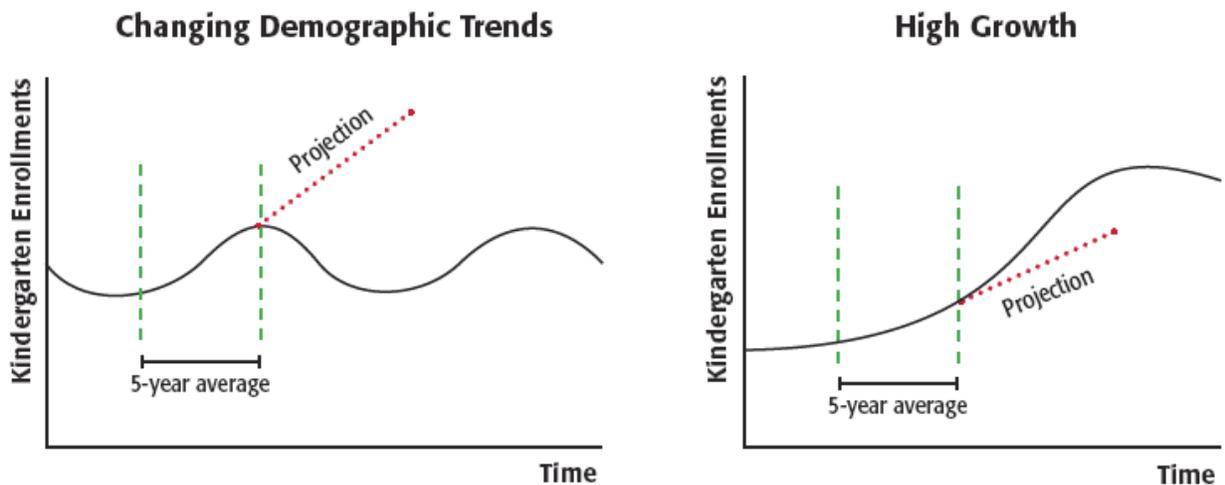
Advantages of K Linear Cohort Survival Method

- According to the 1990 Study, OSPI’s current methodology projects over 70% of the State’s districts within $\pm 5\%$ of actual enrollments one year out (this decreases to 29% five years out).
- The current methodology is relatively simple to calculate (actual enrollments by grade is the only data input required).

Disadvantages of K Linear Cohort Survival Method

- In districts where demographics are rapidly changing, the current methodology is less accurate – this has been cited as a concern with respect to high growth districts.
- In smaller districts, where there are less defined trends and a small change in numbers of students results in larger percent changes, the method is less accurate.

Exhibit 2 **Challenges with the K Linear Cohort Survival Methodology**



Source: Berk & Associates, 2008

2. TESTING THE ACCURACY OF K LINEAR COHORT PROJECTION

Methodology for Testing

- Using actual enrollments from 1997 – 2002, the K Linear Cohort Methodology was replicated by school district to “project” 2003-2007 enrollments.
- Projected enrollments were compared to actual enrollments.
- Comparisons focus on 2007 actual vs. projected enrollments as this captures a five year projection and is more representative of the timeframe for adding facilities.
- Comparisons were analyzed across district size categories and district growth categories.

Task Force Meeting: October 15, 2008
Enrollment Projections – Preliminary Analysis and Findings

- Size Categories:
 - **Large:** 2007 total enrollment greater than 5,000.
 - **Medium:** 2007 total enrollment greater than 1,000 but less than 5,000.
 - **Small:** 2007 total enrollment greater than 100 but less than 1,000.
 - **Very Small:** 2007 total enrollment less than 100.
- Growth Categories: Using 2003-2007 actual total enrollments
 - **High Growth:** Average annual growth rate greater than 2%, total growth rate greater than 5%, and total growth of at least 500 students.
 - **Growth:** Total growth rate of at least 5%, and total growth of 100-499 students.
 - **Small Change:** Districts with less than a 2% average annual change or less than a total change of 100 students.
 - **Decline:** Total decline rate of -5% or more and total loss of 100-499 students.
 - **Strong Decline:** Average annual decline rate of -2% or more, total decline rate of -5% or more, and total loss of 100-499 students.

Exhibit 3
Summary of Districts and Enrollments by District Size and Growth Category

District Size Category	Number of Districts in Analysis	2007 Total Enrollments	Percent of Total Enrollment
Large	60	761,264	74.8%
Medium	87	207,351	20.4%
Small	105	47,910	4.7%
Very Small	32	1,756	0.2%
Total	284	1,018,281	

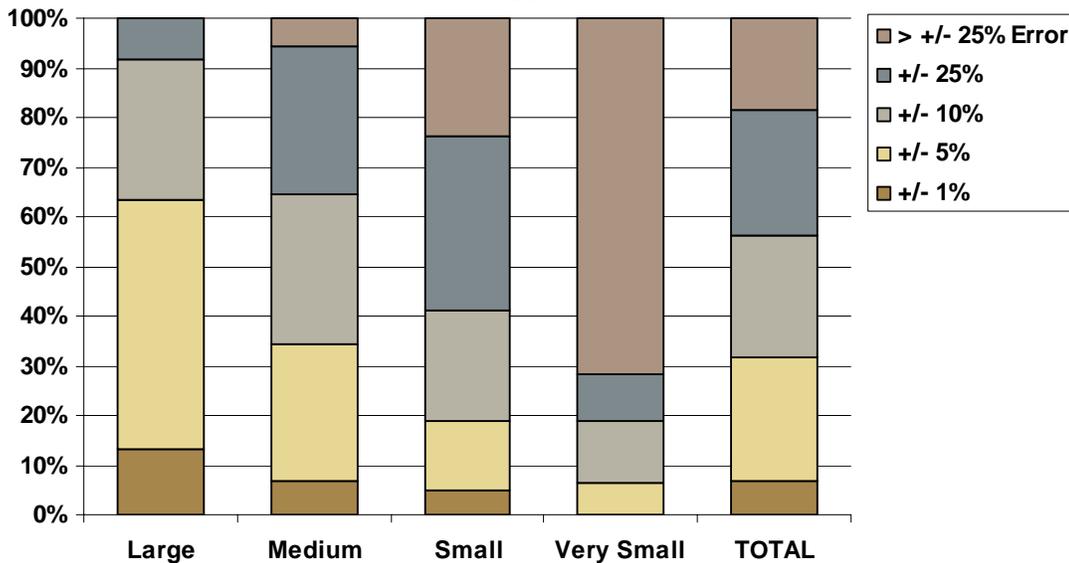
District Growth Category	Number of Districts in Analysis	2007 Total Enrollments	Percent of Total Enrollment
High Growth	11	87,383	8.6%
Growth	27	171,630	16.9%
Small Change	227	625,624	61.4%
Decline	16	93,668	9.2%
Strong Decline	3	39,976	3.9%
Total	284	1,018,281	

Source: OSPI, Berk & Associates, 2008

Preliminary Findings

- OSPI's current method projects five-year enrollments within +/- 5% of actual enrollments for 32% of districts. These districts comprise 58% of the State's total K-12 students.
- Projections for larger districts are more accurate than for smaller districts (see **Exhibit 4** below). 63% of large districts were projected within +/- 5% versus 19% of small districts.

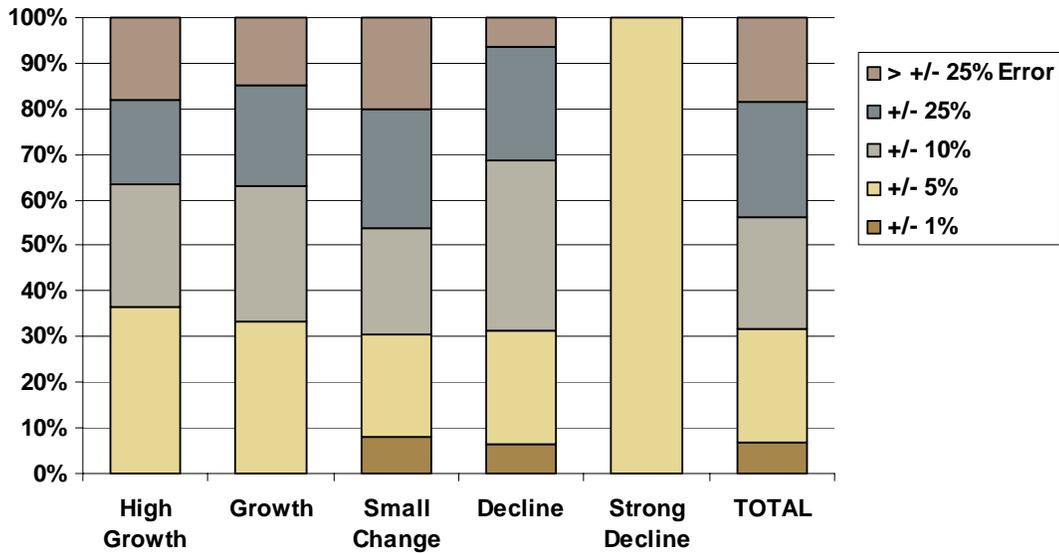
Exhibit 4
Accuracy of OSPI’s Current Methodology by District Size Category, 5 Years Out



Source: OSPI, Berk & Associates, 2008

- Projections were less accurate for Growth and High Growth districts (see **Exhibit 5** below). These districts account for 26% of the State’s K-12 student enrollment. None of them were projected within +/- 1%, but over 30% of each category were projected within +/-5%. This portion represents 13% of the State’s total K-12 enrollment.
- The Small Change category had a higher proportion of districts with > 25% error rates, likely because this category includes a high proportion of small and very small districts.
- The Strong Decline category shows consistent accuracy; however, it includes only three school districts.

Exhibit 5
Accuracy of OSPI’s Current Methodology by District Growth Category, 5 Years Out



Source: OSPI, Berk & Associates, 2008

3. TESTING OTHER METHODS

Determining What to Test

- Other methods to test were identified through review of the 1990 report, conversations with school districts (Vancouver, Spokane, Evergreen), and a review of methods in other states (California, Oregon, Nevada, Colorado).
- A Regression model was not tested for the following reasons:
 - Significantly more labor intensive and difficult to update
 - Would not be transparent to most users
 - Questionable how reliable the method is

Variations of K Linear Cohort Survival

- The following different averaging methods for arriving at the cohort survival ratio were tested:
 - Five-year average
 - Five-year average, weighted recent years more highly
 - Three-year average
 - Using differences instead of ratios for small districts
- Three-year averages were generally less accurate than five-year averages

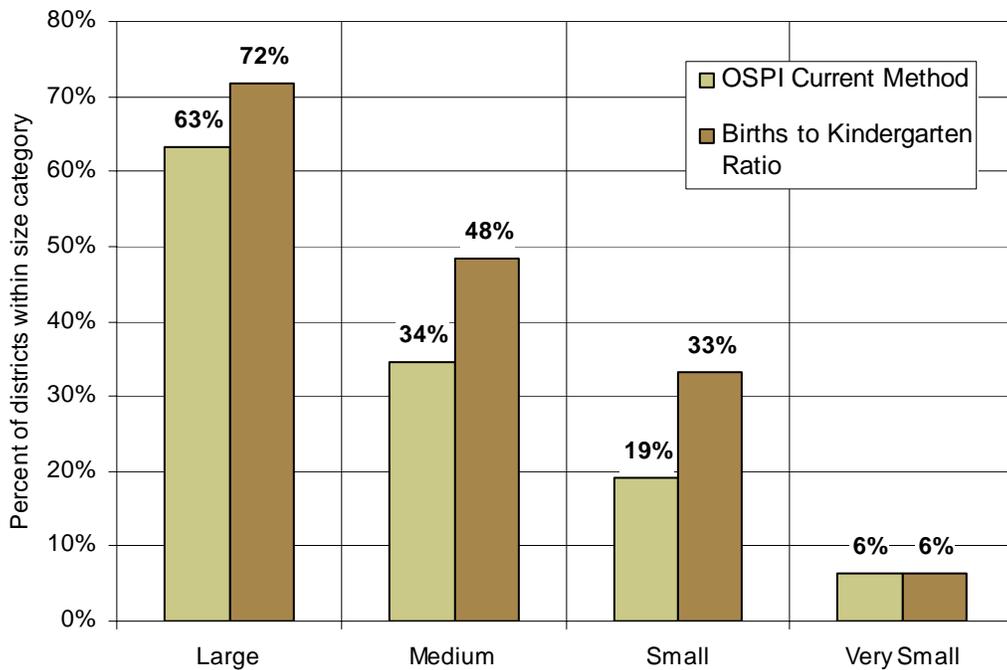
Task Force Meeting: October 15, 2008
Enrollment Projections – Preliminary Analysis and Findings

- Five-year weighted averages were slightly more accurate for large districts (0.1% on average) and small districts (0.6% on average) but less accurate for medium and very small districts

Births to Kindergarten Ratio

- In lieu of a linear trend for kindergarten enrollments, the ratio between county births five years prior and school district kindergarten enrollments was tested. County births were used instead of district births because sub-county data are available only in some areas (where available, district births would be the preferable measure).
- With the exception of very small districts, this is a much better predictor of kindergarten enrollments and therefore total enrollments (using a cohort survival method) than OSPI's current method (see **Exhibit 6** below)
- For high growth districts, a linear trend is a better predictor than birth to kindergarten ratios (see **Exhibit 7**), probably because county, rather than district births, are used.

Exhibit 6
Districts with less than 5% Difference from Actual, by District Size Category



Source: DOH, OSPI, Berk & Associates, 2008

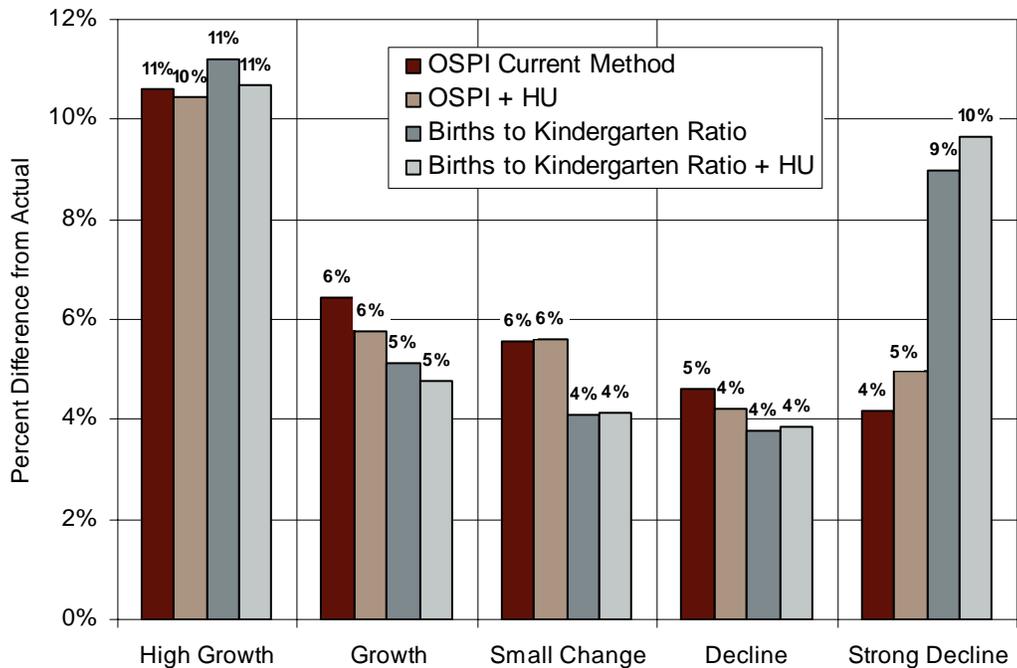
Housing Unit Adjustments

- To improve accuracy in Growth and High Growth districts, a housing unit analysis was conducted:
 - Using OFM's estimated annual housing unit totals 2000-2002 by school district, an average annual housing unit growth was determined.

Task Force Meeting: October 15, 2008
Enrollment Projections – Preliminary Analysis and Findings

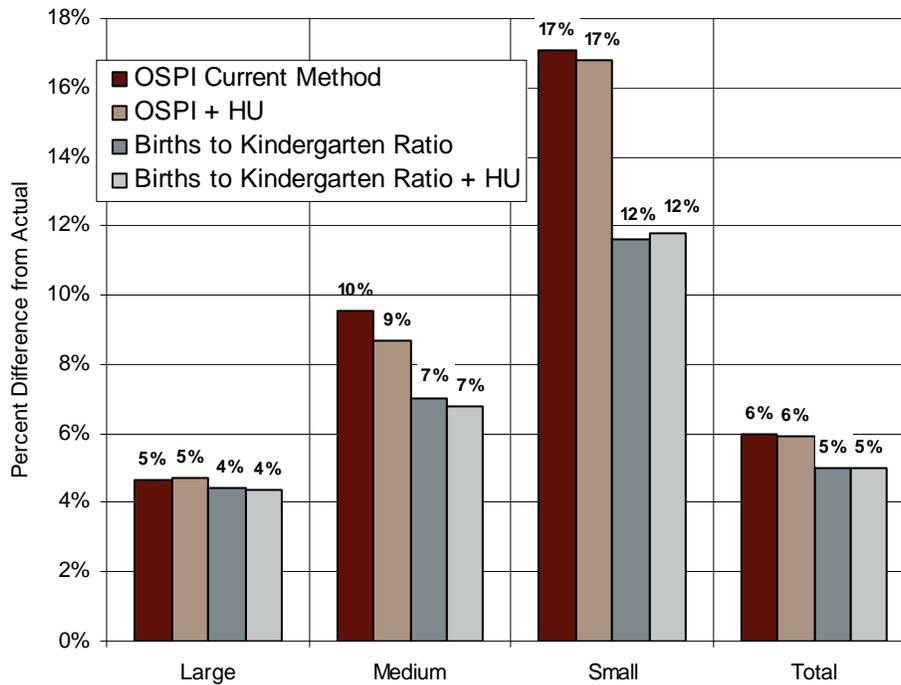
- 2003-2007 actual annual housing unit growth by school district was compared to the average.
- In years when housing growth was higher than average, total enrollments were adjusted upwards, and in years when housing unit growth was lower than average, total enrollments were adjusted downward.
- The enrollment adjustment was determined by applying a yield factor to the difference in housing units. The yield factor ranged from .5 to .7 depending upon the county’s mix of single and multifamily housing unit growth.
- The housing unit adjustment improved accuracy of projections for high growth and growth districts (or 25.5% of the State’s total K-12 enrollment), but the improvements were slight (0.1% and 0.3%, respectively).
- **Exhibits 7 & 8** below show the impact of the housing units adjustment on both OSPI’s current method and the births to kindergarten method

Exhibit 7
Error Rates by Enrollment Projection Method and District Growth Characteristics



Source: OFM, DOH, OSPI, Berk & Associates, 2008

Exhibit 8
Error Rates by Enrollment Projection Method and District Size Characteristics



Source: OFM, DOH, OSPI, Berk & Associates, 2008

4. PRELIMINARY RECOMMENDATIONS

- Use births to kindergarten ratio instead of a linear trend to predict kindergarten enrollments. Allow districts to use local, rather than county data, where available.
- Give growth districts the option of including a housing unit adjustment to enrollment projections.

5. NEXT STEPS & QUESTIONS

- Analyze impact of online learning programs on enrollment projections
- Question regarding the relationship between enrollment projections and the SCAGP funding formula: for small districts, given the high error rates, would a method for State funding that is not based on enrollment projections by grade level be more appropriate?