Introduction

As Pomp and Circumstance played softly in the background, approximately 37,800 rural high school seniors received their diplomas this past June. This fall, 34,100 rural kindergartners will join their teachers in singing their ABCs. This 3,700 difference between the class of 2005 and the class of 2018 demonstrates a cycle of declining enrollment that may affect many rural schools over the coming years.

Data on rural school enrollment show the majority of rural schools have had either stagnant or declining enrollments over the past 10 years. Enrollment projections from the Pennsylvania Department of Education suggest that this trend will continue for at least another 10 years.

To better understand rural school enrollment trends, the Center for Rural Pennsylvania looked at 10 years of enrollment data, from 1992 to 2002, to identify the trends in and characteristics of schools with significant changes in enrollment. The Center also analyzed enrollment projections through 2012 to understand the likely impact these trends will have on rural school districts.

Overall, the analysis suggests that demographic forces, such as low birth rates and low in-migration rates, are contributing to a slow enrollment decline among rural school districts. Overcoming these demographic forces will be difficult for rural school districts, which must also contend with weaker economic conditions.

Method

In July 2004, the Pennsylvania Department of Education (PDE) released its revised enrollment projections for 500 Pennsylvania school districts. The Bryn Athyn School District in Montgomery County was excluded because it has no students. The projections cover the 2005 through 2014 school years and are available on PDE’s web site, www.pde.state.pa.us, along with the methodology used to develop the projections. (See Pennsylvania Department of Education Projection Model on page 3.)

The Center for Rural Pennsylvania analyzed these projections to: determine future enrollment trends in the state’s rural and urban school districts; understand the characteristics of districts that are likely to experience significant increases or decreases in enrollment; and identify demographic and socio-economic factors related to enrollment trends. The Center’s analysis focused on enrollment for a 10-year period, from 2002 to 2012. The 2002 to 2012 period was used because of the availability of other education data.

To begin the analysis, schools districts were identified as either rural or urban using the Center for Rural Pennsylvania’s definition. A school district was considered rural if the number of persons per square mile in the district was below the statewide figure of 274 persons per square mile. A district was considered urban if the district’s population density was at or above the statewide figure. Based on this definition, 243 schools were considered rural and 257 schools were considered urban.

Figure 1: Change in Enrollment Categories, 2002-2012

<table>
<thead>
<tr>
<th>Type of Change</th>
<th># Rural Districts</th>
<th># Urban Districts</th>
<th>Total # Districts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Significant Increase in Enrollment</td>
<td>10</td>
<td>35</td>
<td>45</td>
</tr>
<tr>
<td>Moderate Change in Enrollment (14% decline to 14% increase in enrollment)</td>
<td>118</td>
<td>150</td>
<td>268</td>
</tr>
<tr>
<td>Significant Decrease in Enrollment (15% or greater decrease in enrollment)</td>
<td>115</td>
<td>72</td>
<td>187</td>
</tr>
<tr>
<td>Total # Districts</td>
<td>243</td>
<td>257</td>
<td>500</td>
</tr>
</tbody>
</table>

*Excludes Bryn Athyn School District
The next step was to identify districts that will likely have significant projected increases or decreases in enrollment. In this report, enrollment was determined in two ways due to data accessibility. From 1992 to 2002, enrollment referred to average daily membership (ADM). And from 2002 to 2012 enrollment was the number of students enrolled and attending classes or projected to be attending classes on October 1st of each year.

**Data Limitations**

As with all quantitative analyses, there are several limitations that may affect data interpretation. Below are several limitations associated with the data and methodology used for this analysis:

- **Statistical Models:** The enrollment projections are based on statistical models. One limitation of such models is the attempt to make future predictions based on past trends. Unknown factors, such as a new housing development or a factory closing, can make district-level projections inaccurate. Readers should focus more on the rate and direction of enrollment change rather than the final enrollment figures.

- **Data from Small Districts are Less Reliable:** Another limitation with enrollment statistical models is that the smaller the district, the less reliable the projections. This is especially true for districts with less than 1,000 students. In 2002, 50, mostly rural, school districts were in this category.

- **Exclusion of Private, Home Schooled and Other Students:** The data used here reflect only public schools, and exclude private school and home schooled students. The impact of excluding students in private and non-public schools, homes, out-of-district special education classes, comprehensive area vocational-technical schools, charter schools, state-owned schools, alternative high schools, and juvenile correctional institutions is likely minimal.

- **Economic Analysis at the County Level:** When data are aggregated from the school district level to the county level, many differences between school districts within the same county are obliterated. As a result, on the surface, a county may show an increase in population or a prosperous economy. Yet, within the county, there may be school districts with declining enrollment and poor economic conditions. Readers, therefore, should recognize that the conclusions from the economic development section may not apply to all school districts in a specific county. In addition, readers should be aware that 45 of Pennsylvania’s 238 rural school districts are in urban counties, and that 50 of the state’s 263 urban school districts are in rural counties.
Using the percent change in enrollment between 2002 and 2012, districts were grouped into one of three categories: districts with significant projected increases in enrollment (15 percent or greater increase); districts with projected moderate changes in enrollment (increase or decrease); and districts with significant projected decreases in enrollment (15 percent or greater decrease). Figure 1 on page 1 shows the number of school districts in each category and Figure 2 on page 2 shows the location of these districts.

The middle category, “moderate change in enrollment,” was intentionally made large to include districts that may have only marginal changes in enrollment. Districts that had significant increases or decreases in enrollment are the principle focus of this report.

The final step was to analyze the following three factors that contribute to enrollment change: birth rates; in- and out-migration; and economic conditions. Birth data from the Pennsylvania Department of Health include the number of live births for each calendar year by the mother's municipality and county of residence. The Center aggregated municipal-level birth data to the school district level. In those instances where a municipality was in two or more school districts, the Center assigned the births in that municipality to the school district that had the highest total property market value. This was based on the assumption that the majority of the population lived there. The Center examined birth rates from 1992 to 2002. Birth rates were calculated by dividing the total number of live births for each year by the population and then multiplying by 1,000.

Migration in and out of school districts was determined by subtracting the natural population change from the total population change from 1992 to 2002. Natural change is the number of births minus the number of deaths. If the difference was negative, then the school district had a net out-migration of residents; if the number was positive, then the district had a net in-migration of residents. The data on deaths also came from the Pennsylvania Department of Health and were aggregated from the municipal to the school district level using the process described above. The population data were from the U.S. Census Bureau and represent population estimates for 1992 and 2002.

The final analysis focused on four economic variables: (1) change in employment between 1992 and 2002; (2) change in the number of business establishments between 1992 and 2002; (3) average annual unemployment rate between 1992 and 2002; and (4) change in inflation adjusted average annual wages between 1992 and 2002. The sources of this data were the U.S. Bureau of Economic Analysis and the Pennsylvania Department of Labor and Industry. Because these indicators are only readily available at the county level, school district enrollment figures were aggregated to the county level. Using the Center for Rural Pennsylvania's definition, rural counties were identified as those counties whose population density was below the statewide population density of 274 persons per square mile. Urban counties are those counties with a population density at or above the statewide density.

All financial data was adjusted for inflation using the CPI-U with 2002=100. To make the analysis easier to understand, the Center used the last date of the school year to represent the entire school calendar year. For example, the 2001-2002 school year is shown throughout the analysis as 2002.

**Results**

**Enrollment Trends**

In 2002, 521,035 students were enrolled in Pennsylvania's rural schools. Fifty-two percent of students were in elementary grades (K-6) and 48 percent were in secondary grades (7-12).
Over the past 20 years, enrollment in rural schools peaked in the early 1980s with 562,100 students. This period represented the tail end of the Baby Boomer generation (those born between 1946 and 1964) who graduated from high school. Over the remainder of the decade and into the first part of the 1990s, enrollment in rural schools declined. The lowest period was in 1990, when enrollment bottomed out at 514,446 students, an 8 percent decline from 1982.

During the 1990s, rural school enrollment slowly increased. Between 1990 and 1998, the number of students attending rural schools increased 4 percent. Starting in 1999, enrollment began to decline again and, by 2003, the number of students attending rural schools had decreased 2 percent.

Over the next 10 years, rural school enrollment is projected to continue its decline. (See Figure 3.) Between 2005 and 2014, enrollment in rural schools is projected to decrease 9 percent. The most significant decline is projected to be in western Pennsylvania, where rural school districts may have a 17 percent decline in enrollment. Rural districts in eastern Pennsylvania are projected to have a 1 percent decline in enrollment.

As Figure 4 shows, rural and urban school districts had similar enrollment patterns, with the exception of the 1992-2002 period, when urban enrollment increased much faster than rural enrollment.

Data from the U.S. Census Bureau show that public school enrollment nationally has steadily increased between 1982 and 2002. During this period, nationwide enrollment increased 19 percent, while in Pennsylvania, enrollment decreased 0.4 percent.

Using a different data set and timeframe, the U.S. Department of Education’s National Center for Education Statistics also shows that public enrollment has steadily increased from 1992 to 2002. The states with the highest increase in enrollment were Florida, Arizona, and Nevada, each had an increased greater than 25 percent. Eight states had a decline in enrollment: North Dakota, Wyoming, and West Virginia led the pack with declines of 10 percent or more.

Pennsylvania ranked 22nd in the change in the number of students with a 6 percent increase between 1992 and 2002.

In 2002, Pennsylvania had the nation’s second lowest student to population ratio, or the number of students as a percent of the population. In this year, 15 percent of the state’s 12.3 million residents were public school students. Delaware had the nation’s lowest ratio of 14 percent, while Utah had the nation’s highest with 21 percent.

Pennsylvania’s low ranking is likely due to the low percentage of children under 18 years old. According to the Census Bureau, less than 25 percent of the state’s population was under 18 years old. In Utah, 32 percent of the population was under 18 years old.

In the future, the National Center for Education Statistics is projecting that public school enrollment in the United States will increase 5 percent between 2002 and 2012. In 2012, it is projected that there were will be 49.3 million public students. In comparison, PDE projects that in 2012, 1.6 million students will be attending Pennsylvania public schools, or 7 percent fewer students than in 2002.
Characteristics of Rural School Districts With Significant Enrollment Declines

According to the enrollment projections from PDE, 115 rural school districts are projected to have a significant decline in enrollment (15 percent or greater). In general, these districts are geographically larger than the average rural school district and have smaller populations. They also are less affluent and have significantly lower birth rates and in-migration rates than other rural school districts.

These school districts encompassed an average area of 157 square miles, and had an average population of 11,800 in 2000. Sixty-five percent were in western Pennsylvania.

Between 1990 and 2000, these districts had a 2 percent increase in population. This increase, however, was driven by an increase in persons age 45 years old and older. Persons in this age bracket increased 16 percent, while the number of children under 15 years old declined 7 percent. This decline can be partially attributed to a decline in the number of births. During this 10-year period, the number of births in these districts declined 18 percent.

Despite the decline in births, the 115 rural districts with a projected significant enrollment decline saw a net in-migration of residents. In the period between 1992 and 2002, 6,000 new residents moved into these districts, for an average of 52 new residents per district. As a ratio of the population, these districts had a net in-migration rate of 4.4 per 1,000 population. Statewide, the in-migration rate was 10.8.

Financially, when compared to all Pennsylvania school districts, rural districts with a significant projected enrollment decline are less affluent. According to Census 2000, the average household income in rural districts was $43,140, or $9,500 below the statewide average. In addition, these districts had lower housing values. In 2000, the average specified owner-occupied housing unit was valued at $88,800, or nearly $32,000 below the statewide average.

In 2002, the average market value of total taxable property was $261,000 per student, or $98,000 below the statewide average. The market value of specified owner-occupied housing units was $188,000, or nearly one-half of what the statewide average was.

In 2002, the typical rural district with a projected enrollment decline had 442 students. Statewide, the typical district had six school buildings, four of which were elementary schools. The average enrollment per building was 574 students per building.

In 2002, the typical rural district with a projected enrollment decline had 118 classroom teachers, or one teacher for every 15.6 students. The statewide rate was one teacher for every 16.3 students. Between 1992 and 2002, the number of classroom teachers in these districts increased 12 percent.

Characteristics of Rural School Districts With Significant Enrollment Increases

According to the enrollment projections from PDE, 10 rural school districts are projected to have a significant increase in enrollment (15 percent or greater). In general, these districts are geographically smaller than the average rural school district, but they have larger populations. They also are more affluent and have significantly higher birth rates and migration rates than other rural school districts.

The 10 rural school districts with projected significant enrollment increases are in northeast and south central Pennsylvania. These districts cover an average area of less than 129 square miles, with an average population of 25,400 in 2000.

Between 1990 and 2000, these districts had a 21 percent increase in population. During this period, the number of children under 15 years old increased 25 percent, while the number of persons age 45 years old and older increased 30 percent. The increase in the number of children can be attributed to children moving into these districts, since between 1990 and 2000, the number of births declined 7 percent. The birth rate declined by nearly three points from 13.8 in 1990 to 10.9 in 2000.

In-migration appears to be the driving force in enrollment increases in these districts. From 1992 to 2002, these districts had an average net in-migration of 4,147 new residents.

These rural districts also had higher household incomes and higher housing values. According to Census Bureau data, the average household income in these districts was $53,132, or about $450 above the statewide average. The average value of specified owner-occupied housing units was $127,900, or $6,600 above the statewide average.

In 2002, 22 percent of students were eligible for the free and reduced school lunch program.

With higher incomes and housing values, these rural districts are less reliant on state revenue sources. In 2002, these districts received only 31 percent of their revenues from the state. The total expenditures per student in these districts, however, were $8,804, or $560 below the statewide average.

The market value of total taxable property was about $261,000 per student, or $98,000 below the statewide average.

In 2002, the typical rural district with a projected enrollment increase had six school buildings, four of which were elementary schools. The average enrollment per building was 743 students. That same year, these districts had an average of 257 classroom teachers, or one teacher for every 6.7 students. Between 1992 and 2002, the number of classroom teachers in these districts increased 42 percent.
Factors Contributing to Enrollment Change

Birth Rates

One of the factors affecting school enrollment is the number of births. As Figure 5 shows, births in Pennsylvania's rural counties have been on a 30-year decline. In 1970, the rural birth rate was 16.8 and, in 2002, the rate was 10.4. During this time, the number of rural students in first grade went from a high of 47,700 in 1976 (six years after their birth in 1970) to a low of 36,000 in 2002. Because of fewer births in 2002, PDE projects that first grade enrollment in 2008 will drop to approximately 34,900, or a 3 percent decline from 2002.

In both 1990 and 2000, the total fertility rate, or the average number of children a woman has during her lifetime, was 1.75 in rural Pennsylvania. This is below the replacement level of 2.11 births. Rural Pennsylvania, however, is not alone. Four New England states, Vermont, Rhode Island, Maine, and Massachusetts, each had total fertility rates in 2000 below the rural Pennsylvania rate. The Pennsylvania statewide rate went from 1.87 in 1990 to 1.82 in 2000. In the United States, however, the total fertility rate increased from 2.01 in 1990 to 2.13 in 2000.

The impact of changing birth rates on school enrollment is gradual, but cumulative. Children born today will not enter the school system for another five or six years. As a result, most rural school districts will not experience a steep increase or decline in enrollment from one year to the next. However, the cumulative effect of these changes may translate to either more students or fewer students over a seven- or 10-year period. For school officials, the gradual effect of changing birth rates means that long-term building planning is important, even though current enrollment patterns may be showing only slight changes.

Migration

Migration is another important factor affecting school enrollment. Between 1992 and 2002, rural school districts had a net increase of 106,600 new residents attributed to migration. This increase, however, was not evenly distributed. More than 90 percent of these new residents went to rural school districts in northeast and south central Pennsylvania. Rural districts in western Pennsylvania generally had a net out-migration of residents.

In addition to the regional differences, there were also important age differences, with older people moving into and younger persons moving out of rural areas. According to Census Bureau data, between 1995 and 2000, Pennsylvania's rural counties had a net loss of nearly 30,800 persons between the ages of 20 and 35 and a net gain of 14,600 persons who were 45 years old and older. The result of this migration is that there are fewer younger residents who may start families. There are also fewer families with children moving into rural counties.

Economic Development

Do rural economic conditions affect school enrollment? Between 1992 and 2002, the variable with the most statistically significant correlation was the change in business establishments. This variable was positively correlated, meaning that as the number of businesses increase, so did school enrollment. Between 1992 and 2002, Pennsylvania had a 13 percent increase in business establishments. The 16

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1 Total fertility rate (TFR) is defined as the average number of children that would be born alive to a woman during her lifetime if she were to pass through her child-bearing years conforming to the age-specific fertility rates of a given year.
rural counties that had increases at or above this rate also had a 12 percent increase in school enrollment. The 32 rural counties that had an increase below this statewide rate had a 6 percent decline in school enrollment.

Change in the number of business establishments was the only economic variable examined to have a statistically significant correlation with enrollment. Average unemployment rate and change in employment between 1992 and 2002 were correlated but at much lower levels. And the percent change in adjusted average annual wage was not correlated with enrollment.

Economic development has a role in changing school enrollment, but its impact appears to be limited. Economic development may attract new residents, but it does not necessarily attract younger residents.

Conclusion

The Pennsylvania Department of Education’s enrollment projections present a mixed picture for the state’s rural school districts. The majority of districts (49 percent) are likely to see only marginal change in enrollment between 2002 and 2012. However, for 115 districts, there likely will be significant declines in the number of students, and, for 10 districts, there likely will be significant increases in enrollment.

For those districts projected to have a significant decline, the root causes appear to be very low birth and in-migration rates. Reversing these demographic forces will be extremely difficult given the age of the population and the limited economic opportunities. As a result, many of these districts may see fewer students and fewer new families each year. This pattern, however, is not new to these districts. Over the last 20 years, from 1982 to 2002, these districts have seen a 17 percent decline in enrollment, or an average decline of 18 students per district per year.

Statewide, there are 187 districts that are projected to have an enrollment decline of 15 percent or greater. Geographically, these districts are clustered in western Pennsylvania and in the state’s northern tier. Therefore, the same demographic and economic factors affecting their districts are most likely affecting their neighboring districts as well. Officials may take some comfort in knowing that the rate of change is likely to be gradual. According to PDE’s projections, rural districts will see an average decline of 42 students per year between 2002 and 2012.

For the 10 rural districts that are projected to have a significant increase in enrollment, the root cause appears to be in-migration. These districts are located in some of the state’s fastest growing counties. Between 1992 and 2002, these districts saw a 31 percent increase in enrollment, or an average of 101 students per year. PDE’s projections show continuing growth, but at a slightly lower rate. Between 2002 and 2012, these districts are projected to increase 21 percent, or an average of 91 students per year.

It is important to note that the enrollment growth of these districts is being propelled by in-migration, not births. The
lack of a companion increase in birth rates makes long-term
growth in these districts less sustainable. It also makes
districts more susceptible to economic change. Because
many of these new residents do not have long-term ties to
their region, a protracted recession may result in many
residents moving to other areas in search of employment. A
result, officials in these districts should not be trapped into
thinking that continued rapid growth is inevitable.

What are the implications of changing enrollment for
Pennsylvania’s rural school districts? The answer to this
question depends on whether the district is projected to have
an enrollment decrease or increase. Following is a brief look at
some of the possible implications for these rural districts.

School Buildings

In 1999, the National Center for Education Statistics
estimated that the average age of a school building in the
northeastern United States was 46 years old. This means the
majority of school buildings were built during the Baby
Boom growth years of the 1950s. In Pennsylvania, there are
no current estimates of school building age. However, a 2001
survey by the Pennsylvania School Boards Association (PSBA)
cited age as the single most important reason for school
construction projects. Other top reasons included the need for
technology improvements and inadequate instructional space.

Districts with Projected Enrollment Declines: Despite
enrollment declines, these school districts may be in need of
new, expanded or upgraded buildings. For example, if these
districts decide to combine elementary schools, they may
need to expand or modify existing schools. Similarly, their
current high school buildings may be at the end of their life
span and need to be replaced.

Districts with Projected Enrollment Increases: In the 2001
PSBA study, the fourth reason for planned school building
construction was enrollment increases. For districts with
projected increases, the need for new school buildings will
not diminish. Meeting this demand may be costly.

Teachers

Districts with Projected Enrollment Declines: In 2002,
school districts with a projected decline had a ratio of one
teacher for every 15.6 students. Having fewer students in the
future may not mean having fewer teachers. School districts
may be reluctant to eliminate teaching positions if it would
jeopardize their ability to make Adequate Yearly Progress
(AYP) as required by the federal No Child Left Behind Act2.
Districts also may be reluctant to eliminate teaching posi-
tions for mandated areas, such as special education, math
and science.

Districts with Projected Enrollment Increases: The state-
wide student-teacher ratio in 2002 was 16.3. Among rural
districts with a projected increase in enrollment, the ratio
was 16.7, or 0.4 more students per teacher. On the surface,
this may not seem significant. However, given the import-
tance of testing and AYP, it is important that districts with a
projected enrollment increase maintain suitable student-
teacher ratios.

Increasing Costs

Districts with Projected Enrollment Declines: With
decreasing enrollment, the cost of educating students may not
decline at the same rate or at all since school districts have
fixed costs, such as personnel, administration, and building
and maintenance. Changes in technology and education
requirements may contribute to increased costs.

Districts with Projected Enrollment Increases: School
districts with projected enrollment increases are likely to see
their costs continue to rise. These districts may be under
increased pressure to find adequate classroom space for
students and to keep their student teacher ratios low. As a
result, costs may increase as these districts work to meet
the demand for educational services.

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2 In Pennsylvania, schools are evaluated on achievement using the Pennsylvania System of School Assessment (PSSA), participation in
those tests, and attendance (at the elementary/middle school level) and graduation rates (at the high school level). These measurements
make up a school’s AYP. Districts that fail to make AYP for two or more consecutive years are subject to increased government oversight
and control. Teachers and staff play an important role in assisting students in preparing for the PSSA’s.