Data Resource Issues and Thoughts
Presentation to Commission to Study School Funding
Doug Hall and Jeff McLynch, NH School Funding Fairness Project
May 11, 2020

The NH School Funding Fairness Project is an advocacy organization, but that is not why we are making this presentation. We simply want to share our lengthy experience using state data to understand and analyze policy issues, including school funding.

Doug used education data during his terms in the NH House on the House Finance Committee and as Executive Director of the New Hampshire Center for Public Policy Studies. Jeff had similar experience as Executive Director of the New Hampshire Fiscal Policy Institute.

Doug helped create or revamp major state databases, including the student database in the Department of Education. Our goal this morning is to present some thoughts about data sources of potential use to this Commission, the Carsey School, and Reaching Higher NH.

We will divorce ourselves from an advocacy stance. Call us out if you think otherwise.

In preparing today’s presentation, we once more reviewed HB4 that created the Commission. As you know, it charges the Commission with a variety of responsibilities, two of which appear particularly paramount.

The first of those two principal tasks is to “determine whether the New Hampshire school funding formula complies with court decisions mandating the opportunity for an adequate education for all students in pre-kindergarten through grade 12, with a revenue source that is uniform across the state.”

The second is to “re-establish the baseline for the costs, programs, staffing, and facilities needed to provide the opportunity for an adequate education.”

Accordingly, our aim today is to discuss with you some of the data sources that are available to the Commission as it strives to meet those two charges.

Doug will start with an example.

1) Measuring Poverty and Income
How to best measure poverty has been raised by commission members. There are a few potential sources.
Free & Reduced Lunch

This is an actual count, not a survey. It counts the kids in the school, not some broader measure that involves other persons. New data is reported annually.

Here are some thoughts in understanding and using this data.

- High school students are much less likely to report family income and accept discounted meals. There is a social stigma attached that high schoolers know and respond to in a way that kids in elementary grades do not. For this reason, high school only districts such as Pemi-Baker, and Profile will report a lower number than the true number eligible in their student body.

- With a state formula that provides additional funds to districts on the basis of this count, some district administrators have an incentive to make sure they have every possible low income student located and signed up. On the other hand, administrators in property wealthy districts that are going to receive little or no cash adequacy aid have no such incentive.

- Consider differentiating between those eligible for free lunch (income below 130% of poverty level) and those eligible for reduced price lunch (130%-185% poverty level).

- Watch out for “cliff effects.” For example, if the amount of aid per pupil will change when a certain percentage of students is reached, there is an even stronger incentive to go find that one student who will move a district from one aid level to another. This has happened in many state aid programs over the years. Sometimes legislators pay attention to it, sometimes not. For example, today a cliff effect is still in the law that provides a reduction in SWEPT to low income property owners. Rep. Rick Ladd is aware and will be watching for the perniciousness of this.

The 2010 and/or 2020 census

The Census Bureau is not collecting information on household income in the decennial census. For many decades the decennial census obtained information from each household on income, number of bathrooms, heating fuel, where one lived ten years earlier, and many other issues. That was discontinued after the 2000 census. For each household, the 2020 census is only collecting whether the home is owned or rented, the name, age, birthdate, sex, and race of each household member and their relationship to the person identified as head of household.

The Census Bureau now only collects income related information by the American Community Survey.

The American Community Survey (ACS) of the Census Bureau uses a sample. It is nothing like a complete survey. Its estimates of household and family income are ok for large
populations where the sample is also large. The Census Bureau itself recommends that its data not be used for communities with populations less than 85,000. But its estimates for small populations can be way off. Even after combining 5 years of data, in some small New Hampshire towns no households were surveyed. Nevertheless, the Census Bureau publishes various income data for all towns in New Hampshire.

The following table shows the published percentage of families below poverty for 10 NH towns in the most recent ACS 5-year report.

Table 1

<table>
<thead>
<tr>
<th>Municipality</th>
<th>Percentage of Families Below Poverty Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alton</td>
<td>4.3%</td>
</tr>
<tr>
<td>Berlin</td>
<td>17.3%</td>
</tr>
<tr>
<td>Charlestown</td>
<td>7.8%</td>
</tr>
<tr>
<td>Chichester</td>
<td>5.7%</td>
</tr>
<tr>
<td>Franklin</td>
<td>11.4%</td>
</tr>
<tr>
<td>Haverhill</td>
<td>3.4%</td>
</tr>
<tr>
<td>Hopkinton</td>
<td>3.1%</td>
</tr>
<tr>
<td>Manchester</td>
<td>11.0%</td>
</tr>
<tr>
<td>Mason</td>
<td>8.6%</td>
</tr>
<tr>
<td>Thornton</td>
<td>2.4%</td>
</tr>
</tbody>
</table>

This looks like it is accurate down to the 1/10th of one percent. Seems like it could be used in a funding formula. Not so fast. The statistical margin of error needs to be considered, but you have to really dig into the ACS data tables to find that information. Table 2 adds the sampling error similar to what you are familiar with in political polls.

Table 2

<table>
<thead>
<tr>
<th>Municipality</th>
<th>Percentage of Families Below Poverty Level</th>
<th>95% margin of error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alton</td>
<td>4.3%</td>
<td>+/-5.8%</td>
</tr>
<tr>
<td>Berlin</td>
<td>17.3%</td>
<td>+/-6.7%</td>
</tr>
<tr>
<td>Charlestown</td>
<td>7.8%</td>
<td>+/-5.8%</td>
</tr>
<tr>
<td>Chichester</td>
<td>5.7%</td>
<td>+/-7.0%</td>
</tr>
<tr>
<td>Franklin</td>
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</tr>
</tbody>
</table>

ACS is stating, for example, that the percentage for Charlestown is somewhere between 2.0% and 13.6%. And there is a 5% chance that it is even outside that range.
What is sampling error?

The ACS estimates are based on data from a sample of housing units and people in the population, not the full population. For this reason, ACS estimates have a degree of uncertainty associated with them, called sampling error. In general, the larger the sample, the smaller the level of sampling error.

Why is it important to measure sampling error?

The estimates produced by the ACS are not exact because they are based on a sample. The sampling error measures the degree of uncertainty associated with the estimates. If the degree of uncertainty is too large, then users should be cautious in how the estimates are used.

The Census Bureau also published Median Family Income by town. The numbers look like they are accurate down to the dollar. The ACS published numbers are in the second column in Table 3. Charlestown’s figure is $55,980. It doesn’t look like an estimate. It looks like it must be a pretty accurate number. But the sampling error shows that the true number is probably somewhere between $42,194 and $69,766 with a 5% chance it may even be outside those numbers.

<table>
<thead>
<tr>
<th>Municipality</th>
<th>Median Family Income</th>
<th>95% Lower Bound</th>
<th>95% Upper Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alton</td>
<td>$88,728</td>
<td>$75,340</td>
<td>$102,116</td>
</tr>
<tr>
<td>Berlin</td>
<td>$52,579</td>
<td>$44,625</td>
<td>$60,533</td>
</tr>
<tr>
<td>Charlestown</td>
<td>$55,980</td>
<td>$42,194</td>
<td>$69,766</td>
</tr>
<tr>
<td>Chichester</td>
<td>$88,158</td>
<td>$78,041</td>
<td>$98,275</td>
</tr>
<tr>
<td>Franklin</td>
<td>$60,065</td>
<td>$49,656</td>
<td>$70,475</td>
</tr>
<tr>
<td>Haverhill</td>
<td>$62,500</td>
<td>$50,784</td>
<td>$74,216</td>
</tr>
<tr>
<td>Hopkinton</td>
<td>$102,422</td>
<td>$83,297</td>
<td>$121,547</td>
</tr>
<tr>
<td>Manchester</td>
<td>$67,097</td>
<td>$64,759</td>
<td>$69,435</td>
</tr>
<tr>
<td>Mason</td>
<td>$88,728</td>
<td>$75,340</td>
<td>$102,116</td>
</tr>
<tr>
<td>Thornton</td>
<td>$75,508</td>
<td>$61,192</td>
<td>$89,824</td>
</tr>
</tbody>
</table>

Both the NH Department of Employment Security and the NH Office of Strategic Initiatives republish town level ACS data like that in the “Median Family Income” column without recognizing, stating, or commenting on the inherent error ranges behind the data. They act as if the published data is a hard fact, not a very, very rough estimate.

We strongly recommend that ACS data not be used in any school funding formula. The undisclosed sampling error is just too large to useful.
Given these concerns, our view is that the Free/Reduced Lunch count is the best available data for measuring the relative poverty of the kids in schools.

2) Department of Education Data

School finance and operations data
The Department of Education (DoE) collects data that is useful in understanding the diversity of our schools and the current and historic costs of providing educational services. Some types of data have been collected using the same definitions for decades. Some of that data is summarized and then published on the DoE website. Some data is provided by district, some by town, some by school, and some by grade level. The following is a list of DoE data types. Many have been collected and available for 25 years and more.

- Attendance and enrollment by school & grade
- Class size by school
- Students by race/ethnicity by district
- Free/reduced lunch eligible by district
- Cost/pupil by district
- Equalized valuation per pupil by town and district
- Tax assessment and rates by town and district
- Student/teacher ratio by district
- Teachers’ degrees by district
- Some teacher salary schedule data by district
- Principal salary by school
- Superintendent salary by SAU
- Staff FTEs by type by district
- Adequate education Aid by town
- Building Aid by district
- Special Education Aid by district (3.5-10 and 10+)
- Charter school aid by school
- Tuition and transportation aid by district
- Youth risk behaviors by demographics but only statewide

The above types of data can be used to analyze the relative structural and financial differences among districts and even schools to some degree.

Sometimes the DoE has more detailed data than is published on its website. For example, each district submits an annual DoE-25 form with its revenue and expenditures grouped in significant categories. That spreadsheet has more than 650 rows and 11 columns. Doug has requested and received that data for many years. It allows financial comparisons between districts or state averages. But sometimes the submitted level of detail does not answer an
important financial question. For example: in recent years how much of overall budget increases have been caused by health insurance and retirement increases (especially after the state stopped contributing to the teachers’ retirement fund)? We do not know. We do know that fringe benefits rose from 25.8% of salaries in 2000-01 to 41.0% in 2010-11 and 49.4% in 2018-19. But we don’t know the breakdown for health insurance and retirement contributions. That data could be collected from the districts.

Sometimes the DoE includes notes about the data it provides but those notes are overlooked in policy and political discussions, both statewide and local. The most obvious example of this is the Cost Per Pupil data. The most recent report states that the average in 2018-19 was $16,346 and lists an amount for each district. The note indicates that when excluded items are added in, the average is $19,806, almost $3,500 more. While the lower number is provided for every district, the higher number is not. Some things excluded from the lower number make eminent good sense: tuition paid from one district to another and bond principal repayment. On the other hand transportation, interest on debt, capital items (such as HVAC, new gym floors, etc.), and allocation to charter schools are certainly part of the real cost of each school district but are excluded from the lower number that everyone tends to cite. The DoE could calculate that true cost for each district.

Sometimes the DoE does not have data. For example, the DoE does not collect the budgets or financial data of the SAUs. It might be useful to know the range of cost per pupil among the SAUs. It also does not publish the tuition rates one district will charge another district. It does not collect the school bus mileage of every district. Such information would be useful if collected.

**Student achievement data**

The DoE also has data from years of different types of achievement testing at different grade levels among all of our schools. We recognize that such achievement tests are limited to a small number of subjects and do not test real life skills. Nevertheless, what is available can and should be used to describe some of the results of the investments we make in children’s education.

We know that the same investment in two students with quite different backgrounds will not result in similar achievement. That is apparent to any teacher with two or more kids in their classroom.

It is important to understand the relative impact on achievement of those things districts and schools have no control over (ethnicity, family status, home conditions, parents’ education, disability, gender, home language, etc.) and those that the districts and schools can control (class size, staff/student ratio, school size, physical resources, courses offered, etc.)
Why is this important? There are great differences in the student populations served by different schools and districts. Those differences need to be recognized and be accounted for in any system designed to provide an opportunity for an adequate education to all students.

The College Board reports SAT scores, PSAT scores, and a count of AP Tests and their results by high school for all our high schools. The College Board has also aggregated students statewide based on race/ethnicity, parents’ education, and a few other factors. Such results by school are available to the DoE and could be used in cross tabulations to begin to distinguish the relative importance of demographic characteristics and school characteristics in student achievement. As far as we know, the DoE has not done this. But it should be done.

The following graphs are many years old but they display important factors.

Parental education level has a substantial relationship to a student’s verbal SAT score. Family income does also, but not to the same degree as parental education.

Size of the high schools has very little relationship. Schools spending more per pupil have slightly higher verbal SAT scores.
After controlling for parental education level, higher spending schools show higher verbal SAT results at all parental education levels.

The most recent year’s 11th grade SAT data should be similarly analyzed. As should the achievement test data from the lower grades.

The DoE has a database with a record for every student in our public schools. This was created in the 1990s to better track dropouts that were being underreported. Initially called i4see, it is now part of a larger system, iDefine.


This system contains hundreds of data elements and records of hundreds of thousands of students over many years. It should be mined for information to determine how achievement may vary based on school factors and how it may vary based factors over which the school has no control.

We urge this Commission to have DoE and Carsey School quickly ramp up the use of this important data if you choose to use any achievement and outcome measures in defining adequacy.

Finally, a step backward was taken three months ago. On the revamped DoE website, Excel spreadsheets of these various data types were removed. In their place were added CSV files. For those of you who don’t understand, that means the formulas in the adequate education aid spreadsheet had been removed not just for this year, but for every year past. In addition, anyone downloading one of the DoE CSV files for further analysis must now reformat all rows and columns and formats before work can begin. Caitlin Davis recognized this problem as soon as the change was made and has advocated restoration of the spreadsheets. Many spreadsheets have been restored in the past few weeks.
3. Department of Revenue Administration (DRA) Data
The Department of Revenue Administration (DRA) collects, analyzes, and publishes property tax data. It carries out the annual Equalization Survey, a very important process to ensure that all properties in different towns are taxed for county and SWEPT purposes on an equal basis. Spreadsheets are prepared and released every year.

Doug recently discovered that DRA has for some years provided an incorrect Equalized SWEPT tax rate for each town. This has not affected the taxes imposed because the tax imposed on a property in each town is based on the local rate and that rate is correct in the DRA reports. In fact, that is what towns must use on their tax bills. The incorrect Equalized SWEPT rate, however, has meant that for some years analysis of the relative SWEPT tax burdens among towns has been incorrect. For many towns it is only the matter of a few cents in the equalized tax rates. But for some towns there have been large errors. DRA has told us that the error in their calculations will be corrected in the equalization data for 2019 that will be released in June 2020. But care must be used in current and older Equalized SWEPT rates as published by DRA. DoE separately calculates equalized tax rates for schools and the DoE rates are correct.

Towns report to DRA the value of property in different categories, e.g., residential land, commercial buildings, utilities, current use, railroad, etc. Other categories are not collected such as owner-occupied, seasonal, rental residences, lake frontage, etc. The DRA can do some calculations regarding the effect of possible different tax rates for different types of property as anticipated in the “A, B, and C” part of the mission of this Commission. Differing tax rates are allowed for different uses of property by the amendment to the NH Constitution that was passed in 1968. In the past, proposals have been for changes to the property tax itself. DRA has made estimates of the effect of proposed homestead exemptions and “circuit breakers” that adjust property taxes based on income. Such a circuit breaker currently exists for SWEPT.

Also in the past, when bills for new or changed taxes have been introduced in the legislature, the LBA has asked DRA to produce an analysis of how much a particular proposal might raise or change revenue. These have become Fiscal Notes on bills. In anticipation of work the Commission will need to do later this year, we suggest that DRA be asked to collect all such fiscal notes and update them with more current data where possible. This is simply meant to have a library of analysis and estimates available ahead of the time this Commission may need them.

4. LBA Data
The Legislative Budget Assistant’s Office (LBA) works for the legislature. They are tasked with attaching a Fiscal Note to any bill that would raise or spend money. The Fiscal Note is an attempt to project the impact of the legislation on state revenue or spending. They send
the proposed language in the bill to a relevant state agency and request that agency prepare a fiscal analysis which the LBA staff then review.

The LBA has on file many, many Fiscal Notes prepared for dozens of tax bills that have been proposed by legislators over many years. The LBA should be asked to pull all of those fiscal notes into a compendium. Most will be out of date. But the method by which the potential revenue was estimated will be explained and could be updated by using more recent statistics and inputs.

How much will a $0.50/gallon increase in beer tax raise? How much property tax revenue will be gained or lost if a $100,000 homestead exemption is included in a SWEPT of $8.00? Luxury tax? Payroll tax? Payroll tax with exemption levels? Reinstatement of the old estate tax? Income tax? Sales tax without services? Sales tax with services? Increase the Interest and Dividends tax rate with higher exemption levels? Etc.

Our suggestion is that the LBA be charged with pulling all of this together soon for possible Commission use when it gets to that stage of your work later in the year.

The LBA works for the legislature. The Chairs of Senate and House Committees on Education as well as a member of the House Finance Committee and a member of the House Ways & Means Committee are on this Commission. We suggest that they seek this assistance from the LBA. That would eliminate any possible delays that would occur if the Carsey School were to make the request on behalf of the Commission and it gets tied up in inter-institutional wrangling.

5. Planning Division, Office of Strategic Initiatives (OSI) Data

At one time this agency in the Governor’s Office was charged with actually completing and publishing an overall multi-year state plan. Its responsibilities are now more limited but it is the office that estimates population by town between the decennial censuses. It also has a Geographic Information System (GIS) that could produce information of use by the committee.

For example, the issue of cost variation by school size and remoteness has been raised during Commission discussions. This office could quickly provide square mile measures of every school district so that a measure of population density would be available.

With more effort the GIS (along with the Department of Transportation) could provide the total length of all road miles in each district, thus estimating school bus mileages. There are reasons to think that might be a better measure. There are large unpopulated and forested parts of some towns while the population is mostly along its roads.

OSI re-publishes town level data from the ACS related to income, language, transportation, type of housing, poverty, education, and other factors without noting the wide sampling errors
for most New Hampshire municipalities. That data is good for the state as a whole and for our largest counties, but not for the typical town or school district. We suggest that OSI’s republished ACS data not be used. In fact, OSI should include clear statements about the large sampling errors in those numbers.

6. USNH and CCSNH Data
Both the University System and the Community College System have important data about the graduates of our public schools. That information is often untapped in discussing and evaluating how our schools are doing. How many applicants are there from each high school, what percentage are accepted, and how many enroll? How do admissions staff at UNH subjectively evaluate GPA’s from different high schools? How many students in the CCSNH must take remedial or repeat English or math classes upon entering? Some of this data should be available if someone will ask for it.

7. Data from Other States
The presentations by the Education Commission of the States and the National Conference of State Legislatures were helpful in giving broad overview of how other states handle the issue. Commission members, however, have eagerly sought more detail.

We would hope that the Commission’s budget is sufficient to bring to New Hampshire one or more knowledgeable persons from three or four selected states. This could be done by virtual online presentations and meetings. How does Vermont divide up the local/state responsibility? The Vermont Secretary of Education, Daniel French, could send their most involved staff person. What has happened in Massachusetts? The UMass College of Education could send its faculty members who have been most involved in analyzing the funding changes and achievement impacts. Those persons could work with Carsey School and Reaching Higher and then speak to the Commission.

Moreover, there are a number of highly regarded public policy research centers to which the Commission could turn to supplement the information provided by state agencies or by the contractor that it will soon engage. The New England Public Policy Center (a part of the Federal Reserve Bank of Boston), the Urban Institute’s State and Local Finance Initiative, and multiple initiatives within the Pew Charitable Trusts all have substantial expertise in state-level public finance and tax policy and have conducted extensive research, both within the region and across the nation, that they could draw upon in advising the Commission or responding to specific requests and needs.

Questions? Comments?

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