Measuring Significant Discrepancy: An Indicator B4 Technical Assistance Guide

September 2011

(Version 1.0)

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CHAPTER 1. INTRODUCTION

This technical assistance (TA) guide is designed to help states define measures for the two parts of Indicator B4 of the State Performance Plans and Annual Performance Reports they are required to submit under the Individuals with Disabilities Education Act. As shown below, B4A addresses significant discrepancy in the rates of suspensions and expulsions, and B4B addresses significant discrepancy, by race or ethnicity, in the rates of suspensions and expulsions.

Statutory Basis for Indicator B4 (Rates of Suspension and Expulsion)

(A) IN GENERAL. The State educational agency examines data, including data disaggregated by race and ethnicity, to determine if significant discrepancies are occurring in the rate of long-term suspensions and expulsions of children with disabilities-

(i) Among local education agencies in the state; or

(ii) Compared to such rates for nondisabled children within such agencies.

(20 U.S.C. 1412(a)(22))

(3) Monitoring priorities. The Secretary shall monitor the States, and shall require each State to monitor the local educational agencies located in the State (except the State exercise of general supervisory responsibility), using quantifiable indicators in each of the following priority areas, and using such qualitative indicators as are needed to adequately measure performance in the following priority areas:

(A) Provision of a free appropriate public education in the least restrictive environment.

(20 U.S.C. 1416(a)(3)(A))

Measurement for Indicator B4: Rates of Suspension and Expulsion

A. Percent of districts that have a significant discrepancy in the rate of suspensions and expulsions of greater than 10 days in a school year for children with IEPs; and

B. Percent of districts that have: (a) a significant discrepancy, by race or ethnicity, in the rate of suspensions and expulsions of greater than 10 days in a school year for children with IEPs; and (b) policies, procedures or practices that contribute to the significant discrepancy and do not comply with requirements relating to the development and implementation of IEPs, the use of positive behavioral interventions and supports, and procedural safeguards.

Throughout this guide, we will use the shorthand phrase *significant discrepancy* to refer to the measurement requirements of Indicators B4A and B4B.

For convenience, the instructions provided to states by OSEP from the 2011 measurement table are reproduced here. They can also be found at: http://www2.ed.gov/fund/data/report/idea/sppapr.html. Please note that the measurement table can change from year to year.

OSEP's Instructions for Indicator B4—2011

Data Source:

Data collected on Table 5 of Information Collection 1820-0621 (Report of Children with Disabilities Subject to Disciplinary Removal). Discrepancy can be computed by either comparing the rates of suspensions and expulsions for children with IEPs to rates for nondisabled children within the LEA or by comparing the rates of suspensions and expulsions for children with IEPs among LEAs within the State.

Measurement:

A. Percent = [(# of districts that have a significant discrepancy in the rates of suspensions and expulsions for greater than 10 days in a school year of children with IEPs) divided by the (# of districts in the State)] times 100.

B. Percent = [(# of districts that have: (a) a significant discrepancy, by race or ethnicity, in the rates of suspensions and expulsions of greater than 10 days in a school year of children with IEPs; and (b) policies, procedures or practices that contribute to the significant discrepancy and do not comply with requirements relating to the development and implementation of IEPs, the use of positive behavioral interventions and supports, and procedural safeguards) divided by the (# of districts in the State)] times 100.

Include State's definition of "significant discrepancy."

Sampling from State's 618 data is not allowed.

Describe the results of the State's examination of the data for the year before the reporting year (e.g., for the FFY 2009 APR, use data from 2008-2009), including data disaggregated by race and ethnicity to determine if significant discrepancies are occurring in the rates of long-term suspensions and expulsions of children with IEPs, as required at 20 U.S.C. 1412(a)(22). The State's examination must include one of the following comparisons:

- The rates of suspensions and expulsions for children with IEPs among LEAs within the State; or
- The rates of suspensions and expulsions for children with IEPs to nondisabled children within the LEAs.

In the description, specify which method the State used to determine possible discrepancies and explain what constitutes those discrepancies. If the State used a minimum "n" size requirement, report the number of districts excluded from the calculation as a result of this requirement. States have the option of using the "total number of districts" OR the "number of districts that meet the State's minimum n size" as the denominator in the calculation for B4a and B4b.

For 4A, provide the actual numbers used in the calculation and if significant discrepancies occurred describe how the State educational agency reviewed and, if appropriate, revised (or required the affected local educational agency to revise) its policies, procedures, and practices relating to the development and implementation of IEPs, the use of positive behavioral interventions and supports, and procedural safeguards, to ensure that such policies, procedures, and practices comply with applicable requirements.

OSEP's Instructions for Indicator B4—2011 (continued)	
	For 4B, provide the following: (a) the number of districts that have a significant discrepancy, by race or ethnicity, in the rates of suspensions and expulsions of greater than 10 days in a school year for children with IEPs and (b) the number of districts in which policies, procedures or practices contribute to the significant discrepancy and do not comply with requirements relating to the development and implementation of IEPs, the use of positive behavioral interventions and supports, and procedural safeguards. If discrepancies occurred and the district with discrepancies had policies, procedures or practices that contributed to the significant discrepancy and that do not comply with requirements relating to the development and implementation of IEPs, the use of positive behavioral interventions and supports, and procedural safeguards, describe how the State ensured that such policies, procedures, and practices were revised to comply with applicable requirements consistent with OSEP Memorandum 09-02, dated October 17, 2008. Targets must be 0% for 4B. Section B of this indicator is new for FFY 2009. Baseline, targets and improvement activities to be provided with the FFY 2009 APR due February 1, 2011.

Central Purpose of this TA Guide

While there are many elements to OSEP's instructions, this TA guide focuses on one central purpose:

> To describe the methods a state might use to appropriately determine which of its districts has a significant discrepancy (including a significant discrepancy by race or ethnicity) in the rates of out-of-school suspensions and expulsions totaling greater than 10 days for children with disabilities.

After presenting a set of four basic rates, this document presents a series of methods for determining significant discrepancy, giving a step-by-step example of the use of each method. For each method, this guide includes the question that the method answers, how to interpret its results, and related considerations.

Before outlining and discussing the rates and methods, two factors must be considered: minimum cell size requirements and racial/ethnic categories.

Minimum Cell Size Requirements

Any of the measures described in this document may be unreliable if the number of children included in the analysis is small. Unreliable analyses caused by small cell sizes may result in districts being inappropriately identified with significant discrepancies. The most common method states use to address this problem is to identify a minimum number of children to be included in the analysis, called the minimum n-size or the minimum cell size. If, however, the minimum cell size is too large, many smaller districts may be eliminated from the analysis altogether, leaving no objective way to identify significant discrepancy in these districts. States need to try to balance the risks of inappropriately identifying districts because of small cell sizes against the risk of not identifying districts because of large minimum cell sizes that eliminate large numbers of districts from the analysis completely. We present a more detailed discussion of small cell sizes in Chapter 6.

Racial/Ethnic Categories

This section will be completed when we address indicator 4B.

CHAPTER 2. DATA SOURCES AND DATA EXHIBITS

In this chapter, we discuss the various sources of data states might need for their analyses. The chapter concludes with the presentation of two data exhibits; we use data from these exhibits for the various examples discussed throughout the remainder of this TA guide.

Data Sources

As noted in the OSEP instructions, data collected for Table 5 of Information Collection 1820-0621: Report of Children with Disabilities Subject to Disciplinary Removal (ED*Facts* file specification N/X006) should be used as the data source for completing Indicator B4. States report discipline data in a number of ways on Table 5. For Indicator B4, states should focus on out-of-school suspensions/expulsions totaling greater than 10 days.

Please note:

> *To increase the ease of readability, the remainder of this TA guide will use a form of the term "suspension/expulsion" when referring to "out-of school suspensions/expulsions totaling greater than 10 days."*

States will also need child count data collected for Table 1 of Information Collection 1820-0043 (Report of Children with Disabilities Receiving Special Education Under Part B of the *Individuals with Disabilities Education Act*; ED*Facts* file specification N/X002). In addition, if comparing suspension/expulsion rates for children with disabilities to suspension rates for children without disabilities, states will also need counts of children without disabilities and suspension/expulsion data for children without disabilities.[1]

Data Exhibits

All of the examples in this TA guide are based on data presented in Exhibits 1 and 2. These exhibits present the following data by district for a fictitious State A:

- Total number of children with disabilities in the district (Exhibit 1);
- Total number of children with disabilities suspended/expelled (Exhibit 1);
- Total number of children without disabilities in the district (Exhibit 2); and
- Total number of children without disabilities suspended/expelled (Exhibit 2).

[1] Total enrollment data often includes both children with disabilities and children without disabilities. The numbers of children without disabilities can be derived by subtracting the number of children with disabilities from the total enrollment numbers.

Using these data, two basic rates can be calculated for each district: (1) a suspension/expulsion rate for children with disabilities and (2) a suspension/expulsion rate for children without disabilities. The calculation of these rates is described in Chapter 3.

It should be noted that, in order to simplify the examples, State A has a limited number of districts. However, these methods can be easily translated to states with a larger number of districts.

Exhibit 1. Number of Children with Disabilities Suspended/ Expelled in State A

District	Number of children with disabilities	Number of children with disabilities with out-of-school suspensions/expulsions totaling > 10 days
District 1	110	24
District 2	180	30
District 3	50	2
District 4	4	0
District 5	2,500	600
District 6	60	1
District 7	3,500	100
District 8	75	2
State Totals	***6,479***	***759***

Exhibit 2. Number of Children without Disabilities Suspended/ Expelled in State A

District	Number of children without disabilities	Number of children without disabilities with out-of-school suspensions/ expulsions totaling > 10 days
District 1	925	75
District 2	1,055	125
District 3	525	122
District 4	28	2
District 5	27,500	1,670
District 6	625	90
District 7	70,120	2,105
District 8	1,500	125
State Totals	***102,278***	***4,314***

CHAPTER 3. CALCULATING BASIC SUSPENSION/EXPULSION RATES

This chapter describes how to calculate the basic suspension/expulsion rates that will be used throughout this TA guide. These basic suspension expulsion rates set the foundation for the comparisons that are described in the methodological examples that follow (see Chapter 4).

Rate #1: District-Level Suspension/Expulsion Rate for Children with Disabilities

Question: In District 1 in State A, what is the percentage of children with disabilities who have been suspended /expelled for more than 10 days?

1. Find the number of children with disabilities suspended/expelled in District 1. Using Exhibit 1, District 1 has 24 children with disabilities suspended/expelled.

2. Find the number of children with disabilities in District 1. Using Exhibit 1, District 1 has 110 children with disabilities.

3. Divide the number of children with disabilities suspended/expelled in District 1 by the number of children with disabilities in District 1.

4. Multiply the quotient by 100 to create a percentage.

$$\text{Rate} = \frac{\text{Children with disabilities suspended/expelled in District 1}}{\text{All children with disabilities in District 1}} \times 100$$

$$= \frac{24}{110} \times 100$$

$$= 21.8\%$$

Answer: For District 1 in State A, the percentage of children with disabilities who have been suspended/expelled for greater than 10 days is 21.8%. Therefore, for District 1, the suspension/expulsion rate for children with disabilities is 21.8%.

In Exhibit 3 below, we have calculated the suspension/expulsion rates for children with disabilities for each of eight districts in State A.

Exhibit 3. Suspension/Expulsion Rates for Children with Disabilities in State A

District	Suspension/expulsion rate for children with disabilities
District 1	21.8%
District 2	16.7%
District 3	4.0%
District 4	0.0%
District 5	24.0%
District 6	1.7%
District 7	2.9%
District 8	2.7%

Rate #2: District-Level Suspension/Expulsion Rate for Children without Disabilities

Question: In District 1 in State A, what is the percentage of children without disabilities who have been suspended/expelled for greater than 10 days?

1. Find the number of children without disabilities suspended/expelled in District 1. Using Exhibit 2, District 1 has 75 children without disabilities suspended/expelled.

2. Find the number of children without disabilities in District 1. Using Exhibit 2, District 1 has 925 children without disabilities.

3. Divide the number of children without disabilities suspended/expelled in District 1 by the number of children without disabilities in District 1.

4. Multiply the quotient by 100 to create a percentage.

$$\text{Rate} = \frac{\text{Children without disabilities suspended/expelled in District 1}}{\text{All children without disabilities in District 1}} \times 100$$

$$= \frac{75}{925} \times 100$$

$$= 8.1\%$$

Answer: In District 1 in State A, the percentage of children without disabilities who have been suspended/expelled is 8.1%. Therefore, for District 1, the suspension/expulsion rate for children without disabilities is 8.1%.

In Exhibit 4 below, we have calculated the suspension/expulsion rates for children without disabilities for each of the eight districts in State A.

Exhibit 4. Suspension/Expulsion Rates for Children without Disabilities in State A

District	Suspension/expulsion rate for children without disabilities
District 1	8.1%
District 2	11.8%
District 3	23.2%
District 4	7.1%
District 5	6.1%
District 6	14.4%
District 7	3.0%
District 8	8.3%

Some calculations of significant discrepancy require that a district's suspension/expulsion rate be compared to the suspension/expulsion rates of other districts. We next present two basic rates that are useful for such comparisons—a state-level suspension/expulsion rate (Rate #3) and a mean district-level suspension/expulsion rate (Rate #4). The two rates are calculated in different ways and have slightly different statistical properties. The state-level rate calculation assigns equal weight to each child with disabilities in the state, therefore giving more weight to districts with larger numbers of children. The mean district-level rate calculation gives equal weight to each district.

Rate #3: State-Level Suspension/Expulsion Rate for Children with Disabilities

Question: In State A, what is the percentage of children with disabilities who have been suspended/expelled for greater than 10 days?

1. Find the total number of children with disabilities suspended/expelled in State A. Using Exhibit 1, the total number of children with disabilities suspended/expelled in State A is 759.

2. Find the total number of children with disabilities in State A. Using Exhibit 1, the total number of children with disabilities is 6,479.

3. Divide the total number of children with disabilities suspended/expelled by the total number of children with disabilities.

4. Multiply the quotient by 100 to create a percentage.

$$\text{Rate} = \frac{\text{Children with disabilities suspended/expelled in State A}}{\text{All children with disabilities in the state}} \times 100$$

$$= \frac{759}{6{,}479} \times 100$$

$$= 11.7\%$$

Answer: **In State A, the percentage of children with disabilities who have been suspended/ expelled for greater than 10 days is 11.7%. Therefore, for State A, the state-level suspension/expulsion rate for children with disabilities is 11.7%.**

Rate #4: Mean District-Level Suspension/Expulsion Rate for Children with Disabilities

Question: **In State A, what is the mean district-level suspension/expulsion rate for children with disabilities?**

1. Find the suspension/rates for each of the non-excluded districts in State A. Using the data in Exhibit 3, the suspension/expulsion rates for Districts 1 though District 8 in State A are: 21.8%, 16.7%, 4.0%, 0%, 24.0%, 1.7%, 2.9%, and 2.7%, respectively.

2. Sum the suspension/expulsion rates for children with disabilities for all of the districts in State A. Using the data in Exhibit 3, the sum of the rates for the eight districts in State A is 73.8%.

$$\begin{aligned}\text{Sum of suspension/expulsion rates} &= \text{Rate for District 1} + \text{Rate for District 2} + \\ &\quad \text{Rate for District 3} + \text{Rate for District 4} + \\ &\quad \text{Rate for District 5} + \text{Rate for District 6} + \\ &\quad \text{Rate for District 7} + \text{Rate for District 8} \\ &= 21.8\% + 16.7\% + 4.0\% + 0\% + 24.0\% \\ &\quad + 1.7\% + 2.9\% + 2.7\% \\ &= 73.8\%\end{aligned}$$

3. To find the mean district-level suspension/expulsion rate, divide the sum of the suspension/ expulsion rates for children with disabilities by the total number of districts in State A. There are eight districts in State A.

$$\text{Mean district-level rate} = \frac{\text{Sum of the suspension/expulsion rates for children with disabilities}}{\text{Total number of districts in State A}}$$

$$= \frac{73.8\%}{8}$$

$$= 9.2\%$$

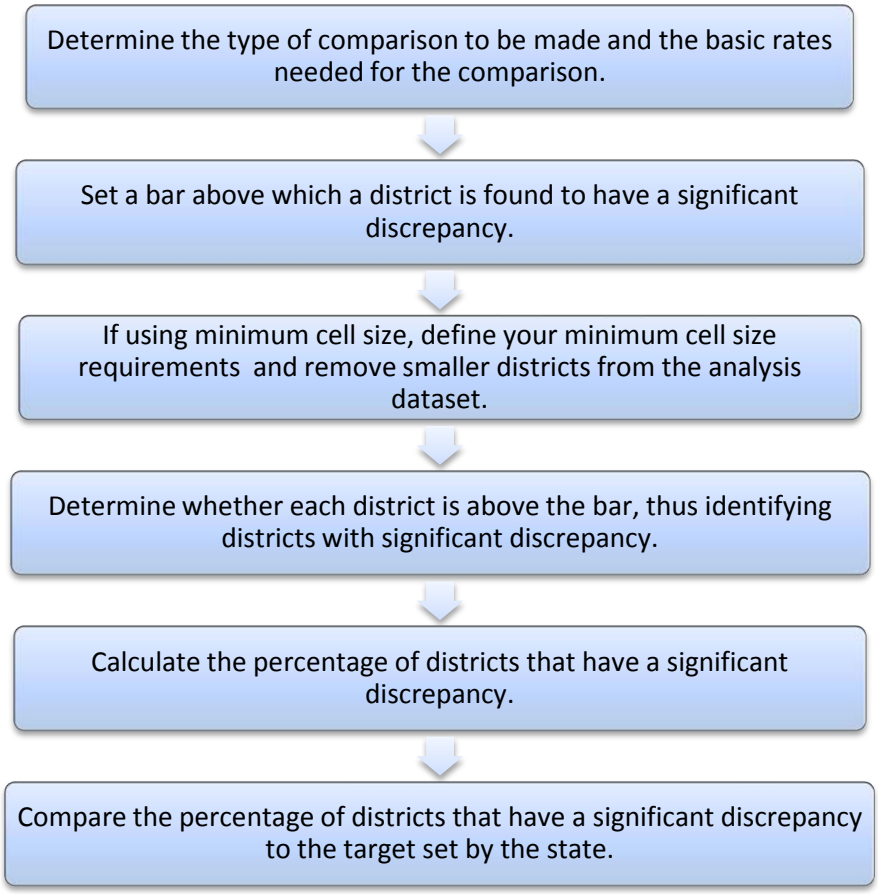
Answer: In State A, the mean district-level suspension/expulsion rate is 9.2%.

CHAPTER 4. METHODOLOGIES FOR INDICATOR B4A

In this chapter, we discuss methodologies that states may want to consider using to identify whether districts have a significant discrepancy for Indicator B4A. For each method, the TA guide summarizes the question it answers and provides a step-by-step example of how it is calculated. We also include brief discussions of how to interpret the method and some considerations.

Overall Steps for Identifying Significant Discrepancy

The following steps can be used to identify significant discrepancy for B4A.



Types of Comparisons

To determine whether a significant discrepancy exists within a district, one of two types of comparisons can be used. States may either:

1. Compare the rates of suspensions/expulsions for children with disabilities among districts within the state, or

2. Compare the rates of suspensions/expulsions for children with disabilities to the rates for children without disabilities within each district.

Within each of these two types of comparisons, several methods of analysis can be used. The first four methods described in this chapter pertain to the first comparison, and the remaining two methods pertain to the second comparison.

It should be noted that the comparison options and corresponding methodologies described in this chapter do not address whether a district that is identified with a significant discrepancy is in noncompliance with IDEA requirements. For districts with significant discrepancies, the state needs to review and, if appropriate, revise (or require the district to revise) the policies, procedures, and practices relating to the development and implementation of IEPs, the use of positive behavioral interventions and supports, and procedural safeguards, to ensure that such policies, procedures, and practices comply with applicable requirements.

Exhibit 5 presents a brief overview of the methods discussed in this chapter; each method is then described in more detail.

Exhibit 5. Summary of Methods for Identifying Significant Discrepancy for B4A

Example #	Method	A district has a significant discrepancy when…
Comparison Option #1		
Example #1a (Comparable to Example #4a)	Using the state-level suspension/ expulsion rate for children with disabilities to set the suspension/ expulsion-rate bar	…its suspension/expulsion rate for children with disabilities is higher than the state's suspension/expulsion rate for children with disabilities.
	• *Variation: Add* x *percentage points to the state-level suspension/ expulsion rate for children with disabilities to set the suspension/ expulsion-rate bar*	*…its suspension/expulsion rate for children with disabilities is at least x percentage points more than the state's suspension/ expulsion rate for children with disabilities.*
	• *Variation: Multiply the state-level suspension/expulsion rate for children with disabilities by* x *to set the suspension/expulsion-rate bar*	*…its suspension/expulsion rate for children with disabilities is more than x times the state's suspension/expulsion rate for children with disabilities. (Expressed with percents…when its suspension/expulsion rate for children with disabilities is [(x-1)*100] percent more than the state's suspension/expulsion rate for children with disabilities.)*
Example #1b (Comparable to Example #4b)	Using the mean district-level suspension/expulsion rate for children with disabilities to set the suspension/ expulsion-rate bar	…the suspension/expulsion rate for children with disabilities is higher than the mean district-level suspension/expulsion rate for children with disabilities.
	• *Variation: Add x percentage points to the mean district-level suspension/ expulsion rate for children with disabilities to set the suspension/ expulsion-rate bar*	*…its suspension/expulsion rate for children with disabilities is at least x percentage points more than the mean district-level suspension/expulsion rate for children with disabilities.*
	• *Variation: Multiply the mean district-level suspension/expulsion rate for children with disabilities by x to set the suspension/expulsion-rate bar*	*…its suspension/expulsion rate for children with disabilities is more than x times the mean district-level suspension/expulsion rate for children with disabilities. (Expressed with percents…when its suspension/ expulsion rate for children with disabilities is [(x-1)*100] percent more than the mean district-level suspension/expulsion rate for children with disabilities.)*

Exhibit 5. Summary of Methods for Identifying Significant Discrepancy for B4A (continued)

Example #	Method	A district has a significant discrepancy when…
Example #2	Using percentiles to set the suspension/expulsion-rate bar	…its suspension/expulsion rate for children with disabilities is greater than the *x* percentile.
Example #3	Using standard deviations to set the suspension/expulsion-rate bar	…its suspension/expulsion rate for children with disabilities is more than *x* standard deviations above the state's suspension/ expulsion rate for children with disabilities.
Example #4a (Comparable to Example #1a)	Using a rate ratio to compare district-level suspension/expulsion rate to the state-level suspension/expulsion rate	…the ratio of its suspension/expulsion rate for children with disabilities to the state-level suspension/expulsion rate for children with disabilities is greater than *x.*
Example #4b (Comparable to Example #1b)	Using a rate ratio to compare district-level suspension/expulsion rates to the mean district-level suspension/ expulsion rate	…the ratio of its suspension/expulsion rate for children with disabilities to the mean district-level suspension/expulsion rate for children with disabilities is greater than *x.*
Comparison Option #2		
Example #5	Using a rate ratio to compare a district-level suspension/expulsion rate for children with disabilities to the same district's suspension/expulsion rate for children without disabilities	… the ratio of its suspension/expulsion rate for children with disabilities to its suspension/expulsion rate for children without disabilities is greater than *x.*
Example #6	Using a rate difference to compare a district-level suspension/expulsion rate for children with disabilities to the same district's suspension/expulsion rate for children without disabilities	…its suspension/expulsion rate for children with disabilities is at least *x* percentage points greater than its suspension/expulsion rate for children without disabilities.

Comparison Option 1: Comparing the Rates of Suspensions/Expulsions for Children with Disabilities Among Districts, or, Equivalently, to a State-Set Suspension/Expulsion-Rate Bar

States may identify a suspension/expulsion rate for children with disabilities that districts should not exceed. This rate can be thought of as a bar. The suspension/expulsion-rate bar should be related, in some way, to the state mean or some other measure of the distribution of suspension/expulsion rates throughout the state in order to be congruent with the first approach provided in the SPP/APR instructions of comparing the rates of suspensions and expulsions for children with disabilities among districts within the state.

It should first be noted that methods described for Comparison Option 1 allow states to identify districts that are significantly discrepant as compared to the overall state-level suspension/expulsion rate for children with disabilities.

The remainder of this section demonstrates how to determine whether a district is significantly discrepant from other districts in the state using the method of comparing the suspension/expulsion rates of a district's children with disabilities to a state-identified suspension/expulsion-rate bar. It will provide examples of three ways to set a bar. In each example, the bar is systematically related to the rates of other districts:

- Using a state mean (Examples #1a and #1b),
- Using percentiles (Example #2), and
- Using standard deviations (Example #3).

In addition, the state may choose to set a rate ratio bar (Example #4).

Using a State Mean

Some states may choose to compare the district-level suspension/expulsion rate for children with disabilities (Rate #1) to either:

- The state-level suspension/expulsion rate for children with disabilities (Rate #3), or to
- The mean district-level suspension/expulsion rate for children with disabilities (Rate #4).

Either of these comparisons can be used as the basis for determining significant discrepancy. Example #1a and Example #1b demonstrate how to make these comparisons. Since these two comparisons are related, the interpretations and considerations are interwoven and appear at the end of Example #1b.

Example #1a: Using the State-Level Suspension/Expulsion Rate for Children with Disabilities to Set the Suspension/Expulsion-Rate Bar

Question: How does District 1's suspension/expulsion rate for children with disabilities compare to the state-level suspension/expulsion rate for children with disabilities?

1. Calculate the suspension/expulsion rate for children with disabilities for District 1 (see Rate #1). The rate is 21.8%.

$$\text{District rate} = \frac{\text{Children with disabilities suspended/expelled in District 1}}{\text{All children with disabilities in the District 1}} \times 100$$
$$= \frac{24}{110} \times 100$$
$$= 21.8\%$$

2. Calculate the state-level suspension/expulsion rate for children with disabilities for State A (see Rate #3). The rate is 11.7%.

$$\text{State rate} = \frac{\text{Children with disabilities suspended/expelled in State A}}{\text{All children with disabilities in the state}} \times 100$$
$$= \frac{759}{6{,}479} \times 100$$
$$= 11.7\%$$

3. Use this comparison as a basis for determining significant discrepancy.

Answer: District 1's suspension/expulsion rate for children with disabilities (21.8%) is higher than the state-level suspension /expulsion rate for children with disabilities (11.7%).

Example #1b: Using the Mean District-Level Suspension/Expulsion Rate for Children with Disabilities to Set the Suspension/Expulsion-Rate Bar

Question: How does District 1's suspension/expulsion rate for children with disabilities compare to the mean district-level suspension/expulsion rate for children with disabilities?

1. Calculate the suspension/expulsion rate for children with disabilities for District 1 (see Rate #1). The rate is 21.8%.

$$\text{District rate} = \frac{\text{Children with disabilities suspended/expelled in District 1}}{\text{All children with disabilities in the District 1}} \times 100$$
$$= \frac{24}{110} \times 100$$
$$= 21.8\%$$

2. Calculate the mean district-level suspension/expulsion rate for children with disabilities for State A (see Rate #4). The rate is 9.2%.

$$\text{Mean district-level rate} = \frac{\text{Sum of the district-level suspension/expulsion rates}}{\text{Total number of districts in State A}}$$
$$= \frac{73.8\%}{8}$$
$$= 9.2\%$$

3. Use this comparison as a basis for determining significant discrepancy.

Answer: District 1's suspension/expulsion rate for children with disabilities (21.8%) is higher than the mean district-level suspension/expulsion rate for children with disabilities (9.2%).

Example 1a and 1b: Interpretation

The state-level suspension/expulsion rate for children with disabilities and the mean district-level suspension/expulsion rate for children with disabilities are measures of central tendency.[2] For this reason, a state that chooses to use either of the two rates as its suspension/expulsion-rate bar will, under certain conditions, tend to find significant discrepancy in about half of its districts.[3]

Variation 1: Some states may choose to set the bar by adding a certain number of percentage points to the state-level rate or mean-district level rate (e.g., any district with a suspension/expulsion rate for children with disabilities that is more than three percentage points above the state-level suspension/expulsion rate for children with disabilities is considered to have a significant discrepancy). In most cases, this will decrease the number of districts that are identified.

Variation 2: Other states may choose to set the bar by multiplying the state-level rate or mean-district level rate by some number (e.g., any district with a suspension/expulsion rate for children with disabilities that is more than 1.1 times more than the state-level suspension/expulsion rate for children with disabilities is considered to have a significant discrepancy), or, equivalently, by setting it at a certain percentage above the calculated rate (e.g., any district with a suspension/expulsion rate for children with disabilities that is more than 10% above the state-level suspension/expulsion rate for children with disabilities is considered to have a significant discrepancy). Again, in most cases, this will decrease the number of districts identified.

Example 1a and 1b: Considerations

Using either the state-level suspension/expulsion rate for children with disabilities or the mean district-level suspension/expulsion rate for children with disabilities as the state suspension/expulsion-rate bar is a straightforward way to determine significant discrepancy for the state's districts. Using one calculation, a state can set its bar for determining the suspension/expulsion rate for children with disabilities that will be considered a significant discrepancy for every district in the state.

The methods in this section are based on state rates (i.e., the state-level suspension/expulsion rate for children with disabilities or the mean district-level suspension/expulsion rate for children with disabilities). Each state must decide whether to periodically (e.g., annually) recalculate the bars that are based on these rates or to set the bars in the first year of the SPP/APR and not change them. If the bars are recalculated annually, the state will identify about the same percentage of its districts each year—even if its state-level suspension/expulsion rate for children with disabilities is declining. If the bar is not changed, progress in state-level suspension/expulsion rates is likely to be mirrored by a decrease in the number of districts identified with a significant discrepancy.

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[2] Two of the most common measures of central tendency are the mean and the median. The median of a list of values always finds the number that is in the "middle of the pack," with an equal number of values above and below the median. The mean tends to do the same, but it is also responsive to the values in the distribution, not just their placement. The state-level suspension/expulsion rate for children with disabilities and the mean district-level suspension/expulsion rate for children with disabilities are both means.

[3] If the statewide distribution of suspension/expulsion rates for children with disabilities is not normally distributed, which may often be the case, then a mean district-level suspension/expulsion rate for children with disabilities bar for significant discrepancy might identify somewhat more or less than 50% of districts. The same is true for the state-level suspension/expulsion rate for children with disabilities.

Comparisons can be made between these methods (i.e., Examples 1a and 1b) and the rate-ratio methods described in Examples 4a and 4b. For example, using the state-level suspension/expulsion rate for children with disabilities or the mean district level suspension/expulsion rates for children with disabilities to set the bar is equivalent to the choice of using a rate ratio of 1.0 as the state bar (Examples 4a and 4b). One of the main differences is that methods used in Examples 1a and 1b do not require the calculation of rate ratios for each district.

As noted previously, all methods using Comparison Option 1 identify districts within the state that suspend/expel children with disabilities at a higher rate than other districts in the state. These methods can say nothing about whether these rates are higher than the local or statewide rates of suspension/ expulsion for children without disabilities.

Using Percentiles

Percentiles can also be used to set the suspension/expulsion-rate bar. When districts are placed in a rank order based on their suspension/expulsion rates for children with disabilities, a percentile can quantify where in the distribution a particular district falls. For example, the median district in this distribution, with an equal number of districts having higher and having lower suspension/expulsion rates for children with disabilities, will be very close to the 50th percentile.[4] This section shows how to convert the district-level suspension/expulsion rates for children with disabilities to percentiles.

Example #2: Using Percentiles to Set the Suspension/Expulsion-Rate Bar

Question: What percentile for suspension/expulsion of children with disabilities is District 1 in State A? In other words, what percentage of districts in State A have suspension/ expulsion rates for children with disabilities lower than District 1?

1. Using the data in Exhibit 3, sort the district-level suspension/expulsion rates for children with disabilities in order from lowest to highest.

Sorted from lowest to highest =	
District 4:	0.0%
District 6:	1.7%
District 8:	2.7%
District 7:	2.9%
District 3:	4.0%
District 2:	16.7%
District 1:	21.8%
District 5:	24.0%

2. In the sorted list, find District 1's suspension/expulsion rate for children with disabilities. District 1's suspension/expulsion rate for children with disabilities is 21.8%.

Sorted from lowest to highest =	
District 4:	0.0%
District 6:	1.7%
District 8:	2.7%
District 7:	2.9%
District 3:	4.0%
District 2:	16.7%
District 1:	21.8%
District 5:	24.0%

3. Count the number of districts that have suspension/expulsion rates for children with disabilities that are less than District 1's. In State A, six districts have suspension/expulsion rates for children with disabilities that are less than 21.8%

[4] The median of a list of values always finds the number that is in the "middle of the pack," with an equal number of values above and below the median.

4. Find the total number of districts. In State A, there are eight districts.

5. Divide the number of districts with suspension/expulsion rates for children with disabilities that are less than District 1's by the total number of districts in State A.

6. Multiply the quotient by 100 to get a percentage.

$$\text{Percentile for District 1} = \frac{\text{Number of districts with rate less than District 1}}{\text{Total number of districts}} \times 100$$
$$= \frac{6}{8} \times 100$$
$$= 75.0\%$$

Answer: **District 1 is in the 75th percentile for suspension/expulsion of children with disabilities in State A. In other words, 75% of districts in State A have suspension/expulsion rates for children with disabilities lower than District 1.**

Example #2: Interpretation

In order to determine significant discrepancy using percentiles, the state must determine a percentile above which a district is determined to have a significant discrepancy. For example, if State A sets its bar at the 60th percentile, then District 1 would be identified as having a significant discrepancy. However, if State A set its bar at the 85th percentile, District 1 would not be identified.

Example #2: Considerations

When using percentiles, the state's choice of what percentile to use as the state's bar determines what percentage of the state's districts will be identified as having a significant discrepancy. If, for example, the state chooses the 80th percentile for its suspension/expulsion-rate bar, approximately 20% of the districts included in the analysis will be identified with a significant discrepancy.

Unless the state changes its percentile bar from year to year, the percentage of districts identified will not change even if the state-level suspension/expulsion rate is declining or increasing. Using the prior example, suppose a state chooses the 80th percentile for its bar. It will, by definition, identify about 20% of its districts with a significant discrepancy in the first year. Suppose that every district then reduces its suspension/expulsion rates. In the second year's calculations, this reduction in rates may affect which districts are identified, but it will not affect the percentage of districts that are identified. In the second year, again, approximately 20% of the districts will be identified. This may be considered a disadvantage in that the same percentage of districts is identified each year, regardless of whether the state is making progress in reducing its overall suspension/expulsion rates.

As noted previously, all methods using Comparison Option 1 identify districts within the state that suspend/expel children with disabilities at a higher rate than other districts in the state. They can say nothing about whether these rates are higher than the local or statewide rates of suspension/expulsion for children without disabilities.

Using Standard Deviations

Standard deviations provide a uniform metric that tells something about the spread of a distribution (e.g., the distribution of district-level suspension/expulsion rates for children with disabilities).

For the calculation of significant discrepancy, states may choose to use standard deviations to determine how far above or below the mean district-level suspension/expulsion rate for children with disabilities each district is. They could then choose a particular number of standard deviations above that mean as the bar for significant discrepancy.

Example #3: Using Standard Deviations to Set the Suspension/Expulsion-Rate Bar

Question: How many standard deviations above or below the mean district-level suspension/ expulsion rate for children with disabilities is District 1?

1. Using the data in Exhibit 3, calculate the mean district-level suspension/expulsion rate for children with disabilities (see Rate #4) for State A. The mean district-level suspension/expulsion rate is 9.2%.

$$\text{Mean district-level rate} = \frac{\text{Sum of the district-level suspension/expulsion rates}}{\text{Total number of districts in State A}}$$

$$= \frac{73.8\%}{8}$$

$$= 9.2\%$$

2. Calculate each district's deviation from the mean district-level suspension/expulsion rate for children with disabilities. To calculate the deviations, subtract the mean district-level suspension/expulsion rate for children with disabilities (9.2%) from each of the eight district-level suspension/expulsion rates for children with disabilities found in Exhibit 3.

Deviation from the mean = district-level rate – mean district-level rate

District 1: 21.8% — 9.2% = 12.6%

District 2: 16.7% — 9.2% = 7.5%;

District 3: 4.0% — 9.2% = -5.2%;

District 4: 0.0%— 9.2% = -9.2%;

District 5: 24.0% — 9.2% = 14.8%;

District 6: 1.7% — 9.2% = -7.5%;

District 7: 2.9% — 9.2% = -6.3%;

District 8: 2.7% — 9.2% = -6.5%

3. To find the squared deviations from the means, square each of the deviations from the means that was calculated in step 2.

Squared deviation from the mean = (deviation from the mean)^2

District 1: 12.6^2 = 158.76;

District 2: 7.5^2 = 56.25;

District 3: $(-5.2)^2$ = 27.04;

District 4: $(-9.2)^2$ = 84.64;

District 5: 14.8^2 = 219.04;

District 6: $(-7.5)^2$ = 56.25;

District 7: $(-6.3)^2$ = 39.69;

District 8: $(-6.5)^2$ = 42.25.

4. To find the sum of the squared deviations, add all of the squared deviations from the means calculated in step 3.

Sum of the squared deviations = Sum of all of the squared deviations from the means

= 158.76+56.25+27.04+84.64+219.04+56.25+39.69+42.25

= 683.92

5. To find the standard deviation, divide the sum of the squared deviations calculated in step 4 by one less than the number of districts, then take the square root of the result.

$$\text{Standard deviation} = \sqrt{\frac{\text{Sum of squared deviations}}{(\text{Number of districts} - 1)}}$$

$$= \sqrt{\frac{683.92}{(8-1)}}$$

$$= \sqrt{\frac{683.92}{7}}$$

$$= \sqrt{97.70}$$

$$= 9.88$$

6. To find how many standard deviations District 1 is above the mean, divide the District 1 deviation from the mean (12.6) by the standard deviation.

$$\text{Number of standard deviations above the mean} = \frac{\text{District deviation from the mean}}{\text{Standard deviation}}$$
$$= \frac{12.6}{9.88}$$
$$= 1.28$$

Answer: **District 1's suspension/expulsion rate for children with disabilities is 1.28 standard deviations above the mean district-level suspension/expulsion rate for children with disabilities.**

Example #3: Interpretation

A standard deviation tells us how closely a set of data points is clustered around its mean. In this example, in State A, the mean district-level suspension/expulsion rate for children with disabilities is 9.2%, with a standard deviation of 9.88%. This standard deviation is relatively high because the district rates vary widely, from 0% to 24%.

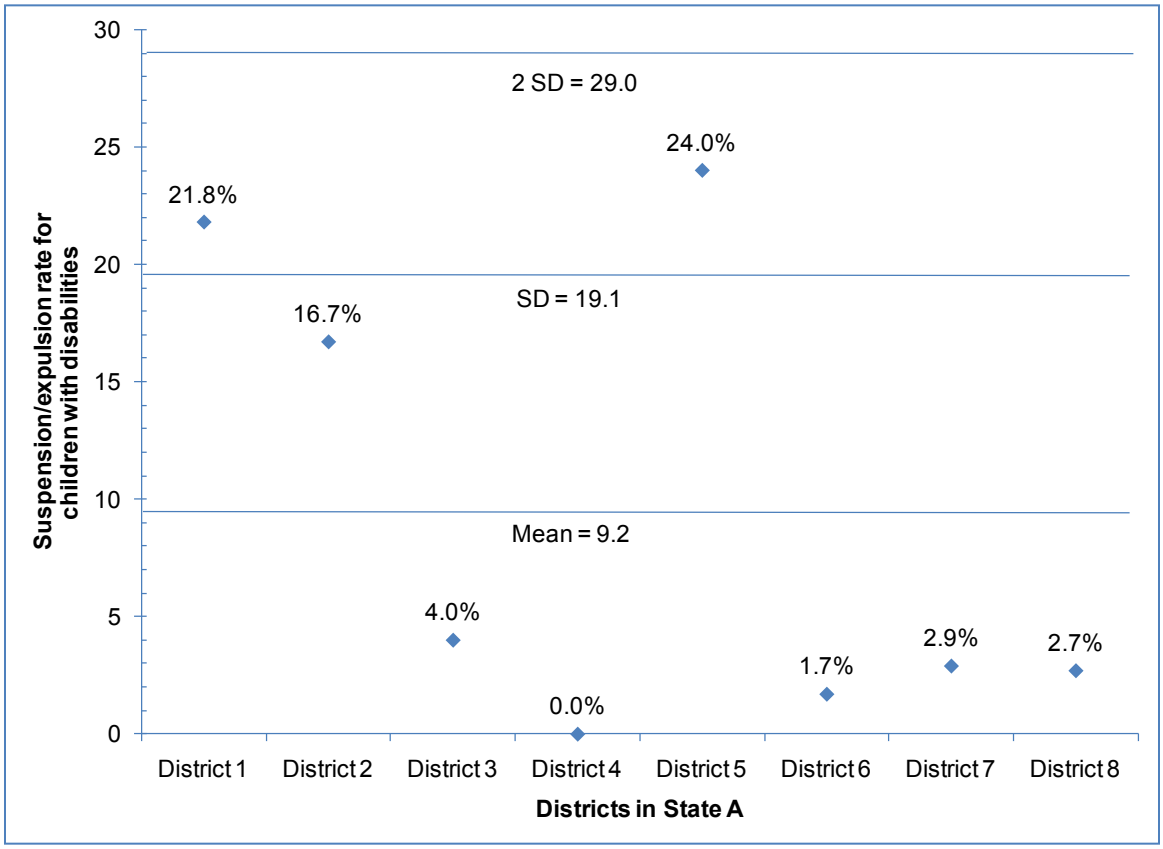
A state may choose to set its suspension/expulsion-rate bar for significant discrepancy by using standard deviation. When using this method, states need to decide how many standard deviations above the mean they want to set their bar. For example, the state might choose to say that all districts that are more than two standard deviations above the mean district-level rate of suspension/expulsion for children with disabilities have a significant discrepancy. In the box below using the mean district-level rate of 9.2% and the standard deviation of 9.88, 1 standard deviation above the mean would be 19.1% and 2 standard deviations above the mean would be 29.0%.

1 standard deviation above the mean = mean district-level rate + Standard Deviation
= 9.2% + 9.88
= 19.1%

2 standard deviations above the mean = mean district-level + 2(Standard Deviation)
= 9.2% + 2(9.88)
= 29.0%

Exhibit 6 uses the entire set of district suspension/expulsion rates in our fictitious State A (Exhibit 3) to show that if the bar were set at one standard deviation above the mean, or 19.1%, then two districts would be significantly discrepant. If the bar was set at 2 standard deviations above the mean or 29%, then no districts would be identified since the highest rate in our example is 24%.

Exhibit 6. Districts in State A with Suspension/Expulsions Rates One and Two Standard Deviations Above the Mean



Example #3: Considerations

Standard deviations show the variability or spread of the distribution of a set of rates. The greater the spread of rates, the greater the standard deviations will be. Or conversely, if the rates are closely clustered around the mean, then the standard deviation would be smaller. Therefore, standard deviations allow a state to identify districts that are outside the cluster by setting the bar at a state-identified number of standard deviations that a district should not exceed. When deciding whether to set the bar at 1, 2, or 3 standard deviations above the mean, consideration should be given to the amount of spread in the suspension/expulsion rates that exist in the state.

As noted previously, all methods using Comparison Option 1 identify districts within the state that suspend/expel children with disabilities at a higher rate than other districts in the state. They can say nothing about whether these rates are higher than the local or statewide rates of suspension/expulsion for children without disabilities.

Using Rate Ratios

States may choose to use ratios to compare the district-level suspension/expulsion rate for children with disabilities to either:

- The state-level suspension/expulsion rate for children with disabilities, or to
- The mean district-level suspension/expulsion rate for children with disabilities.

In this section, Example #4a and Example #4b demonstrate how to calculate these ratios, referred to as *rate ratios* from this point forward. The interpretations and considerations are interwoven and appear at the end of Example #4b.

Example #4a: Using a Rate Ratio to Compare District-Level Suspension/ Expulsion Rates to State-Level Suspension/Expulsion Rates

The rate ratio equation used to compare district-level suspension/expulsion rates to state-level suspension/expulsion rates is:

$$\text{Rate ratio} = \frac{\text{District-level suspension/expulsion rate for children with disabilities}}{\text{State-level suspension/expulsion rate for children with disabilities}}$$

Question: What is the suspension/expulsion rate for children with disabilities in District 1 as compared to the state-level suspension/expulsion rate for children with disabilities in State A?

1. Calculate the district-level suspension/expulsion rate for children with disabilities for District 1 (see Rate #1). The district-level suspension/expulsion rate for children with disabilities for District 1 is 21.8%

$$\text{District rate} = \frac{\text{Children with disabilities suspended/expelled in District 1}}{\text{All children with disabilities in the District 1}} \times 100$$
$$= \frac{24}{110} \times 100$$
$$= 21.8\%$$

2. Calculate the state-level suspension/expulsion rate for children with disabilities for State A (see Rate #3). The state-level suspension/expulsion rate for children with disabilities is 11.7%

$$\text{State-level rate} = \frac{\text{All children with disabilities suspended/expelled in State A}}{\text{All children with disabilities in the state}} \times 100$$
$$= \frac{759}{6{,}479} \times 100$$
$$= 11.7\%$$

3. Divide the suspension/expulsion rate for children with disabilities for District 1 by the state-level suspension/expulsion rate children with disabilities for State A.

$$\text{Rate ratio} = \frac{\text{District-level suspension/expulsion rate for children with disabilities in District 1}}{\text{State-level suspension/expulsion rate for children with disabilities in State A}}$$
$$= \frac{21.8\%}{11.7\%}$$
$$= 1.86$$

Answer: **The suspension/expulsion rate for children with disabilities in District 1 is 1.86 times the state-level suspension/expulsion rate for children with disabilities in State A.**

Example #4b: Using a Rate Ratio to Compare District-Level Suspension/ Expulsion Rates to Mean District-Level Suspension/Expulsion Rates

The rate-ratio equation used to compare district-level suspension/expulsion rates to mean district-level suspension/expulsion rates is:

$$\text{Rate ratio} = \frac{\text{District-level suspension/expulsion rate for children with disabilities}}{\text{Mean district-level suspension/expulsion rate for children with disabilities}}$$

Question: What is the suspension/expulsion rate for children with disabilities in District 1 as compared to the mean district-level suspension rate for all children with disabilities in State A?

1. Calculate the district-level suspension/expulsion rate for children with disabilities for District 1 (see Rate #1). The district-level suspension/expulsion rate for children with disabilities for District 1 is 21.8%

$$\text{District rate} = \frac{\text{Children with disabilities suspended/expelled in District 1}}{\text{All children with disabilities in District 1}} \times 100$$
$$= \frac{24}{110} \times 100$$
$$= 21.8\%$$

2. Calculate the mean district-level suspension expulsion rate for children with disabilities in District 1 (see Rate # 4).

$$\text{Mean district-level rate} = \frac{\text{Sum of the suspension/expulsion rates for children with disabilities}}{\text{Total number of districts in State A}}$$
$$= \frac{73.8\%}{8}$$
$$= 9.2\%$$

3. Divide the suspension/expulsion rate for children with disabilities for District 1 by the mean district-level suspension/expulsion rate children with disabilities for State A.

$$\text{Rate ratio} = \frac{\text{District-level suspension/expulsion rate for children with disabilities in District 1}}{\text{Mean district-level suspension/expulsion rate for children with disabilities in State A}}$$

$$= \frac{21.8\%}{9.2\%}$$

$$= 2.37$$

Answer: The suspension/expulsion rate for children with disabilities in District 1 is 2.37 times the mean district-level suspension/expulsion rate for children with disabilities in State A.

Examples #4a and 4b: Interpretation

Rate ratios compare the relative sizes of two rates. Example 4a divides the district-level suspension/expulsion rate for children with disabilities by the state-level suspension/expulsion rate for children with disabilities, and Example 4b divides the district-level suspension/expulsion rate for children with disabilities by the mean district-level suspension/expulsion rate for children with disabilities. In both examples, a rate ratio of 1.00 indicates no difference between the rates. In other words, the district is no more or less likely to suspend/expel children with disabilities than the state overall. A rate ratio greater than 1.00 indicates that the rate for children with disabilities in the district under analysis is greater than the rate for the state overall, while a rate ratio less than 1.00 indicates that the rate for children with disabilities in a particular district is less than the rate for the state overall. To give two examples, a rate ratio of 2.00 indicates that children with disabilities in the district are suspended/expelled at twice the rate of children with disabilities in the state overall, while a rate ratio of 0.5 indicates that children with disabilities in the district are suspended/expelled at half the rate of children with disabilities in the state overall.

It is up to the state to pick a rate ratio above which a district is identified as having a significant discrepancy. For example, if the state had chosen a rate ratio of 1.5 as its bar, then District 1 in both examples 4a and 4b would be identified as having a significant discrepancy because its rate ratio is above the bar. If however, the state had chosen a rate ratio of 2.5 as its bar, then District 1 in both examples 4a and 4b would not be identified as having a significant discrepancy because its rate ratio is below the bar.

Examples #4a and 4b: Considerations

This method has the advantage and disadvantage of being familiar to the many states that are using risk ratios to address indicators B9 and B10. The disadvantage of this familiarity is that the rate ratios for B4 in this document are not completely analogous to the B9 and B10 risk ratios. Instead of comparing racial/ethnic groups within districts like indicators B9 and B10, these rate ratios compare district-level suspension/expulsion rates for children with disabilities to state-level or mean district-level suspension/expulsion rates for children with disabilities.

Comparisons can be made between the method described in Examples 1a and 1b and the rate ratio methods described in this section. For example, using the state-level suspension/expulsion rate for

children with disabilities or the mean district-level suspension/expulsion rates for children with disabilities to set the bar is equivalent to the choice of a using rate ratio of 1.0 as the state bar.

Therefore, the methods described in examples 4a and 4b will identify exactly the same districts as corresponding methods from examples 1a and 1b. For example, State A has a state-level suspension/expulsion rate for children with disabilities of 11.7%. Consider two methods of setting the bar for significant discrepancy:

1. Any district with a suspension/expulsion rate for children with disabilities that is more than twice the state rate (2 x 11.7% = 23.4%) has a significant discrepancy (Example 1a).

2. Any district with a suspension/expulsion rate ratio for children with disabilities that exceeds 2.0 has a significant discrepancy (Example 4a).

These methods are equivalent in the sense that they will identify exactly the same districts—only District 5 has a suspension/expulsion rate for children with disabilities that is more than 23.4% (see Exhibit 3), and, equivalently, only District 5 has a suspension/expulsion rate ratio for children with disabilities that exceeds 2.0.

The first method above requires the calculation of each district's suspension/expulsion rate for children with disabilities (Rate #1) followed by the comparison of this rate to a state bar (e.g., 23.4). The bar is calculated *once* by the state, as described in example 1a and shown above. The second method also requires the calculation of each district's suspension/expulsion rate for children with disabilities followed by the calculation of the suspension/expulsion rate ratio for *every district*, as described in example 4a. States may want to take this into consideration when choosing a methodology.

Rate Ratio for District 5
= 24.0%/11.7%
= 2.05

As previously noted, all methods using Comparison Option 1 identify districts within the state that suspend/expel children with disabilities at a higher rate than other districts in the state. They can say nothing about whether these rates are higher than the local or statewide rates of suspension/expulsion for children without disabilities.

Comparison Option 2: Comparing the Rates of Suspensions/Expulsions for Children with Disabilities to the Rates for Children without Disabilities within each District

The previous section described methods that states might use if they choose to examine significant discrepancies using the first comparison option (i.e., comparing the rates of suspensions/expulsions for children with disabilities among districts within the state). This section describes methods that states might use if they choose to examine significant discrepancies using the second comparison option (i.e., comparing the rates of suspensions/expulsions for children with disabilities to children without disabilities within the districts).

Unlike the previous section, the methodologies described in this section do not use state-level suspension/expulsion rates. Comparison Option 2 focuses on suspension/expulsion rates within a district by comparing the suspension/expulsion rate of children with disabilities in a district to the suspension/expulsion rate for children without disabilities in the same district. Because the focus is on rates *within* districts, it would be inappropriate to compare, for instance, the district-level suspension/expulsion rate for children with disabilities to the state-level suspension/expulsion rate for children without disabilities because this would be focusing on rates *across or among* districts as opposed to rates within districts.

It should first be noted that methods described for Comparison Option 2 allow states to identify districts that are significantly discrepant as compared to the district-level suspension/expulsion rates for children without disabilities. Again, because the focus is on rates within districts, these methods do not address how the suspension/expulsion rates for one district compare to those of other districts within the state.

Because Comparison Option 2 focuses on comparisons of rates within districts, these methods work particularly well for states or territories with unitary systems since they are not able to compare rates among districts.

The remainder of this section describes two methodologies that states using Comparison Option 2 may choose to use to compare district-level suspension/expulsion rates for children with disabilities to district-level suspension/expulsion rates for children without disabilities:

- Rate ratios (Example #5),
- Rate differences (Example #6).

Rate Ratio

States may want to compare the suspension/expulsion rate for children with disabilities to the suspension/expulsion rate for children without disabilities within each district by using a rate ratio.

Example #5: Using a Rate Ratio to Compare a District-Level Suspension/Expulsion Rate for Children with Disabilities to the Same District's Suspension/Expulsion Rate for Children without Disabilities

The equation for this rate ratio is:

$$\text{Rate ratio} = \frac{\text{District-level suspension/expulsion rate for children with disabilities}}{\text{District-level suspension/expulsion rate for children without disabilities}}$$

Question: What is the suspension/expulsion rate for children with disabilities in District 1 as compared to the suspension/expulsion rate for children without disabilities in District 1?

1. Calculate the district-level suspension/expulsion rate for children with disabilities for District 1 (see Rate #1). The district-level suspension/expulsion rate for children with disabilities for District 1 is 21.8%.

$$\text{District rate} = \frac{\text{Children with disabilities suspended/expelled in District 1}}{\text{All children with disabilities in the District 1}} \times 100$$
$$= \frac{24}{110} \times 100$$
$$= 21.8\%$$

2. Calculate the district-level suspension/expulsion rate for children without disabilities for District 1 (see Rate #2). The district-level suspension/expulsion rate for children without disabilities in District 1 is 8.1%.

$$\text{District rate} = \frac{\text{Children without disabilities suspended/expelled in District 1}}{\text{All children without disabilities in District 1}} \times 100$$
$$= \frac{75}{925} \times 100$$
$$= 8.1\%$$

3. Divide the suspension/expulsion rate for children with disabilities for District 1 by the district-level suspension/expulsion rate for children without disabilities for District 1.

$$\text{Rate ratio} = \frac{\text{District-level suspension/expulsion rate for children with disabilities in District 1}}{\text{District-level suspension/expulsion rate for children without disabilities in District 1}}$$
$$= \frac{21.8\%}{8.1\%}$$
$$= 2.69$$

Answer: In District 1, the suspension/expulsion rate for children with disabilities is 2.69 times the suspension/expulsion rate for children without disabilities.

Example #5: Interpretation

This rate ratio compares the relative size of two rates by dividing the district-level suspension/expulsion rate for children with disabilities by the suspension/expulsion rate for children without disabilities in that same district. A rate ratio of 1.00 indicates no difference between the rates. A rate ratio greater than 1.00 indicates that the suspension/expulsion rate for children with disabilities in a particular district is greater than the rate for children without disabilities in that district. A rate ratio less than 1.00 indicates that the suspension/expulsion rate for children with disabilities in a particular district is less than the rate for children without disabilities in that district. To give two specific examples, a rate ratio of 2.00 indicates that children with disabilities are suspended/expelled at twice the rate of children without disabilities in that district, while a rate ratio of 0.5 indicates that children with disabilities are suspended/expelled at half the rate of children without disabilities in that district.

It is up to the state to pick a rate ratio above which a district is identified as having a significant discrepancy. For example, if the state had chosen a rate ratio of 1.5 as its bar, then District 1 would be identified as having a significant discrepancy because its rate ratio is above the bar. If however, the state had chosen a rate ratio of 3.0 as its bar, then District 1 would not be identified as having a significant discrepancy because its rate ratio is below the bar.

Example #5: Considerations

This method has the advantage of being familiar to the many states that are using risk ratios to address indicators B9 and B10. Mathematically, it differs only in that the comparison group for Indicator B4A, only considers two groups of children: those with disabilities and those without.

All methods using Comparison Option 2 identify districts within the state that suspend/expel children with disabilities at a higher rate than they suspend children without disabilities. They can say nothing about how either of these rates compares with the corresponding rates in the state's other districts. To use the example above, our calculations tell us that in District 1, children with disabilities are 2.69 times as likely to be suspended/expelled as are children without disabilities—but they tell us nothing about whether children with disabilities are more likely to be suspended/expelled in District 1 than in the state's other districts.

Rate Difference

Another way to compare suspension/expulsion rates is to determine the difference in rates of suspension/expulsion between children with disabilities in a district and children without disabilities in that same district. This comparison shows how far apart the two rates are from each other.

Example #6: Using a Rate Difference to Compare a District-Level Suspension/ Expulsion Rate for Children with Disabilities to the Same District's Suspension/Expulsion Rate for Children without Disabilities

The equation for the rate difference is:

Rate difference =(District-level suspension/expulsion for children with disabilities) —
(District-level suspension/expulsion rate for children without disabilities)

Question: What is difference between the suspension/expulsion rates for children with disabilities in District 1 and the suspension/expulsion rate for children without disabilities in District 1?

1. Calculate the district-level suspension/expulsion rate for children with disabilities for District 1 (see Rate #1). The district-level suspension/expulsion rate for children with disabilities for District 1 is 21.8%.

$$\text{District rate} = \frac{\text{Children with disabilities suspended/expelled in District 1}}{\text{All children with disabilities in District 1}} \times 100$$
$$= \frac{24}{110} \times 100$$
$$= 21.8\%$$

2. Calculate the district-level suspension/expulsion rate for children without disabilities for District 1 (see Rate #2). The district-level suspension/expulsion rate for children without disabilities in District 1 is 8.1%.

$$\text{District rate} = \frac{\text{Children without disabilities suspended/expelled in District 1}}{\text{All children without disabilities in District 1}} \times 100$$
$$= \frac{75}{925} \times 100$$
$$= 8.1\%$$

3. Subtract the district-level suspension/expulsion rate for children without disabilities in District 1 from the district-level suspension/expulsion rate for children with disabilities in District 1. The rate difference is 13.7 percentage points.

Rate difference =(District-level suspension/expulsion for children with disabilities) —
(District-level suspension/expulsion rate for children without disabilities)

= 21.8% — 8.1%

= 13.7

Answer: **The difference between the suspension/expulsion rate for children with disabilities in District 1 and the suspension/expulsion rate for children without disabilities in District 1 is 13.7 percentage points.**

Example #6: Interpretation

Rate difference tells us how much one rate differs from another—how many percentage points would need to be added to the lower rate to get to the higher rate. A rate difference of 0 would indicate no difference between the two rates. A positive rate difference indicates how much greater the suspension/expulsion rate for children with disabilities in the district is as compared to the suspension/ expulsion rate for children without disabilities in that same district. A negative rate difference indicates how much less the suspension/expulsion rate for children with disabilities in the district is as compared to the suspension/expulsion rate for children without disabilities in that same district.

It is up to the state to pick a rate difference above which a district is found to have a significant discrepancy. For example, if the state had chosen a rate difference of 5 percentage points as its bar, then District 1 would be identified as having a significant discrepancy because its rate difference is above the bar. If however, the state had chosen a rate difference of 15 percentage points as its bar, then District 1 would not be identified as having a significant discrepancy because its rate difference is below the bar.

District A suspends/expels:
16% children with disabilities
8% children without disabilities

District B suspends/expels:
2% of children with disabilities
1% of children without disabilities

The rate ratios are:
District A: 16/8=2
District B: 2/1=2

The rate differences are:
District A: 16%-8%= 8 percentage points
District B: 2%-1%=1 percentage point

Example #6: Considerations

The rate difference describes how much two rates differ from each other. As described in the previous section, rate ratio compares the relative size of the two rates. For example, suppose in District A, the suspension/expulsion rate for children with disabilities is 16% and the suspension/expulsion rate for children without disabilities is 8%. In District B, the suspension/expulsion rate for children with disabilities is 2% and the suspension/expulsion rate for children without disabilities

is 1%. The rate ratios would be the same (2.0) in both cases (i.e., 16%/8% = 2.0 and 2%/1% = 2.0). However, the rate differences would be 8 percentage points (i.e., 16%–8%=8) and 1 percentage point (2%–1%= 1). The rate difference distinguishes those districts that have high-suspension/expulsion rates from those that have low-suspension/expulsion rates even though the rate ratios are the same. States might want to consider using both of these methods in conjunction since they answer different questions.

As noted previously, all methods using Comparison Option 2 identify districts within the state that suspend/expel children with disabilities at a higher rate than they suspend children without disabilities. They can say nothing about how either of these rates compares with the corresponding rates in the state's other districts. To use the example above, our calculations tell us that in District 1, the difference between the suspension/expulsion rates for children with disabilities in District 1 and the suspension/expulsion rate for children without disabilities in District 1 is 13.7 percentage points—but they tell us nothing about whether children with disabilities are more likely to be suspended/expelled in District 1 than in the state's other districts.

CHAPTER 5. METHODOLOGIES FOR INDICATOR B4B

Coming Soon!

CHAPTER 6. SMALL CELL SIZES

Introduction

Any of the measures discussed in this TA guide can be unreliable if the number of children included in the analysis is small. Unreliable analyses caused by small cell sizes may result in districts being inappropriately identified with a significant discrepancy. The most common method states use to address this problem is to identify a minimum number of children to be included in the analysis, called a minimum n-size or a minimum cell size.

When deciding to implement a minimum cell size, it is important for states to realize that there is no perfect value; any minimum cell size has trade-offs and limitations. On one hand, small cell sizes may produce unreliable results. On the other hand, if the state implements a large minimum cell size, many districts may be completely eliminated from the analysis, leaving no objective way to identify significant discrepancies in these districts. According to the SPP/APR Measurement Table, states are required to report on the number of districts excluded from the calculations as a result of the state's minimum cell size requirements. States need to balance the possibility of inappropriately identifying districts because of small cell sizes against the possibility of not identifying districts because of large minimum cell sizes that eliminate large numbers of districts from the analysis completely.

This chapter discusses small cell sizes, including choosing and implementing minimum cell sizes and reporting the minimum cell sizes in a clear manner. We also discuss using multiple years of data when identifying significant discrepancies, which is another method that states use to address the possibility of unreliable results due to small numbers.

Choosing and Implementing Minimum Cell Sizes

While, as noted above, there is no perfect minimum cell size value, states may want to consider a number of issues when choosing and implementing a minimum cell size. These issues are discussed in more detail in this section.

In general, states should note that it may not be appropriate to apply one minimum cell-size "rule" to all data sets and all analyses. For example, the minimum cell size for calculating Adequate Yearly Progress (AYP) may not be appropriate for analyzing data related to Indicator B4 because the analyses are different, and the practical balance between the risk of inappropriately identifying districts versus the risk of failing to identify districts are different. States should be prepared to describe their minimum cell size requirements and provide a rationale regarding how they chose them.

Types of Minimum Cell Sizes

When implementing a minimum cell size, states should determine how "cell" is to be defined for their analyses. For example, if using Comparison Option 1, the minimum cell size may be based on the:

- Number of children with disabilities (e.g., 15 children with disabilities in the district); or

- Number of children with disabilities suspended/expelled (e.g., 5 children suspended/expelled in the district).

If using Comparison Option 2, the minimum cell size may also be based on the:

- Number of children without disabilities (e.g., 20 children without disabilities in the district); or
- Number of children without disabilities suspended/expelled (e.g., 3 children without disabilities suspended/expelled in the district).

Because of these various options, it is important that states clearly define their minimum cell sizes, which we discuss in more detail later in this chapter.

Choosing a Minimum Cell Size

When deciding whether to implement a minimum cell size requirement, states should consider the impact such a decision will have on their analyses. As noted earlier in the introduction, small cell sizes can result in unreliable analyses that may inappropriately identify districts as having a significant discrepancy, but implementing a large minimum cell size may result in a large number of districts being excluded from the analyses. States need to balance these two concerns, that is, the potential for unreliable results versus exclusion of too many districts, when making these decisions.

When choosing a type of minimum cell size, it should be noted that it is the denominator of the suspension/expulsion rate calculation that determines reliability. Consider the following example using data for District 3 and District 4 in State A.

If the number of children with disabilities in the district is large enough, the district-level suspension/expulsion rate will tend to be fairly stable. According to Exhibit 1, District 3 has 50 children with disabilities and 2 of these children were suspended/ expelled. That means that the suspension/expulsion rate for children with disabilities in District 3 is 4.0% (see Exhibit 3). If one additional child with disabilities was suspended/expelled in this district (i.e., 3 children instead of 2 children), the suspension/expulsion rate for District 3 would increase by 2 percentage points, from 4% to 6%:

- *District 3 has 50 children with disabilities*
  - *Each child suspended/ expelled raises the rate by .02 (1/50 = .02)*
- *District 4 has 4 children with disabilities*
  - *Each child suspended/ expelled raises the rate by .25 (1/4=. 25)*

$$\text{Rate} = \frac{\text{Children with disabilities suspended/expelled in District 3}}{\text{All children with disabilities in District 3}} \times 100$$

$$= \frac{3}{50} \times 100$$

$$= 6.0\%$$

On the other hand, if the number of children with disabilities in the district is small, the district-level suspension/expulsion rate will be less stable. For example, according to Exhibit 1, District 4 has four

children with disabilities, none of whom were suspended/expelled. That means that the suspension/expulsion rate for District 4 is 0% (see Exhibit 3). However, if one of the four children with disabilities in District 4 was suspended/expelled, the suspension/expulsion rate would go from 0% to 25%:

$$\text{Rate} = \frac{\text{Children with disabilities suspended/expelled in District 4}}{\text{All children with disabilities in District 4}} \times 100$$
$$= \frac{1}{4} \times 100$$
$$= 25.0\%$$

Therefore, when calculating district-level suspension/expulsion rates for children with disabilities, states wanting to address reliability issues due to small cell sizes should consider basing their minimum cell size on the denominator of these rate calculations. That is, they should consider basing their minimum cell size on the number of children with disabilities in the district (i.e., there must be a certain number of children with disabilities in the district in order for the district to be included in the analyses).

Some states may choose to base their minimum cell sizes on the number of children with disabilities suspended/expelled in the district (i.e., there must be a certain number of children with disabilities suspended/expelled in the district in order for the district to be included in the analyses), which is the numerator of the rate calculation. Because the numbers of children being suspended/expelled in any given district are often small, this type of minimum cell size has the potential for eliminating a large number of districts from the analyses. Some of these districts may, in fact, have suspension/expulsion rates of 0% (which is acceptable), while others may have rates that are lower than the state bar; meaning that, had these districts been included in the analyses, they would not have been identified as having a significant discrepancy. States choosing to implement this type of minimum cell size, therefore, should exercise caution.

Each of the methodologies using Comparison Option 1 or Comparison Option 2 relies on district-level suspension/expulsion rates for children with disabilities. In addition, methodologies using Comparison Option 1 rely on state-level suspension/expulsion rates or distributions for children with disabilities, and methodologies using Comparison Option 2 rely on district-level rates for children without disabilities. Both of these suspension/expulsion rates are typically based on larger numbers of children, so they tend to be more stable than district-level rates for children with disabilities, and therefore, are usually less of a concern with respect to small cell issues.

Implementing a Minimum Cell Size

If a state decides to implement a minimum cell size, then the state should apply that minimum cell size to its analysis dataset, removing any districts from the dataset that do not meet the minimum cell size requirement. For example, suppose State A decides to use one of the methodologies described under Comparison Option 1 or Comparison Option 2 and implements a minimum cell size requirement stating that there must be at least 10 children with disabilities in a district. Under these circumstances, District 4, which has only four children with disabilities, would be removed from the dataset. State A would then proceed with analyzing each of the remaining districts to determine if they have a significant discrepancy.

Clarity in Reporting Minimum Cell Sizes

States should ensure that their reporting on minimum cell sizes is clear. For example, as discussed previously, states may choose to use different types of minimum cell sizes. Therefore, it is important for states to be clear with regard to how they are defining their cell sizes when presenting their minimum cell size requirements. An example where the cell size is not clear is:

- Rates are completed for districts with a minimum of 30 children.

This statement should be revised. For example:

- ✓ Significant discrepancy calculations are made only for districts that have at least 30 children with disabilities; or
- ✓ Significant discrepancy calculations are made only for districts that have at least 30 children with disabilities and 30 children without disabilities.

Some states use a combination of minimum cell size requirements (e.g., there must be 30 children with disabilities in the district AND there must be at least 5 children with disabilities who were suspended/ expelled in the district). States using multiple minimum cell size requirements should be especially careful to ensure that it is clear how they are defining the various cells that make up their requirements.

States should also describe their minimum cell size requirements separately from their definitions of significant discrepancy. Two examples where the state's minimum cell size requirement is hard to distinguish from the state's definition of significant discrepancy are:

- Districts with at least 15 children with disabilities that had a suspension/expulsion rate of 4.0 or higher.
- Within a district, a minimum of 10 children with disabilities that are suspended/expelled at 2 times the rate of children without disabilities suspended/expelled

These statements should be revised to clearly separate cell size from measurement. For example:

- ✓ In order for a district to be included in the analyses, there needed to be at least 15 children with disabilities in the district. The state defined significant discrepancy as any district that had a suspension/expulsion rate for children with disabilities that was greater than 4.0%.
- ✓ In order for a district to be included in the analyses, there needed to be at least 10 children with disabilities and 10 children without disabilities in the district. The state defined significant discrepancy as any district that had a suspension/expulsion rate for children with disabilities that was more than 2 times the rate for children without disabilities.

Calculating the Percentage of Districts with Significant Discrepancy

According to the 2011 measurement table, if states use a minimum cell size requirement, they must report the number of districts excluded from the calculation as a result of this requirement. An example of how states might report this information is:

- ✓ In order for a district to be included in the analysis, there needed to be at least 15 children with disabilities in the district. This minimum cell size requirement eliminated 25 of the state's 150 districts from the analysis.

When determining the percentage of districts that the state identified as having a significant discrepancy, states have the option of using the total number of districts in their state OR the number of districts that met the state's minimum cell size requirements as the denominator in the calculation.

Continuing with the example from above, this state has a total of 150 districts, and 25 of them do not meet the state's minimum cell requirement. Suppose this state identified 20 districts of its 150 districts as having a significant discrepancy. The state could calculate the percentage of districts with a significant discrepancy in one of two ways:

1. If the state chooses to use all districts in the percentage denominator, the percentage is calculated as:

$$\text{Percentage} = \frac{\text{Number of districts with a significant discrepancy}}{\text{Total number of districts}} \times 100$$

$$= \frac{20}{150} \times 100$$

$$= 13.3\%$$

2. If the state chooses to use the number of districts that met the state's minimum cell size requirements in the percentage denominator, the percentage is calculated as:

$$\text{Percentage} = \frac{\text{Number of districts with a significant discrepancy}}{\text{Number of districts meeting minimum cell size requirement}} \times 100$$

$$= \frac{20}{125} \times 100$$

$$= 16.0\%$$

As shown above, removing districts that do not meet the state's minimum cell size requirements from the denominator increases the percentage of districts identified with a significant discrepancy for the state. The more districts that are removed from the denominator, the more pronounced the difference between the two percentages will be. It should also be noted that removing these districts will have the greatest impact on states with the smallest numbers of districts. States should take these implications into consideration when deciding how to report on the percentage of districts identified with a significant discrepancy for B4.

Multiple Years of Data

Another approach to addressing small cell sizes is to require that a district's suspension/expulsion rate meet the state's definition for significant discrepancy for multiple consecutive years (e.g., 2 or 3 years) before it is identified as having a significant discrepancy. Smaller districts with unexpectedly high rates in one year are unlikely to have similarly high rates for multiple years in a row unless there is a larger underlying issue. Larger districts with more stable high rates will probably have similarly high rates year after year unless they address the underlying issues leading to those high rates. To implement this approach, the state will need to analyze the data for the current year, and then data from previous years.