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IOWA Students with Autism:

Who are they, how are they served, and are they achieving?

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Executive Summary

The Iowa Department of Education completed two studies in 2011-2012. The studies addressed several areas of need: (a) identifying students likely on the Autism Spectrum, (b) examining where large numbers of students on the Autism Spectrum are attending school, (c) evaluating the services being provided to students and the location of those services, (d) determining the extent to which services are evidence-based, (e) determining if services are sufficient to effect change needed to reach performance levels needed to access life opportunity, (f) understanding the kinds of problems being addressed through the Individualized Education Programs (IEPs) for the students identified, (g) examining the severity of behavior problems in the sample, and (h) examining academic proficiency and growth for students likely to be on the Autism Spectrum.

Key findings of the studies are:

- About 1 in 150 students is likely to be on the Autism Spectrum and need an IEP (2010-2011 data).
- Most schools do not have large numbers of students on the Autism Spectrum, but 57 districts in the state of Iowa (out of nearly 350) have at least 11 students likely to be on the Autism Spectrum.
- The most frequent services on IEPs are: speech, special transportation, and paraprofessional support.
- About half of the students have speech services on their IEP.
- Students in the sample are below Iowa's State Performance Plan targets for inclusion in general education (as are all students with disabilities).
- The unique nature of services across the sample suggest that IEP teams are making service determinations based on individual needs, not on a diagnosis and not forcing children to fit into already existing services.
- Most IEPs do not document information about methodology (documenting methodology is not required).
- When methodologies are described in IEPs, they tend to be unestablished or emerging practices rather than established practices (as defined by the National Autism Council for students with Autism or Autism Spectrum Disorder).
- At least 80 percent of students have IEPs that make service commitments that are at or above research standards for instruction per day and related services per month, although one could make the case that since the data suggest IEP teams are making service decisions based on need, 100 percent of students are getting services that constitute their free and appropriate public education.
- Small percentages of students are achieving proficiency in reading and math on the state accountability tests for reading and math.
- Students do not show much academic growth year-to-year when assessed on the state accountability tests for reading and math.

Additional studies will be conducted to:

- Determine percentage of students with methodology listed on IEPs that is evidence-based versus those that are not;
- Examine extent to which IEP progress is being made;
- Examine extent to which IEP data are used in decision making;
- Examine caseloads of providers assigned to students on the Autism Spectrum;
- Understand teacher preparation in methods proven to support students with Autism;
- Understand Area Education Agency (AEA) staff support to teachers in methods proven to support students with Autism;
- Estimate parent and teacher perception of how adequately what is written on IEPs is being delivered.

Introduction

Because students with disabilities are classified as “eligible individuals” in Iowa, it has been difficult for the Iowa Department of Education to understand the extent to which Autism is prevalent in Iowa’s schools and the kinds of services being provided to students with Autism or Autism Spectrum Disorder. Initial attempts to understand the extent of the population, started in 2009-2010. The method used (sorting students with an Autism label) may have underrepresented the prevalence. A parent survey done in 2010-2011 also did not yield valid prevalence estimates compared to generally accepted national estimates.

In 2011-2012, the Iowa Department of Education generated data through two sources. The first source was the state-wide electronic IEP database (Web IEP) that has individual IEPs stored and documents goals, services, locations of services, minutes of services and, in some cases, teaching strategies. The second database (the Special Education Information Management System) contains information on levels of service and funding levels.

A team of professionals at the Iowa Department of Education developed a list of key words associated with Autism and Autism Spectrum Disorder (ASD), and had data files pulled on each keyword in logical fields on the Web IEP. Each individual file initially had duplicate records (a child with more than one IEP meeting within the search period could be listed more than one time), and each individual file had to be edited so that each child appeared only once. Then, the data files had to be aggregated so that each child had only one record of data that reflected the services received and the keywords sorted on to generate the data file.

The data file aggregated as a result of the key word searches resulted in identification of 3,102 children and youth in Iowa (PK through grade 12) who were either confirmed to have Autism or whose constellation of services and IEP descriptions made it highly likely that these students were on the Autism Spectrum. Another 5,013 students were receiving one service associated with Autism or ASD, but not enough services as a whole to be considered “likely to be on the Autism spectrum.” These 5,013 students were not included in our analyses.

This report summarizes the two studies conducted in 2011-2012. We summarized student demographics, the communities in which students are attending public schools, the extent to which students with Autism are included with nondisabled peers, the type and amount of services provided to students, IEP goals of a sample of the students, and student achievement on the Iowa Tests of Basic Skills.

Study One: Who are the Students and What Are Their Services?

Method

The Web IEP and Special Education Information Management Data System were used to develop several data files. A data file was created for each of the following key words: Autism, Autism Specialist, TEACCH, ABA, Structure, Visual, Schedule, Boardmaker, Sensory and PECS. These keywords were used because they are words or strategies likely to be associated with Autism or Autism Spectrum Disorder, and that IEP teams in Iowa often used these keywords in writing IEPs.

In addition, students who were designated "Autism" as primary, secondary, or tertiary disabilities were identified.

Students with IEPs active in the 2010-2011 school year were included in the data because the data were drawn prior to the start of the 2012 school year and because achievement data available at the time of the study were from the 2010-2011 school year.

The number of students found in each sort (students could show up in more than one sort) is summarized in Table 1.

Table 1. *Number of Students Identified by Keyword Search in the IEP*

Keyword	Number of Students Found
Schedule	4,426
Sensory	2,594
Structure	1,948
Autism as Primary, Secondary, Tertiary Disability	1,852
Autism written somewhere on the IEP	1,678
Boardmaker	385
PECS	302
TEACCH	120
ABA	46

To create a dataset in which children were counted only once, the data from each sort summarized in Table 1 were combined into a single data file. The first data file had 13,727 records with 4,688 unduplicated birthdates.

The procedure for including children in the final sample was:

a) Each keyword was coded for "likelihood the keyword represents Autism," with "1" representing the highest likelihood and "4" the lowest.

b) If Autism was designated as the primary, secondary, or tertiary disability, the child would be considered on the spectrum, and that record in the data file was coded as "1." In addition, if Autism was written on the IEP, one can reasonably conclude that the child

was on the spectrum, and that record was coded "1." Students coded "1" were kept in the analysis and duplicate records of other keywords were deleted. Autism was documented as primary, secondary, or tertiary disability 1,852 times (see Table 1). Autism written somewhere on the IEP was found 1,678 times. The same children could be in both sorts, so the data were aggregated in a way that the master file had only one record for each child.

c) TEACCH is a framework developed for students with Autism and on the Autism Spectrum, and Iowa's AEAs often train TEACCH for teachers of students on the Autism Spectrum. Hence, a student whose IEP included "TEACCH" on the IEP is highly likely to be on the Autism Spectrum. These records were coded "2." Students who were not coded "1" but were coded "2", were also included in the data file and duplicate records from other key words were deleted.

d) Applied Behavior Analysis (ABA) (coded 3) and Schedule, Sensory, Structure, Boardmaker, and PECS (each coded 4), are methods frequently, but not exclusively, used with students with Autism.

- In Iowa, ABA is much more likely to be associated with Autism than other disabilities. If a student with ABA in the IEP had at least one code of "4," they were included as highly likely to be on the Autism Spectrum.

- Sensory, Structure, PECS, and Boardmaker are used with children on the Autism Spectrum, but are also often used with students with behavior or communication problems. Students with three or more keywords coded "4," but not coded 1, 2, or 3, were included as highly likely to be on the Autism Spectrum.

Table 2 summarizes the keyword and the code used for the keyword to keep students in the data file for additional analyses. Table 3 illustrates how the duplicated count looked prior to condensing records. So that we did not lose data based on the decision rules described above, we coded students as "highly likely of having ASD" and "has services but not likely to be ASD."

Table 2. *Keywords Associated with Autism Spectrum Disorder and Corresponding Code for Inclusion in Sample*

Keyword	Code for Keyword
Autism as Primary, Secondary, Tertiary Disability	1
Autism written somewhere on the IEP	1
TEACCH	2
ABA	3
Schedule	4
Sensory	4
Structure	4
Boardmaker	4
PECS	4

Hence, we had a data file where children could be included for more than one reason (any of the codes used in Table 2). We needed a method of keeping some children in the file because they probably had behaviors sufficient to warrant being included in our file as "highly likely of being on the Autism Spectrum." Table 3 is a sample of what the first few columns in our data file looked like.

Table 3. *Sample Duplicated Child by Keyword Search and Autism Likelihood Code*

Name	School	Autism Likelihood Code
John Jones	East Overshoe	1
John Jones	East Overshoe	2
John Jones	East Overshoe	3
John Jones	East Overshoe	4 (Visual)
Mary Jones	West Undertoe	4 (PECS)
Mary Jones	West Undertoe	4 (Sensory)
Margaret Jonese	South Undertoe	4 (Schedule)

Duplicate rows were deleted so that each student was in the data file only one time. The "highest" key word code was the record kept. For example, John Jones has a keyword code of "1," "2," "3," and "4." Because "1" corresponds to "Autism on the IEP," John is in the sample, but the rows corresponding to keywords "2," "3," and "4" were deleted.

Mary Jones, because "4" corresponds to PECS and another "4" corresponds to Sensory, is also likely on the spectrum because she has multiple services associated with Autism, but are also often used with students without Autism. John and Mary would be included in the 3,102 students highly likely to be on the Autism Spectrum.

Margaret Jonese has Schedule on the IEP but no other keywords associated with Autism; hence, Margaret would be considered "less certain" to be on the Autism Spectrum because many children get supports in the Sensory area. Getting Sensory services alone (without any other services) makes it less certain that a student like Margaret is truly on the Autism Spectrum. As such, Margaret would be included in the 5,013 students with a service associated with Autism but only one service, making it less clear as to whether she has sufficient characteristics to be on the Autism Spectrum. Had Margaret had three services associated with Autism, she would have been included in the sample.

Once the data file was condensed so that we had only one record per child and had identified children as highly likely or insufficient data to judge Autism or Autism Spectrum Disorder, we analyzed the data to answer several questions:

1) Who are the students with Autism in Iowa (grade, community)?
2) What service providers are assigned to the students?
3) What kinds of settings are services being provided?

The results of this initial data analyses are summarized on the following pages.

Results

The first question of interest is, "Who are the students?" We analyzed the sample of students highly likely to be on the Autism Spectrum by grade level in 2010-2011. We examined the frequency count, and then we examined the percentage of students by grade of the total number of students included for analysis. We then took the general education student counts from data used in the Certified Enrollment files to capture total students by grade in 2010-2011, and to calculate an incidence of Autism by grade. Data are summarized in Table 4.

Table 4. *Grade, Frequency Count, Percent, and Incidence of Students Likely to be Autistic or on the Autism Spectrum (2010-2011)*

Grade	Count	Percent of Autism Count	Count for All Students	Incidence by Grade
PK	397	13%	27,208	1 in 70
K	191	6%	39,321	1 in 250
1	239	8%	35,391	1 in 150
2	228	7%	35,139	1 in 150
3	234	8%	34,950	1 in 150
4	221	7%	35,098	1 in 160
5	246	8%	35,347	1 in 140
6	201	6%	35,094	1 in 170
7	192	6%	35,429	1 in 200
8	175	6%	35,274	1 in 200
9	192	6%	37,014	1 in 200
10	161	5%	36,614	1 in 230
11	149	5%	36,474	1 in 240
12	276	9%	37,544	1 in 130
Total	3,102	100%	495,897	1 in 150

Data reflect a higher incidence in the *enrolled* PK population compared to K-12. The enrolled PK population includes children with disabilities from age 3 to kindergarten entry and approximately 50 percent of Iowa's 4-year-olds (those enrolled in publicly funded preschools).

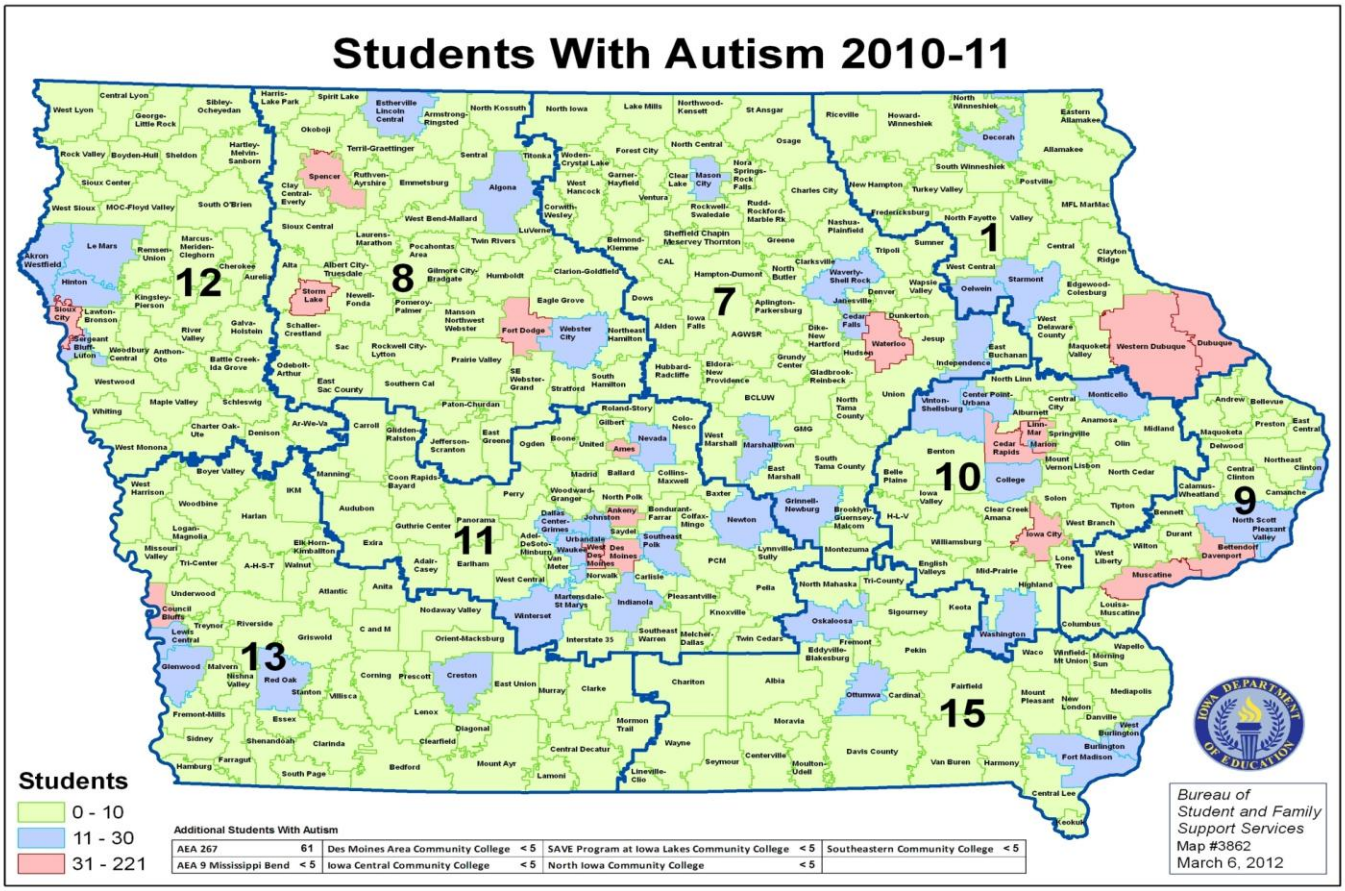
Total identification in 2010-2011 represents one child in 150 being on the Autism Spectrum Disorder. National data prior to March 2012 estimated prevalence at one in 110; after March 2012, the national estimate was revised to one in 88.

The attending district for each child was included in the data set. The density of students in our sample by district and AEA, based on 2010-2011 school boundaries (i.e., prior to any 2011 district consolidation) is summarized in Figure 1.

Most districts have none or fewer than 10 students likely to be on the Autism Spectrum. Forty districts have between 11 and 30 students likely to be on the Autism Spectrum. Seventeen districts have 31 or more students likely to be on the Autism Spectrum, with the highest frequency of 221. Only Great Prairie AEA did not have one district with at least 31 students

likely to be on the spectrum, but all AEAs had at least four districts with between 11 and 30 students likely to be on the spectrum.

Figure 1. Density Plot of Students Likely on the Spectrum by District and AEA (Minimum of 10)



Services

We then looked at the data file to ascertain what services were assigned to students. The data draws on the keywords and the creation of one record per child, and how the data were condensed, which led to not all children in the sample having their service provider codes in the data file. Information on services being provided to students was available on 1,953 students of the 3,102 students.

Table 5 summarizes the grade levels of the 1,953 students on whom we had service data. Compared to Table 4, the sample of students for whom service data were available is underrepresented at PK and kindergarten and overrepresented for grade 12. However, as a

whole, with a sample this size, the service data can be interpreted with 95 percent confidence that the population results are +/- 1 point from the results presented.

Table 5. *Grade Levels, Frequency, and Percent of Total for Students for Whom Service Data were Available*

Grade	Frequency	Percent of Total
PK	162	8%
K	63	3%
1	150	8%
2	136	7%
3	143	6%
4	139	7%
5	154	8%
6	132	7%
7	128	7%
8	129	7%
9	148	8%
10	123	6%
11	120	6%
12	226	12%
Grand Total	**1,953**	100%

The range of services available was:

> Adaptive PE, Autism Resource, Assistive Technology, Audiology, Consultation, Itinerant Teacher of the Deaf, Counseling, Hospital/Homebound, Developmental Service (birth-2 only), Other Outcome Linked service (birth-2 only), Health, Home Intervention, Interpreter, Nursing, Other Medicaid-eligible LEA service, Orientation and Mobility, Occupational Therapy, Paraprofessional (Medicaid reimbursable – typically health or behavior support), Physical Therapy, Psychological Services, Service Coordination (birth-2 only), Specially Designed Instruction, Speech, Specialty, Social Work, Teacher Associate (non-Medicaid reimbursable – typically instructional support), Transition, Specialized Transportation, Itinerant Teacher of the Blind, Work Experience (high school only).

Table 6 summarizes the service providers listed on the IEP, the frequency count of the service provided out of 1,953, and the percentage of the sample receiving that service. Speech was the most frequent service, with a speech provider assigned to 929 of 1,953 (48 percent) of students in the sample. Specialized Transportation (44 percent), Paraprofessional (Medicaid reimbursable) (34 percent), and Paraprofessional (non-Medicaid reimbursable) (20 percent) were the next most frequent services assigned to students in the sample.

Table 6. *Services, Frequency, and Percent of Total (n=1,953) Assigned to Students by Service Provider Code listed on the IEP*

Service	Frequency	Percent of Total
Speech	929	48%
Specialized Transportation	859	44%
Paraprofessional (Medicaid)	666	34%
Paraprofessional (Non-Medicaid)	383	20%
Assistive Technology	240	12%
Occupational Therapy	227	12%
Nursing	153	8%
Health	132	7%
Autism Resource	80	5%
Specialty Services	30	1.5%
Other Medicaid Eligible	26	1%
Specially Designed Instruction	20	1%
Adaptive PE	6	<1%
Audiology	6	<1%
Consultation	12	<1%
Itinerant Teacher of Deaf	Small N (<5)	<1%
Counseling	8	<1%
Hospital/Homebound	Small N (<5)	<1%
Interpreter	Small N (<5)	<1%
Orientation and Mobility	Small N (<5)	<1%
Physical Therapy	10	<1%
Psychological Services	Small N (<5)	<1%
Social Work	18	<1%
Transition	Small N (<5)	<1%
Itinerant Teacher of Blind	Small N (<5)	<1%
Home Intervention	0	0%
Service Coordination (0-2)	15	9% of PK, number of children 0-2 not known for this analysis
Developmental Service (0-2 only)	11	6% of PK, number of children 0-2 not known for this analysis
Other Outcome Linked Service (0-2)	Small N (<5)	<1% of PK, number of children 0-2 not known for this analysis
Work Experience	37	8% (469 students grades 10-12)

There are no data at the state level for comparison purposes, nor are there benchmarks nationally for what kinds of services ought to be prevalent for what percentage of students. For students with Autism, it would be reasonable to expect services in the areas of communication, behavior, and social interactions. However, it would also be reasonable for service decisions to be made at the IEP team level. There is also no way to easily capture services in the behavior or social areas. We will address behavior and peer interactions later in this report when we examine IEP goals and the extent to which behavior is indicated as an area of concern on the IEP.

Another way to analyze services is to see how many students received what combination of services. There were 265 combinations of services, ranging from a single service to six services. Table 7 summarizes the combinations of services where at least 15 children had that set of services. The 22 most frequent combinations of services span 970 students. There were an additional 243 combinations of services for 983 students in which 14 or fewer children had that combination of service listed on the IEP, and those combinations were not included in Table 7. Glancing through Table 7 suggests the common clusters of service to be speech only, or a combination of speech, transportation, and paraprofessional.

Table 7. *Combinations of Services provided to at least 15 students of 1,953*

Service or Combination of Services	Number
Speech Only	121
Special Transportation, Speech	99
Special Transportation, Speech, Paraprofessional (Medicaid)	93
Special Transportation Only	75
Teacher Associate (non Medicaid)	67
Paraprofessional (Medicaid)	65
Special Transportation, Paraprofessional (Medicaid)	61
Transportation, Teacher Associate (non Medicaid) Speech	56
Speech, Paraprofessional (Medicaid)	43
Teacher Associate (non Medicaid), Speech	43
Special Transportation, Teacher Associate (non Medicaid)	35
Speech, Occupational Therapy	24
Transportation, Speech, Occupational Therapy	23
Transportation, Speech, Paraprofessional (Medicaid), Occupational Therapy	22
Assistive Technology	21
Specially Designed Instruction	20
Transportation, Paraprofessional (Medicaid), Health Services	19
Transportation, Speech, Assistive Technology, Paraprofessional (Medicaid)	18
Transportation, Speech, Paraprofessional (Medicaid), Nursing	17
Transportation, Teacher Associate (non Medicaid), Speech, Occupational Therapy	17
Paraprofessional (Medicaid), Nursing	16
Transportation, Speech, Paraprofessional (Medicaid), Occupational Therapy, Assistive Technology	15

Through this analysis, it is not known if services are being provided in the general education setting, in the special education setting, in a direct service mode, or in a consultative mode. In addition, the extent to which services being provided are evidence-based and consistent with research on how much service needs to be provided, is not known. We will examine Least Restrictiveness of Services, as well as the amount of services being provided and the extent to which services are evidence-based, later in this report.

Percent of School Day in General Education

Children ages 5 and over have a number representing the percentage of time they are pulled out of general education. This is called “Least Restrictive Environment,” or LRE. LRE is calculated from the IEP services page, and takes the total minutes of service in a special education setting divided by the total number of minutes in a school day, and converts to a percent of time excluded from general education. Special education services provided in the general education setting are not included in the percent of time removed from general education: Only those services NOT provided in general education are included.

Consistent with the State of Iowa Annual Performance Report for Students with Disabilities (Part B) http://educateiowa.gov/index.php?option=com_content&task=view&id=623&Itemid=1641, the LRE was converted into one of three categories representing percentage of time included in general education. The three categories are: included in general education less than 40 percent of the school day, included in general education between 40 percent and 79 percent of the school day, and included in general education between 80 percent and 100 percent of the school day.

As a point of reference, the state goals for LRE are: 65 percent of students with IEPs in general education at least 80 percent of the school day, no more than 12.5 percent of students with IEPs in general education less than 40 percent of the school day.

Table 8 summarizes percent of students in each grade and total, included in each reporting category. Percentages represent the percentage of each school day the child is included in general education.

Table 8. *Percentage of Day Included in General Education, by Grade (2010-2011 data) (N=3,102)*

Grade	No Data	<40%	40%-79%	80%-100%
PK	22%	23%	12%	42%
K	13%	23%	20%	44%
1	0%	30%	30%	40%
2	0%	30%	30%	39%
3	0%	31%	27%	42%
4	0%	32%	32%	36%
5	0%	33%	28%	39%
6	0%	26%	35%	39%
7	0%	33%	25%	42%
8	1%	30%	27%	43%
9	0%	31%	30%	39%
10	0%	29%	22%	48%
11	0%	38%	27%	36%
12	0%	41%	26%	33%
Grand Total	**4%**	**30%**	**26%**	**40%**

Students with Autism would not meet state targets for inclusion in general education. State results show that 40 percent of students with Autism are included in general education 80 percent of the school day; while the state target is 65 percent (state data for all students with disabilities was 61 percent included in general education 80 percent of the school day, also below the state target). State results show that 30 percent of students with Autism were included in general education less than 40 percent of the school day. (State data for all students with disabilities was 8.36 percent, below the state target of 12.5 percent, which is the desired target.)

Study One Conclusions

We were able to identify 3,102 students who, in 2010-2011, had IEPs that either designated the child as on the Autism Spectrum or included combinations of the kinds of methodologies associated with Autism to reasonably code the child as likely to be on the Autism Spectrum. The prevalence was 1-in-150 PK through grade 12, ranging from 1-in-70 in PK to 1-in-240 at grade 11.

The majority of school districts in Iowa do not have 10 or more students on the Autism Spectrum, although many schools in the state are serving 11 or more students who appear to be on the Autism Spectrum.

For 1,953 students of the 3,102 for whom we could examine the service providers assigned to the IEP (based on the data we obtained in the keyword search and the way we had to delete rows of data to build our data file), about half had speech as a service, and the most frequent services were Speech, Transportation, and Paraprofessional.

In addition, we were able to examine the extent to which students were included in the general education setting. Students likely to be on the Autism Spectrum are included with nondisabled peers for less time than other children with disabilities and, as a group, do not meet State Performance Plan targets for inclusion in general education (nor would students with disabilities in general).

Study One led us to reexamine what more we needed to know and how we might better understand the kinds of services students on the Autism Spectrum were receiving, the extent to which services were evidence-based, the extent to which services were being provided consistent with research standards, the kinds of goals and problems being addressed on IEPs, the extent to which challenging behavior appears to be an issue, and the academic performance of students likely to be on the Autism Spectrum.

The method used, research questions, and results for Study Two are summarized next.

Study Two: What Services and Goals Are Being Provided With What Effects?

Because the data aggregation to identify the students was so time intensive, a method was developed to "track" the students in the data file in future years. A research field was added that would identify the student as a student in our sample of 3,102. We used this field to obtain service data on students in greater detail than we used in Study 1.

We obtained data on: (a) IEP goals for students in the sample with IEPs; (b) services listed on the IEP as special education; (c) minutes per month of services listed on the IEP; (d) mode of service delivery (direct service or consultative); and (e) whether the child's IEP contained a functional behavior assessment or a behavior intervention plan.

Based on how the data were drawn, we obtained data for 1,848 students out of the original 3,102. We had to recode services and IEP goals by hand, so we decided to code samples of data first prior to recoding all 1,848 cases. The service data were easier to recode than the IEP data, so the analyses below will describe services for 1,000 of 1,848, and IEP goals for 300 students (both are large enough samples from which to generalize).

Are Services Evidence-based?

From the data used in Study One to estimate our population, we developed a second data set. We had individual files of students whose services included some specific methods such as: Treatment and Education of Autistic and Related Communication-Handicapped Children or TEACCH, Boardmaker, Picture Exchange Communication System, Applied Behavior Analysis (ABA), Sensory Diet, and Schedule. We matched our file defining the likelihood of being on the Autism Spectrum, with each file defining services. We used the National Autism Center (2011) guide, *Evidence-Based Practice and Autism in the Schools: A Guide to Appropriate Interventions to Students with Autism Spectrum Disorders*, to define ABA as "Established," Sensory as "Unestablished," and the others "Emerging."

Note: We did not search all keywords in the National Autism Center guide. We might have missed a keyword if it was written on part of the IEP that was not searched, and IEP teams are not required to be specific in terms of methodology. Hence, the results that follow likely underreport the extent to which evidence-based practices are being implemented in Iowa.

Table 9 summarizes the combinations of established, emerging, and unestablished methods that were found in the IEP fields we sampled for the keywords we sampled.

Table 9*. Percentage of established, emerging, and unestablished methods reported on IEPs (The number of 3,020 differs from our original pool of 3,102 because only students with state Identifiers could be maintained in the file as we merged across six datasets.)*

Practice	No.	%
Established	6	0%
Established + Emerging	3	0%
Established + Emerging + Unestablished	8	0%
1 Emerging	324	11%
2 Emerging	49	2%
3 Emerging	6	0%
Emerging + Unestablished	303	10%
Unestablished	439	15%
None listed	1,882	62%

Most IEPS did not contain keywords that reflected practices captured in the National Autism Council Report. A variety of explanations can be proposed, but the likely reasons are: (a) because children are not labeled “Autistic” or on the Autism Spectrum, IEP teams may not be thinking of treatments associated with Autism; (b) IEP teams are not required to document specific methods on IEPs; (c) we did not search on all keywords (i.e. social story or peer mediation); (d) we did not include IEP goal searches in our aggregate; and (e) we may have missed fields.

Two solutions for more reliable data: (a) are randomly sampled IEPs of children likely on the spectrum and search for keywords, and (b) have a standard procedure for documenting services on the IEP.

A second way to interpret the data is presented in Table 10. Table 10 excludes the 1,882 children in the sample whose IEPs did not contain the keywords we searched on in the fields we queried.

Table 10*. Percentage of established, emerging, and unestablished methods reported on IEPs with relevant data (No.=1,138)*

Practice	No.	%
Established	6	1%
Established + Emerging	3	0%
Established + Emerging + Unestablished	8	1%
1 Emerging	324	28%
2 Emerging	49	4%
3 Emerging	6	1%
Emerging + Unestablished	303	27%
Unestablished	439	39%

Data in Table 10 reflect that 2 percent of the IEPs had an established practice listed (in combination with other practices), 61 percent of IEPs had an emerging practice listed (in combination with established or unestablished practices), and while 67 percent of IEPs had an unestablished practice (Sensory*)* listed in combination with other practices.

These data highlight a need for more training for parents and staff alike on what constitutes established or evidence-based practice. Additional research will be done to examine the extent to which teachers and AEA staff understand evidence-based practices and are trained to deliver the practices.

Given the Iowa Department of Education's goal of eliminating the achievement gap by 2020, we can only afford to deliver practices that work. One commentary is that the National Autism Council included in its analysis only studies specific to Autism. Hence, specialized instruction, which has an established research base, was found to be "emerging" in the National Autism Council review because so few studies have been done specific to children on the Autism Spectrum. A similar case could be made for other strategies reviewed. Future work in this area might be expanded to use What Works Clearinghouse (http://ies.ed.gov/ncee/wwc/) or other meta-analyses or reviews to judge practices. Only practices with high effect can be selected by the state for state-wide implementation, considering factors such as effect, cost, sustainability, scale-up, alignment to the instructional core, international benchmarking, capacity of institutes of higher education to conduct work at the preservice level, and capacity of the AEAs to engage in support at the in-service levels.

How Much Service are Students Receiving?

For IEP services, we coded the type of service (specialized instruction, speech, occupational therapy, physical therapy, paraprofessional). We coded minutes per day of specialized instruction, and minutes per month of related service. We also coded when services were listed on an IEP as "no LRE minutes," which means the support and related service provider is consulting with the classroom teacher but not seeing students directly. That type of service delivery and minutes per month is summarized in Table 11.

We then examined the professional literature and asked some experts in Autism and Communication Disorders if there were standards of minutes of service delivery published in the research. The research did not provide clear standards of practice. We decided to code instructional services in terms of 0 minutes per day, 1-29 minutes per day, 30-44 minutes per day, and 45+ minutes per day, and we thought using 30 minutes per day of specialized instruction would give us a good benchmark of sufficiency of amount of services described on the IEP. At or above the benchmark is coded **bold**.

For speech and communication, the research provided mixed results: some students made progress given five hours of direct service in a year, whereas other students did not make progress given 20 hours of service in a year; much is dependent on the child, the nature of the speech or communication problem, or the severity of the speech problem. Based on our review of the speech research, we decided to judge "sufficiency of amount of services" as 45 minutes/month (at or above benchmark coded in **bold**). We did not find standards in the Occupational Therapy literature nor the Physical Therapy literature; hence, we applied the same rules as for speech.

NOTE: Decisions about all services, including speech, occupational therapy, and physical therapy, are made at the IEP team level based on professional judgment of the IEP team of each child's unique needs. The "benchmark" of 45 minutes/month is for evaluation purposes only and should not be interpreted as a "target" for service delivery by teachers, parents, AEA staff, or other advocates for special education.

Table 11. *Service Provided and Method (Direct/Consultative), and Minutes per Day (instruction) or Month (other services)*

	Direct					Consultative			
Minutes* / **Service**	N=1,000	0	1-29 mins.	30-44 mins.	45+ mins.	N=1,000	1-29 mins.	30-44 mins.	45+ mins.
Specialized Instruction	972 (97%)	12 (<1%)	85 (9%)	**129 (13%)**	**746 (77%)**				
Speech	382 (38%)		3 (<1%)	19 (5%)	**360 (94%)**	74 (7%)	20 (27%)	10 (14%)	**44 (59%)**
Occupational Therapy	63 (6%)		2 (3%)	13 (21%)	**48 (76%)**	43 (4%)	28 (65%)	8 (19%)	**7 (16%)**
Physical Therapy	2 (0%)		0	0	2 (100%)	3 (0%)	1 (33%)	1 (33%)	1 (33%)
Associate	67 (7%)		1 (1%)	3 (4%)	63 (94%)	**446 (45%)**	4 (<1%)	7 (1%)	435 (98%)

*Per day for specialized instruction, per month for others

In addition, the IEP provides a calculation of all services per month, in total minutes of services per month. Without examining the combination of services, we thought, as an initial benchmark, 645 minutes per month of services would represent "likely to be enough to make a difference." This level of service represents 30 minutes per day of specialized instruction and 45 minutes per month of another therapy.

NOTE: 645 minutes per month was used as a benchmark for evaluating the amount of services. Some students need more, some need less. Decisions about minutes of services are made at the IEP level. The benchmark used in this study should not be interpreted by teachers, AEA staff, administrators, advocates, parents, or any other interested party as a "minimum" standard against which services will be judged. Data on IEP goal progress is used by IEP teams to determine if services are sufficient at the individual child level.

Minutes of services per month for all 1,848 students in the Study Two data draw were coded 0-645 (0-30 minutes per day of specialized instruction plus 45 minutes/month of a service), 646-1,245 (between 30 and 60 minutes per day of specialized instruction plus 45 minutes per month in one service), 1,246-2,445 (between one and two hours per day of specialized instruction plus 45 minutes per month of a service), 2,446-3,645 (between 2 and 3 hours per day of specialized instruction plus 45 minutes per month of a service), and greater than 3,646 minutes per month of specialized instruction and related service. The minutes per month of direct instruction and related services, are summarized in Table 12. The bolded percentages reflect minutes of service per month above our target benchmark of 645 minutes per month.

Table 12. *Frequency Counts and Percentages of Minutes per Month of IEP Services*

Minutes Per Month	N (Total = 1,848)	%
0-645	367	19.86%
646-1,245	302	**16.34%**
1,246-2,445	270	**14.61%**
2,446-3,645	194	**10.50%**
3,646+	715	**38.69%**

Conclusions From Services Data Listed on IEPs

Based on the data summarized in Tables 9 and 10, some general conclusions are:

1. We rated enough cases to generalize the data to all students in the population, and results are +/- 2.5 percent.
2. Most students in the sample are getting, at least on their IEPs, sufficient minutes of specialized instruction (at least 30 minutes per day). Students receiving less than 30 minutes per day had that time determined by their IEP team, so the conclusion is the time is sufficient to meet their needs.
3. Students getting related services are getting those services in amounts consistent with the research we could find, and probably enough to make a difference.
4. When students receive speech, most of the time it is in a direct service model, not a consultative model.

Academic Proficiency

We took the 3,102 students identified in Study One, and we had 2008-2009, 2009-2010, and 2010-2011 reading and math Iowa Test of Basic Skills scores matched to those students.

Students are tested in grades 3, 8 and 11, so children would not have data included unless they were in one of the tested grades across one of those three school years. For 2009, we found at least one point of achievement data on 2,051 students, and 1,751 students with all three years of achievement data. The state reports three levels of proficiency: Basic (<41st percentile), Proficient (41st-89th percentile), and Advanced (90th percentile or higher).

Data in reading are summarized in Figure 2. Data in math are summarized in Figure 3.

The data depicted in Figure 2 reflect that:

- Of 2,051 students with ASD who took standardized reading assessments in 2009, 1,349 (65.8%) scored at the ***basic level***, 616 (30.0%) scored at the ***proficient level***, and 86 (4.2%) scored at the ***advanced level***.

- Of the 1,349 students with ASD who scored at the ***basic level*** in 2009, 1,191 (88.3%) scored at the ***basic level***, 155 (11.5%) scored at the ***proficient level***, and three (.02%) scored at the ***advanced level*** in 2010.

- Of the 1,191 students who scored at the ***basic level*** in 2009 and the ***basic level*** in 2010, 1,090 (91.5%) scored at the ***basic level***, 100 (8.4%) scored at the ***proficient level***, and one (.1%) scored at the ***advanced level*** in 2011.

- Of the 155 students who scored at the ***basic level*** in 2009 and the ***proficient level*** in 2010, 91 (58.7%) scored at the ***basic level***, 62 (40.0%) scored at the ***proficient level***, and two (1.3% scored at the ***advanced level*** in 2011).

- Of the three students who scored at the ***basic level*** in 2009 and the ***advanced level*** in 2010, two (66.7%) scored at the ***basic level***, one (33.3%) scored at the ***proficient level***, and 0 (0.0%) scored at the ***advanced level*** in 2011.

- Of the 616 students with ASD who scored at the ***proficient level*** in 2009, 207 (33.6%) scored at the ***basic level***, 366 (59.4%) scored at the ***proficient level***, and 43 (7.0%) scored at the ***advanced level*** in 2010.

- Of the 207 students who scored at the ***proficient level*** in 2009 and the ***basic level*** in 2010, 144 (69.6%) scored at the ***basic level***, 62 (30.0%) scored at the ***proficient level***, and one (.5%) scored at the ***advanced level*** in 2011.

- Of the 366 students who scored at the ***proficient level*** in 2009 and the ***proficient level*** in 2010, 86 (23.5%) scored at the ***basic level***, 266 (72.7%) scored at the ***proficient level***, and 14 (3.8%) scored at the ***advanced level*** in 2011.

- Of the 43 students who scored at the ***proficient level*** in 2009 and the ***advanced level*** in 2010, 0 (0.0%) scored at the ***basic level***, 30 (69.8%) scored at the ***proficient level***, and 13 (30.2%) scored at the ***advanced level*** in 2011.

- Of the 86 students with ASD who scored at the ***advanced level*** in 2009, 1 (1.2%) scored at the ***basic level***, 42 (48.8%) scored at the ***proficient level***, and 43 (50.0%) scored at the ***advanced level*** in 2010.

- The one student who scored at the ***advanced level*** in 2009 and the *basic level* in 2010, also (100%) scored at the ***basic level*** in 2011.

- Of the 42 students who scored at the ***advanced level*** in 2009 and the ***proficient level*** in 2010, four (9.5%) scored at the ***basic level***, 24 (57.1%) scored at the ***proficient level***, and 14 (33.3%) scored at the ***advanced level*** in 2011.

- Of the 43 students who scored at the ***advanced level*** in 2009 and the ***advanced level*** in 2010, 0 (0.0%) scored at the ***basic level***, 10 (23.3%) scored at the ***proficient level***, and 33 (76.7%) scored at the ***advanced level*** in 2011.

Figure 2, Reading

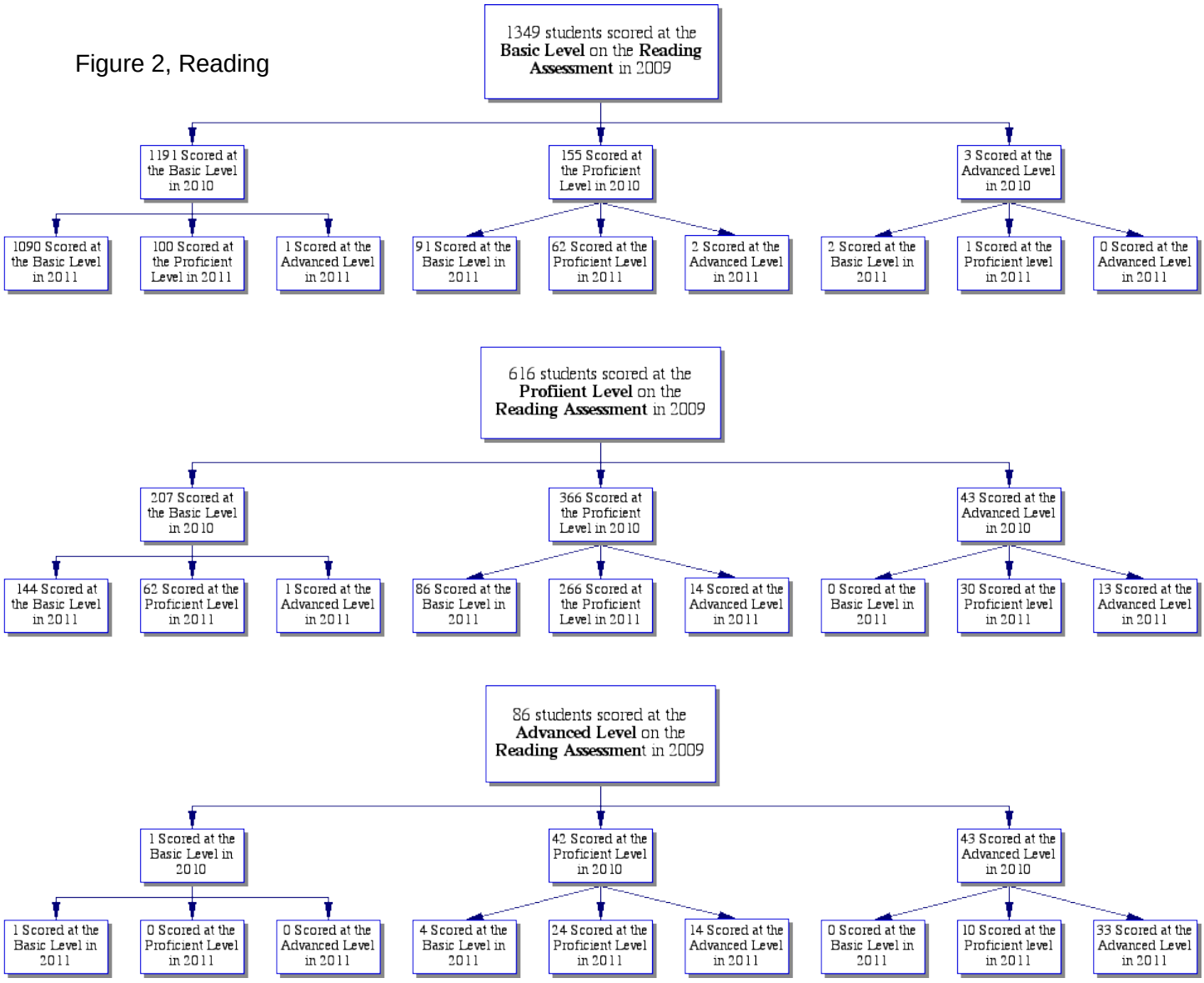
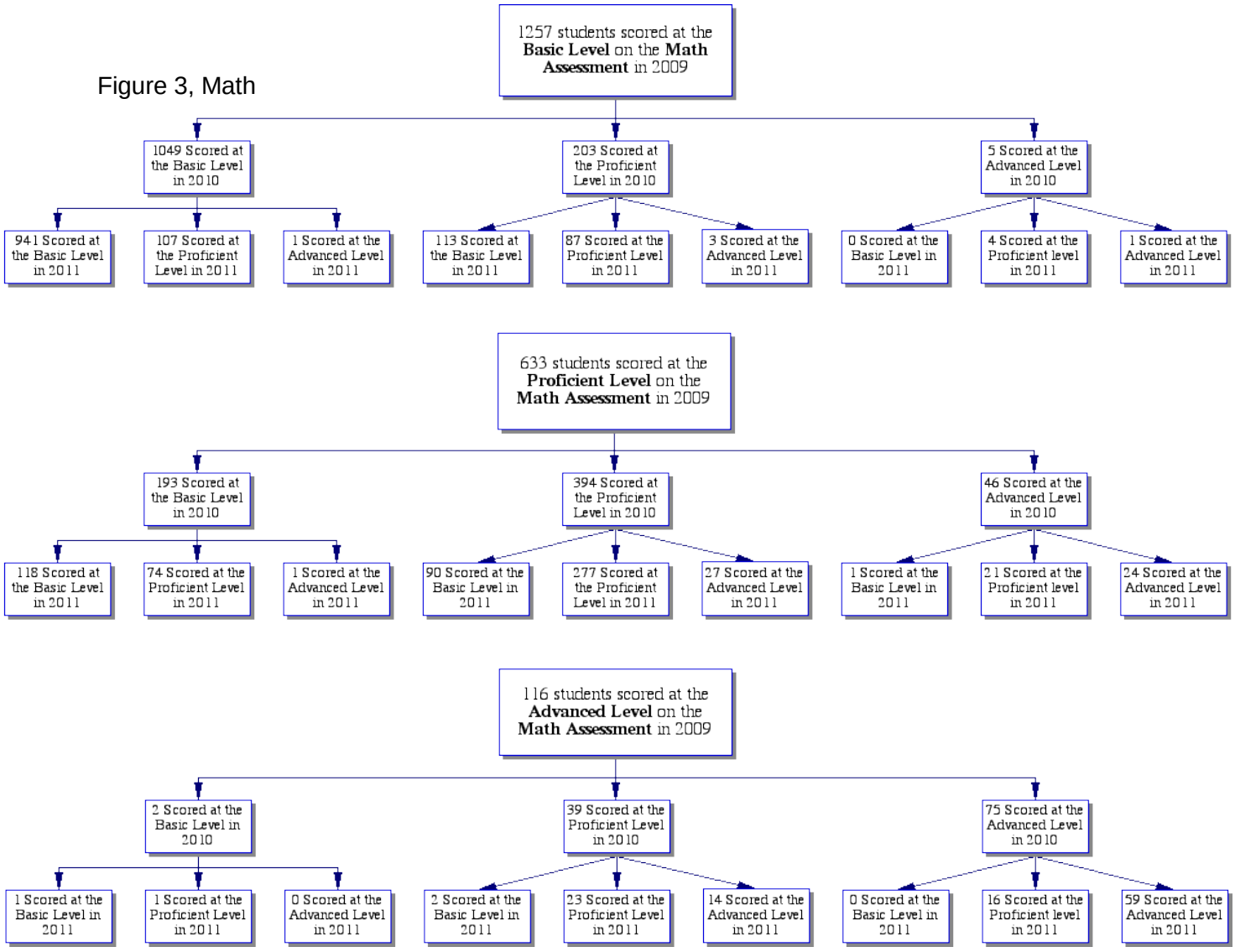


Figure 3, Math



The data depicted in Figure 3 reflect that:

- Of the 2,006 students with ASD who took the standardized math test in 2009, 1,257 (62.7%) scored at the ***basic level***, 633 (31.6%) scored at the ***proficient level***, and 116 (5.8%) scored at the ***advanced level.***

- Of 1,257 students with ASD who scored at the ***basic level*** in 2009, 1,049 (83.5%) scored at the ***basic level***, 203 (16.1%) scored at the ***proficient level***, and five (0.4%) scored at the ***advanced level*** in 2010.

- Of the 1,049 students with ASD who scored at the ***basic level*** in 2009 and the ***basic level*** in 2010, 941 (89.7%) scored at the ***basic level***, 107 (10.2%) scored at the ***proficient level***, and one (0.1%) scored at the ***advanced level*** in 2011.

- Of the 203 students with ASD who scored at the ***basic level*** in 2009 and the ***proficient level*** **in** 2010, 113 (55.7%) scored at the ***basic level***, 87 (42.9%) scored at the **proficient level**, and three (1.5%) scored at the ***advanced level*** in 2011.

- Of the five students with ASD who scored at the ***basic level*** in 2009 and the ***advanced level*** in 2010, 0 (0.0%) scored at the ***basic level***, 80% scored at the ***proficient level***, and 20% scored at the ***advanced level*** in 2011.

- Of 633 students with ASD who scored at the ***proficient level*** in 2009, 193 (30.5%) scored at the ***basic level***, 394 (62.2%) scored at the ***proficient level***, and 46 (7.3%) scored at the ***advanced level*** in 2010.

- Of the 193 students with ASD who scored at the ***proficient level*** in 2009 and the ***basic level*** in 2010, 118 (61.1%) scored at the ***basic level***, 74 (38.3%) scored at the ***proficient level,*** and one (0.5%) scored at the ***advanced level*** in 2011.

- Of the 394 students with ASD who scored at the ***proficient level*** in 2009 and the ***proficient level*** in 2010, 90 (22.8%) scored at the ***basic level***, 277 (70.3%) scored at the ***proficient level***, and 27 (6.9%) scored at the ***advanced level*** in 2011.

- Of the 46 students with ASD who scored at the ***proficient level*** in 2009 and the ***advanced level*** in 2010, 1 (2.2%) scored at the ***basic level***, 21 (45.7%) scored at the ***proficient level***, and 24 (52.2%) scored at the ***advanced level*** in 2011.

- Of the 116 students with ASD who scored at the ***advanced level*** in 2009, 2 (1.7%) scored at the ***basic level***, 39 (33.6%) scored at the ***proficient level,*** and 75 (64.7%) scored at the ***advanced level*** in 2010.

- Of the two students with ASD who scored at the ***advanced level*** in 2009 and the ***basic level*** in 2010, 1 (50%) scored at the ***basic level***, 1 (50%) scored at the ***proficient level***, and 0 (0.0%) scored at the ***advanced level*** in 2011.

- Of the 39 students with ASD who scored at the ***advanced level*** in 2009 and the ***proficient level*** in 2010, two (5.1%) scored at the ***basic level***, 23 (59.0%) scored at the ***proficient level***, and 14 (35.9%) scored at the ***advanced level*** in 2011.

- Of the 75 students who scored at the ***advanced level*** in 2009 and the ***advanced level*** in 2010, 0 (0.0%) scored at the ***basic level***, 16 (21.3%) scored at the ***proficient level***, and 59 (78.7%) scored at the ***advanced level*** in 2011.

Generally speaking, most students were not proficient. The majority of students with ASD performed at the basic level on standardized tests for math (62.7%) and reading (65.8%). The overall performance of students with ASD on standardized tests tends to be higher in math than in reading. Performance on standardized tests for both math and reading shows minimal changes due to growth from the base year to subsequent years.

As a comparison, in Iowa, students without disabilities score about 80 percent proficient or advanced, students with disabilities score about 40 percent proficient or advanced, with +/- 5 point variance by grade and content area.

Behavior Concerns

Because repetitive or excessive behaviors are considered part of the Autism Spectrum, we were interested in examining how many students had IEPs that addressed behavioral concerns. We used Functional Behavior Assessment (FBA) or Behavior Intervention Plan (BIP) as the indicator for behavior concern. In addition, we searched the Special Considerations section of the IEP to see if the IEP team checked that behavior was a concern. We did not search individual IEP goals for keywords associated with behavior problems. We used the same data file we used in the IEP services and minutes of service analyses for 1,848 students. Table 13 summarizes the results. The results are duplicated in that one student could be counted in each analysis.

Table 13. *Percentage of Cases with FBA or BIP (N=1,848)*

Area Reviewed	No.	%
Behavior Indicated a Concern	1,192	64.5%
Current FBA	919	49.7%
Current BIP	889	48.1%
Current FBA, no BIP	39	0.02%
Current BIP, no FBA	11	0.006%
Behavior Indicated a Concern, no FBA or BIP	319	17.3%

IEP Goals

We wanted to know how many IEP goals students in our sample had, and the areas in which IEP goals were being written. The IEP goal review is complicated, so we drew a sample of 297 students to obtain a 95 percent confidence level of +/- 5.21 percent.

The total number of goals identified within the sample of 297 IEPs equaled 916. The number of goals written in the IEPs reviewed ranged from one to 10 with the most common number of goals being three and the average being 3.08.

The number of IEPs that had five or fewer goals accounted for 94 percent (279) of all IEPs. The majority of goals (63.6% or 189) had between two and four goals.

Of all 297 IEPs in the sample, 52.9 percent (157) addressed reading/language arts and 45.1 percent addressed math (134). This accounted for 31.8 percent (291 of 916) of all goals.

Of all IEPs in the sample, 36.4 percent (108) addressed communication and 29.3 percent (87) addressed writing. This accounted for 21.3 percent (195 of 916) of all goals.

Of all IEPs in the sample, 32.7 percent (97) addressed peer/social interaction and 21.5 percent addressed excessive behavior (64). This accounted for 17.6 percent (161 of 916) of all goals.

A total of 37.4 percent (111) of all 297 IEPs had both a reading/language arts goal and a math goal, and 23.9 percent (71) of all IEPs had both a reading/language arts goal and a writing goal.

The IEPs that had both a writing goal and a peer/social support goal totaled 10 percent (30).

The IEPs that had both a peer/social support and excessive behavior goal totaled 6 percent (17).

The IEPs that had both an excessive behavior goal and a current FBA/BIP totaled 20 percent (60).

Conclusions Based on Analysis of Proficiency, Behavior and IEP Goals

Based on the data reviewed, the following conclusions are appropriate:

1. That majority of students with ASD perform at the basic level on standardized tests for math (62.7 percent) and reading (65.8 percent). The overall performance of students with ASD on standardized tests tends to be higher in math than in reading. Performance on standardized tests for both math and reading shows minimal change in performance due to growth from the base year to subsequent years.

2. The majority of IEPs for students with ASD have between one and five goals with the average number of goals being three. Reading/language arts (52.9 percent of IEPs) and math (45.1 percent of IEPs) were the most common goals on the IEPs sampled. Behavior was a concern in 64.5 percent of IEPs but was found in only 17.6 percent of all goals (assuming peer/social interaction and excessive behavior goals are combined).

3. Goal statements are written in such a way that categorizing them into common terminology is difficult. This becomes problematic when attempting to determine the degree to which evidence-based interventions are being implemented as part of IEPs. More clarity on this issue may improve communication with parents, who use different criteria to place value on interventions. Parent surveys completed in 2011 as part of another study did not indicate an understanding or appreciation for research-based interventions or understanding of what different interventions entailed.

4. While most IEPs included a duration notation for interventions, the formats varied to the point that standardized assessments of the intensity of interventions was impossible to establish. Guidance regarding uniformity in identifying who provides interventions and the intensity of the interventions would improve assessments of the fidelity of the interventions.

5. This study could not determine the degree to which common definitions, intensity, and fidelity were used to identify interventions in IEPs. This is a knowledge-to-practice issue. At this point, it is unclear how knowledge translation procedures for both preservice and in-service education are used to ensure uniformity across IEPs. Improved and better coordinated knowledge translation could allow AEAs and LEAs to better demonstrate the quality of interventions. This clarity, in turn, could improve the understanding of why student performance on standardized tests remains so low. Are we not using evidence-based interventions? Are we not implementing these interventions with high fidelity due to training or resource constraints? Is student performance higher when evidence-based interventions are used?

Summary and Conclusion

Because Iowa does not require IEP teams to designate a category of disability when identifying students with disabilities, it has been difficult to determine how many students in Iowa demonstrate behaviors and learning styles associated with Autism Spectrum Disorder at levels sufficient to be considered "on the Autism Spectrum."

Using two data sources, we were able to identify 3,102 students with disabilities whose services and keywords on their IEPs made it highly likely that they were on the Autism Spectrum. This represents a prevalence of about 1:150, which is lower than national estimates. However, mere identification of Autism is not the intent of Individuals with Disabilities Education Act *(*IDEA*);* services to meet needs must be provided. As long as 100 percent of Iowa's students with disabilities have services that are meeting their needs, the extent to which the right label is used to identify students is not important. Labels do, however, provide some information on the types of services one might expect.

We also found that most school districts in the state do not have large numbers of students on the Autism Spectrum being identified, and that even small districts have established programs that meet the needs of students in our study.

In this study, we found that most services provided were: (a) services not directly linked to improving academic or social-emotional performance (more indirect services or support and paraprofessional services as opposed to instructional supports), and (b) not considered established practice according to credible national sources. The Iowa Department of Education must partner with Iowa's Area Education Agencies and Institutes of Higher Education to enhance teachers' and administrators' knowledge and skills to support evidence-based practices.

We also found that students in our sample were being served in more restrictive settings. This finding is appropriate, as long as there is evidence students are making progress. To this end, the academic performance data did not support high levels of proficiency or high levels of growth, even though the analysis also showed that services were being documented on IEPs at levels high enough to effect change.

The data also reflect individualized decision-making. IEP teams are considering each child and writing programs and services that reflect the child's needs rather than packaged programs or "what the district has." This is important because the intent of the IDEA is for services to be

provided based on need, not label or convenience. The data in the study reflect high levels of individualization, even though the data also do not reflect high levels of achievement.

Additional studies must be done to determine what teachers and AEA staff know about evidence-based practices, the extent to which evidence-based practices are being implemented with integrity, the extent to which IEP goals are ambitious, and the extent to which IEP goals are being monitored using valid methods, and instructional decisions being made based on student progress.

Next Steps

First, these data need to be disseminated and conversations with staff in the Area Education Agencies and Iowa's local schools need to occur. The Iowa Department of Education has started these conversations and has many stakeholder groups with whom regular meetings are held to discuss this study and the implications thereof. Conversations will occur in the 2012-2013 school year and plans for professional development for the 2013-2014 school year should emerge.

Second, a research and evaluation agenda needs to be established. We now have a mechanism to track the 3,102 students in our sample, and adding additional students will be less cumbersome now that the bulk of students have been classified. We understand where students are being provided services, and we can use the data to target families, schools, and AEA teams to better understand issues such as:

- The percentage of students have methodology listed on IEPs that is evidence-based or not evidence-based;
- The outcomes of students on the Autism Spectrum who receive evidence-based interventions compared to students on the Autism Spectrum who do not receive evidence-based interventions;
- The extent to which IEP goals are grade referenced;
- The extent to which IEP goals are being monitored;
- The extent to which IEP data are used in decision making;
- The systemic issues that support or impede higher levels of evidence-based practice and higher achievement levels;
- The short- and long-term performance differences, including different life opportunities that can be linked to the extent to which evidence-based practices were used during the school-aged years;
- The caseloads of providers assigned to students on the Autism Spectrum;
- Preservice teacher preparation in methods proven to support students with Autism;
- In-service teacher preparation in methods proven to support students with Autism;
- AEA staff preparation to support teachers in methods proven with Autism;
- Parent and teacher perception of how well what is written on IEPs is being delivered;
- The understanding of parents, teachers, AEA staff, and building administrators of which practices are truly evidence-based and advocate for practices that are evidence-based rather than unproven or popular.

Third, we need to examine the databases we have, how IEP teams are entering data, and whether enhancements are needed in data entry, or if enhancements to the IEP would benefit not only students in Iowa, but also our evaluation efforts. It was clear in the IEP goal analysis that lack of consistency in goal setting and goal writing make it difficult, at the systems level, to evaluate IEP goal quality and IEP progress.

This report represents the first time Iowa has a more than scant understanding of students on the Autism Spectrum. The studies shed some light on areas in which policy and resources might be retargeted to change lives of students and families. The research agenda resulting from this report will align with Iowa Department of Education efforts to eliminate achievement gaps, to define roles and functions within Iowa's educational system, and create teams of caring individuals working together to change lives.

It would be inappropriate and potentially unethical to use the content of this report for personal gain or to use against schools or IEP teams in due process proceedings, or by schools or AEAs to make caseload decisions based on our summary of "are services sufficient," since the intent of this report is to begin to understand services at the system level and to understand what systems supports are needed to better impact performance of students with disabilities in the state of Iowa. In this report, we explored students on the Autism Spectrum, but additional work for all students with disabilities must be undertaken. In addition, we reiterate several times that it appears that decisions are being based on student needs at the individual level, and that is what we want. Additionally though, the data suggest students are not making sufficient progress as a whole, and that needs to be changed. In the end, change will come only when classroom teachers have the supports they need to enhance the relationship between the teacher, the content, and the child. Change will come only when practices with large effect sizes are implemented. Change will come only when practices we select as a system can be scaled up reliably across Iowa. The Iowa Department of Education is committed to providing leadership and service to all educational stakeholders to create a world-class education system in which all of Iowa's students, including students on the Autism Spectrum, are given supports to pursue their dreams.