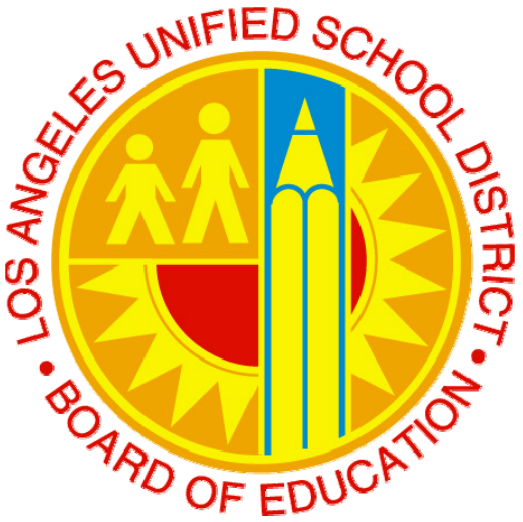

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Study to Measure the Delivery of Services in Accordance with the Individualized Education Programs of Students with Disabilities, Year 5 2007-08

A Joint Report Produced by the Los Angeles Unified School District Research and Planning Division and the American Institutes for Research

Submitted by (in alphabetical order):
Jenifer J. Harr, Ph.D., American Institutes for Research
Deborah F. Oliver, Ph.D., Research and Planning Division, Los Angeles Unified School District
Miguel Socias, Ph.D., American Institutes for Research

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Year 5 Summary

- This report focuses on Outcome #13 of the Modified Consent Decree (MCD) which requires that the Los Angeles Unified School District provides evidence that at least 93% of special education services required by students' Individualized Education Programs (IEPs) were delivered and that 85% of the services meet the frequency and duration specified in the IEPs.
- Estimates for the population of special education students excluding students with Specific Learning Disabilities (SLD) show 92% of required services were delivered. Although slightly lower than the 93% target, the confidence interval around this estimate includes the target, and therefore the estimate is not statistically different from the MCD outcome.
- For students with SLD, our estimates show that 93% of the required services were delivered.
- Estimates, including the confidence intervals, for both the frequency and duration of all services combined are lower than the MCD outcome.

Overview

This report presents the results from the Year 5 study to measure whether the Los Angeles Unified School District (LAUSD or the District) has met the goals of Outcome #13 of the Modified Consent Decree (MCD). Outcome #13 measures the delivery of services to students with disabilities. Since the District did not meet the outcome in 2006-07, data collection and service delivery monitoring continued in 2007-08. In Year 5, this study has been a collaborative effort between LAUSD's Research and Planning Division and the American Institutes for

Research (AIR).[1] This project is directed by the Office of the Independent Monitor (OIM), an independent body responsible for overseeing the progress of the District towards the outcomes, verifying the accuracy of District data, and determining disengagement from the MCD.

Outcome #13 states that the District must provide evidence that at least 93% of special education services required by students' Individualized Education Programs (IEPs) were delivered, and 85% of the services must meet the frequency and duration specified in the IEPs. This outcome examines two disability groups for evidence of service: all disabilities combined excluding Specific Learning Disability (SLD) and SLD individually.[2]

The study addressed the following three questions:

(1) Was there evidence of service delivery?

(2) Did the student receive service at the frequency (i.e., how often the service was provided) stated on the IEP?

(3) Did the student receive service for the duration (i.e., amount of time service was provided) stated on the IEP?

In addition, the Research and Planning Division conducted a separate site visit study to compare observations of service sessions in relation to what was documented on provider logs. This was an important step in determining the accuracy of the logs being used for this outcome.

[1] The American Institutes for Research (AIR) conducted the Year 1 study in 2003-04, developing the initial methodology that the Research and Planning Division modified as needed in subsequent years. AIR also conducted checks to validate the Research and Planning Division results in Years 2 and 3, as well as provided technical assistance in Year 4.

[2] Starting with Year 2, the MCD required that the District disaggregate the evidence of service delivery results for the population excluding SLD and for SLD only. Because students with SLD comprise the majority of the special education population, the OIM wanted to ensure that this group did not bias the overall results.

Methods

This study addressed the three research questions by examining the agreement between student IEPs and provider logs over periods of 8 weeks (for weekly services) or 2 months (for monthly services). Logs are the official record of service and therefore should reflect actual service provision. Over the last several years, LAUSD has used a districtwide web-based software system called Welligent to document IEPs and provider logs. LAUSD's Research and Planning Division drew a random sample of 4,486 special education students across 10 disability categories (see Appendix A for a comprehensive description of the sample). The Research and Planning Division requested Welligent IEP information from the Information Technology Division, resulting in IEPs for 4,399 students (98% of the sample). We excluded some students from the study because they exited special education, attended non-public schools, or left the District.

Based on the services specified in the IEPs, the Research and Planning Division requested 7,110 logs from the Division of Special Education. In past years, Research and Planning Division staff compared the IEP information to the logs and then entered the codes into a database according to a detailed coding manual. Since providers now document most of the logs in Welligent, a different approach was taken this year. With guidance from the Research and Planning Division and the OIM, AIR developed a computer program based on the coding rules in the manual to electronically compare IEPs and logs. This computer program analyzed more than 70% of the sampled services, improving efficiency in conducting this work. The Research and Planning Division continued to hand-code the non-Welligent logs (paper logs), all Resource Specialist Program (RSP) logs, and logs accompanied by supplemental information from the Division of Special Education. See Appendix A for the complete methodology.

Summary of Findings

Were special education services provided as required by the IEP?

Based on provider logs, we found evidence that 92% of the special education services required by IEPs districtwide during the 2007-08 school year were provided.[3] This figure represents services for students in all disability categories districtwide except for those with Specific Learning Disabilities (SLD). For the students with SLD included in this study, we found evidence that 93% of their required services were provided. Figure 1 illustrates the percentages of services for which there was evidence of provision by disability category and Figure 2 shows this information by service category.[4]

Because these estimates are based on a sample of students and not the entire population, we estimated confidence intervals at the 95% level to specify the precision of these estimates. If we examined the entire population of students excluding SLD in 2007-08, we would expect (with 95% confidence) the true service delivery rate to fall between 89.5% and 94.9%. The confidence interval for SLD shows that the true estimate would be expected to fall within the range of 91.7% to 94.7%.

For both SLD and the special education population excluding SLD, the confidence interval ranges include the MCD outcome of 93%, and therefore the estimates of service provision are not statistically different from the required outcome.

While the outcome does not apply to individual disability categories, except for SLD, disaggregating the results by disability and service categories may be helpful for future

[3] This is a population estimate based on the probability weights for each disability category, excluding SLD. Please see Appendix C for more details.

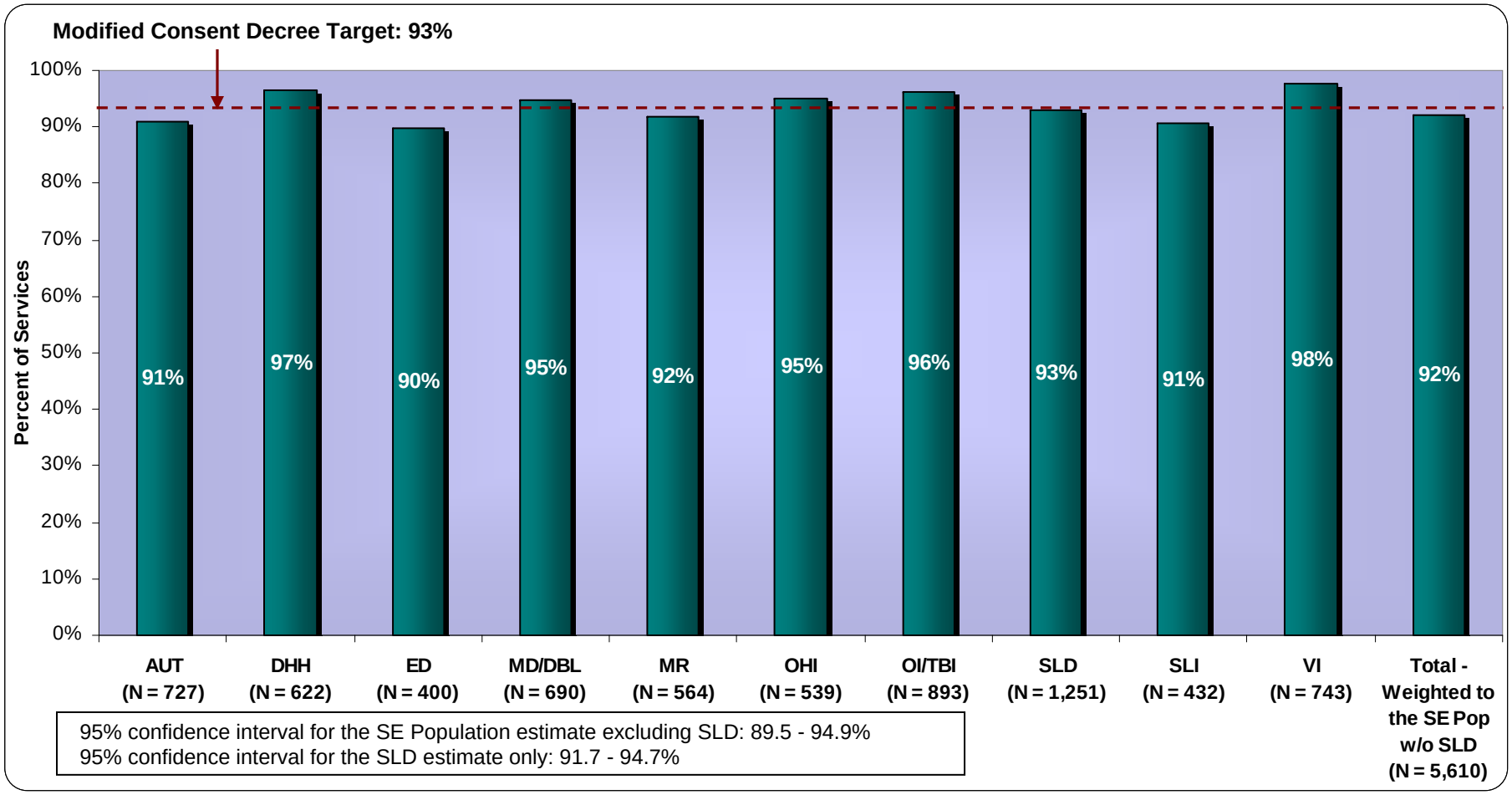
[4] The numbers (n) shown underneath the disability and service categories in Figures 1 and 2 represent the total number of services analyzed for that category. For example, we found evidence of service provision for 91% of the 727 services required for the sampled students with Autism.

monitoring purposes. Across the 10 disability categories, the estimate of service delivery for students with Autism, Emotional Disturbance, Mental Retardation, and Speech/Language Impairment were below the 93% threshold (although the confidence intervals for all individual categories overlap with the outcome).[5] From the service perspective, 2 of the 11 service categories – Language and Speech (86%) and Non-Public Agency (87%) – show estimates of service delivery less than 93%.

[5] Please see the confidence intervals in Appendix C for individual disability categories.

FIGURE 1

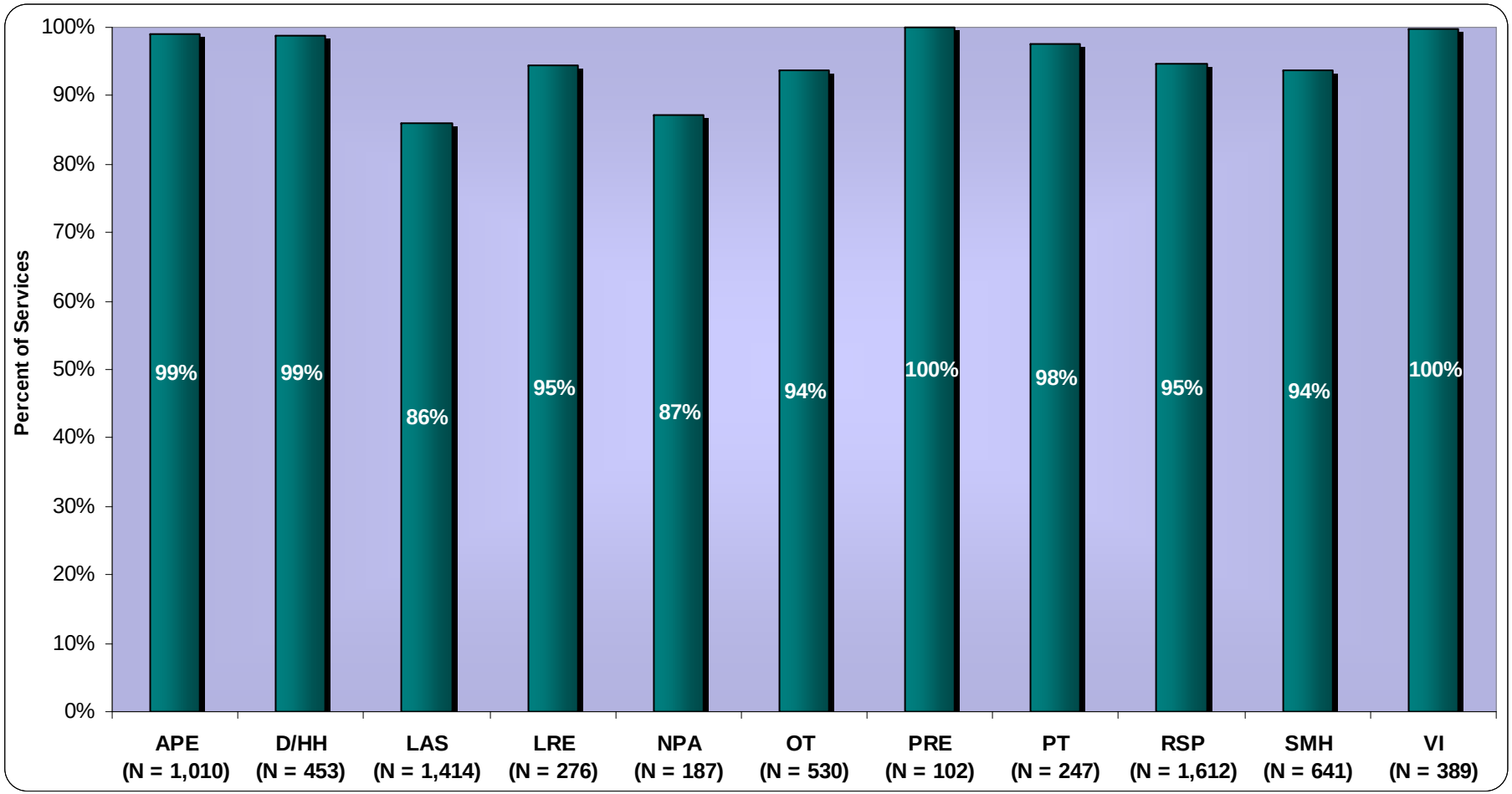
Percentages of services for which there was evidence of provision, by disability category, 2007–08



Abbreviations: AUT (Autism); DHH (Deaf/Hard of Hearing); ED (Emotional Disturbance); MD/DBL (Multiple Disabilities/Deaf-Blindness); MR (Mental Retardation); OHI (Other Health Impairment); OI/TBI (Orthopedic Impairment/Traumatic Brain Injury); SE (Special Education); SLD (Specific Learning Disability); SLI (Speech/Language Impairment); VI (Visual Impairment).

FIGURE 2

Percentages of services for which there was evidence of provision, by service category, 2007–08



Abbreviations: APE (Adapted Physical Education); D/HH (Deaf/Hard of Hearing Itinerant Service); LAS (Language & Speech); LRE (Least Restrictive Environment Itinerant Service); NPA (Non-Public Agency); OT (Occupational Therapy); PRE (Pre-School); PT (Physical Therapy); RSP (Resource Specialist); SMH (School Mental Health); VI (Visual Impairment Itinerant Service).

Were services provided at the frequency and duration required by the IEP?

A second component of this study examined whether the services were provided at the frequency (e.g., 2 times a week) and the duration (e.g., 30 minutes per week) as documented in the IEPs. As mentioned above, the outcome specifies that 85% of services must meet the frequency and duration documented in the IEPs. Based on the analysis of the logs, we estimated that 76% of services across the population of students in special education with evidence of service met the frequency requirements in 2007-08, while 72% met the IEP specifications for duration.[6] It is important to note that these percentages are based on the numbers of students for which evidence of service was provided; if all students were included (including those for whom no log was provided) when calculating the percentages, the estimates would decrease.[7] Figure 3 reports this information by disability category, and Figure 4 depicts the percentages by service category. As with the above analysis, we generated 95% confidence intervals for each districtwide estimate.

The confidence intervals for both frequency and duration indicate that the estimates are statistically lower than the established outcome of 85%.

Similar to previous years' results, there was considerable variation by individual disability and service categories. Estimates for meeting the IEP frequency ranged from 69% for students with Emotional Disturbance to 85% for students with Visual Impairments. Duration rates ranged from 67% for students with Emotional Disturbance to 82% for students with Multiple Disabilities/Deaf-Blindness. By service category, frequency estimates ranged from 64% for

[6] This is the first year in which population estimates were calculated for frequency and duration.

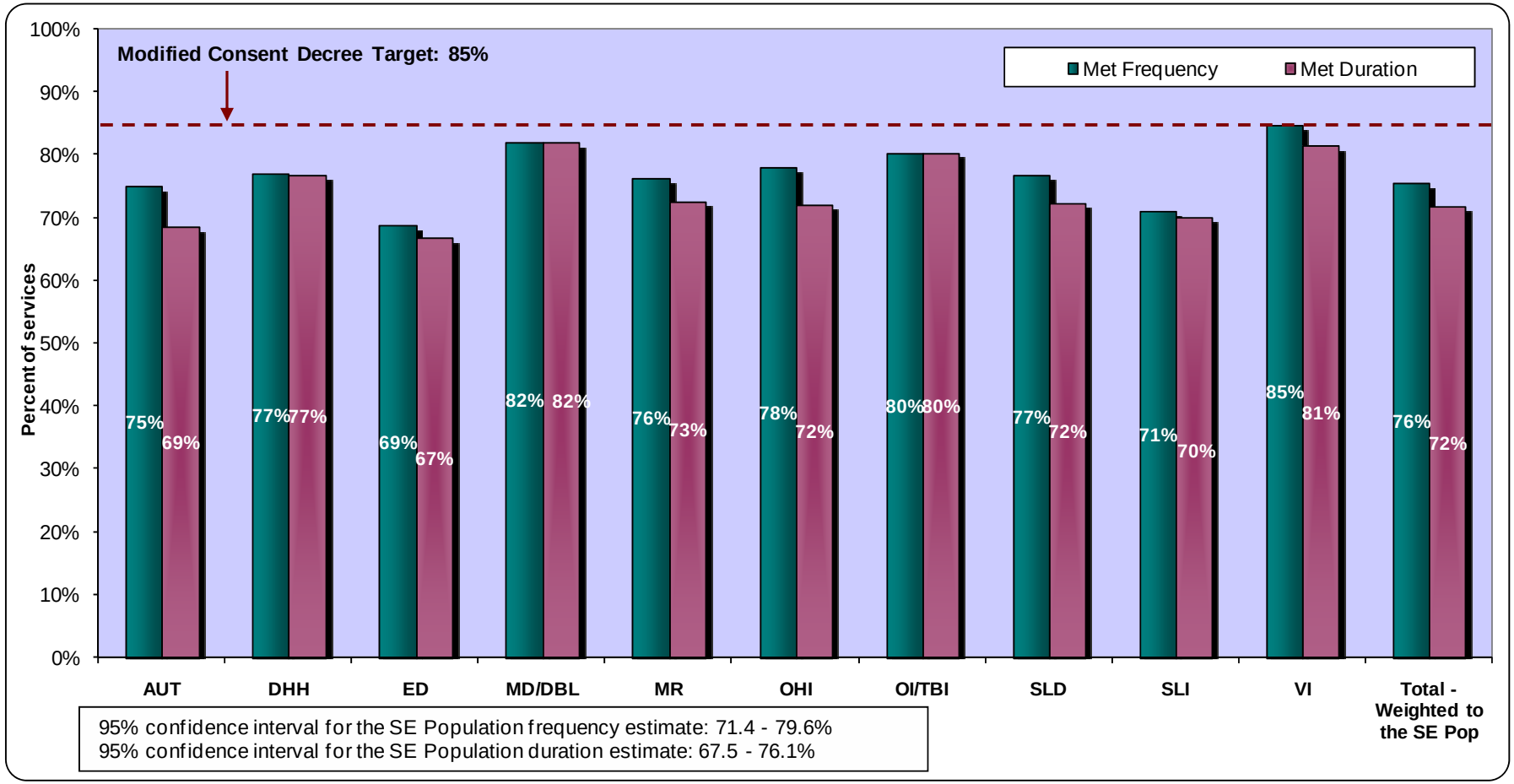
[7] For example, while we analyzed 727 services for students with Autism in the evidence of service analysis, the frequency and duration percentages are based on a smaller number (633 services for frequency and 627 for duration; see Appendix D). These lower numbers are due to not receiving logs for all 727 services, as well as excluding records from the frequency/duration analyses if the student left the District, exited special education, or enrolled in NPS (or if the IEP did not specify a frequency and/or duration).

School Mental Health and 91% for Least Restrictive Environment services; duration estimates ranged from 60% for Non-Public Agency and 88% for Physical Therapy services.

In prior years of this study, the frequency and duration results were not weighted to represent the overall population of special education students, but rather were presented as unweighted percentages. These unweighted results are shown in Tables D-2 and D-3 in Appendix D for Years 2 through 5 of this study. Over the years, the unweighted estimates of services with frequency at least equal to the IEP increased from 57% in Year 2 to 78% in Year 5; for duration, the estimates increased from 60% to 75%.

FIGURE 3

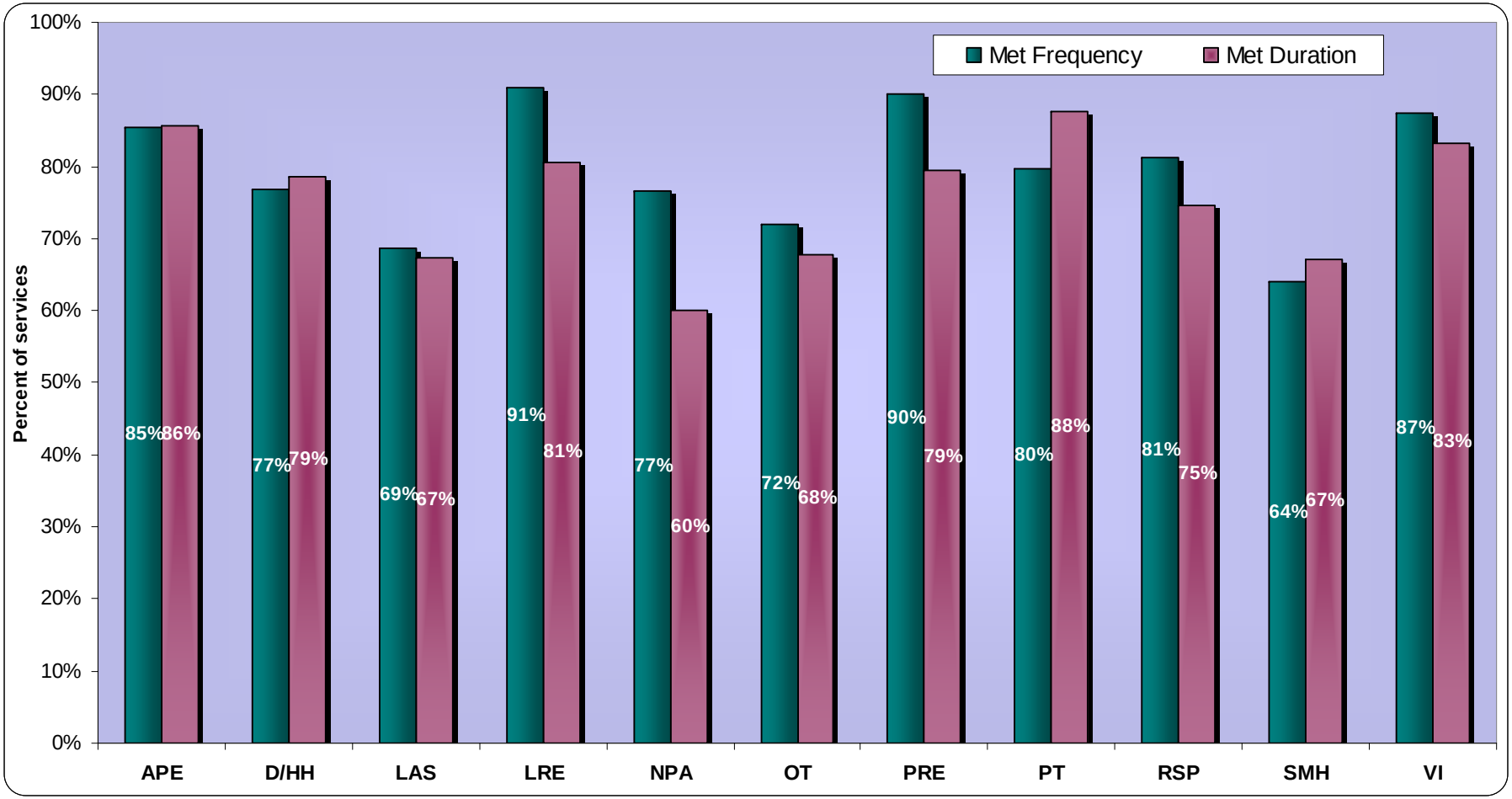
Percentages of services that met frequency/duration as specified by the IEPs, by disability category, 2007-08



Please see Appendix D for the number of service observations included in the frequency and duration analyses. Abbreviations: AUT (Autism); DHH (Deaf/Hard of Hearing); ED (Emotional Disturbance); MD/DBL (Multiple Disabilities/Deaf-Blindness); MR (Mental Retardation); OHI (Other Health Impairment); OI/TBI (Orthopedic Impairment/Traumatic Brain Injury); SE (Special Education); SLD (Specific Learning Disability); SLI (Speech/Language Impairment); VI (Visual Impairment).

FIGURE 4

Percentages of services that met frequency/duration as specified by the IEPs, by service category, 2007-08



Please see Appendix D for the number of service observations included in the frequency and duration analyses. Abbreviations: APE (Adapted Physical Education); D/HH (Deaf/Hard of Hearing Itinerant Service); LAS (Language & Speech); LRE (Least Restrictive Environment Itinerant Service); NPA (Non-Public Agency); OT (Occupational Therapy); PRE (Pre-School); PT (Physical Therapy); RSP (Resource Specialist); SMH (School Mental Health); VI (Visual Impairment Itinerant Service).

Conclusion and Recommendations

In Year 5, for both populations of interest – for all disability categories excluding SLD and for SLD only – our estimates of service delivery, including their confidence intervals, are not statistically significantly different from the outcome of 93%. However, the frequency and duration results show estimates and confidence intervals that are lower than the required outcome of 85%. Using unweighted estimates, the percentages of services that met the IEP requirements increased from 57% to 78% for frequency and from 60% to 75% for duration between Year 2 and Year 5.

Based on these findings and methodological issues that the study team encountered, we propose a series of recommendations below to improve IEP and log documentation in LAUSD. The first two of these recommendations were included in prior years' reports, and although vast improvements in documentation have occurred over the last five years, these issues were also observed in the current year.

1) For consistency and efficiency, the Division of Special Education should ensure that all IEPs and provider logs are documented in the Welligent system. While only 3% of the overall logs analyzed for the Year 5 study were in paper or partial paper form, some services in our sample showed higher rates of non-Welligent logs. For example, 38% of the logs for Non-Public Agency services in the study sample were in paper or partial paper format. Although the vast majority of RSP logs were in the Welligent system this year, 7% of the sampled logs were still not fully electronic.
2) The Information Technology Division (ITD) should build checks in the Welligent system to ensure that the information in the IEP is consistently documented. To conduct this study, we pulled service information from various sections in a student's IEP. In some

cases, the service information in one section in the IEP did not correspond with information in another section.

3) The Division of Special Education should continue to train providers on how to enter log information into the Welligent system accurately. Based on the observation study and similar to last year's study, more than 20% of the logs did not match what site visitors observed or what was reported by school staff (see Appendix B for a discussion of the observation study and results). Also, since RSP and APE providers are not required to indicate the time of the service, it was difficult to reliably monitor these services. We recommend that providers be required to provide actual times of service delivery for RSP and APE.
4) The Division of Special Education should continue to examine individual services to determine why they did not meet the MCD outcomes for service delivery, frequency, and duration. This may require providing more training targeted towards providers of certain services to improve provision and documentation.

Appendix A: Service Study Methods

Sampling Design

The Los Angeles Unified School District's (LAUSD) Student Information System (SIS) special education database comprised the study population. Reflecting student information on "Norm Day," October 3, 2007, this database contained 73,644 cases with a special education disability code. As in previous years, students were excluded if they attended non-public schools, had graduated or left the District, or were not 3-years old by September 30, 2007. Excluding these students reduced the database to 73,038 students. Table A-1 reports the counts of students in the database by disability code.

TABLE A-1
Counts of students with disability codes in the Los Angeles Unified School District, 2007

	N	Percent
Autistic (AUT)	6,294	8.6%
Deaf – Blindness (DBL)	7	.0%
Deafness (DEA)	397	.5%
Developmental Delay (DD)	2,765	3.8%
Emotional Disturbance (ED)	911	1.2%
Established Medical Disability (EMD)	29	.0%
Hard of Hearing (HOH)	639	.9%
Mentally Retarded (MR)	4,136	5.7%
Multiple Disabilities – Hearing (MDH)	96	.1%
Multiple Disabilities – Orthopedic (MDO)	1,391	1.9%
Multiple Disabilities – Vision (MDV)	158	.2%
Orthopedic Impairment (OI)	735	1.0%
Other Health Impairment (OHI)	4,653	6.4%
Specific Learning Disability (SLD)	40,696	55.7%
Speech and Language Impairment (SLI)	9,764	13.4%
Traumatic Brain Injury (TBI)	133	.2%
Visual Impairment (VI)	234	.3%
Total	**73,038**	**100%**

Note: Table A-1 excludes students attending non-public schools, who graduated or left the District, or who were not 3-years old by September 30, 2007.

As done in Years 2–4, the Research and Planning Division collapsed the disabilities and services into 10 and 11 groups, respectively, combining categories that were similar in nature as well as consolidating low-incidence categories. For example, we grouped Developmental Delay (DD) with Mental Retardation (MR). (See Tables A-2 and A-3 for these groupings.)

The study objective was to make statements about the overall special education population as well as specific disabilities and services. To do so, we set a goal to collect data on 330 students in 9 of 10 disability categories. Since Specific Learning Disability (SLD) represented the largest group in the population, we drew a larger sample to increase the precision of the estimates. Because the first year's results showed approximately 15% errors and 15% attrition/transiency in the data, we over-sampled by approximately 30%. As was done during the previous years, we randomly selected 380 cases in each category except for Visual Impairment (VI) and SLD. For VI, we selected all of the cases (366), given that there were fewer than 380 students. For SLD, we randomly selected 1,080 students, for a grand total of 4,486.

Individualized Education Program (IEP) and Log Collection

The Research and Planning Division provided a list of the 4,486 students in the sample to the Information Technology Division (ITD), requesting specific information from current and amended IEPs. Among this sample were 50 IEPs that were over 18 months old; these were requested directly from the school principals in October 2007 with the intention of obtaining a current IEP.[8] If we did not receive a newer IEP from the schools, we used the older one from the Welligent system. As shown in Table A-2, we obtained more than 330 IEPs for each disability category.[9]

[8] There has been a continuous decline in the numbers of IEPs (non-Welligent or those over 18 months old) requested directly from the schools, from 509 in Year 3 to 158 in Year 4 to 50 in the current study.

[9] Some IEPs were excluded from the study, due to students exiting special education or leaving the District.

TABLE A-2
Number of students sampled and number of students for whom IEPs were obtained, by disability category

Disability Grouping	Categories Included	N Sampled	N of Students whose IEPs were Obtained
Autism (AUT)	AUT	380	376
Deaf/Hard of Hearing (DHH)	DEA, HOH	380	378
Emotional Disturbance (ED)	ED	380	343
Mental Retardation (MR)	DD, MR	380	375
Multiple Disability/Deaf-Blind (MD/DBL)	DBL, MDH, MDO	380	379
Orthopedic Impairment/ Traumatic Brain Injury (OI/TBI)	OI, ORT, TBI	380	374
Other Health Impairment (OHI)	EMD, OHI	380	374
Specific Learning Disability (SLD)	SLD	1,080	1,069
Speech and Language Impairment (SLI)	SLI, LAS	380	367
Visual Impairment (VI)	VI, MDV	366	364
Total		**4,486**	**4,399**

Based on these IEPs,[10] we generated a list for all of the services the students were entitled to receive and determined which 8-week/2-month period would be most appropriate to request, given that LAUSD has single and multi-track schedules.[11] On behalf of the Research and Planning Division, the Division of Special Education collected the sampled service logs from the Welligent system and service providers. See Table A-3 for the number of logs per service in our sample.

[10] Since services could be documented in various locations in the IEP, we took steps to ensure that the log request was comprehensive.

[11] Some service providers had vacations during our requested period, so we made additional adjustments for certain services and tracks. We asked for complete months for monthly services, which included more than the 8-weeks requested for weekly services.

TABLE A-3
Number of logs per service in the sample

Service Grouping	Services Included	N of Service Logs Requested	Percent
Adapted Physical Education (APE)	• Adapted Physical Education	1,044	14.7%
Deaf/Hard of Hearing Itinerant Service (DHH)	• Audiology • Deaf/Hard of Hearing Itinerant	459	6.5%
Language and Speech (LAS)	• Language and Speech	1,463	20.6%
Least Restrictive Environment Itinerant Service (LRE)	• Inclusion • Least Restrictive Environment Counselor	282	4.0%
Non-Public Agency (NPA)	• Non-Public Agency Services-Behavior Support • Non-Public Agency Services-Speech	231	3.2%
Occupational Therapy (OT)	• Occupational Therapy • Occupational Therapy - Clinic	547	7.7%
Physical Therapy (PT)	• Physical Therapy	291	4.1%
Pre-School (PRE)	• Pre-Kindergarten Itinerant • PKIT-HS	108	1.5%
School Mental Health (SMH)	• Pupil Counseling • School Mental Health	646	9.1%
Resource Specialist Program (RSP)	• Resource Specialist Program	1,634	23.0%
Visual Impairment Itinerant Service (VI)	• Blind/Partially Sighted Itinerant • Orientation Mobility for Blind	405	5.7%
Total		**7,110**	**100%**

Data Entry and Analysis

In Years 2 through 4, the Research and Planning Division checked the logs by hand to determine whether the information on the logs matched the IEP requirements. This was necessary since many of the logs were completed on paper with different formats and non-standard coding, and hand-coding allowed us to use all of the information provided in making coding decision. Given that the Welligent system housed the majority of provider logs in Year 5, the Research and Planning Division and the American Institutes for Research (AIR) revised the

approach in order to take advantage of this electronic information. Accordingly, AIR developed a computer program to analyze information extracted from the Welligent databases, while Research and Planning continued to hand-code a more limited number of logs.

Research and Planning's Data Entry and Coding

Although most providers were trained to use the Welligent computerized system, some providers were still completing paper logs (i.e., non-Welligent forms). Also, since IEPs are not static, the Division of Special Education may have provided additional information on the student or the service. For instance, a student may have left the District after our request or had a new IEP meeting, thus impacting what log information we would expect. Lastly, Resource Specialist Program (RSP) was the most complex service in that it often covers multiple subjects, so we decided that AIR's program would not analyze these cases. Consequently, the Research and Planning Division continued to hand-code non-Welligent paper logs, student cases for which the Division of Special Education provided additional information, and all of the RSP logs. This resulted in hand-coding over 2,000 logs.

As in past years, the Research and Planning Division and AIR collaborated on establishing and documenting detailed rules to maintain consistency coding the data. Based on these coding rules, each service was given a code for each research question to indicate whether the log met the IEP requirements (code 1) or did not meet the requirements (code 2). In some cases, the log or IEP lacked sufficient information to make a judgment, and in others, we excluded the service from the analysis (e.g., if the student left the District). Although the log requests were made for specific 8-week/2-month time periods, we counted logs as evidence of service if a log was dated between September 2007 and February 2008 and reported at least one session of service provision.

Only services for which we obtained a log were included in the frequency and duration analysis, which examined whether the service was provided over an 8-week/2-month period in

accordance with the IEP specifications. For instance, if the IEP noted that service was to be provided once a week, we would expect service to occur at least 8 times over the 8 weeks. For the duration analysis, if the IEP stated that the student was to receive 30 minutes of service per week, we would expect the student to receive a minimum of 240 minutes of service. As mentioned above, we excluded some cases from the frequency and/or duration analysis if a valid reason was given (e.g., student left the District).

AIR's Program Coding and Analysis

In Year 5, AIR used a computer program to analyze 5,078 service observations, roughly 70% of the total sample analyzed for the 2007-08 study. AIR combined the computer results with the Research and Planning Division's codes for another 2,032 cases to generate estimates of the rates of service delivery based on a total of 7,110 services, representing 4,342 students in special education in LAUSD.[12]

Given the growing numbers of electronic (i.e., Welligent) IEPs and provider logs over the course of the service study, in Year 4 (2006-07) AIR tested the feasibility and reliability of using a computer program to analyze electronic information as an alternative to the hand-coding process. There are multiple advantages to using a computer program to analyze thousands of electronic logs, which include improved cost-efficiency, greater consistency and transparency in applying the rules, and the ability to adjust rules at any point and apply them retrospectively to all log records. At the same time, we recognized that standardizing the rules for a computer program could be challenging due to variations in how the logs were documented, but we believed it would be accurate for the vast majority of logs. As part of this process, we compared the results derived from the program in Year 4 for six services[13] to the Research and Planning

[12] While the Research and Planning Division collected a total of 4,399 IEPs, the final analysis included 4,342 IEPs. We dropped 57 students from the sample since their IEPs did not require at least one of the services analyzed for this study.

[13] These services were: DHH, LAS, LRE, OT, PT, and SMH. Services not analyzed by the Year 4 program included RSP, APE, Preschool, and VI due to size limitations of the program and the use of paper logs.

Division's manual interpretation of hundreds of service records. Although there were areas to improve, the results were promising.[14]

Based on these results, the OIM, AIR, and the Research and Planning Division jointly decided to use a computer program to generate estimates of service delivery, frequency, and duration for the majority of students with Welligent logs in Year 5 (2007-08). Because of the complexity of the RSP rules, the Research and Planning Division would continue to manually code all RSP logs as well as services which required using supplemental information (e.g., paper IEPs, paper/partial paper logs, notes from the Division of Special Education) to guide the coding process.

Validation Checks

Although we had a solid foundation through the Year 4 work, the earlier program underwent several changes and two stages of validation checks before we produced the Year 5 estimates. At the first stage, we identified areas for improvement based on the Year 4 results and modified the program to better align with the rules used that year. After these changes, we compared the program results to the Research and Planning Division's codes. Once we were comfortable that the program was producing results that aligned well with the Research and Planning Division's Year 4 codes, we then modified the program again to correspond with the Year 5 specifications and new rules.

However, unlike Year 4, we did not have the Research and Planning Division codes in Year 5 to check whether the program revisions were producing reliable results. Therefore, for the second stage validation, AIR drew a sub-sample of 283 services (representing 251 students) from the Welligent log databases for the Research and Planning Division to hand-code and compare to

[14] For a full description, see Harr, J. & Socias, M. (2007). *Year 4 Service Study: An Alternative Approach*. Palo Alto, CA: American Institutes for Research.

the program results. Of these, 250 service logs across 232 students were included in the validation exercise.[15]

Ultimately, this validation exercise helped strengthen the program. Based on comparisons of the program and Research and Planning Division codes, we made further modifications that resolved all but four of the observed differences in the sample, resulting in a match-rate of 98% between the program's and the Research and Planning Division's codes. These remaining discrepancies were not program errors, but rather due to differences in how the program was designed to implement the rules. Three of the differences found in the validation exercise were attributed to the criteria used to apply holiday credit. A challenge we faced was defining what constitutes a regular service pattern for the purpose of providing credit for holidays that fall on "typical" days of service. Because of the timeframe for which the logs were collected (8 weeks for weekly services or 2 months for monthly services, in accordance with previous years), we had few data points by which to determine whether the pattern over an 8-week period was consistent enough to merit holiday credit. Accordingly, the strict criteria used in the program (described in Appendix E) resulted in some differences between the program codes and how the Research and Planning Division coded the logs manually. Although there was some evidence of the manual process and the computer program coding services differently, these cases were limited.

[15] The program did not generate codes for the full sample because the District provided paper logs or supplemental information to guide the coding for these services.

Appendix B: Observation Study Conducted by the Research and Planning Division

Overview

As was done in Year 4, the Research and Planning Division conducted a separate study[16] to assess the accuracy of log documentation by comparing information from field observations to what providers documented on the log for a sample of services.[17] Accuracy was measured by whether what we observed at the school or what was reported by the school staff matched the log. This study is an important step in understanding the reliability of analyzing logs as a method to monitor progress towards the Modified Consent Decree (MCD) outcomes.

Methods

The Research and Planning Division selected a subsample of 35 students in each of 7 service categories for a total of 245 services from the MCD sample for field observations. Only students with specific frequency and duration information (e.g., one time a week for 30 minutes) in their Individualized Education Programs (IEPs) were selected for the sample. The service categories included in this study were Adapted Physical Education (APE), Deaf/Hard of Hearing (DHH), Language and Speech (LAS), Mental Health (MH), Occupational Therapy (OT), Resource Specialist Program (RSP), and Visual Impairment (VI). After completion of the observations, logs were requested from the Information Technology Division (ITD) for the subsample for the observation period (i.e., January, February, and March).

The study was a three-step process. The first step was to obtain each student's service schedule information from administrators, special education coordinators, or IEP (special education) clerks at the school of enrollment. Using this information, we documented whether

[16] Note that this study was carried out by the Research and Planning Division of the Los Angeles Unified School District (LAUSD). The American Institutes for Research (AIR) did not participate in the study's design, data collection, or analysis.

[17] In Years 1 through 3 the study was designed to determine whether services were occurring or not. This study was not designed for that purpose.

the sampled student was still at the school, whether or not he or she was receiving special education services, the required frequency and duration of current IEP services, and scheduling information (e.g., days of the week/month and time of day at which services were typically provided). We also documented whether the day and start time were flexible (e.g., sometime during the mornings) or fixed (e.g., every Friday at 9 a.m.). In the flexible cases, we asked the school to try to find out the schedule for the next few months. During the calls, we inquired about all of the services listed on the IEP, so that the schools would not know the specific focus of our visit. No attempt was made to set up a visit time. Although students often receive services in more than one category, if a student was no longer receiving the specific service we selected, we did not attempt to observe any other service for that same student. Examples of students whose service wouldn't be observed are flexible schedules, no provider was assigned, or the student had to be dropped from the study.

In the second step, we visited the school during the scheduled service time. The third step was the comparison of the observation findings with the log information using a set of coding rules. We used the logs to determine the following information: 1) the status of the session (if service was completed or if there was a reason why service was not completed), 2) the number of completed service minutes (e.g., 30), and 3) what time the service session started (e.g., 9:30). For sessions in which service was provided, we compared the observation notes on the status of the session, the amount of minutes, and the start time to the log information; for instances of no service, we examined only the status. Number of minutes and start time was based on when the provider was available for service and not when the student arrived. Since Adapted Physical Education (APE) and Resource Specialist Program (RSP) providers are not required to indicate a start time, these cases were dropped from this part of the analysis.

Based on the observation or what was reported by school staff, we categorized the status of each session with 11 distinct codes:

- session completed

- service provided but session incomplete
- provider absent because of illness, an emergency or jury duty
- provider in meeting or training
- student absent
- student no show
- provider absent but the reason was unacceptable or unknown[18]
- no provider assigned
- service too flexible
- student excluded from analysis
- service occurred at another time.

We expected the observation or school information to match what we saw on the logs. For instance, if the school staff reported to us that the provider was at an IEP meeting, we would expect the log to indicate that the provider was at an IEP meeting for that day. In some cases we did not conduct an observation (i.e., no provider was assigned, the service was too flexible to observe, or the case was excluded from analysis). In these cases we would not expect to receive a log. Overall, we documented if the log and observation information matched or did not match.

[18] For the purposes of the study, the MCD indicates that certain reasons for provider absences (i.e., illness, emergencies, or jury duty) are acceptable whereas others are not. Therefore, provider absences with an acceptable reason and provider absences with an unacceptable reason were coded separately.

Results

Overall, did the observation or school information match the log status?

In 78% of the cases the log and observation matched for status over the seven service categories. Matches were documented for both services that we observed and for those that we were given a reason from school staff as to why service wasn't completed. As indicated in Table B-1, the observations provided a variety of different situations to compare to the logs.

TABLE B-1
Number of matched observations to logs by session status

Status of Session	Observations	N (%) of Observations in which Status of Observed Session Matched the Log
Code 1. Session completed	115	105 (91%)
Code 2. Service provided but session incomplete*	13	12 (92%)
Code 3. Provider absent (illness, emergency, jury duty)/student present at school	8	1 (13%)
Code 4. Provider in meeting/student present at school	4	1 (25%)
Code 5. Student absent/ provider present at school	25	15 (60%)
Code 6. Student no show/ provider present at school	4	2 (50%)
Code 7. Provider absent (reason unknown)/student present at school	9	0 (0%)
Code 8. No provider assigned	10	7 (70%)
Code 9. Service too flexible to be observed	33	27 (82%)
Code 10. Exclude from analysis (e.g., student exited from special education, moved to a Non-Public School, or left the District)	18	15 (83%)
Code 11. Session occurred at a different time	6	5 (83%)
TOTAL	**245**	**190 (78%)**

* Welligent does not permit the documentation of a "service provided but incomplete duration" status; therefore, we would expect the provider to document "Complete" when service was provided.

Did the completed service session information match the logs?

For codes 1 and 2 (complete and partially complete) combined, we found that 91% of the cases had a completed session listed for the day we observed. Of the 11 cases in which the log did not document a complete session that day, 7 had no information on the log for that day, 3 had no Welligent log provided by ITD, and 1 indicated that the student was absent.

Did the number of service minutes and the start times match the logs?

We were able to look at completed minutes and start times for codes 1 and 2 (complete and partially complete). Of the 90 code 1 (complete) cases with a duration documented on the log (RSP was eliminated from this analysis because of multiple sessions), 60 matched within five minutes. In 20 cases, we observed more time than was indicated on the log, and in 10 cases, the log indicated more minutes than we observed. Of the 75 cases with a start time documented on the log (APE and RSP do not have start times listed on the logs), 57 matched within five minutes. For code 2 (partially complete), in the 12 cases completed, 6 of the logs matched the amount of minutes observed, 5 did not match, and one RSP case was excluded. Of the 5 cases that did not match, 4 had more minutes listed on the log and 1 had fewer minutes listed on the log. Of the 5 cases with start times documented on the log, only one matched the observation. Across codes 1 and 2, the number of minutes that the observation and log differed ranged from 6 to 50 minutes.[19]

Did the reasons for no service match the logs?

It appears from this study that more documentation inconsistencies occur when the provider has to indicate why no service was provided. For codes 3 through 7 (reasons for no service), only 38% of the logs matched the status information. Of the 31 cases that did not match, in 10 cases there was a log but nothing was indicated on the log for that day, in 1 case no Welligent log was provided by ITD, in 6 cases a different reason for no service was listed, and in 14 cases

[19] There was one case that was off by 720 minutes but it is reasonable to assume that this was a typographical error.

the log indicated a completed service. Of the 14 cases marked completed service on the logs, 11 had an unknown time (APE and RSP), 2 had the same time listed, and 1 had a different time listed. Even though the logs indicated that service was provided we coded them as not matching because it did not match what we were told by the school staff. For APE and RSP (complete but unknown time), it is unclear what this means as we can not tell if the service was actually provided at a different time because time of service is not listed on the log for these two services.

Did the information match when we did not expect to receive a log?

In cases where we did not expect to receive logs (specific reasons identified below), a match is when we do not receive a log or the log is not for the service time period. In 10 instances the school reported that no provider had been assigned (code 8), but in 3 cases a log was provided and there was evidence of service during the same week that the school indicated that no provider was assigned. Therefore, 7 cases were considered a match and 3 cases were not. Since we did not expect service we did not attempt observations. Based on information provided by the school, 33 instances were too flexible to observe (code 9); however, after examining the logs, we determined that at least 6 cases had a set schedule. Therefore, 27 cases were considered a match and 6 were not. It is important to note that the schedule information obtained during the initial call could change over time, resulting in service going from a flexible to fixed schedule. We excluded 18 cases from the analyses (e.g., the student left the school or exited the service), but in 3 cases, logs were provided with service information for the week that we received the information from the school (code 10). Therefore, 15 cases were considered a match and the 3 were not. We did not expect logs for these students but we may have been given incorrect or incomplete information as to the status of the student.

Were there any differences by service categories?

When comparing the logs by service category and status we found that DHH had the most matches (86%) whereas RSP had the least matches (63%). LAS was most likely to provide the scheduled number of minutes (93%) whereas MH was least likely to provide the scheduled minutes (42%). LAS was most likely to have no provider assigned to the student and DHH was most likely to provide services on a flexible schedule.

What were the limitations of the study?

First, we had to rely on what was reported by the school. In some cases the person providing the information may have had incorrect information. This may have resulted in some errors in the analyses. Second, some services may have changed from the time of the telephone call to the observation. This could be true for services where no provider was assigned and cases that were dropped from the study (e.g., the student left the District). In these types of cases if we received a log and there was service listed on the log during the week we called the school then we considered it not matching (i.e., we did not expect to receive a log but we received one with evidence of service). If we received no log or the log had services listed but not during the week of the telephone call then we considered this a match (i.e., we did not expect to receive a log and either we did not receive one or we did receive one but there was not clear evidence of service). Finally, both APE and RSP do not indicate the time of the service on the log (i.e., the system defaults to 8 a.m.). This made it difficult to analyze if something other than what we expected showed up on the log. For example, if we were told that the provider was in an IEP meeting but the log showed that the service was complete we don't know if the service occurred at another time or if this was an error.

Conclusion

An important step in using log data to monitor service delivery is to assess whether the data accurately reflects what is occurring at the schools. Overall, the logs and the observation or information provided by the school matched 78% of the time. Consistent with the prior year's results, logs did not always reflect what we saw or what was reported by the school. When examining only sessions in which service was provided (codes 1 and 2 – complete and partially complete), we found that 91% of the logs indicated the service status correctly. However, when the providers had to document reasons for no service the percentages of matches was much lower.

Overall, the impact of the observation-log discrepancies upon the MCD outcome measures is uncertain, working both in favor and against the outcomes. For example, 8% of the observed sessions in which service was provided (10 of 128) were missing session or log information (which could have the effect of lowering both the frequency and duration rates in the IEP-log comparison). Also, 11% of the logs with duration for code 1 sessions (10 of 90) reported more duration than what was observed (thereby possibly inflating the duration rates) whereas in 20 cases the log indicated less time than we observed (thereby possibly deflating the duration rates). In conclusion, the study shows that services need to be better documented on the logs.

Even incorrectly documented reasons for services not being provided could have implications for the outcome measures. For the purposes of the MCD study, certain reasons for no service being provided are counted as service and therefore proper documentation affects the outcome. For example, the study methodology provides credit for student absences. Among the 25 observations in which we were told that the student was absent, in 10 cases student absence was not indicated on the log and therefore, providers would not have received session credit.

While some of the discrepancies may be due to schools providing incorrect information as opposed to incorrect log documentation on part of the provider, these results suggest that

providers may be still learning to use the Welligent system and more training as well as periodic checks may be needed to ensure that the logs are accurately documented. This is especially essential for providers new to the Welligent log system. It is important in establishing a useful monitoring system that providers not only document completed services but also the reasons why services did not occur.

Appendix C: Population Estimates and Statistical Confidence Intervals

Calculating Population Estimates

To derive estimates representative of the overall population of students in special education in the Los Angeles Unified School District (LAUSD), we assigned a weight to the compliance rates for each disability category. Tables C-1 shows the population (Column A) and sample size (Column B) of each disability category excluding Specific Learning Disability (SLD) for the evidence of service delivery analysis, along with the probability (Column C) that each student with a particular disability had of being sampled. To calculate this probability, we divided the sample size by the population size for each disability category. In the case of students with Mental Retardation, for instance, each student had a 5.3% probability (i.e., 369 / 6,901) of being selected into the sample.

Column D presents the *probability weight*, which we calculated by dividing one by the probability of being selected into the sample. This weight reflects the number of students in the population that each student of the sample represented. For example, each student with Mental Retardation in the sample represented about 19 students with this disability in the population. We then applied the weights to the individual percentages by disability category to derive an overall population estimate of 92.2%. Because SLD is held to a separate outcome, we did not include it in the overall population estimates for evidence of service delivery. We conducted similar weighting exercises to estimate population estimates for frequency and duration.

TABLE C-1

Probability and weights for evidence of service delivery population estimates (excluding SLD)

Disability	Population A	Sample B	Probability C	Weight D
Autism	6,294	372	0.059	16.9
Deaf/Hard of Hearing	1,036	377	0.364	2.7
Emotional Disturbance	911	336	0.369	2.7
Multiple Disabilities/Deaf-Blindness	1,494	364	0.244	4.1
Mental Retardation	6,901	369	0.053	18.7
Other Health Impairment	4682	370	0.079	12.7
Orthopedic Impairment/ Traumatic Brain Injury	868	374	0.431	2.3
Speech & Language Impairment	9764	358	0.037	27.3
Visual Impairment	392	358	0.913	1.1
Total	**32,342**	**3,278**		

Statistical Confidence Intervals

The estimated rates of service delivery, frequency, and duration discussed in this report constitute a point estimate of the population rates. In other words, these are the best single numbers that summarize the information contained in the sample. A methodological alternative is to generate intervals rather than point estimates. An interval with a certain size has a certain probability of containing the population estimate. The larger the interval, the higher the probability that the population estimate (i.e., the service delivery rate in the population of students with disabilities in LAUSD) is contained in it. Because of this, these intervals are called *confidence intervals*.

In order to generate a statistical confidence interval, it is necessary to know the statistical distribution of the variable under analysis. In the case of this study, the unit of analysis is a dichotomous variable. This means that the variable analyzed only takes two possible values (yes or no, one or two, etc.), representing those cases in which a service was provided or not. The distribution of such dichotomous variables is called *Bernoulli distribution*. At a confidence level of 95%, the confidence interval for these distributions is defined as:

$$[p - 1.96\frac{\sqrt{p(1-p)}}{\sqrt{n}}, p + 1.96\frac{\sqrt{p(1-p)}}{\sqrt{n}}]$$

(*p* represents the proportion of cases estimated). This means, that if 100 samples are drawn from the population of students with disabilities in LAUSD, in 95 of the cases, the true population rates will be contained in this statistical confidence interval. Note that this interval uses the *Central Limit Theorem* and is therefore more accurate as the sample size increases. A final important aspect of this confidence interval is that the sample size is in the denominator of the fraction that generates the interval (this fraction represents the estimated standard deviation of a Bernoulli distribution). Therefore, if a certain sample size is relatively small, the statistical confidence interval has to increase in order to maintain the 95% confidence level. Table C-2 presents the confidence intervals for individual disability categories and the overall population estimates.

TABLE C-2

Statistical confidence intervals by disability category, 95% confidence level, 2007-08

Disability Categories	% of Services with Evidence of Log	Lower Limit	Upper Limit	% of Services that Met Frequency	Lower Limit	Upper Limit	% of Services that Met Duration	Lower Limit	Upper Limit
Autism	90.9%	88.0%	93.8%	75.0%	70.5%	79.6%	68.7%	63.8%	73.6%
Deaf/Hard of Hearing	96.6%	94.8%	98.4%	77.1%	72.8%	81.4%	76.9%	72.5%	81.2%
Emotional Disturbance	89.8%	86.5%	93.0%	68.7%	63.5%	73.9%	66.8%	61.4%	72.1%
Multiple Disabilities/ Deaf-Blindness	94.8%	92.5%	97.1%	82.0%	77.8%	86.3%	81.9%	77.8%	86.1%
Mental Retardation	91.8%	89.1%	94.6%	76.4%	71.8%	81.0%	72.7%	67.8%	77.5%
Other Health Impairment	95.0%	92.8%	97.2%	78.1%	73.7%	82.5%	72.2%	67.4%	76.9%
Orthopedic Impairment/Traumatic Brain Injury	96.1%	94.1%	98.0%	80.2%	76.0%	84.4%	80.1%	76.0%	84.3%
Specific Learning Disability	93.1%	91.7%	94.7%	76.8%	74.2%	79.5%	72.3%	69.4%	75.2%
Speech/Language Impairment	90.7%	87.7%	93.7%	71.1%	66.0%	76.3%	69.9%	64.7%	75.2%
Visual Impairment	97.6%	96.0%	99.2%	84.7%	80.9%	88.5%	81.4%	77.3%	85.6%
Population Estimates (including SLD)	--	--	--	**75.5%**	**71.4%**	**79.6%**	**71.8%**	**67.5%**	**76.1%**
Population Estimates (excluding SLD)	**92.2%**	**89.5%**	**94.9%**	--	--	--	--	--	--

Appendix D: Estimates for Years 2-5[20]

TABLE D-1

Percentages of services for which there was evidence of service provision by disability category, 2004-05 to 2007-08

	2004-05 Year 2		2005-06 Year 3		2006-07 Year 4		2007-08 Year 5	
Disability	% of Services for which there was Evidence of Service Provision	N of Services	% of Services for which there was Evidence of Service Provision	N of Services	% of Services for which there was Evidence of Service Provision	N of Services	% of Services for which there was Evidence of Service Provision	N of Services
Autism	95%	528	87%	594	89%	704	91%	727
Deaf/Hard of Hearing	95%	546	93%	524	90%	633	97%	622
Emotional Disturbance	81%	306	85%	355	80%	437	90%	400
Multiple Disabilities/Deaf-Blind	98%	432	93%	446	95%	656	95%	690
Mental Retardation	96%	385	88%	457	87%	577	92%	564
Other Health Impairment	84%	416	84%	424	81%	483	95%	539
Orthopedic Impairment/ Traumatic Brain Injury	93%	693	91%	740	89%	841	96%	893
Speech & Lang. Impairment	95%	338	78%	389	86%	459	91%	432
Visual Impairment	98%	630	96%	659	96%	751	98%	743
Overall Population Estimate (w/o SLD)	**93%**		**85%**		**87%**		**92%**	
Specific Learning Disability	**73%**	723	**79%**	744	**74%**	1,187	**93%**	1,251

[20] Due to considerable changes in the study methodology since Year 1, the results for the first year (2003-04) are not presented.

TABLE D-2

Percentages of services with frequency at least equal to the IEP by disability category, 2004-05 to 2007-08

	2004-05 Year 2		2005-06 Year 3		2006-07 Year 4		2007-08 Year 5	
Disability	% of Services with Frequency at least Equal to the IEP	N of Services	% of Services with Frequency at least Equal to the IEP	N of Services	% of Services with Frequency at least Equal to the IEP	N of Services	% of Services with Frequency at least Equal to the IEP	N of Services
Autism	56%	458	59%	462	66%	581	75%	633
Deaf/Hard of Hearing	58%	486	66%	423	75%	528	77%	577
Emotional Disturbance	49%	206	67%	254	74%	320	69%	345
Multiple Disabilities/Deaf-Blind	60%	363	70%	374	80%	531	82%	551
Mental Retardation	54%	348	61%	365	74%	462	76%	487
Other Health Impairment	56%	305	58%	298	70%	351	78%	483
Orthopedic Impairment/ Traumatic Brain Injury	67%	543	70%	582	78%	612	80%	748
Specific Learning Disability	52%	442	54%	459	65%	794	77%	1,105
Speech & Lang. Impairment	49%	289	50%	282	62%	360	71%	367
Visual Impairment	60%	571	68%	583	82%	690	85%	686
Total (unweighted)	**57%**	**4,011**	**63%**	**4,082**	**73%**	**5,229**	**78%**	**5,982**
Overall Population Estimate	--	--	--	--	--	--	**76%**	

Note: 2007-08 is the first year in which a population estimate was calculated. This estimate is not comparable to earlier years.

TABLE D-3

Percentages of services with duration at least equal to the IEP by disability category, 2004-05 to 2007-08

	2004-05 Year 2		2005-06 Year 3		2006-07 Year 4		2007-08 Year 5	
Disability	% of Services with Duration at least Equal to the IEP	N of Services	% of Services with Duration at least Equal to the IEP	N of Services	% of Services with Duration at least Equal to the IEP	N of Services	% of Services with Duration at least Equal to the IEP	N of Services
Autism	58%	458	59%	463	60%	573	69%	627
Deaf/Hard of Hearing	60%	484	68%	419	76%	513	77%	579
Emotional Disturbance	65%	200	69%	255	77%	310	67%	343
Multiple Disabilities/Deaf-Blind	60%	359	74%	373	82%	548	82%	598
Mental Retardation	55%	345	64%	365	69%	463	73%	483
Other Health Impairment	59%	299	61%	302	65%	338	72%	485
Orthopedic Impairment/ Traumatic Brain Injury	68%	542	73%	582	78%	641	80%	806
Specific Learning Disability	56%	435	59%	467	56%	762	72%	1,094
Speech & Lang. Impairment	51%	288	53%	282	62%	354	70%	366
Visual Impairment	63%	567	69%	581	81%	685	81%	689
Total (unweighted)	**60%**	**3,977**	**65%**	**4,089**	**70%**	**5,187**	**75%**	**6,070**
Overall Population Estimate	--	--	--	--	--	--	**72%**	

Note: 2007-08 is the first year in which a population estimate was calculated. This estimate is not comparable to earlier years.

TABLE D-4

Percentages of services for which there was evidence of service provision by service category, 2004-05 to 2007-08

	2004-05 Year 2		2005-06 Year 3		2006-07 Year 4		2007-08 Year 5	
Service	% of Services for which there was Evidence of Service Provision	N of Services	% of Services for which there was Evidence of Service Provision	N of Services	% of Services for which there was Evidence of Service Provision	N of Services	% of Services for which there was Evidence of Service Provision	N of Services
Adapted Physical Education	99%	977	96%	962	98%	1,038	99%	1,010
Deaf/Hard of Hearing	100%	390	99%	392	96%	448	99%	453
Language and Speech	96%	1,075	86%	1,147	82%	1,420	86%	1,414
Least Restrictive Environment	85%	197	95%	198	96%	254	95%	276
Non-Public Agency	95%	55	85%	110	92%	155	87%	187
Occupational Therapy	98%	402	93%	427	92%	537	94%	530
Pre-School	100%	75	38%	110	95%	100	100%	102
Physical Therapy	100%	131	94%	148	98%	218	98%	247
Resource Specialist Program	65%	959	77%	1,055	71%	1,592	95%	1,612
School Mental Health	88%	409	86%	459	87%	572	94%	641
Visual Impairment	99%	327	97%	324	100%	394	100%	389

TABLE D-5

Percentages of services with frequency at least equal to the IEP by service category, 2004-05 to 2007-08

	2004-05 Year 2		2005-06 Year 3		2006-07 Year 4		2007-08 Year 5	
Service	% of Services with Frequency at least Equal to the IEP	N of Services	% of Services with Frequency at least Equal to the IEP	N of Services	% of Services with Frequency at least Equal to the IEP	N of Services	% of Services with Frequency at least Equal to the IEP	N of Services
Adapted Physical Education	68%	893	70%	865	81%	945	85%	973
Deaf/Hard of Hearing	62%	362	69%	346	81%	397	77%	430
Language and Speech	42%	965	48%	895	60%	1,085	69%	1,140
Least Restrictive Environment	80%	145	87%	174	87%	212	91%	246
Non-Public Agency	80%	39	70%	77	71%	123	77%	150
Occupational Therapy	55%	367	67%	365	72%	429	72%	426
Pre-School	80%	51	81%	36	76%	87	90%	101
Physical Therapy	61%	72	79%	90	71%	114	80%	113
Resource Specialist Program	60%	498	54%	593	67%	994	81%	1,461
School Mental Health	45%	318	65%	352	71%	459	64%	571
Visual Impairment	63%	301	71%	289	92%	384	87%	371

TABLE D-6

Percentages of services with duration at least equal to the IEP by service category, 2004-05 to 2007-08

	2004-05 Year 2		2005-06 Year 3		2006-07 Year 4		2007-08 Year 5	
Service	% of Services with Duration at least Equal to the IEP	N of Services	% of Services with Duration at least Equal to the IEP	N of Services	% of Services with Duration at least Equal to the IEP	N of Services	% of Services with Duration at least Equal to the IEP	N of Services
Adapted Physical Education	67%	881	73%	869	83%	945	86%	966
Deaf/Hard of Hearing	64%	361	72%	342	84%	383	79%	431
Language and Speech	44%	959	50%	899	60%	1,064	67%	1,141
Least Restrictive Environment	80%	144	87%	176	81%	211	81%	248
Non-Public Agency	83%	42	68%	77	55%	119	60%	148
Occupational Therapy	56%	365	66%	369	67%	435	68%	461
Pre-School	86%	51	83%	36	69%	86	79%	97
Physical Therapy	60%	72	75%	81	80%	173	88%	202
Resource Specialist Program	61%	487	60%	601	55%	946	75%	1,437
School Mental Health	62%	313	67%	355	74%	445	67%	570
Visual Impairment	67%	302	72%	284	89%	380	83%	369

Appendix E: How AIR's Computer Program Defined Patterns for Providing Holiday Credit

Overview

As described in Appendix A, AIR developed a computer program to electronically compare service information on the Individualized Education Program (IEP) to that on the logs for this study. This approach was used to analyze over 70% of the services sampled for this study. While AIR attempted to follow as close as possible the coding rules used for the manual hand-coding process, there were a few situations in which AIR had to modify the rules in order to create a functional program. One of these modified rules pertained to how the program recognized service patterns for the purpose of applying credit for holidays that occurred on days in which services were "regularly scheduled."

For the purpose of this study, the coding rules provided credit if a regularly provided service falls on a holiday.[21] For example, if a student regularly receives service on Mondays, the provider would receive credit for service on Monday holidays. While a manual coder may be able to reliably determine patterns without extensive guidance, a computer program requires an explicit set of rules to follow. The program can identify only those patterns that are clearly laid out by programming code, and this appendix describes the criteria used for this purpose.

Because of the timeframe for which the logs were collected (8 weeks for weekly services or 2 months for monthly services, in accordance with previous years), we had few data points by which to determine whether the pattern over an 8-week period was consistent enough to merit holiday credit. Although there was some evidence of the manual process and the computer program coding services differently, these cases were limited. We acknowledge that monthly

[21] The research team found that holidays were generally not explicitly documented on Welligent logs.

services occurring more than once monthly[22] may have been adversely impacted by the pattern criteria due to the limited number of service observations by which to determine a "pattern" and due to the fact that the program only examined patterns across eight weeks. While the logs for monthly services may span 9-10 weeks depending on the month requested, the program required an even number of weeks in order to reliably detect consistent patterns in Weeks 1-4 that matched the patterns in Weeks 5-8. Accordingly, the strict criteria used in the program resulted in some differences between the program codes and how the Research and Planning Division coded the logs manually.

Computer Program Criteria

In reviewing the databases used in Year 4, AIR established the following steps for the computer program to identify patterns for the Year 5 study.

1) Does the pattern observed in Weeks 1-4 mirror that observed in Weeks 5-8?

There are a finite number of fixed patterns that can occur over an 8-week period, as shown below:

[22] Please note that services occurring once monthly were not impacted by the holiday rule. The coding rules stipulate that once-monthly services do not receive credit for holidays.

TABLE E-1

Possible fixed patterns of service across 8-weeks (excluding once a month services)

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
Counterpart	5	6	7	8	1	2	3	4
Weekly – Case 1	■	■	■	■	■	■	■	■
Non-Weekly -Case 2	■		■		■		■	
Non-Weekly -Case 3		■		■		■		■
Non-Weekly -Case 4	■			■	■			■
Non-Weekly -Case 5	■	■			■	■		
Non-Weekly -Case 6		■	■			■	■	
Non-Weekly -Case 7			■	■			■	■

For a certain day of service to qualify as having a "pattern," it must exhibit one of the above configurations in which the *pattern for Weeks 1-4 mirrors the pattern for Weeks 5-8*. For example, if a service is provided on Mondays, the service must occur on each Monday of every week; **or** on Monday in Weeks 1, 3, 5, and 7; **or** on Monday in Weeks 2, 4, 6, and 8; and so on, in order for it to be considered a "pattern." If the Monday service was provided in Week 1, 2, 4, and 6, this would not qualify as a pattern. In other words, the sessions occurring in Weeks 1-4 must have counterparts in Weeks 5-8.

The program applied this test separately to each day of the week. For example, if the service is provided on Mondays and Thursdays, the program examined the occurrence of the Monday services, and then examined the occurrence of the Thursday services. It is possible that the Monday services follow a pattern, but the Thursday services do not, and therefore the Thursday service would not be eligible for holiday credit.

However, it is not enough that the sessions and holidays appear in a mirror fashion, shown in Table E-1. There also needed to be a minimum number of observations across the eight weeks to identify a pattern with some reliability. Hence, the next question:

2) Does the log provide sufficient observations for a given day of the week?

We also examined the actual number of sessions and the potential number of sessions (including holidays) that fall on the same days of service in Weeks 1-4 or Weeks 5-8. See the following example in Table E-2 (S represents a session with a status, and H represents holidays).

TABLE E-2
Example of actual and potential sessions in a log

	Monday	Tuesday	Wednesday	Thursday	Friday
Week 1	*H*				S
Week 2	S				
Week 3	S				S
Week 4	S			*S*	*S*
Week 5	*S*				S
Week 6	S	S			H
Week 7	S				S
Week 8	S			*H*	*H*
"Actual sessions"	**7**	**1**		**1**	**5**
"Potential sessions"	**8**	**1**		**2**	**6**

- For Monday in the above example, there are seven sessions with status information, and a holiday, for a total of eight potential sessions. Since the holiday in Week 1 mirrors the session in Week 5 (the counterpart of Week 1, italics), we counted the holiday as a potential session.
- For Friday in the above example, there are five sessions with status information, and a holiday in Week 8 and Week 6. The holiday that falls on a Friday in Week 6 (shaded cell) has no session counterpart in Week 2, and therefore it was not counted as a potential

session. The holiday in Week 8 counted as a potential session because it mirrors the Thursday in Week 4 (see italics above), for a total of six potential sessions.

- For Thursday in the above example, the holiday falls on the Thursday in Week 8. Since the service in the first four weeks occurs in Week 4 (the counterpart of Week 8), the holiday was considered a potential session.
- For Tuesday, there is one session provided.

To establish some reliability, the pattern for a given day needed a minimum number of actual sessions in relation to the number of potential sessions. These minimums helped ensure that the occurrence of services on a certain day of the week across the eight weeks was not random. To start, if a particular day of the week had between one to three total potential sessions (e.g., documented sessions, plus undocumented holidays) across the eight weeks, we deemed this as an insufficient number of observations to make a reliable judgment about the pattern. In these cases, the log would not receive holiday credit for a given day. We further determined that an odd number of potential sessions (e.g., five or seven) could not be considered a pattern.

To write the program to detect patterns with some degree of reliability, we stipulated that if the log documented for a given day of the week at least three actual sessions out of four potential sessions, at least five actual sessions out of six potential sessions, or at least six sessions out of eight potential sessions, the program would provide holiday credit (if the case met the first criteria above).

Using these minimums, we would assign provider credit to the Monday holiday shown in Table E-2 since the Monday actual sessions met the minimum for the eight potential sessions. We would assign credit for the Friday holiday in Week 8 since the Friday services met the minimum needed for six potential sessions. The Friday holiday in Week 6 would not be given credit because it does not have a counterpart session in Week 2 (as explained in Question 1).

Although the Thursday holiday in Table E-2 has a counterpart session, there is insufficient information to make a judgment as to whether there is a pattern. Credit would not be provided in this case.

If the answer to both Questions 1 and 2 is yes, we then asked:

3) How much credit to provide for the holiday session?

Services may be provided once, twice, and even three times in a given day. The program assigned credit based on the number of services that occurred on the counterpart day. For example, if a valid holiday occurs on Thursday of Week 6 and two service sessions were provided on Thursday of Week 2, the program gave the holiday credit for two sessions. In the event that the counterparts are both holidays, and they qualify for credit, the program applied the most frequent number of services based on the other sessions.