

Exhibit 3

TERRIEN REPORT

I, William J. Therrien, do hereby affirm and state:

Introduction and Qualifications

1. I am a special education professor. I received my Ph.D. in special education from the Pennsylvania State University in 2004.
2. I also received a Masters of Education in Special Education in 1998 from the Arizona State University.
3. I am a Board Certified Behavior Analyst (BCBA). As a BCBA I am licensed to provide Applied Behavior Analysis (ABA) services to clients who have academic deficits and/or problem behaviors. ABA is an evidenced based approach to provide services to students with disabilities including students with autism.
4. I am presently a special education professor and program coordinator in the Curry School at the University of Virginia.
5. My research focuses on designing and evaluating effective instructional practices for students with disabilities.
6. Since completing my academic training, I have served in numerous capacities including as the editor of *Exceptional Children*, a top research journal in special education, associate professor and co-director of the Center for Disability Research and Education at the University of Iowa and assistant professor at Miami University.
7. Prior to my roles in higher education, I was a special education teacher in Arizona, Alaska and Pennsylvania.
8. For a more complete description of my education and work experiences as well as a complete list of my publications see Exhibit A.

9. By virtue of my special education training, research, positions held in higher education, and previous K-12 teaching experience, I am considered by many to be an expert in identifying and providing effective special education services to students with disabilities in K-12 schools.
10. All of the information set forth in this declaration is based upon the review of the attached exhibits and my interviews of teachers, parents and MPAS advocate who have in-depth experience with the Flint Community Schools. My perspectives are informed by my education, personal knowledge, and extensive experience within K-12 education and the special education field.

Evidence of lack of child find efforts in Flint Community Schools since the lead poisoning

11. As indicated in Dr. Lidsky's declaration, increased levels of lead in the blood can result in brain damage, lower IQs, poor academic achievement, increased attention-related difficulties, and increased problem behaviors (see Dr. Lidsky's expert reports).
12. A significant number of Flint students were poisoned due to lead in the water over an 18 month period.
13. Formal evaluations, from neuro psychologists, Drs. Lidsky and Sudhalter, indicate that the children they assessed showed signs of lead exposure (see their respective expert reports).
14. Parents and teachers in the Flint Community Schools reported a stark increase in academic and behavioral problems since the lead water exposure.
15. There was a significant decrease in the number of students reported as proficient in 3rd through 8th grade on the Reading/ English Language Arts end of the year assessments between the 13-14 and 14-15 school year. In addition, the pass rate for Flint remains low.

16. The academic and behavioral difficulties caused by the Flint lead poisoning, found by neuro psychologists, reported by teachers and parents, and apparent in Flint test scores should result in an increase in the number of students identified for special education services via the Individuals with Disabilities Education Act (IDEA) and/or via a 504 plan provided as part of the Rehabilitation Act.

- a. Thirteen disabilities categories are recognized under IDEA including categories that would be expected to increase in prevalence due to lead exposure such as autism spectrum disorder, specific learning disabilities, emotional impairment, otherwise health impaired, cognitive impairment and traumatic brain injury. See the following link for Michigan Administrative Rules for Special Education.

https://www.michigan.gov/documents/mde/MARSE_Supplemented_with_IDEA_Regs_379598_7.pdf

- b. Disabilities recognized under 504 are broader than those delineated in IDEA and include any physical or mental impairment that substantially limits one or more major life activity (e.g., learning). See Exhibit B for Implementation Regulations for Section 504 of Rehabilitation Act provided as a link on the Michigan

Department of Education Website- http://www.michigan.gov/mde/0,4615,7-140-6598_7376---,00.html

17. There has not been a significant increase in the number of students receiving special education services under IDEA in the Flint Community Schools since the lead crisis. Further the percentage of students receiving special education services in the Flint Community Schools is lower than comparable urban school districts (e.g., Detroit) that did not experience the Flint water crisis.

18. There is little indication that the school district is identifying/ providing services to students who should receive services under Section 504 of the Rehabilitation Act.
- a. Out of all the teachers I interviewed, many with extensive teaching experience, only one had ever had an experience working with a student with a 504 plan. Other teachers had never heard of a 504 plan nor knew that students could receive services under Section 504 of the Rehabilitation Act. No teacher was able to name who was the school or district coordinator for 504 plans.
 - b. A special education advocate for the Michigan Protection and Advocacy Services who has extensive experience working with parents who have children with disabilities from the Flint Community Schools indicated she was not aware of any students receiving services under Section 504 of the Rehabilitation Act in the district.
 - c. A review of the Flint Community Schools website, Learning Support (i.e., special education) page conducted on October 13, 2017 and searches of the entire website on the same date using the search terms: “504”, “section 504”, and “Rehabilitation act” were conducted. No information was found. See exhibit C.

19. Based on items 1-18 listed above, it is my expert opinion that Flint Community Schools are not meeting their obligation to identify, locate and evaluate all children with disabilities. It is also evident that they are not identifying and providing services to many students with disabilities under Section 504 of the Rehabilitation Act.

Systemic Difficulties with Child Find efforts within the Flint Community Schools

20. Prior to a formal referral for potential special education eligibility, the Flint Community Schools utilize a response to intervention (RTI) approach to provide gradual increasing

interventions to students. See Exhibit D for essential components of RTI. They also use a student assistance team (SAT) pre-referral process in order to assist teachers to provide students with instructional and behavioral supports prior to formal referral for special education eligibility determination. According to their district website (see Exhibit C), the student assistant teams are, "...a multidisciplinary team that assesses at-risk students. The team meets to review student strengths and weaknesses, and suggest strategies and recommendations to help make schooling successful." Teacher and parent interviews indicate that these processes are inadequately staffed and that this often results in delayed and/or no evaluation for potential special education eligibility identification. They also report that when the SAT meets it often does not include a multidisciplinary team. The Office of Special Education Dear colleague letter that the Flint Community Schools provides linked access to on their website (see Exhibit E-document titled RTI memo 1-21-11) indicates that the use of RTI strategies cannot be used to delay or deny provisions of a full and individual evaluation to a child suspected of having a disability.

21. The potential efficacy of using an RTI process in Flint Community Schools is in question because of the lead water crisis. RTI is intended to be used as a preventative approach and as part of specific learning disability identification, primarily in early reading. The approach has limited to no research base outside to support its use outside of early reading or in grades outside of elementary school.
22. Teachers report that the response to intervention process, now served under a larger umbrella that also includes behavior termed MIBLSI, is inadequately staffed and that they have received little to no training on conducting the approach and providing the increasingly intensive interventions required for it to be effective. Students can remain in RTI

intervention over several years and often go in and out of additional RTI support services over years resulting in a delay or denial of special education evaluation.

23. Teachers reported that there are capacity issues in regards to the number of students who can be discussed at monthly SAT meetings and that unlike what is stated on the district's website, the SAT often is not multi-disciplinary. It also typically requires multiple meetings before SAT will consider potentially referring a student for special education evaluation and there is no carry-over from year to year in regards to students who have been involved in the SAT process. This has resulted in many students waiting a significant time period, many over years, before they can be considered for special education eligibility with a sizable number of students never being considered for special education evaluation.
24. Because of the capacity issues in the SAT process, many teachers reported that they no longer refer students through the process even if they suspect that students have disabilities. All but one of the teachers interviewed were unaware that they could trigger a special education evaluation outside the SAT process.
25. Middle and high school teachers interviewed report that they are unaware if there is a process to use when they suspect a child has a disability, in general or for a disability that might be associated with lead poisoning.
26. Teachers reported receiving no training on how to identify disabilities that might be related to the lead poisoning.
 - a. Without training, teachers and other school professional are at risk of misinterpreting inappropriate student behaviors as acts of willful disobedience instead of what they likely are--manifestations of the student's disability. This

misinterpretation in turn likely results in the use of ineffective punitive measures that exacerbate the problem.

27. Teachers reported that students are often excluded from special education evaluation because they had a lack of opportunity to learn (e.g., missed days of school). However, for many of these students, a large number of these absences were at the direction of the school via a process the teachers termed “snap suspension”. A teacher can suspend a student using a snap suspension and these missed days are often counted only as absences. Further, considering that students were often not having their behavioral and academic needs met via the RTI and SAT processes, it is not surprising that missed school days occurred.
28. Given the information I am aware of, it seems unlikely that the Genesee Intermediate School District is collaborating effectively with and providing competent oversight of the special education programming in the Flint Community Schools.
29. Based on items 19-28 above, it is apparent that the RTI process is resulting in delays and denials of special education evaluation. Further there is no empirical evidence to support the use of an RTI process with a student population similar to those in the Flint Community Schools. Flint Community Schools has an insufficient and over capacity SAT process that is often not staffed with a multi-disciplinary team at the elementary level. They have no discernable SAT process at the middle and high school levels to identify students with disabilities in general and specifically for disabilities caused by the lead poisoning. These insufficient processes lead to children with disabilities, including students poisoned by lead, not being identified. Further, because students with disabilities are not identified, they do not receive the specialized instruction they need to make meaningful progress in school.

- a. In order to address the significant and unique crisis in the Flint Community Schools, a different approach than what is in place needs to be implemented as soon as possible. Potential sources to draw on in order to develop this new model approach include the Center for Disease Control's, *Education Interventions for Children Affected by Lead* (see Exhibit F) and Connecticut Department of Education's *Prevention and Management of Lead Poisoning in Children guidelines* (see Exhibit G).

I declare under penalty of perjury that the foregoing is true and correct.



William J. Therrien, Ph.D., BCBA

10/16/17
Date

INDEX OF EXHIBITS

<u>Exhibit</u>	<u>Description</u>
A	Curriculum Vitae of William J. Therrien, Ph.D., BCBA
B	Implementation Regulations for Section 504 of Rehabilitation Act
C	Review and search of Flint Community Schools webpage
D	Response to Intervention Essential Components
E	Office of Special Education (OSEP) Dear colleague letter
F	CDC Education Interventions for Children Affected by Lead
G	Connecticut Department of Education's Prevention and Management of Lead Poisoning in Children guidelines

TERRIEN REPORT

Exhibit A

William J. Therrien, Ph.D., BCBA

University of Virginia
Curry School of Education
therrien@virginia.edu

EDUCATION

<i>Ph.D. in Special Education</i>	2004
The Pennsylvania State University, University Park, PA	
<i>Masters of Education in Special Education</i>	1998
Arizona State University, Tempe, AZ	
<i>Bachelor of Arts in Communications and History minor</i>	1993
The Pennsylvania State University, University Park, PA	

PROFESSIONAL POSITIONS

<i>Special Education Program Coordinator</i>	2015- present
University of Virginia	
<i>Co-Editor, Exceptional Children</i>	2015- present
<i>Special Education Professor</i>	2014- present
University of Virginia	
<i>Co-Director, Center for Disability Research and Education</i>	2012- 2014
University of Iowa, Iowa City, IA	
<i>Associate Professor</i>	2009-2014
University of Iowa, Iowa City, IA	
<i>Special Education Program Coordinator</i>	2007-2012
University of Iowa, Iowa City, IA	
<i>Assistant Professor</i>	2006-2009
University of Iowa, Iowa City, IA	
<i>Assistant Professor</i>	2004-2006
Miami University, Oxford, Ohio	
<i>Self-Contained Middle School Teacher</i>	2000-2001
Williamson Junior/Senior High School, Tioga, PA	
<i>Special Education and Regular Education Teacher</i>	1998-2000
Aleknagik School, Aleknagik, AK	
<i>Learning Disabilities Resource Teacher</i>	1998
Gilbert and Greenfield Middle Schools, Gilbert, AZ	

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HONORS

Dean's Scholar, 2010-2013, University of Iowa College of Education. (2010).

Thomas N. Urban Research Award for Outstanding Research Contribution to Iowa Education, Iowa Academy of Education. (2010).

Teacher Education and Special Education Publications Award, Volume 31, Teacher Education Division of the Council for Exceptional Children. (2009).

Selected to attend IES Research Training Institute: Cluster Randomized Trials at Vanderbilt University, Institute of Educational Sciences. (2007).

Selected to attend Early Career Research Workshop, Council for Exceptional Children, Division of Research. (2006).

PEER REVIEWED JOURNAL ARTICLES

* Asterisk indicates student/post-doc author

*Romig, J., *Miller, A., Therrien, W., Lloyd, J. (Under Review). Meta-analysis of administration procedures for curriculum-based measurement of written language.

Solis, M., El Zein, F., *Black, M., Therrien, W. J., Invernizzi M. (In Press). Word reading intervention for students with ASD: A multiple-baseline study of data based individualization. *Education and Training in Autism and Developmental Disabilities*.

*Matthews, H., *Hirsch, S., & Therrien, W. (In Press). Becoming critical consumers of research: Understanding replication. *Intervention School and Clinic*.

*Black, M., & Therrien, W. (In Press). Parent training programs for school age children with autism: A systematic review. *Remedial and Special Education*.

*Villanueva, M. G., Hand, B., Shelley, M., & Therrien, W. (In Press). The Conceptualization and development of the practical epistemology in science survey (PESS). *Research In Science Education*.

Therrien, W., *Benson, S., Hughes, C., *Morris, J. (2017). Explicit Instruction and Next Generation Science Standards Aligned Classrooms: A fit or a split? *Learning Disabilities Research and Practice*, 32(3), 149-154.

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- *Park, Y., *Yoon, S., Hand, B., Therrien, W., & Shelley, M. (2013). The Effectiveness of Argument-Based Teaching & Learning Approach for Improving the Vocabulary, Reading, Writing Ability of Students with Special Needs in Inclusive Education, *Korean Journal of Special Education*, 48(2), 301-317.
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- *Hofstadter, K.L., Jones, K.M., & Therrien, W.J. (2009). Class-Wide Effects of Positive Peer Reporting on the On-Task Behavior of Children with Emotional Disturbance. *Journal of Evidence Based Practice for Schools*, 10(1), 2-19.
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- Therrien, W. & Wasburn-Moses, L. (2009). Impact of No Child Left Behind's Highly Qualified Requirements on both Rural and Non-Rural Schools in Ohio. *Rural Special Education Quarterly*, 28(1), 11-19.
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William J. Therrien, Ph.D., BCBA

BOOK CHAPTERS

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- Therrien, W., & *Watt, S. (2013). Repeated Reading. In John Hattie and Eric Anderman (Eds), *International Handbook of Student Achievement*. London, Routledge.
- Hosp, J. & Therrien, W. (2010). Multilevel modeling in educational research. *In Educational Policy and Practice: The Good, the Bad, and the Pseudoscience*. Nova Science Publishers.
- Rozalski, M. E., Therrien, W.J., Harris, P., & Miller, J. (2007). Teaching reading to secondary school-age students with emotional/behavioral disorders. In L.M. Bullock & R.A. Gable (Eds.), *Council for Children with Behavioral Disorders Mini-Library Series 2007*. Denton, Texas.
- Therrien, W., & Kubina Jr., R., (2007). Developing fluency with repeated readings. In R. Robinson & M. McKenna (Eds). *Issues and Trends in Literacy Education (4th Ed.)*. Pearson, United Kingdom. -- Reprint of Therrien, W., & Kubina, R. (2006) The importance of context in repeated reading. *Reading Improvement, 44(4)*, 179-188.
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GRANTS

Therrien, W. (Co-PI) with Doabler, C. (21017-2021). Promoting Scientific Explorers among Students with Learning Disabilities. Sponsored by the National Science Foundation, \$2,500,000.

Therrien, W. (PI) with Kennedy, M. (2017-2022). Special Education Teachers and Researchers for Virginia Education. Sponsored by Office of Special Education Programs, \$1,250,000.00.

Therrien, William J (Co-PI), Hosp & Therrien (2014-2019). Special Education Leaders Applying Research in Schools. Sponsored by Office of Special Education Programs, \$1,250,000.00.

Therrien, William J (Principal Investigator), Therrien, Hosp, & Foley-Nicpon (2011-2015). Special Education Leaders for Iowa (SELIA): Training the Next Generation to Serve High Needs Children with Disabilities. Sponsored by Office of Special Education Programs, \$1,250,000.00.

Therrien, William J (Co-PI), Hendrickson, Therrien, & Hosp (2010-2015). Realizing Education and Career Hopes Outcomes (REACH-OUT), Sponsored by Office of Post-Secondary Education, \$2,500,000.00.

Therrien, William J (Principal Investigator), Therrien, Hand, and Shelly, M. (2010-2013). Science Writing Heuristic Post-Doctoral Fellowship Grant, Sponsored by Institute of Education Sciences, \$650,000.00.

Therrien, William J (Co-PI), Hand, B., Therrien, W., & Shelly, M. (2009-2013). The Efficacy of the Science Writing Heuristic Approach. Sponsored by Institute of Education Sciences., \$4,800,000.00.

Therrien, William J (Co-PI), Therrien and Foley-Nicpon (2006-2010). Preparing leaders in disability and pediatric psychology: Integrating practice and educational policy. Sponsored by U.S. Department of Education, Federal Government, \$887,415.00.

Therrien, William J (Principal Investigator), Therrien and Mokhtari (2006)., Highly Qualified Teacher Seminars in Math, Science, and English," Sponsored by Ohio Department of Education, \$50,000.00. (May 2006 - September 2006).

Therrien, William J (Principal Investigator). Therrien, & Wasburn- Moses. (2006). *Impact of No Child Left Behind's Highly Qualified Requirements on Special Education in Ohio* (\$49,000). Grant funded by Ohio's State Superintendents Task Force for Special Education.

William J. Therrien, Ph.D., BCBA

Therrien, William J (Principal Investigator). Therrien, Tanner, Wasburn-Moses & Southern. (2005-2007). *Alternative certification program for special educators*. Awarded (\$400,000) by Ohio Department of Education. Developed and currently implementing a special education licensure program for teachers working on emergency special education certificates.

Therrien, William J (Principal Investigator). Therrien (2005). Summer research award from the School of Education at Miami University," Sponsored by Miami University, The University of Iowa, \$5,000.00.

Therrien, William J (Principal Investigator). Therrien & Mokhtari (2005). *Developed and implemented seminars in Math and Science geared to enable special educators to meet highly qualified teacher requirements*. Awarded (\$30,000) by Ohio Department of Education.

Therrien, William J (Principal Investigator). Therrien & Mokhtari (2005). *Developed and implemented seminars in English geared to enable special educators to meet highly qualified teacher requirements*. Awarded (\$27,000) by Ohio Department of Education.

Therrien, William J (Principal Investigator). Therrien (2004-2006). *The effect of a combined repeated reading and question generation intervention on students with special needs reading achievement*. Awarded (\$40,000) by Ohio's Superintendent's Task Force for Preparing Special Education Personnel. Examined the effect of a combined reading fluency and text comprehension intervention on the reading achievement of 4th through 8th grade students with learning disabilities.

PRESENTATIONS

Refereed Presentations

Cook, B., & Therrien, W. (2017). CEC- DR Showcase: Can reforms to academic publishing improve the validity of special education research? Lecture presented at the Council for Exception Children Conference held in Boston, MA (April 2017).

Lloyd, J., Therrien, W., & Sayeski, K. . *How to write for Exceptional Children and Teaching Exceptional Children*. Lecture presented at the Council for Exception Children Conference held in Boston, MA (April 2017).

Cook, B., & Therrien, W. (2016). Reforms to academic publishing: Should they be adopted in special education? Lecture presented at the Annual Conference of Teacher Educators for Children with Behavioral Disorders, Tempe, AZ. (October 2016).

Carrero, K., Stevenson, R., Therrien, W., Schwilk, C. (2016). Effects of repeated readings on fluency and comprehension for secondary students with EBD. Lecture presented at the Annual Conference of Teacher Educators for Children with Behavioral Disorders, Tempe, AZ. (October 2016).

William J. Therrien, Ph.D., BCBA

Hughes, C., Lee, D., Therrien, W., Hosp, J., & Ferko, D. (2016). Practice with a purpose: Designing motivating practice activities. Lecture presented at the Annual Conference of Teacher Educators for Children with Behavioral Disorders, Tempe, AZ. (October 2016).

Brooks, D., Lee, D., & Therrien, W. *Project BI- SSCI*. Lecture presented at the Behavior Analysis Research Colloquium held in State College, PA (April 2016).

Hua, J., & Therrien, W. Masked visual analysis. Lecture presented at the Behavior Analysis Research Colloquium held in State College, PA (April 2016).

Lloyd, J., Therrien, W., & Sayeski, K. *How to write for Exceptional Children and Teaching Exceptional Children*. Lecture presented at the Council for Exception Children Conference held in St. Louis, MO (April 2016).

Cook, B., Coyne, M., Therrien, W., Travers, J., & Lemons, C. *Replication in special education research*. Lecture presented at the Council for Exception Children Conference held in St. Louis, MO (April 2016).

Taylor, J., Hughes, C., & Therrien, W. *Science education for students with disabilities in inclusive classrooms: Status of the research and future directions*. Presentation at the AERA- UCSB STEM and special education conference, Santa Barbara, CA (January 2016).

Therrien, W., Lee, D., Hughes, C. *Evidence based academic and behavioral supports for students with EBD in inquiry science classrooms*. Lecture presented at the Annual Conference of Teacher Educators for Children with Behavioral Disorders, Tempe, AZ. (October 2015).

deBettencourt, L., Therrien, W., Bryant, D., & Reed, D. *The changing nature of teacher preparation: Implications for teaching students with LD*. Panel presented at the 37th Annual International Conference on Learning Disabilities held in Las Vegas, NV (October 2015).

Cook, B., & Therrien, W. *Examining replication in special education research*. Panel presented at the 37th Annual International Conference on Learning Disabilities held in Las Vegas, NV (October 2015).

Schirmer, B., Schaffer, L., & Therrien, W. *Effect of Reread-Adapt and Answer-Comprehend on the fluency and comprehension of high school Deaf readers*. Lecture presented at the Association for Applied Behavior Analysis Conference held in San Antonio, TX (May 2015).

Therrien, W., O'Connor, R., & Strickland, T. *Strategies for secondary students in history and algebra*. Lecture presented at the Council for Exception Children Conference held in San Diego, CA (April 2015).

William J. Therrien, Ph.D., BCBA

Therrien, W., Watt, S., Pazey, B. *Perceptions of students and teachers using project based learning in the STEMS*. Le Lecture presented at the Council for Exception Children Conference held in San Diego, CA (April 2015).

Therrien, W , Allor, J., Faggella- Luby, M. *Evidence-based practices: Academic Interventions- Reading*. Lecture presented at the Council for Exceptional Children, Division of Learning Disabilities Learning Disabilities Symposium held at Southern Methodist University, Dallas, TX (2014, October 4).

Lee., D., Therrien, W., & Hughes, C. I'm going to have who in my classroom? Building a Support System for Students with EBD from the Ground Up. Symposium presented at the Annual Conference of Teacher Educators for Children with Behavioral Disorders, Tempe, AZ. (October 2014).

Fostvedt, L., Shelley, M., Hand, B., Laugerman, M., & Therrien, W. J., *Impacts of an Inquiry-Based Learning Approach to Teaching Science: Implications for Policy*. Paper presented at the the annual meeting of the American Educational Research Association, AERA, Philadelphia, PA. (April 2014).

Shelley, M., Fostvedt, L., Laugerman, M., Hand, B., & Therrien, W. J., *Multilevel Mediation Modeling of a New Inquiry Based Approach to Teaching Science*. Paper presented at the the annual meeting of the National Association of Research in Science Teaching, NARST, Pittsburgh, PA. (March 2014).

Therrien, W. J., Hua, Y., & Lee, D., *Increasing on-task behavior in secondary science classrooms*. Symposium presented at the Annual Conference of Teacher Educators for Children with Behavioral Disorders, Tempe, AZ. (October 2013).

Therrien, W.J., Taylor, J. *Science Instruction for Students With LD: Emerging Evidence-Based Practices*. Lecture presented at the CEC 2013 Convention and Expo, San Antonio, Texas (April 2013).

Taylor, J., Therrien, W.J. *Science Inquiry Instruction for students with LD: Pros, Cons, and Instructional Scaffolds for Success*. Lecture presented at the CEC 2013 Convention and Expo, San Antonio, Texas (April 2013).

Therrien, W.J., Israel, M., Jitendra, A., Mastropieri, M., Riccomini, P., Scruggs, T., Witzel, B. *Supporting Students with Learning Disabilities in the STEMS*. Lecture presented at the CEC 2013 Convention and Expo, San Antonio, Texas (April 2013).

Watt, S., Kaldenberg, E., Therrien, W.J. *Effective Reading Comprehension Strategies of Science Text for Students with Learning Disabilities*. Lecture presented at the CEC 2013 Convention and Expo, San Antonio, Texas (April 2013).

William J. Therrien, Ph.D., BCBA

Taylor, J. C. & Therrien, W.. *Making collaboration work: Strategies for special educators & science educators to use for students with disabilities*. Paper presented at The International Meeting of the Association of Science Teacher Educators, Charleston, South Carolina (January 2013).

Taylor, J., Therrien, W.J.. *Effective Instructional Strategies for Students with EBD in Science Classrooms*. Lecture presented at the TECBD 2012 Conference, Tempe, AZ.

Lee, David, Therrien, W.J., Hua, Y., Ferko, D., Hiidak, G. *Setting Neutral: Solutions for Modifying Content Area Instruction for Students with EBD*. Lecture presented at the TECBD 2012 Conference, Tempe, AZ.

Watt, S., Therrien, W.J., Taylor, J.C., & Kaldenberg, E.R., *Effective science instruction for students with emotional and behavioral disorders*. Lecture presented at the CEC 2012 Convention and Expo, Denver, Colorado (2012, April 13).

Kaldenberg, E. R., Therrien, W. J., Taylor, J. C., Hosp, J., Watt, S., & Banda. D., *Meta-analysis of writing instruction for students with learning disabilities*. Lecture presented at the CEC 2011 Convention and Expo, Denver, Colorado (2012, April 12).

Shelley, M., Gonwa-Reeves, C., Baenziger, J., Hand, B., & Therrien, W. J., *Student learning and inquiry-based science instruction: Testing effectiveness in a randomized trial*. Lecture presented at the annual meeting of the American Educational Research Association, American Educational Research Association, Vancouver, BC (April 13, 2012).

Shelley, M., Gonwa-Reeves, C., Baenziger, J., Hand, B., & Therrien, W. J., *Student learning through the science writing heuristic: Iowa Tests of Basic Skills, Cornell Critical Thinking Tests, and classroom Implementation*. Lecture presented at the National Association for Research in Science Teaching Annual International Conference, National Association for Research in Science Teaching, Indianapolis, IN (March 29, 2012).

Shelley, M., Gonwa-Reeves, C., Baenziger, J., Hand, B., Therrien, W. J., Villanueva, M. G., & Taylor, J., *Multilevel models for estimating the effect of implementing argumentation-based elementary science Instruction: The science writing heuristic*. Lecture presented at the Conference of the Society for Research on Educational Effectiveness, Society for Research on Educational Effectiveness, Washington, DC (March 9, 2012).

Taylor, J., Therrien, W. J., Kaldenberg, E., Watt, S., & Hosp, J. L., *Students and science education: A meta-analysis*. Lecture presented at the Annual Conference of Teacher Educators for Children with Behavioral Disorders, Tempe, AZ (October 29, 2011).

Lee, D., Therrien, W. J., Hua, Y., & Ferko, D., *Why students with EBD don't do homework: Some potential fixes*. Lecture presented at the Annual Conference of Teacher Educators for Children with Behavioral Disorders, Tempe, AZ (October 28, 2011).

William J. Therrien, Ph.D., BCBA

Hand, B., Therrien, W. J., Villanueva, M. G., Taylor, J., & Shelley, M., *Using an argument-based inquiry approach to learn science: Year 1 results of the science writing heuristic (SWH)*. Lecture presented at the Conference of the Society for Research on Educational Effectiveness, Society for Research on Educational Effectiveness, Washington, D.C. (September 10, 2011).

Hand, B., Therrien, W. J., Villanueva, M. G., & Taylor, J., *Using an argument-based inquiry approach to learn science: Year 1 results of the science writing heuristic*. Paper presented at the Society for Research on Educational Effectiveness, Washington, DC (September 9, 2011).

Shelley, M., Gonwa-Reeves, C., Baenziger, J., Hand, B., & Therrien, W. J., *Modeling outcomes for elementary science education: The science writing heuristic project*. Lecture presented at the Joint Statistical Meetings, Miami Beach, FL (August 1, 2011).

Hosp, J. L., Therrien, W. J., Fien, H., Smolkowski, K., & Chaparo, E., *Intervention effects of universal screening assessment*. Poster presented at the Council for Exceptional Children Annual Convention and Expo, Council for Exceptional Children, National Harbor, MD (April 2011).

Therrien, W. J., *Effective science instruction for students with learning disabilities*. Paper presented at the Council for Exceptional Children Conference, Washington, D.C. (April 2011).

Woods-Groves, S., Hendrickson, J. M., & Therrien, W. J., *Teaching postsecondary students with developmental disabilities to effectively write essays*. Paper presented at the National Council for Exceptional Children Conference, National Harbor, MD (April 2011).

Schirmer, B. R., Schaffer, L., Therrien, W. J., & Schirmer, T. N., *Effect of repeated reading as an intervention to improve fluency and comprehension of struggling deaf readers*. Paper presented at the Paper accepted for presentation at the Annual Conference of the American Educational Research Association, New Orleans, LA (April 2011).

Hosp, J. L., Fien, H., Therrien, W. J., Smolkowski, K., & Chapparro, E., *Universal screening: Intervention effects on classification accuracy*. Paper presented at the National Association of School Psychologists Annual Convention, National Association of School Psychologists, San Francisco, CA (February 2011).

Hosp, J. L., Therrien, W. J., & Fien, H., *Universal screening: intervention effects on classification accuracy*. Paper presented at the National Association of School Psychologists conference, San Francisco, CA (February 2011).

Schirmer, B., Therrien, W. J., & Schaffer, L., *Repeated reading and question generation intervention: Impact on reading fluency and achievement with deaf readers*. Presentation

William J. Therrien, Ph.D., BCBA

at the 21st International Congress on Education of the Deaf held in Vancouver, Canada July 2010. Paper. (July 2010).

Albro, Hand, B., & Therrien, W. J., *Arguing to learn: Exploring argumentation as a tool for critical thinking.* Paper presented at the Association for Psychological Science Conference, Boston, MA (May 2010).

Banda, D., Hart, S., Liu-Gitz, L., Therrien, W. J., & Sokolosky, S., *Impact of training peers and children with autism on social skills during center time activities in inclusive classrooms.* Poster presented at the Poster presentation at the Applied Behavior Analysis Conference held in May 2010 in Chicago, IL (May 2010).

Woods-Groves, S., Therrien, W. J., Shaw, J., & Hendrickson, J. M., *Target writing instruction: Teaching students with developmental disabilities to effectively write essays.* Lecture presented at the National Council for Exceptional Children Convention, Nashville, TN (April 2010).

Therrien, W. J., Banda, D., Woods-Groves, S., Gormley, S., & Southern, T., *Using meta-analyses to guide practice in EBD. Presentation at the Teacher Educators of Students with Severe Behavioral Disorders.* Paper. Tempe, AZ (October 2009).

Schirmer, B. R., Therrien, W. J., Schaffer, L., & Schirmer, T. N., *Repeated reading as an instructional intervention to improve the fluency of deaf readers.* Paper presented at the Paper accepted for presentation at the Annual Conference of the Society for the Scientific Study of Reading, Boston, MA (June 2009).

Therrien, W. J., Banda, D., & Woods-Groves, S., *How can results from meta-analyses guide practice? A review of the EBD research base.* Paper presented at the National Council for Exceptional Children Convention, Seattle, WA (April 2009).

Therrien, W. J., *Can Meta-Analyses Guide Practice? A Review of the EBD Research Base.* Paper presented at the National Council for Exceptional Children Convention in Seattle, Seattle, WA (April 2009).

Kirk, J., & Therrien, W. J., *Is Passage Repetition Needed to Improve Reading Fluency? A Comparison Study.* Paper presented at the National Council for Exceptional Children Convention in Seattle, Seattle, WA (April 2009).

Therrien, W. J. *Target reading fluency and comprehension: Implementation of the Read-Adapt and Answer-Comprehend Intervention.* Paper presented at the International Child & Adolescent Conference in Minneapolis, Minneapolis, MN(November 2008)

Therrien, W., Zaman, M., & Banda, D. *Can results from meta-analyses guide practice? A review of the learning disability research base.* Presentation at the National Council for Exceptional Children Convention, Boston, MA (April 2008).

William J. Therrien, Ph.D., BCBA

Harper, D., Latham, E., & Therrien, W. *Overview of Collegiate Options for Students with Intellectual Disabilities*. Presentation at the National Council for Exceptional Children Convention, Boston, MA (April 2008).

Therrien, W., & Gormley, S. *Implementation of Reread-Adapt and Answer-Comprehend Intervention to Improve Reading Fluency and Comprehension*. Poster session at the National Council for Exceptional Children Convention, Boston, MA (April 2008).

Schwilk, C., Therrien, W., McAfee, J., & Banda, D. *The need for an observable assessment of problematic internet use*. Presentation at the Teacher Educators of Students with Severe Behavioral Disorders, Tempe, AZ (November 2007).

Therrien, W. *Implementation of a combined reading fluency and text comprehension intervention*. Invited presentation at the Council for Exceptional Children's Division for Learning Disabilities National Conference, San Antonio, TX (November 2007).

Therrien, W. & Banda, D. *Fluency and text comprehension remediation for students with reading and behavioral difficulties: A combined approach*. Invited presentation at Council for Children with Behavioral Disorder's National Conference Dallas, TX (October 2007).

Therrien, W. & Hughes, C. *Essay Test-Taking Strategy: Teaching students with LD to effectively answer essay questions*. Presentation at the National Council for Exceptional Children Convention, Louisville, KY (April 2007).

Therrien, W. *Response to Intervention: Implications for special education*. Invited keynote presentation at the Inclusive Education symposium held at the University of Iowa, Iowa City, IA (April 2007).

Therrien, W. *Response to Intervention: Implications for special education assessment*. Invited presentation to special education cohort at Miami University held in Oxford, OH (March 2007).

Therrien, W. *Target reading fluency and comprehension: Implementation of the Reread-Adapt and Answer-Comprehend Intervention*. Presentation at the Teacher Educators of Students with Severe Behavioral Disorders, Tempe, AZ.

Therrien, W. *Empirically based reading instruction in the United States*. Presentation at the International Symposium on Applied Educational and School Psychology, Liaoning Normal University, Dalian, China (July 2006).

Therrien, W. *Combining repeated reading and question generation to improve students' reading achievement*. Presentation at the National Council for Exceptional Children Convention, Salt Lake City, UT (April 2006).

Therrien, W. *Effectiveness of a combined repeated reading and question generation intervention*. Presentation at the National Council for Exceptional Children Convention, Salt Lake City, UT (April 2006).

William J. Therrien, Ph.D., BCBA

Jones, K. & Therrien, W. *The Classwide Effects of Positive Behavior Supports on Critical Social Behaviors*. Presentation at the Teacher Educators of Students with Emotional and Behavioral Disorders Conference, Tempe, AZ (November 2005).

Gormley, S. & Therrien, W. *Now you tell me. What you can learn from your speech therapist but were afraid to ask*. Presentation at the Learning Disabilities Worldwide Conference, Burlington, MA (October 2005).

Therrien, W., & Gormley, S. *Effect of repeated reading and question generation on reading achievement*. Peer reviewed presentation at the National Council for Exceptional Children Convention, Baltimore, MD (April 2005).

Therrien, W., & Banda, D. *Fluency and comprehension gains as a result of repeated reading: A Meta-analysis*. Peer reviewed presentation at the National Council for Exceptional Children Convention, Baltimore, MD (April 2005).

Therrien, W. *SSTF Reading Grant Proposal Presentation*. Invited presentation at the Annual Ohio State Superintendent Task Force Conference, Columbus, OH (March 2005).

Therrien, W. & Gormley, S. & Schwilk, C. (2003). *Reading fluency identification and remediation*. Peer reviewed presentation at the National Council for Exceptional Children Convention, New Orleans, LA (April 2004).

Therrien, W. & Gormley, S. & Schwilk, C. *Reading fluency identification and remediation*. Peer reviewed presentation at the Pennsylvania federation of the Council for Exceptional Children, Harrisburg, PA (November 2003).

Therrien, W. *Efficacy of behavioral self-management techniques with adolescents with learning disabilities and behavior disorders*. Peer reviewed presentation at Behavior Analysis Research Colloquium, State College, PA (October 2003).

Non-refereed Presentations

Therrien, W. *College for students with intellectual disabilities: Why not?* Presentation at the Disability across the disciplines symposium , Charlottesville, VA (February 2016).

Hua, Y., & Therrien, W. J., *Applied Behavior Analysis and treatment of children with autism*. Keynote Address presented at the Annual Convention of ABA International China Chapter, Institute of Mental Health, Peking University, Beijing, China. (March 2013).

Therrien, W. *Effective Science Education for Students with Disabilities*, Pursuing the promise, 2012 Iowa statewide special education conference, Des Moines, IA (June 12, 2012).

Shelley, M., Gonwa-Reeves, C., Baenziger, J., Hand, B., & Therrien, W. J., *Inquiry and elementary science learning: Evidence from a randomized trial of the Science Writing Heuristic.*, National Association for Research in Science Teaching, Indianapolis, IN (March 24, 2012).

William J. Therrien, Ph.D., BCBA

Therrien, W. J., Secada, W., & Avalos, M., *Reading and Writing in the Content Area of Math and Science*. Lecture presented at the Institute of Education Sciences Principal Investigator Meeting, Institute of Education Sciences, Washington, D.C. (September 7, 2011).

Villanueva, M. G., Hand, B., Therrien, W. J., Shelley, M., & Taylor, J., *Questions, Claims, and Evidence: Lessons learned from students and teachers engaging in the Science Writing Heuristic approach*. The Meeting of the Society for Research on Educational Effectiveness, Washington DC (September 7, 2011).

Hughes, C., Therrien, W. J., & W., *The essay writing strategy: Helping students write more organized and complete responses to essay prompts*. Council for Exceptional Children Division of Learning Disabilities (DLD) Conference, Baltimore, MD (October 2010).

Schrimer, B., & Therrien, W. J., *Effectiveness of the Reread-Adapt and Answer-Comprehend Program: Impact on fluency and comprehension among elementary Deaf readers*. International Reading Association Conference in Chicago, Chicago, IL (April 2010).

Zaman, M., Therrien, W. J., & Banda, D., *The effects of two reading interventions on fluency and comprehension with students with developmental disabilities*. Poster presented at the 35th Annual Conference for the Association of Behavior Analysis, Phoenix, AZ (May 2009).

Schwilk, C., McAfee, J., & Therrien, W. J., *The effect of teaching college students to task analyze long term writing assignments*. 35th Annual Conference for the Association of Behavior Analysis, Phoenix, AZ. Poster. (May 2009).

Therrien, W. J., Panel member on topic "*Paper to Publication*" for University of Iowa's Graduate Student Executive Council. Paper. (February 17, 2009).

Ho, A., Hollingworth, L., Therrien, W. J., & Wood, S. M., *Navigating your last year as a graduate student*. University of Iowa, College of Education, Iowa City, IA (October 14, 2008).

Therrien, W. J., *Implementation of Reread-Adapt and Answer-Comprehend Intervention to Improve Reading Fluency and Comprehension*. Poster presented at National Council for Exceptional Children Convention, Boston, MA (April 2008).

Therrien, W. J., *Implementation of a combined reading fluency and text comprehension intervention*. presented at the Invited presentation at the Council for Exceptional Children's Division for Learning Disabilities National Conference, San Antonio, TX (November 2007).

William J. Therrien, Ph.D., BCBA

Therrien, W. J., & Banda, D., *Fluency and text comprehension remediation for students with reading and behavioral difficulties: A combined approach*. presented at the Invited presentation at Council for Children with Behavioral Disorder's National Conference, Dallas, TX (October 2007).

Therrien, W. J., *Response to Intervention: Implications for special education assessment*., Invited presentation to special education cohort at Miami University, Oxford, OH. (March 2007).

Therrien, W. J., *Invited presentation on publishing dissertation data at the Education and Allied Profession's Research Lunch held at Miami University*.. (October 2005).

Therrien, W. J., *Invited presentation to Miami University School of Education's Steering Committee for Funding*.. (September 2005).

Therrien, W. J., *SSTF Reading Grant Proposal Presentation*. presented at the Invited presentation at the Annual Ohio State Superintendent Task Force Conference. (May 2005).

Therrien, W. J., *Invited presentation to all 6th through 12th grade Special Educators in the Talawanda School District on Highly Qualified Teacher (HQT) requirements*. (March 2005).

Therrien, W. J., *Invited presentation to Miami University America Read tutors*. (March 2005).

Therrien, W. J., *In-service conducted at Bellefonte Elementary School on instruction techniques for reading fluency remediation for regular and special educators*. (September 2003).

SERVICE

Editorial and review activities

Reading Psychology (2013- present)
Editorial Board

The Elementary School Journal (2012- present)
Editorial Board

Learning Disabilities Research and Practice (2006–Present).
Editorial Board

IES reviewer, Panel (2016 and 2017)

NSF Reviewer, Panel (2016 and 2017)

William J. Therrien, Ph.D., BCBA

Council for Exceptional Children, Division of Learning Disabilities. (2006–2011).
Editor, DLD Times, Council for Exceptional Children, Division of Learning Disabilities
Newsletter

The 2010 Jakobsen Conference held at the University of Iowa. (2010-2012).
Served as a judge for the 2010-12 Jakobsen Conference.

Council for Exceptional Children. (June 2007–present).
Review and evaluate conference presentation proposals for the National Council for
Exceptional Children Conventions.

Committee Assignments

Chair, Promotion and Tenure, (2017-2018)

Member, Virginia Disability Advocacy and Action Committee (DAAC), (2016-2018).

Co-chair, Promotion and Tenure, (2016-2017).

Member, Doctoral Studies Committee, (2015-2016).

Search Committee Member, Clinical and School Psychology (2015-16).

Search Committee Member, Autism Cluster Hire (2015-2017).

Member, Internal Review Committee (2015-2016).

Academic co-coordinator for the Disabilities Studies certificate program in the College of
Liberal Arts. (June 2011–2014).

University Search Committee for Dean of the College of Education. (2010-11).
Search committee member

Merit committee. (January 2013–2014).

Task Force to Review College PHD Research Requirements. (2012–2014).

Advisory Board for School Counseling Program. (2011–2014).

Advisory Board for Iowa Center for Assistive Technology and Education Research. (2009–
2014).

Search Committee Member- Educational Leadership Program. (2012–2013).

Search Committee Member- Learning Sciences Program. (2012–2013).

William J. Therrien, Ph.D., BCBA

College of Education Faculty Advisory Committee. (2007–2010).
Representative for the Department of Teaching and Learning

ITBS Special Graduate Assistantship Committee. (January 2009–May 2010).
Review applications for assistantships

Student Computing Fee Committee. (2006–2007).
Committee member, reviewed applications

Faculty Advisory Council to the Dean at Miami University. (2005–2006).

Member of Committee to Evaluate Administrators at Miami University. (2005–2006).

Summer orientation faculty advisor. (2005).
Advised College of Education students at Miami University during summer orientation

Consulting

Culpeper School District (2016-17).
PD sessions for reading specialists

ACT Fairness Reviewer. (2006–2014).
Review ACT questions for issues of fairness

Freemont Mills Community School District. (2009-2010).
Helped develop a remedial reading fluency program for middle school special education students. Duties included training and demonstration teaching.

Michigan School for the Deaf. (2008–2009).
Helped develop a reading fluency program for Deaf students. Duties included training, demonstration teaching and program implementation guidance.

The Atlantic Community School District. (2008–2009).
Helped develop and implement a remedial reading program for high school students with significant cognitive disabilities. Duties included site visits, training, demonstration teaching and evaluation.

REACH, College of Education, University of Iowa. (2007–2014).
Admissions and Interview committees

Other Services

Council for Exceptional Children, Division of Learning Disabilities (2013- present).
Communication and Publications Chair

William J. Therrien, Ph.D., BCBA

University of Iowa student Council for Exceptional Children (2008–2009).
Treasurer

Best Buddies, University of Iowa. (2007–2008).
Faculty Advisor

State of Ohio. (2005–2006).
State of Ohio Praxis III assessor.

Best Buddies of Miami University. (2004–2006).
Faculty advisor of Best Buddies: Best Buddies is an organization dedicated to enhancing the lives of people with intellectual disabilities by providing opportunities for one-to-one friendships

Faculty Liaison to Miami University America Reads program. (2005–2006).
Trained America Read tutors and provided assistance developing and implementing reading interventions for at-risk students

TERRIEN REPORT

Exhibit B

[\[Notice to Readers\]](#)

TITLE 34 EDUCATION

SUBTITLE B REGULATIONS OF THE OFFICES OF THE DEPARTMENT OF EDUCATION

CHAPTER I -- OFFICE FOR CIVIL RIGHTS, DEPARTMENT OF EDUCATION

**PART 104 -- NONDISCRIMINATION ON THE BASIS OF HANDICAP IN PROGRAMS OR ACTIVITIES
RECEIVING FEDERAL FINANCIAL ASSISTANCE****[Subpart A](#) -- General Provisions**

Sec.

[104.1](#) Purpose.[104.2](#) Application.[104.3](#) Definitions.[104.4](#) Discrimination prohibited.[104.5](#) Assurances required.[104.6](#) Remedial action, voluntary action, and self-evaluation.[104.7](#) Designation of responsible employee and adoption of grievance procedures.[104.8](#) Notice.[104.9](#) Administrative requirements for small recipients.[104.10](#) Effect of state or local law or other requirements and effect of employment opportunities.**[Subpart B](#) -- Employment Practices**[104.11](#) Discrimination prohibited.[104.12](#) Reasonable accommodation.[104.13](#) Employment criteria.[104.14](#) Preemployment inquiries.**[Subpart C](#) -- Accessibility**[104.21](#) Discrimination prohibited.[104.22](#) Existing facilities.[104.23](#) New construction.**[Subpart D](#) -- Preschool, Elementary, and Secondary Education**

[104.31](#) Application of this subpart.

[104.32](#) Location and notification.

[104.33](#) Free appropriate public education.

[104.34](#) Educational setting.

[104.35](#) Evaluation and placement.

[104.36](#) Procedural safeguards.

[104.37](#) Nonacademic services.

[104.38](#) Preschool and adult education.

[104.39](#) Private education.

[Subpart E](#) -- Postsecondary Education

[104.41](#) Application of this subpart.

[104.42](#) Admissions and recruitment.

[104.43](#) Treatment of students; general.

[104.44](#) Academic adjustments.

[104.45](#) Housing.

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APPENDIX A TO PART 104 ANALYSIS OF FINAL REGULATION

APPENDIX B TO PART 104 GUIDELINES FOR ELIMINATING DISCRIMINATION AND DENIAL OF SERVICES ON THE BASIS OF RACE, COLOR, NATIONAL ORIGIN, SEX, AND HANDICAP IN VOCATIONAL EDUCATION PROGRAMS [NOTE]

AUTHORITY: 20 U.S.C. 1405; 29 U.S.C. 794.

SOURCE: 45 FR 30936, May 9, 1980, unless otherwise noted.

Subpart A -- General Provisions

104.1 Purpose.

The purpose of this part is to effectuate section 504 of the Rehabilitation Act of 1973, which is designed to eliminate discrimination on the basis of handicap in any program or activity receiving Federal financial assistance.

104.2 Application.

This part applies to each recipient of Federal financial assistance from the Department of Education and to the program or activity that receives such assistance.

104.3 Definitions.

As used in this part, the term:

(a) *The Act* means the Rehabilitation Act of 1973, Pub. L. 93-112, as amended by the Rehabilitation Act Amendments of 1974, Pub. L. 93-516, 29 U.S.C. 794.

(b) *Section 504* means section 504 of the Act.

(c) *Education of the Handicapped Act* means that statute as amended by the Education for all Handicapped Children Act of 1975, Pub. L. 94-142, 20 U.S.C. 1401 et seq.

(d) *Department* means the Department of Education.

(e) *Assistant Secretary* means the Assistant Secretary for Civil Rights of the Department of Education.

(f) *Recipient* means any state or its political subdivision, any instrumentality of a state or its political subdivision, any public or private agency, institution, organization, or other entity, or any person to which Federal financial assistance is extended directly or through another recipient, including any successor, assignee, or transferee of a recipient, but excluding the ultimate beneficiary of the assistance.

(g) *Applicant for assistance* means one who submits an application, request, or plan required to be approved by a Department official or by a recipient as a condition to becoming a recipient.

(h) *Federal financial assistance* means any grant, loan, contract (other than a procurement contract or a contract of insurance or guaranty), or any other arrangement by which the Department provides or otherwise makes available assistance in the form of:

(1) Funds;

(2) Services of Federal personnel; or

(3) Real and personal property or any interest in or use of such property, including:

(i) Transfers or leases of such property for less than fair market value or for reduced consideration; and

(ii) Proceeds from a subsequent transfer or lease of such property if the Federal share of its fair market value is not returned to the Federal Government.

(i) *Facility* means all or any portion of buildings, structures, equipment, roads, walks, parking lots, or other real or personal property or interest in such property.

(j) *Handicapped person* -- (1) *Handicapped persons* means any person who (i) has a physical or mental impairment which substantially limits one or more major life activities, (ii) has a record of such an impairment, or (iii) is regarded as having such an impairment.

(2) As used in paragraph (j)(1) of this section, the phrase:

(i) *Physical or mental impairment* means (A) any physiological disorder or condition, cosmetic disfigurement, or anatomical loss affecting one or more of the following body systems: neurological; musculoskeletal; special sense

organs; respiratory, including speech organs; cardiovascular; reproductive, digestive, genito-urinary; hemic and lymphatic; skin; and endocrine; or (B) any mental or psychological disorder, such as mental retardation, organic brain syndrome, emotional or mental illness, and specific learning disabilities.

(ii) *Major life activities* means functions such as caring for one's self, performing manual tasks, walking, seeing, hearing, speaking, breathing, learning, and working.

(iii) *Has a record of such an impairment* means has a history of, or has been misclassified as having, a mental or physical impairment that substantially limits one or more major life activities.

(iv) *Is regarded as having an impairment* means (A) has a physical or mental impairment that does not substantially limit major life activities but that is treated by a recipient as constituting such a limitation; (B) has a physical or mental impairment that substantially limits major life activities only as a result of the attitudes of others toward such impairment; or (C) has none of the impairments defined in paragraph (j)(2)(i) of this section but is treated by a recipient as having such an impairment.

(k) *Program or activity* means all of the operations of--

(1)(i) A department, agency, special purpose district, or other instrumentality of a State or of a local government; or

(ii) The entity of such State or local government that distributes such assistance and each such department or agency (and each other State or local government entity) to which the assistance is extended, in the case of assistance to a State or local government;

(2)(i) A college, university, or other postsecondary institution, or a public system of higher education; or

(ii) A local educational agency (as defined in 20 U.S.C. 8801), system of vocational education, or other school system;

(3)(i) An entire corporation, partnership, or other private organization, or an entire sole proprietorship--

(A) If assistance is extended to such corporation, partnership, private organization, or sole proprietorship as a whole; or

(B) Which is principally engaged in the business of providing education, health care, housing, social services, or parks and recreation; or

(ii) The entire plant or other comparable, geographically separate facility to which Federal financial assistance is extended, in the case of any other corporation, partnership, private organization, or sole proprietorship; or

(4) Any other entity which is established by two or more of the entities described in paragraph (k)(1), (2), or (3) of this section; any part of which is extended Federal financial assistance.

(Authority: 29 U.S.C. 794(b))

(l) *Qualified handicapped person* means:

(1) With respect to employment, a handicapped person who, with reasonable accommodation, can perform the essential functions of the job in question;

(2) With respect to public preschool elementary, secondary, or adult educational services, a handicapped person (i) of an age during which nonhandicapped persons are provided such services, (ii) of any age during which it is mandatory under state law to provide such services to handicapped persons, or (iii) to whom a state is required to provide a free appropriate public education under section 612 of the Education of the Handicapped Act; and

(3) With respect to postsecondary and vocational education services, a handicapped person who meets the academic and technical standards requisite to admission or participation in the recipient's education program or activity;

(4) With respect to other services, a handicapped person who meets the essential eligibility requirements for the receipt of such services.

(m) *Handicap* means any condition or characteristic that renders a person a handicapped person as defined in paragraph (j) of this section.

104.4 Discrimination prohibited.

(a) *General.* No qualified handicapped person shall, on the basis of handicap, be excluded from participation in, be denied the benefits of, or otherwise be subjected to discrimination under any program or activity which receives Federal financial assistance.

(b) *Discriminatory actions prohibited.* (1) A recipient, in providing any aid, benefit, or service, may not, directly or through contractual, licensing, or other arrangements, on the basis of handicap:

- (i) Deny a qualified handicapped person the opportunity to participate in or benefit from the aid, benefit, or service;
- (ii) Afford a qualified handicapped person an opportunity to participate in or benefit from the aid, benefit, or service that is not equal to that afforded others;
- (iii) Provide a qualified handicapped person with an aid, benefit, or service that is not as effective as that provided to others;
- (iv) Provide different or separate aid, benefits, or services to handicapped persons or to any class of handicapped persons unless such action is necessary to provide qualified handicapped persons with aid, benefits, or services that are as effective as those provided to others;
- (v) Aid or perpetuate discrimination against a qualified handicapped person by providing significant assistance to an agency, organization, or person that discriminates on the basis of handicap in providing any aid, benefit, or service to beneficiaries of the recipients program or activity;
- (vi) Deny a qualified handicapped person the opportunity to participate as a member of planning or advisory boards; or
- (vii) Otherwise limit a qualified handicapped person in the enjoyment of any right, privilege, advantage, or opportunity enjoyed by others receiving an aid, benefit, or service.

(2) For purposes of this part, aids, benefits, and services, to be equally effective, are not required to produce the identical result or level of achievement for handicapped and nonhandicapped persons, but must afford handicapped persons equal opportunity to obtain the same result, to gain the same benefit, or to reach the same level of achievement, in the most integrated setting appropriate to the person's needs.

(3) Despite the existence of separate or different aid, benefits, or services provided in accordance with this part, a recipient may not deny a qualified handicapped person the opportunity to participate in such aid, benefits, or services that are not separate or different.

(4) A recipient may not, directly or through contractual or other arrangements, utilize criteria or methods of administration (i) that have the effect of subjecting qualified handicapped persons to discrimination on the basis of handicap, (ii) that have the purpose or effect of defeating or substantially impairing accomplishment of the objectives of the recipient's program or activity with respect to handicapped persons, or (iii) that perpetuate the discrimination of another recipient if both recipients are subject to common administrative control or are agencies of the same State.

(5) In determining the site or location of a facility, an applicant for assistance or a recipient may not make selections (i) that have the effect of excluding handicapped persons from, denying them the benefits of, or otherwise subjecting them to discrimination under any program or activity that receives Federal financial assistance or (ii) that have the purpose or effect of defeating or substantially impairing the accomplishment of the objectives of the program or activity with respect to handicapped persons.

(6) As used in this section, the aid, benefit, or service provided under a program or activity receiving Federal financial assistance includes any aid, benefit, or service provided in or through a facility that has been constructed, expanded, altered, leased or rented, or otherwise acquired, in whole or in part, with Federal financial assistance.

(c) *Aid, benefits or services limited by Federal law.* The exclusion of nonhandicapped persons from aid, benefits, or services limited by Federal statute or executive order to handicapped persons or the exclusion of a specific class of handicapped persons from aid, benefits, or services limited by Federal statute or executive order to a different class of handicapped persons is not prohibited by this part.

104.5 Assurances required.

(a) *Assurances.* An applicant for Federal financial assistance to which this part applies shall submit an assurance, on a form specified by the Assistant Secretary, that the program or activity will be operated in compliance with this part. An applicant may incorporate these assurances by reference in subsequent applications to the Department.

(b) *Duration of obligation.* (1) In the case of Federal financial assistance extended in the form of real property or to provide real property or structures on the property, the assurance will obligate the recipient or, in the case of a subsequent transfer, the transferee, for the period during which the real property or structures are used for the purpose for which Federal financial assistance is extended or for another purpose involving the provision of similar services or benefits.

(2) In the case of Federal financial assistance extended to provide personal property, the assurance will obligate the recipient for the period during which it retains ownership or possession of the property.

(3) In all other cases the assurance will obligate the recipient for the period during which Federal financial assistance is extended.

(c) *Covenants.* (1) Where Federal financial assistance is provided in the form of real property or interest in the property from the Department, the instrument effecting or recording this transfer shall contain a covenant running with the land to assure nondiscrimination for the period during which the real property is used for a purpose for which the Federal financial assistance is extended or for another purpose involving the provision of similar services or benefits.

(2) Where no transfer of property is involved but property is purchased or improved with Federal financial assistance, the recipient shall agree to include the covenant described in paragraph (b)(2) of this section in the instrument effecting or recording any subsequent transfer of the property.

(3) Where Federal financial assistance is provided in the form of real property or interest in the property from the Department, the covenant shall also include a condition coupled with a right to be reserved by the Department to revert title to the property in the event of a breach of the covenant. If a transferee of real property proposes to mortgage or otherwise encumber the real property as security for financing construction of new, or improvement of existing, facilities on the property for the purposes for which the property was transferred, the Assistant Secretary may, upon request of the transferee and if necessary to accomplish such financing and upon such conditions as he or she deems appropriate, agree to forbear the exercise of such right to revert title for so long as the lien of such mortgage or other encumbrance remains effective.

104.6 Remedial action, voluntary action, and self-evaluation.

(a) *Remedial action.* (1) If the Assistant Secretary finds that a recipient has discriminated against persons on the basis of handicap in violation of section 504 or this part, the recipient shall take such remedial action as the Assistant Secretary deems necessary to overcome the effects of the discrimination.

(2) Where a recipient is found to have discriminated against persons on the basis of handicap in violation of section 504 or this part and where another recipient exercises control over the recipient that has discriminated, the Assistant Secretary, where appropriate, may require either or both recipients to take remedial action.

(3) The Assistant Secretary may, where necessary to overcome the effects of discrimination in violation of section 504 or this part, require a recipient to take remedial action (i) with respect to handicapped persons who are no longer participants in the recipient's program or activity but who were participants in the program or activity when such discrimination occurred or (ii) with respect to handicapped persons who would have been participants in the program or activity had the discrimination not occurred.

(b) *Voluntary action.* A recipient may take steps, in addition to any action that is required by this part, to overcome the effects of conditions that resulted in limited participation in the recipient's program or activity by qualified handicapped

persons.

(c) *Self-evaluation.* (1) A recipient shall, within one year of the effective date of this part:

(i) Evaluate, with the assistance of interested persons, including handicapped persons or organizations representing handicapped persons, its current policies and practices and the effects thereof that do not or may not meet the requirements of this part;

(ii) Modify, after consultation with interested persons, including handicapped persons or organizations representing handicapped persons, any policies and practices that do not meet the requirements of this part; and

(iii) Take, after consultation with interested persons, including handicapped persons or organizations representing handicapped persons, appropriate remedial steps to eliminate the effects of any discrimination that resulted from adherence to these policies and practices.

(2) A recipient that employs fifteen or more persons shall, for at least three years following completion of the evaluation required under paragraph (c)(1) of this section, maintain on file, make available for public inspection, and provide to the Assistant Secretary upon request:

(i) A list of the interested persons consulted,

(ii) A description of areas examined and any problems identified, and

(iii) A description of any modifications made and of any remedial steps taken.

104.7 Designation of responsible employee and adoption of grievance procedures.

(a) *Designation of responsible employee.* A recipient that employs fifteen or more persons shall designate at least one person to coordinate its efforts to comply with this part.

(b) *Adoption of grievance procedures.* A recipient that employs fifteen or more persons shall adopt grievance procedures that incorporate appropriate due process standards and that provide for the prompt and equitable resolution of complaints alleging any action prohibited by this part. Such procedures need not be established with respect to complaints from applicants for employment or from applicants for admission to postsecondary educational institutions.

104.8 Notice.

(a) A recipient that employs fifteen or more persons shall take appropriate initial and continuing steps to notify participants, beneficiaries, applicants, and employees, including those with impaired vision or hearing, and unions or professional organizations holding collective bargaining or professional agreements with the recipient that it does not discriminate on the basis of handicap in violation of section 504 and this part. The notification shall state, where appropriate, that the recipient does not discriminate in admission or access to, or treatment or employment in, its program or activity. The notification shall also include an identification of the responsible employee designated pursuant to 104.7(a). A recipient shall make the initial notification required by this paragraph within 90 days of the effective date of this part. Methods of initial and continuing notification may include the posting of notices, publication in newspapers and magazines, placement of notices in recipients' publication, and distribution of memoranda or other written communications.

(b) If a recipient publishes or uses recruitment materials or publications containing general information that it makes available to participants, beneficiaries, applicants, or employees, it shall include in those materials or publications a statement of the policy described in paragraph (a) of this section. A recipient may meet the requirement of this paragraph either by including appropriate inserts in existing materials and publications or by revising and reprinting the materials and publications.

104.9 Administrative requirements for small recipients.

The Assistant Secretary may require any recipient with fewer than fifteen employees, or any class of such recipients, to comply with 104.7 and 104.8, in whole or in part, when the Assistant Secretary finds a violation of this part or finds that

such compliance will not significantly impair the ability of the recipient or class of recipients to provide benefits or services.

104.10 Effect of state or local law or other requirements and effect of employment opportunities.

(a) The obligation to comply with this part is not obviated or alleviated by the existence of any state or local law or other requirement that, on the basis of handicap, imposes prohibitions or limits upon the eligibility of qualified handicapped persons to receive services or to practice any occupation or profession.

(b) The obligation to comply with this part is not obviated or alleviated because employment opportunities in any occupation or profession are or may be more limited for handicapped persons than for nonhandicapped persons.

Subpart B -- Employment Practices

104.11 Discrimination prohibited.

(a) *General.* (1) No qualified handicapped person shall, on the basis of handicap, be subjected to discrimination in employment under any program or activity to which this part applies.

(2) A recipient that receives assistance under the Education of the Handicapped Act shall take positive steps to employ and advance in employment qualified handicapped persons in programs or activities assisted under that Act.

(3) A recipient shall make all decisions concerning employment under any program or activity to which this part applies in a manner which ensures that discrimination on the basis of handicap does not occur and may not limit, segregate, or classify applicants or employees in any way that adversely affects their opportunities or status because of handicap.

(4) A recipient may not participate in a contractual or other relationship that has the effect of subjecting qualified handicapped applicants or employees to discrimination prohibited by this subpart. The relationships referred to in this paragraph include relationships with employment and referral agencies, with labor unions, with organizations providing or administering fringe benefits to employees of the recipient, and with organizations providing training and apprenticeships.

(b) *Specific activities.* The provisions of this subpart apply to:

(1) Recruitment, advertising, and the processing of applications for employment;

(2) Hiring, upgrading, promotion, award of tenure, demotion, transfer, layoff, termination, right of return from layoff and rehiring;

(3) Rates of pay or any other form of compensation and changes in compensation;

(4) Job assignments, job classifications, organizational structures, position descriptions, lines of progression, and seniority lists;

(5) Leaves of absence, sick leave, or any other leave;

(6) Fringe benefits available by virtue of employment, whether or not administered by the recipient;

(7) Selection and financial support for training, including apprenticeship, professional meetings, conferences, and other related activities, and selection for leaves of absence to pursue training;

(8) Employer sponsored activities, including those that are social or recreational; and

(9) Any other term, condition, or privilege of employment.

(c) A recipient's obligation to comply with this subpart is not affected by any inconsistent term of any collective bargaining agreement to which it is a party.

104.12 Reasonable accommodation.

(a) A recipient shall make reasonable accommodation to the known physical or mental limitations of an otherwise qualified handicapped applicant or employee unless the recipient can demonstrate that the accommodation would impose an undue hardship on the operation of its program or activity.

(b) Reasonable accommodation may include:

(1) Making facilities used by employees readily accessible to and usable by handicapped persons, and

(2) Job restructuring, part-time or modified work schedules, acquisition or modification of equipment or devices, the provision of readers or interpreters, and other similar actions.

(c) In determining pursuant to paragraph (a) of this section whether an accommodation would impose an undue hardship on the operation of a recipient's program or activity, factors to be considered include:

(1) The overall size of the recipient's program or activity with respect to number of employees, number and type of facilities, and size of budget;

(2) The type of the recipient's operation, including the composition and structure of the recipient's workforce; and

(3) The nature and cost of the accommodation needed.

(d) A recipient may not deny any employment opportunity to a qualified handicapped employee or applicant if the basis for the denial is the need to make reasonable accommodation to the physical or mental limitations of the employee or applicant.

104.13 Employment criteria.

(a) A recipient may not make use of any employment test or other selection criterion that screens out or tends to screen out handicapped persons or any class of handicapped persons unless:

(1) The test score or other selection criterion, as used by the recipient, is shown to be job-related for the position in question, and

(2) Alternative job-related tests or criteria that do not screen out or tend to screen out as many handicapped persons are not shown by the Director to be available.

(b) A recipient shall select and administer tests concerning employment so as best to ensure that, when administered to an applicant or employee who has a handicap that impairs sensory, manual, or speaking skills, the test results accurately reflect the applicant's or employee's job skills, aptitude, or whatever other factor the test purports to measure, rather than reflecting the applicant's or employee's impaired sensory, manual, or speaking skills (except where those skills are the factors that the test purports to measure).

104.14 Preemployment inquiries.

(a) Except as provided in paragraphs (b) and (c) of this section, a recipient may not conduct a preemployment medical examination or may not make preemployment inquiry of an applicant as to whether the applicant is a handicapped person or as to the nature or severity of a handicap. A recipient may, however, make preemployment inquiry into an applicant's ability to perform job-related functions.

(b) When a recipient is taking remedial action to correct the effects of past discrimination pursuant to 104.6 (a), when a recipient is taking voluntary action to overcome the effects of conditions that resulted in limited participation in its federally assisted program or activity pursuant to 104.6(b), or when a recipient is taking affirmative action pursuant to section 503 of the Act, the recipient may invite applicants for employment to indicate whether and to what extent they are handicapped, *Provided*, That:

(1) The recipient states clearly on any written questionnaire used for this purpose or makes clear orally if no written questionnaire is used that the information requested is intended for use solely in connection with its remedial action obligations or its voluntary or affirmative action efforts; and

(2) The recipient states clearly that the information is being requested on a voluntary basis, that it will be kept confidential as provided in paragraph (d) of this section, that refusal to provide it will not subject the applicant or employee to any adverse treatment, and that it will be used only in accordance with this part.

(c) Nothing in this section shall prohibit a recipient from conditioning an offer of employment on the results of a medical examination conducted prior to the employee's entrance on duty, *Provided*, That:

(1) All entering employees are subjected to such an examination regardless of handicap, and

(2) The results of such an examination are used only in accordance with the requirements of this part.

(d) Information obtained in accordance with this section as to the medical condition or history of the applicant shall be collected and maintained on separate forms that shall be accorded confidentiality as medical records, except that:

(1) Supervisors and managers may be informed regarding restrictions on the work or duties of handicapped persons and regarding necessary accommodations;

(2) First aid and safety personnel may be informed, where appropriate, if the condition might require emergency treatment; and

(3) Government officials investigating compliance with the Act shall be provided relevant information upon request.

Subpart C--Accessibility

104.21 Discrimination prohibited.

No qualified handicapped person shall, because a recipient's facilities are inaccessible to or unusable by handicapped persons, be denied the benefits of, be excluded from participation in, or otherwise be subjected to discrimination under any program or activity to which this part applies.

104.22 Existing facilities.

(a) *Accessibility.* A recipient shall operate its program or activity so that when each part is viewed in its entirety, it is readily accessible to handicapped persons. This paragraph does not require a recipient to make each of its existing facilities or every part of a facility accessible to and usable by handicapped persons.

(b) *Methods.* A recipient may comply with the requirements of paragraph (a) of this section through such means as redesign of equipment, reassignment of classes or other services to accessible buildings, assignment of aides to beneficiaries, home visits, delivery of health, welfare, or other social services at alternate accessible sites, alteration of existing facilities and construction of new facilities in conformance with the requirements of 104.23, or any other methods that result in making its program or activity accessible to handicapped persons. A recipient is not required to make structural changes in existing facilities where other methods are effective in achieving compliance with paragraph (a) of this section. In choosing among available methods for meeting the requirement of paragraph (a) of this section, a recipient shall give priority to those methods that serve handicapped persons in the most integrated setting appropriate.

(c) *Small health, welfare, or other social service providers.* If a recipient with fewer than fifteen employees that provides health, welfare, or other social services finds, after consultation with a handicapped person seeking its services, that there is no method of complying with paragraph (a) of this section other than making a significant alteration in its existing facilities, the recipient may, as an alternative, refer the handicapped person to other providers of those services that are accessible.

(d) *Time period.* A recipient shall comply with the requirement of paragraph (a) of this section within sixty days of the effective date of this part except that where structural changes in facilities are necessary, such changes shall be made within three years of the effective date of this part, but in any event as expeditiously as possible.

(e) *Transition plan.* In the event that structural changes to facilities are necessary to meet the requirement of paragraph (a) of this section, a recipient shall develop, within six months of the effective date of this part, a transition plan setting forth the steps necessary to complete such changes. The plan shall be developed with the assistance of interested

persons, including handicapped persons or organizations representing handicapped persons. A copy of the transition plan shall be made available for public inspection. The plan shall, at a minimum:

- (1) Identify physical obstacles in the recipient's facilities that limit the accessibility of its program or activity to handicapped persons;
- (2) Describe in detail the methods that will be used to make the facilities accessible;
- (3) Specify the schedule for taking the steps necessary to achieve full accessibility in order to comply with paragraph (a) of this section and, if the time period of the transition plan is longer than one year, identify the steps of that will be taken during each year of the transition period; and
- (4) Indicate the person responsible for implementation of the plan.

(f) *Notice.* The recipient shall adopt and implement procedures to ensure that interested persons, including persons with impaired vision or hearing, can obtain information as to the existence and location of services, activities, and facilities that are accessible to and usable by handicapped persons.

104.23 New construction.

(a) *Design and construction.* Each facility or part of a facility constructed by, on behalf of, or for the use of a recipient shall be designed and constructed in such manner that the facility or part of the facility is readily accessible to and usable by handicapped persons, if the construction was commenced after the effective date of this part.

(b) *Alteration.* Each facility or part of a facility which is altered by, on behalf of, or for the use of a recipient after the effective date of this part in a manner that affects or could affect the usability of the facility or part of the facility shall, to the maximum extent feasible, be altered in such manner that the altered portion of the facility is readily accessible to and usable by handicapped persons.

(c) *Conformance with Uniform Federal Accessibility Standards.* (1) Effective as of January 18, 1991, design, construction, or alteration of buildings in conformance with sections 3-8 of the Uniform Federal Accessibility Standards (UFAS) (Appendix A to 41 CFR subpart 101-19.6) shall be deemed to comply with the requirements of this section with respect to those buildings. Departures from particular technical and scoping requirements of UFAS by the use of other methods are permitted where substantially equivalent or greater access to and usability of the building is provided.

(2) For purposes of this section, section 4.1.6(1)(g) of UFAS shall be interpreted to exempt from the requirements of UFAS only mechanical rooms and other spaces that, because of their intended use, will not require accessibility to the public or beneficiaries or result in the employment or residence therein of persons with physical handicaps.

(3) This section does not require recipients to make building alterations that have little likelihood of being accomplished without removing or altering a load-bearing structural member.

[45 FR 30936, May 9, 1980; 45 FR 37426, June 3, 1980, as amended at 55 FR 52138, 52141, Dec. 19, 1990]

Subpart D -- Preschool, Elementary, and Secondary Education

104.31 Application of this subpart.

Subpart D applies to preschool, elementary, secondary, and adult education programs or activities that receive Federal financial assistance and to recipients that operate, or that receive Federal financial assistance for the operation of, such programs or activities.

104.32 Location and notification.

A recipient that operates a public elementary or secondary education program or activity shall annually:

- (a) Undertake to identify and locate every qualified handicapped person residing in the recipient's jurisdiction who is not receiving a public education; and

(b) Take appropriate steps to notify handicapped persons and their parents or guardians of the recipient's duty under this subpart.

104.33 Free appropriate public education.

(a) *General.* A recipient that operates a public elementary or secondary education program or activity shall provide a free appropriate public education to each qualified handicapped person who is in the recipient's jurisdiction, regardless of the nature or severity of the person's handicap.

(b) *Appropriate education.* (1) For the purpose of this subpart, the provision of an appropriate education is the provision of regular or special education and related aids and services that (i) are designed to meet individual educational needs of handicapped persons as adequately as the needs of nonhandicapped persons are met and (ii) are based upon adherence to procedures that satisfy the requirements of 104.34, 104.35, and 104.36.

(2) Implementation of an Individualized Education Program developed in accordance with the Education of the Handicapped Act is one means of meeting the standard established in paragraph (b)(1)(i) of this section.

(3) A recipient may place a handicapped person or refer such a person for aid, benefits, or services other than those that it operates or provides as its means of carrying out the requirements of this subpart. If so, the recipient remains responsible for ensuring that the requirements of this subpart are met with respect to any handicapped person so placed or referred.

(c) *Free education -- (1) General.* For the purpose of this section, the provision of a free education is the provision of educational and related services without cost to the handicapped person or to his or her parents or guardian, except for those fees that are imposed on non-handicapped persons or their parents or guardian. It may consist either of the provision of free services or, if a recipient places a handicapped person or refers such person for aid, benefits, or services not operated or provided by the recipient as its means of carrying out the requirements of this subpart, of payment for the costs of the aid, benefits, or services. Funds available from any public or private agency may be used to meet the requirements of this subpart. Nothing in this section shall be construed to relieve an insurer or similar third party from an otherwise valid obligation to provide or pay for services provided to a handicapped person.

(2) *Transportation.* If a recipient places a handicapped person or refers such person for aid, benefits, or services not operated or provided by the recipient as its means of carrying out the requirements of this subpart, the recipient shall ensure that adequate transportation to and from the aid, benefits, or services is provided at no greater cost than would be incurred by the person or his or her parents or guardian if the person were placed in the aid, benefits, or services operated by the recipient.

(3) *Residential placement.* If a public or private residential placement is necessary to provide a free appropriate public education to a handicapped person because of his or her handicap, the placement, including non-medical care and room and board, shall be provided at no cost to the person or his or her parents or guardian.

(4) *Placement of handicapped persons by parents.* If a recipient has made available, in conformance with the requirements of this section and 104.34, a free appropriate public education to a handicapped person and the person's parents or guardian choose to place the person in a private school, the recipient is not required to pay for the person's education in the private school. Disagreements between a parent or guardian and a recipient regarding whether the recipient has made a free appropriate public education available or otherwise regarding the question of financial responsibility are subject to the due process procedures of 104.36.

(d) *Compliance.* A recipient may not exclude any qualified handicapped person from a public elementary or secondary education after the effective date of this part. A recipient that is not, on the effective date of this regulation, in full compliance with the other requirements of the preceding paragraphs of this section shall meet such requirements at the earliest practicable time and in no event later than September 1, 1978.

104.34 Educational setting.

(a) *Academic setting.* A recipient to which this subpart applies shall educate, or shall provide for the education of, each qualified handicapped person in its jurisdiction with persons who are not handicapped to the maximum extent appropriate to the needs of the handicapped person. A recipient shall place a handicapped person in the regular

educational environment operated by the recipient unless it is demonstrated by the recipient that the education of the person in the regular environment with the use of supplementary aids and services cannot be achieved satisfactorily. Whenever a recipient places a person in a setting other than the regular educational environment pursuant to this paragraph, it shall take into account the proximity of the alternate setting to the person's home.

(b) *Nonacademic settings.* In providing or arranging for the provision of nonacademic and extracurricular services and activities, including meals, recess periods, and the services and activities set forth in 104.37(a)(2), a recipient shall ensure that handicapped persons participate with nonhandicapped persons in such activities and services to the maximum extent appropriate to the needs of the handicapped person in question.

(c) *Comparable facilities.* If a recipient, in compliance with paragraph (a) of this section, operates a facility that is identifiable as being for handicapped persons, the recipient shall ensure that the facility and the services and activities provided therein are comparable to the other facilities, services, and activities of the recipient.

104.35 Evaluation and placement.

(a) *Preplacement evaluation.* A recipient that operates a public elementary or secondary education program or activity shall conduct an evaluation in accordance with the requirements of paragraph (b) of this section of any person who, because of handicap, needs or is believed to need special education or related services before taking any action with respect to the initial placement of the person in regular or special education and any subsequent significant change in placement.

(b) *Evaluation procedures.* A recipient to which this subpart applies shall establish standards and procedures for the evaluation and placement of persons who, because of handicap, need or are believed to need special education or related services which ensure that:

(1) Tests and other evaluation materials have been validated for the specific purpose for which they are used and are administered by trained personnel in conformance with the instructions provided by their producer;

(2) Tests and other evaluation materials include those tailored to assess specific areas of educational need and not merely those which are designed to provide a single general intelligence quotient; and

(3) Tests are selected and administered so as best to ensure that, when a test is administered to a student with impaired sensory, manual, or speaking skills, the test results accurately reflect the student's aptitude or achievement level or whatever other factor the test purports to measure, rather than reflecting the student's impaired sensory, manual, or speaking skills (except where those skills are the factors that the test purports to measure).

(c) *Placement procedures.* In interpreting evaluation data and in making placement decisions, a recipient shall (1) draw upon information from a variety of sources, including aptitude and achievement tests, teacher recommendations, physical condition, social or cultural background, and adaptive behavior, (2) establish procedures to ensure that information obtained from all such sources is documented and carefully considered, (3) ensure that the placement decision is made by a group of persons, including persons knowledgeable about the child, the meaning of the evaluation data, and the placement options, and (4) ensure that the placement decision is made in conformity with 104.34.

(d) *Reevaluation.* A recipient to which this section applies shall establish procedures, in accordance with paragraph (b) of this section, for periodic reevaluation of students who have been provided special education and related services. A reevaluation procedure consistent with the Education for the Handicapped Act is one means of meeting this requirement.

104.36 Procedural safeguards.

A recipient that operates a public elementary or secondary education program or activity shall establish and implement, with respect to actions regarding the identification, evaluation, or educational placement of persons who, because of handicap, need or are believed to need special instruction or related services, a system of procedural safeguards that includes notice, an opportunity for the parents or guardian of the person to examine relevant records, an impartial hearing with opportunity for participation by the person's parents or guardian and representation by counsel, and a review procedure. Compliance with the procedural safeguards of section 615 of the Education of the Handicapped Act is one means of meeting this requirement.

104.37 Nonacademic services.

(a) *General.* (1) A recipient to which this subpart applies shall provide non-academic and extracurricular services and activities in such manner as is necessary to afford handicapped students an equal opportunity for participation in such services and activities.

(2) Nonacademic and extracurricular services and activities may include counseling services, physical recreational athletics, transportation, health services, recreational activities, special interest groups or clubs sponsored by the recipients, referrals to agencies which provide assistance to handicapped persons, and employment of students, including both employment by the recipient and assistance in making available outside employment.

(b) *Counseling services.* A recipient to which this subpart applies that provides personal, academic, or vocational counseling, guidance, or placement services to its students shall provide these services without discrimination on the basis of handicap. The recipient shall ensure that qualified handicapped students are not counseled toward more restrictive career objectives than are nonhandicapped students with similar interests and abilities.

(c) *Physical education and athletics.* (1) In providing physical education courses and athletics and similar aid, benefits, or services to any of its students, a recipient to which this subpart applies may not discriminate on the basis of handicap. A recipient that offers physical education courses or that operates or sponsors interscholastic, club, or intramural athletics shall provide to qualified handicapped students an equal opportunity for participation.

(2) A recipient may offer to handicapped students physical education and athletic activities that are separate or different from those offered to nonhandicapped students only if separation or differentiation is consistent with the requirements of 104.34 and only if no qualified handicapped student is denied the opportunity to compete for teams or to participate in courses that are not separate or different.

104.38 Preschool and adult education.

A recipient to which this subpart applies that provides preschool education or day care or adult education may not, on the basis of handicap, exclude qualified handicapped persons and shall take into account the needs of such persons in determining the aid, benefits, or services to be provided.

104.39 Private education.

(a) A recipient that provides private elementary or secondary education may not, on the basis of handicap, exclude a qualified handicapped person if the person can, with minor adjustments, be provided an appropriate education, as defined in 104.33(b)(1), within that recipient's program or activity.

(b) A recipient to which this section applies may not charge more for the provision of an appropriate education to handicapped persons than to nonhandicapped persons except to the extent that any additional charge is justified by a substantial increase in cost to the recipient.

(c) A recipient to which this section applies that provides special education shall do so in accordance with the provisions of 104.35 and 104.36. Each recipient to which this section applies is subject to the provisions of 104.34, 104.37, and 104.38.

Subpart E -- Postsecondary Education**104.41 Application of this subpart.**

Subpart E applies to postsecondary education programs or activities, including postsecondary vocational education programs or activities, that receive Federal financial assistance and to recipients that operate, or that receive Federal financial assistance for the operation of, such programs or activities.

104.42 Admissions and recruitment.

(a) *General.* Qualified handicapped persons may not, on the basis of handicap, be denied admission or be subjected to discrimination in admission or recruitment by a recipient to which this subpart applies.

(b) *Admissions*. In administering its admission policies, a recipient to which this subpart applies:

- (1) May not apply limitations upon the number or proportion of handicapped persons who may be admitted;
- (2) May not make use of any test or criterion for admission that has a disproportionate, adverse effect on handicapped persons or any class of handicapped persons unless (i) the test or criterion, as used by the recipient, has been validated as a predictor of success in the education program or activity in question and (ii) alternate tests or criteria that have a less disproportionate, adverse effect are not shown by the Assistant Secretary to be available.
- (3) Shall assure itself that (i) admissions tests are selected and administered so as best to ensure that, when a test is administered to an applicant who has a handicap that impairs sensory, manual, or speaking skills, the test results accurately reflect the applicant's aptitude or achievement level or whatever other factor the test purports to measure, rather than reflecting the applicant's impaired sensory, manual, or speaking skills (except where those skills are the factors that the test purports to measure); (ii) admissions tests that are designed for persons with impaired sensory, manual, or speaking skills are offered as often and in as timely a manner as are other admissions tests; and (iii) admissions tests are administered in facilities that, on the whole, are accessible to handicapped persons; and
- (4) Except as provided in paragraph (c) of this section, may not make preadmission inquiry as to whether an applicant for admission is a handicapped person but, after admission, may make inquiries on a confidential basis as to handicaps that may require accommodation.

(c) *Preadmission inquiry exception*. When a recipient is taking remedial action to correct the effects of past discrimination pursuant to 104.6(a) or when a recipient is taking voluntary action to overcome the effects of conditions that resulted in limited participation in its federally assisted program or activity pursuant to 104.6(b), the recipient may invite applicants for admission to indicate whether and to what extent they are handicapped, *Provided*, That:

- (1) The recipient states clearly on any written questionnaire used for this purpose or makes clear orally if no written questionnaire is used that the information requested is intended for use solely in connection with its remedial action obligations or its voluntary action efforts; and
- (2) The recipient states clearly that the information is being requested on a voluntary basis, that it will be kept confidential, that refusal to provide it will not subject the applicant to any adverse treatment, and that it will be used only in accordance with this part.

(d) *Validity studies*. For the purpose of paragraph (b)(2) of this section, a recipient may base prediction equations on first year grades, but shall conduct periodic validity studies against the criterion of overall success in the education program or activity in question in order to monitor the general validity of the test scores.

104.43 Treatment of students; general.

(a) No qualified handicapped student shall, on the basis of handicap, be excluded from participation in, be denied the benefits of, or otherwise be subjected to discrimination under any academic, research, occupational training, housing, health insurance, counseling, financial aid, physical education, athletics, recreation, transportation, other extracurricular, or other postsecondary education aid, benefits, or services to which this subpart applies.

(b) A recipient to which this subpart applies that considers participation by students in education programs or activities not operated wholly by the recipient as part of, or equivalent to, and education program or activity operated by the recipient shall assure itself that the other education program or activity, as a whole, provides an equal opportunity for the participation of qualified handicapped persons.

(c) A recipient to which this subpart applies may not, on the basis of handicap, exclude any qualified handicapped student from any course, course of study, or other part of its education program or activity.

(d) A recipient to which this subpart applies shall operate its program or activity in the most integrated setting appropriate.

104.44 Academic adjustments.

(a) *Academic requirements.* A recipient to which this subpart applies shall make such modifications to its academic requirements as are necessary to ensure that such requirements do not discriminate or have the effect of discriminating, on the basis of handicap, against a qualified handicapped applicant or student. Academic requirements that the recipient can demonstrate are essential to the instruction being pursued by such student or to any directly related licensing requirement will not be regarded as discriminatory within the meaning of this section. Modifications may include changes in the length of time permitted for the completion of degree requirements, substitution of specific courses required for the completion of degree requirements, and adaptation of the manner in which specific courses are conducted.

(b) *Other rules.* A recipient to which this subpart applies may not impose upon handicapped students other rules, such as the prohibition of tape recorders in classrooms or of dog guides in campus buildings, that have the effect of limiting the participation of handicapped students in the recipient's education program or activity.

(c) *Course examinations.* In its course examinations or other procedures for evaluating students' academic achievement, a recipient to which this subpart applies shall provide such methods for evaluating the achievement of students who have a handicap that impairs sensory, manual, or speaking skills as will best ensure that the results of the evaluation represents the student's achievement in the course, rather than reflecting the student's impaired sensory, manual, or speaking skills (except where such skills are the factors that the test purports to measure).

(d) *Auxiliary aids.* (1) A recipient to which this subpart applies shall take such steps as are necessary to ensure that no handicapped student is denied the benefits of, excluded from participation in, or otherwise subjected to discrimination because of the absence of educational auxiliary aids for students with impaired sensory, manual, or speaking skills.

(2) Auxiliary aids may include taped texts, interpreters or other effective methods of making orally delivered materials available to students with hearing impairments, readers in libraries for students with visual impairments, classroom equipment adapted for use by students with manual impairments, and other similar services and actions. Recipients need not provide attendants, individually prescribed devices, readers for personal use or study, or other devices or services of a personal nature.

104.45 Housing.

(a) *Housing provided by the recipient.* A recipient that provides housing to its nonhandicapped students shall provide comparable, convenient, and accessible housing to handicapped students at the same cost as to others. At the end of the transition period provided for in subpart C, such housing shall be available in sufficient quantity and variety so that the scope of handicapped students' choice of living accommodations is, as a whole, comparable to that of nonhandicapped students.

(b) *Other housing.* A recipient that assists any agency, organization, or person in making housing available to any of its students shall take such action as may be necessary to assure itself that such housing is, as a whole, made available in a manner that does not result in discrimination on the basis of handicap.

104.46 Financial and employment assistance to students.

(a) *Provision of financial assistance.* (1) In providing financial assistance to qualified handicapped persons, a recipient to which this subpart applies may not,

(i) On the basis of handicap, provide less assistance than is provided to nonhandicapped persons, limit eligibility for assistance, or otherwise discriminate or

(ii) Assist any entity or person that provides assistance to any of the recipient's students in a manner that discriminates against qualified handicapped persons on the basis of handicap.

(2) A recipient may administer or assist in the administration of scholarships, fellowships, or other forms of financial assistance established under wills, trusts, bequests, or similar legal instruments that require awards to be made on the basis of factors that discriminate or have the effect of discriminating on the basis of handicap only if the overall effect of the award of scholarships, fellowships, and other forms of financial assistance is not discriminatory on the basis of handicap.

(b) *Assistance in making available outside employment.* A recipient that assists any agency, organization, or person in providing employment opportunities to any of its students shall assure itself that such employment opportunities, as a whole, are made available in a manner that would not violate subpart B if they were provided by the recipient.

(c) *Employment of students by recipients.* A recipient that employs any of its students may not do so in a manner that violates subpart B.

104.47 Nonacademic services.

(a) *Physical education and athletics.* (1) In providing physical education courses and athletics and similar aid, benefits, or services to any of its students, a recipient to which this subpart applies may not discriminate on the basis of handicap. A recipient that offers physical education courses or that operates or sponsors intercollegiate, club, or intramural athletics shall provide to qualified handicapped students an equal opportunity for participation in these activities.

(2) A recipient may offer to handicapped students physical education and athletic activities that are separate or different only if separation or differentiation is consistent with the requirements of 104.43(d) and only if no qualified handicapped student is denied the opportunity to compete for teams or to participate in courses that are not separate or different.

(b) *Counseling and placement services.* A recipient to which this subpart applies that provides personal, academic, or vocational counseling, guidance, or placement services to its students shall provide these services without discrimination on the basis of handicap. The recipient shall ensure that qualified handicapped students are not counseled toward more restrictive career objectives than are nonhandicapped students with similar interests and abilities. This requirement does not preclude a recipient from providing factual information about licensing and certification requirements that may present obstacles to handicapped persons in their pursuit of particular careers.

(c) *Social organizations.* A recipient that provides significant assistance to fraternities, sororities, or similar organizations shall assure itself that the membership practices of such organizations do not permit discrimination otherwise prohibited by this subpart.

Subpart F -- Health, Welfare, and Social Services

104.51 Application of this subpart.

Subpart F applies to health, welfare, and other social service programs or activities that receive Federal financial assistance and to recipients that operate, or that receive Federal financial assistance for the operation of, such programs or activities.

104.52 Health, welfare, and other social services.

(a) *General.* In providing health, welfare, or other social services or benefits, a recipient may not, on the basis of handicap:

- (1) Deny a qualified handicapped person these benefits or services;
- (2) Afford a qualified handicapped person an opportunity to receive benefits or services that is not equal to that offered nonhandicapped persons;
- (3) Provide a qualified handicapped person with benefits or services that are not as effective (as defined in 104.4(b)) as the benefits or services provided to others;
- (4) Provide benefits or services in a manner that limits or has the effect of limiting the participation of qualified handicapped persons; or
- (5) Provide different or separate benefits or services to handicapped persons except where necessary to provide qualified handicapped persons with benefits and services that are as effective as those provided to others.

(b) *Notice.* A recipient that provides notice concerning benefits or services or written material concerning waivers of rights or consent to treatment shall take such steps as are necessary to ensure that qualified handicapped persons, including those with impaired sensory or speaking skills, are not denied effective notice because of their handicap.

(c) *Emergency treatment for the hearing impaired.* A recipient hospital that provides health services or benefits shall establish a procedure for effective communication with persons with impaired hearing for the purpose of providing emergency health care.

(d) *Auxiliary aids.* (1) A recipient to which this subpart applies that employs fifteen or more persons shall provide appropriate auxiliary aids to persons with impaired sensory, manual, or speaking skills, where necessary to afford such persons an equal opportunity to benefit from the service in question.

(2) The Assistant Secretary may require recipients with fewer than fifteen employees to provide auxiliary aids where the provision of aids would not significantly impair the ability of the recipient to provide its benefits or services.

(3) For the purpose of this paragraph, auxiliary aids may include brailled and taped material, interpreters, and other aids for persons with impaired hearing or vision.

104.53 Drug and alcohol addicts.

A recipient to which this subpart applies that operates a general hospital or outpatient facility may not discriminate in admission or treatment against a drug or alcohol abuser or alcoholic who is suffering from a medical condition, because of the person's drug or alcohol abuse or alcoholism.

104.54 Education of institutionalized persons.

A recipient to which this subpart applies and that operates or supervises a program or activity that provides aid, benefits or services for persons who are institutionalized because of handicap shall ensure that each qualified handicapped person, as defined in 104.3(k)(2), in its program or activity is provided an appropriate education, as defined in 104.33(b). Nothing in this section shall be interpreted as altering in any way the obligations of recipients under subpart D.

Subpart G -- Procedures

104.61 Procedures.

The procedural provisions applicable to title VI of the Civil Rights Act of 1964 apply to this part. These procedures are found in 100.6-100.10 and part 101 of this title.

TERRIEN REPORT

Exhibit C



FLINT COMMUNITY SCHOOLS

EXPECT MORE. ACHIEVE MORE.

[Learning Support Services](#) » Learning Support Services

LEARNING SUPPORT SERVICES

Melinda Carroll, Director of Student Services

Telephone: (810) 767-6134

Fax: (810) 760-6880

In keeping with state and federal laws, no child with a special need can be denied an education because of the nature or the severity of his or her disability. Learning Support Services serve students from birth to age 26, as required by these laws.

The department offers an assortment of mandated programs and services for students with a disability. It provides full and individual evaluation by certified and highly qualified psychologists, social workers, speech therapists and other ancillary staff for any student who is suspected of having a disability. The services include:

School social workers are the link between home, school and the community, providing direct interventions with students, families and the educational community. They also are advocates for the students' special needs.

School psychologists, who are trained to administer psychological tests, interpret results and make recommendations for eligibility and programs and services for students. They are instrumental in suggesting interventions and providing assistance with progress monitoring for teacher use with students.

- Least Restrictive Environment Behavior Consultants provide school personnel with positive behavior support

Schools

Parent Portal

Board

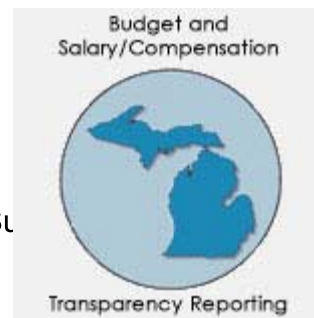
[Our Mission](#)

[Calendar](#)

Learning Su

Staff

Our Beliefs



- The education of ALL STUDENTS, including those with disabilities, is the shared responsibility of the educational community, families and students.
- Highly-qualified staff is held accountable for HIGH EXPECTATIONS for ALL STUDENTS, including students with disabilities.
- Our major focus is on IMPROVED RESULTS AND OUTCOMES for ALL STUDENTS and to increase the capacity for general education and special education to meet the individual TEACHING AND LEARNING NEEDS of ALL DIVERSE LEARNERS.

strategies to deal with difficult behaviors, assist building teams with developing behavior intervention plans and conducting functional assessments.

- MI-ACCESS and MEAP-ACCESS are state alternate assessment programs developed by the Michigan Department of Education to assess students with disabilities that require an alternate assessment and/or accommodation as determined by their Individualized Education Plan (IEP).
- Crisis Prevention Institute, where district instructors provide training to district staff on how to respond effectively to warning signs that may indicate that a student is beginning to lose control.
- Continuum of Services, where special education services are provided in a variety of programs and settings to meet the individual needs of eligible students. Special Education categorical programs include: autistic impaired, cognitive impaired, hearing impaired, learning disabled, physically impaired, otherwise health impaired, early childhood developmentally delayed, and traumatic brain injury, emotionally impaired and visually impaired.

Early Childhood Developmental Delay (ECDD)

Services are available for children, from birth through age 6, who are delayed 2½ times their chronological age in two areas of development.

Student Assistance Teams, a multidisciplinary team that assesses at-risk students. The team meets to review student strengths and weaknesses, and suggest strategies and recommendations to help make schooling successful.

Transition Coordinators and Planning

Transition planning is the process of preparing a student for the completion of his/her school program and moving into adulthood. This planning begins at age fourteen and continues until graduation.

Highly Qualified and Certified Classroom Teachers for Students with disabilities

Teachers of students with disabilities provide both push in and pull out services to ensure that our students receive specialized instruction and access to the general education curriculum in

Schools

Parent Portal

Board

Calendar

To provide specialized instruction and/or services in the Least Restrictive Environment that results in improved academic/behavioral/post-secondary student outcomes, while being fiscally responsible in these efforts.

Our Goals

- To increase the percentage of students with disabilities that spend 80% of their day in the general education classroom.
- To decrease by 5-10% the number of students with disabilities suspended greater than 10 days for the 2013-2014 school year as compared to the 2012-2013 school year.

order to successfully progress towards meeting their IEP goals and objectives.

ChildFind

May09-ProceduralSafeguardsNotice_278611_7

OSE-EIS_Memorandum_10-07_321440_7

TheParentHandbook_09_30_2010

Each district must declare which process they will use to identify students with a Specific Learning Disability. Flint Community Schools will use the Patterns of Strengths and Weakness to identify students with a Specific Learning Disability. The Michigan Department of Education has issued further guidance through the OSEP 11-07 memo.

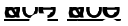
Declarationstatement9-1-10

PatternsofStrengthsandWeaknesses(PSW)ReferralProcess

RTIMemo1-21-11



<https://go2.pcgeducation.com/migisdflint>



FLINT COMMUNITY SCHOOLS

EXPECT MORE. ACHIEVE MORE.

SEARCH

No Results

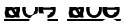
Budget and Salary/Compensation



Transparency Reporting

powered by: People Custom Search






FLINT COMMUNITY SCHOOLS

EXPECT MORE. ACHIEVE MORE.

SEARCH

No Results

Budget and Salary/Compensation



Transparency Reporting

powered by: people Custom Search



MI School Data



FLINT COMMUNITY SCHOOLS

EXPECT MORE. ACHIEVE MORE.

SEARCH

No Results

Budget and Salary/Compensation



Transparency Reporting

powered by: People Custom Search

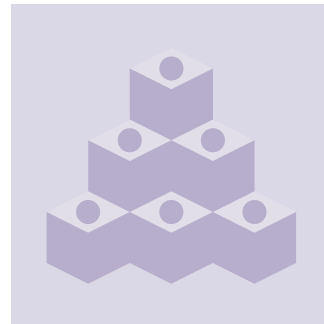


MI School Data

TERRIEN REPORT

Exhibit D

Essential Components of RTI – A Closer Look at Response to Intervention



April 2010



National Center on Response to Intervention
<http://www.rti4success.org>



U.S. Office of Special
Education Programs

About the National Center on Response to Intervention

Through funding from the U.S. Department of Education's Office of Special Education Programs, the American Institutes for Research and researchers from Vanderbilt University and the University of Kansas have established the National Center on Response to Intervention. The Center provides technical assistance to states and districts and builds the capacity of states to assist districts in implementing proven response to intervention frameworks.



National Center on Response to Intervention
<http://www.rti4success.org>

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Introduction

To assist states and local districts with planning for RTI, the National Center on Response to Intervention (NCRTI) has developed this information brief, *Essential Components of RTI – A Closer Look at Response to Intervention*. This brief provides a definition of RTI, reviews essential RTI components, and responds to frequently asked questions. The information presented is intended to provide educators with guidance for RTI implementation that reflects research and evidence-based practices, and supports the implementation of a comprehensive RTI framework. We hope that this brief is useful to your RTI planning, and we encourage you to contact us with additional questions you may have regarding effective implementation of RTI.

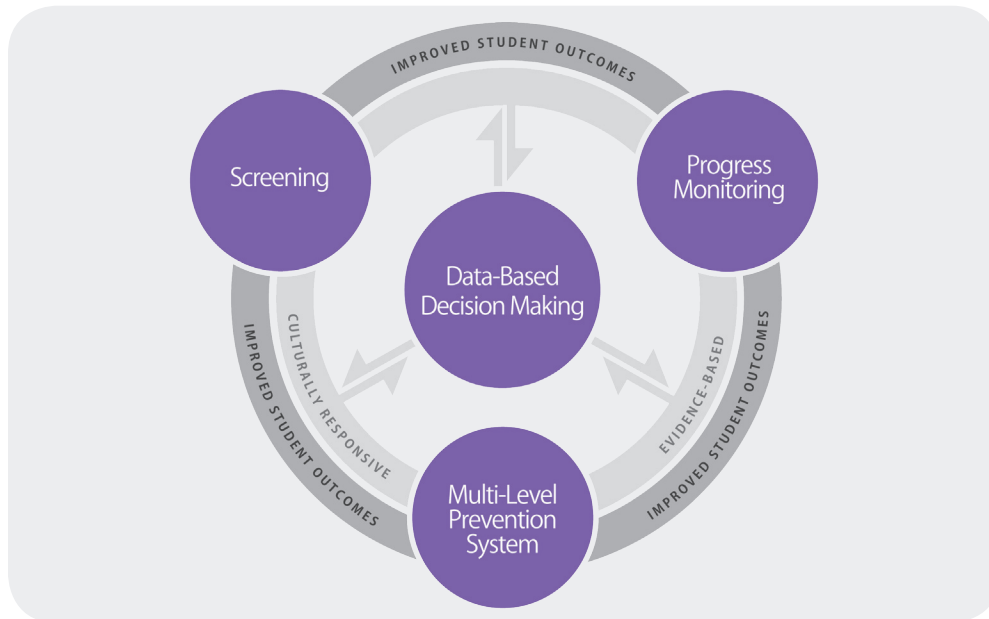
NCRTI believes that rigorous implementation of RTI includes a combination of high quality, culturally and linguistically responsive instruction, assessment, and evidence-based intervention. Further, the NCRTI believes that comprehensive RTI implementation will contribute to more meaningful identification of learning and behavioral problems, improve instructional quality, provide all students with the best opportunities to succeed in school, and assist with the identification of learning disabilities and other disabilities.

Through this document, we maintain there are four essential components of RTI:

- A school-wide, multi-level instructional and behavioral system for preventing school failure
- Screening
- Progress Monitoring
- Data-based decision making for instruction, movement within the multi-level system, and disability identification (in accordance with state law)



The graphic below represents the relationship among the essential components of RTI. Data-based decision making is the essence of good RTI practice; it is essential for the other three components, screening; progress monitoring and multi-levelled instruction. All components must be implemented using culturally responsive and evidence based practices.



Defining RTI

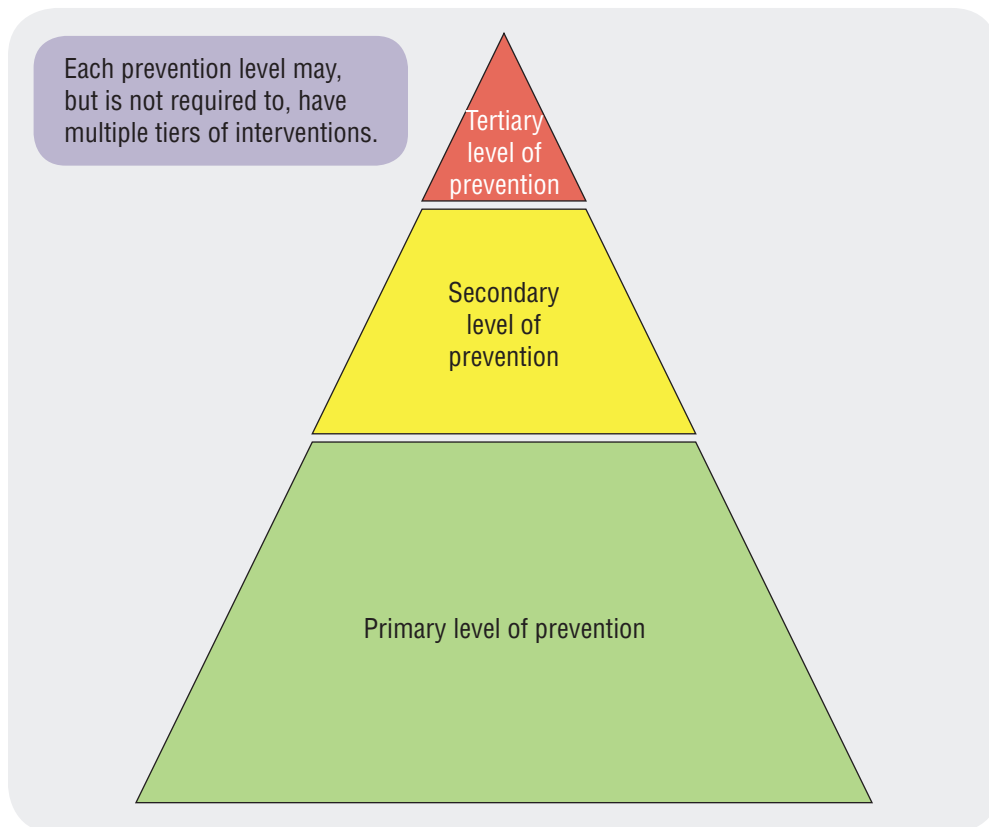
NCRTI offers a definition of response to intervention that reflects what is currently known from research and evidence-based practice.

Response to intervention integrates assessment and intervention within a multi-level prevention system to maximize student achievement and to reduce behavioral problems. With RTI, schools use data to identify students at risk for poor learning outcomes, monitor student progress, provide evidence-based interventions and adjust the intensity and nature of those interventions depending on a student's responsiveness, and identify students with learning disabilities or other disabilities.



Levels, Tiers, and Interventions

The following graphic depicts the progression of support across the multi-level prevention system. Although discussions in the field frequently refer to “tiers” to designate different interventions, we intentionally avoid the use of this term when describing the RTI framework and instead use “levels” to refer to three prevention foci: *primary level*, *secondary level*, and *tertiary level*. Within each of these levels of prevention, there can be more than one intervention. Regardless of the number interventions a school or district implements, each should be classified under one of the three levels of prevention: primary, secondary, or tertiary. This will allow for a common understanding across schools, districts, and states. For example, a school may have three interventions of approximately the same intensity in the secondary prevention level, while another school may have one intervention at that level. While there are differences in the number of interventions, these schools will have a common understanding of the nature and focus of the secondary prevention *level*.



The “What” Part of the Center’s Definition of RTI

RTI integrates student assessment and instructional intervention

RTI is a framework for providing comprehensive support to students and is not an instructional practice. RTI is a prevention oriented approach to linking assessment and instruction that can inform educators’ decisions about how best to teach their students. A goal of RTI is to minimize the risk for long-term negative learning outcomes by responding quickly and efficiently to documented learning or behavioral problems and ensuring appropriate identification of students with disabilities.

RTI employs a multi-level prevention system

A rigorous prevention system provides for the early identification of learning and behavioral challenges and timely intervention for students who are at risk for long-term learning problems. This system includes three levels of intensity or three levels of prevention, which represent a continuum of supports. Many schools use more than one intervention within a given level of prevention.

- Primary prevention: high quality core instruction that meets the needs of most students
- Secondary prevention: evidence-based intervention(s) of moderate intensity that addresses the learning or behavioral challenges of most at-risk students
- Tertiary prevention: individualized intervention(s) of increased intensity for students who show minimal response to secondary prevention

At all levels, attention is on fidelity of implementation, with consideration for cultural and linguistic responsiveness and recognition of student strengths.

RTI can be used to both maximize student achievement and reduce behavioral problems

The RTI framework provides a system for delivering instructional interventions of increasing intensity. These interventions effectively integrate academic instruction with positive behavioral supports. The Positive Behavioral Interventions and Supports (PBIS) Center (<http://www.pbis.org>) provides a school-wide model similar



to the framework described herein, and the two can be combined to provide a school-wide academic and behavioral framework.

RTI can be used to ensure appropriate identification of students with disabilities

By encouraging practitioners to implement early intervention, RTI implementation should improve academic performance and behavior, simultaneously reducing the likelihood that students are wrongly identified as having a disability.

The “How” Part of the Center’s Definition of RTI

Identify students at risk for poor learning outcomes or challenging behavior

Struggling students are identified by implementing a 2-stage screening process. The first stage, universal screening, is a brief assessment for all students conducted at the beginning of the school year; however, some schools and districts use it 2-3 times throughout the school year. For students who score below the cut point on the universal screen, a second stage of screening is then conducted to more accurately predict which students are truly at risk for poor learning outcomes. This second stage involves additional, more in-depth testing or short-term progress monitoring to confirm a student’s at risk status. Screening tools must be reliable, valid, and demonstrate diagnostic accuracy for predicting which students will develop learning or behavioral difficulties.

What is a cut point?

A cut point is a score on the scale of a screening tool or a progress monitoring tool. For universal screeners, educators use the cut point to determine whether to provide additional intervention. For progress monitoring tools, educators use the cut point to determine whether the student has demonstrated adequate response, whether to make an instructional change, and whether to move the student to more or less intensive services.



Provide research-based curricula and evidence-based interventions

Classroom instructors are encouraged to use research-based curricula in all subjects. When a student is identified via screening as requiring additional intervention, evidence-based interventions of moderate intensity are provided. These interventions, which are in addition to the core primary instruction, typically involve small-group instruction to address specific identified problems. These evidenced-based interventions are well defined in terms of duration, frequency, and length of sessions, and the intervention is conducted as it was in the research studies. Students who respond adequately to secondary prevention return to primary prevention (the core curriculum) with ongoing progress monitoring. Students who show minimal response to secondary prevention move to tertiary prevention, where more intensive and individualized supports are provided. All instructional and behavioral interventions should be selected with attention to their evidence of effectiveness and with sensitivity to culturally and linguistically diverse students.

What is the difference between evidence-based interventions and research-based curricula?

We refer to an *evidence-based intervention* in this document as an intervention for which data from scientific, rigorous research designs have demonstrated (or empirically validated) the efficacy of the intervention. That is, within the context of a group or single-subject experiment or a quasi-experimental study, the intervention is shown to improve the results for students who receive the intervention. *Research-based curricula*, on the other hand, may incorporate design features that have been researched generally; however, the curriculum or program as a whole has not been studied using a rigorous research design, as defined by the Elementary and Secondary Education Act.

Monitor student progress

Progress monitoring is used to assess students' performance over time, to quantify student rates of improvement or responsiveness to instruction, to evaluate instructional effectiveness, and for students who are least responsive to effective instruction, to formulate effective individualized programs. Progress monitoring tools must accurately represent students' academic development and must be useful for instructional planning and assessing student learning. In addition, in tertiary



prevention, educators use progress monitoring to compare a student's expected and actual rates of learning. If a student is not achieving the expected rate of learning, the educator experiments with instructional components in an attempt to improve the rate of learning.

Adjust the intensity and nature of interventions depending on a student's responsiveness

Progress monitoring data are used to determine when a student has or has not responded to instruction at any level of the prevention system. Increasing the intensity of an intervention can be accomplished in a number of ways such as lengthening instructional time, increasing the frequency of instructional sessions, reducing the size of the instructional group, or adjusting the level of instruction. Also, intensity can be increased by providing intervention support from a teacher with more experience and skill in teaching students with learning or behavioral difficulties (e.g., a reading specialist or a special educator).

Identify students with learning disabilities or other disabilities

If a student fails to respond to intervention, the student may have a learning disability or other disability that requires further evaluation. Progress monitoring and other data collected over the course of the provided intervention should be examined during the evaluation process, along with data from appropriately selected measures (e.g., tests of cognition, language, perception, and social skills).

In this way, effectively implemented RTI frameworks contribute to the process of disability identification by reducing inappropriate identification of students who might appear to have a disability because of inappropriate or insufficient instruction.

Use data to inform decisions at the school, grade, or classroom levels

Screening and progress monitoring data can be aggregated and used to compare and contrast the adequacy of the core curriculum as well as the effectiveness of different instructional and behavioral strategies for various groups of students within a school. For example, if 60% of the students in a particular grade score below the cut point on a screening test at the beginning of the year, school personnel might consider the appropriateness of the core curriculum or whether differentiated learning activities need to be added to better meet the needs of the students in that grade.



RTI 101: Frequently Asked Questions

NCRTI has received numerous questions about RTI from state and local educators, families, and other stakeholders across the country. Below, we provide answers to frequently asked questions.

What is at the heart of RTI?

The purpose of RTI is to provide all students with the best opportunities to succeed in school, identify students with learning or behavioral problems, and ensure that they receive appropriate instruction and related supports. The goals of RTI are to:

- Integrate all the resources to minimize risk for the long-term negative consequences associated with poor learning or behavioral outcomes
- Strengthen the process of appropriate disability identification

What impact does RTI have on students who are not struggling?

An important component of an effective RTI framework is the quality of the primary prevention level (i.e., the core curriculum), where **all** students receive high-quality instruction that is culturally and linguistically responsive and aligned to a state's achievement standards. This allows teachers and parents to be confident that a student's need for more intensive intervention or referral for special education evaluation is not due to ineffective classroom instruction. In a well designed RTI system, primary prevention should be effective and sufficient for about 80% of the student population.

What is universal screening?

NCRTI defines universal screening as brief assessments that are valid, reliable, and demonstrate diagnostic accuracy for predicting which students will develop learning or behavioral problems. They are conducted with all students to identify those who are at risk of academic failure and, therefore, need more intensive intervention to supplement primary prevention (i.e., the core curriculum). NCRTI provides a review of tools for screening at <http://www.rti4success.org>.

What is student progress monitoring?

NCRTI defines student progress monitoring as repeated measurement of performance to inform the instruction of individual students in general and special



education in grades K-8. These tools must be reliable and valid for representing students' development and have demonstrated utility for helping teachers plan more effective instruction. Progress monitoring is conducted at least monthly to:

- Estimate rates of improvement
- Identify students who are not demonstrating adequate progress
- Compare the efficacy of different forms of instruction to design more effective, individualized instruction

NCRTI provides a review of tools for student progress monitoring at <http://www.rti4success.org>.

What are culturally and linguistically responsive practices?

The use of culturally and linguistically responsive practices by teachers and other school staff involves purposeful consideration of the cultural, linguistic, and socio-economic factors that may have an impact on students' success or failure in the classroom. Attention to these factors, along with the inclusion of cultural elements in the delivery of instruction, will help make the strongest possible connection between the culture and expectations of the school and the culture(s) that students bring to the school. Instruction should be differentiated according to how students learn, build on existing student knowledge and experience, and be language appropriate. In addition, decisions about secondary and tertiary interventions should be informed by an awareness of students' cultural and linguistic strengths and challenges in relation to their responsiveness to instruction.

What are differentiated learning activities?

Teachers use student assessment data and knowledge of student readiness, learning preferences, language and culture to offer students in the same class different teaching and learning strategies to address their needs. Differentiation can involve mixed instructional groupings, team teaching, peer tutoring, learning centers, and accommodations to ensure that all students have access to the instructional program. Differentiated instruction is NOT the same as providing more intensive interventions to students with learning problems.

What is the RTI prevention framework?

RTI has three levels of prevention: primary, secondary, and tertiary. Through this framework, student assessment and instruction are linked for data-based



decision-making. If students move through the framework's specified levels of prevention, their instructional program becomes more intensive and more individualized to target their specific areas of learning or behavioral need.

What is primary prevention?

Primary prevention, the least intensive level of the RTI prevention framework, typically includes the core curriculum and the instructional practices used for all students. Primary prevention includes:

- A core curriculum that is research-based
- Instructional practices that are culturally and linguistically responsive
- Universal screening to determine students' current level of performance
- Differentiated learning activities (e.g., mixed instructional grouping, use of learning centers, peer tutoring) to address individual needs
- Accommodations to ensure all students have access to the instructional program
- Problem solving to identify interventions, as needed, to address behavior problems that prevent students from demonstrating the academic skills they possess

Students who require interventions due to learning difficulties continue to receive instruction in the core curriculum.

What is meant by core curriculum within the RTI framework?

The core curriculum is the course of study deemed critical and usually made mandatory for all students of a school or school system. Core curricula are often instituted at the elementary and secondary levels by local school boards, Departments of Education, or other administrative agencies charged with overseeing education.

What is secondary prevention?

Secondary prevention typically involves small-group instruction that relies on evidence-based interventions that specify the instructional procedures, duration (typically 10 to 15 weeks of 20- to 40-minute sessions), and frequency (3 or 4 times per week) of instruction. Secondary prevention has at least three distinguishing characteristics: it is evidence-based (rather than research-based); it relies entirely on adult-led small-group instruction rather than whole-class instruction; and it involves a clearly articulated, validated intervention, which should be adhered to



with fidelity. NCRTI has established a Technical Review Committee (TRC) which is conducting a review of the rigor of instructional practices for secondary prevention. The results of this review will be posted at <http://www.rti4success.org>.

Secondary prevention is expected to benefit a large majority of students who do not respond to effective primary prevention. As evidenced by progress monitoring data, students who do not benefit from the interventions provided under secondary prevention may need more intensive instruction or an individualized form of intervention, which can be provided at the tertiary prevention level.

What is tertiary prevention?

Tertiary prevention, the third level of the RTI prevention framework, is the most intensive of the three levels and is individualized to target each student's area(s) of need. At the tertiary level, the teacher begins with a more intensive version of the intervention program used in secondary prevention (e.g., longer sessions, smaller group size, more frequent sessions). However, the teacher does not presume it will meet the student's needs. Instead, the teacher conducts frequent progress monitoring (i.e., at least weekly) with each student. These progress monitoring data quantify the effects of the intervention program by depicting the student's rate of improvement over time. When the progress monitoring data indicate the student's rate of progress is unlikely to achieve the established learning goal, the teacher engages in a problem-solving process. That is, the teacher modifies components of the intervention program and continues to employ frequent progress monitoring to evaluate which components enhance the rate of student learning. By continually monitoring and modifying (as needed) each student's program, the teacher is able to design an effective, individualized instructional program.

Why is a common framework for RTI helpful?

A common RTI framework may strengthen RTI implementation by helping schools understand how programming becomes increasingly intensive. This helps schools accurately classify practices as primary, secondary, or tertiary. These distinctions should assist building-level administrators and teachers in determining how to deploy staff in a sensible and efficient manner.

How many tiers of intervention should an RTI framework have?

Schools and districts vary widely in the number of tiers included in their RTI frameworks. Regardless of the number of tiers of intervention a school or district



implements, each should be classified under one of the three levels of prevention: primary, secondary, or tertiary. Within this three-level prevention system, schools may configure their RTI frameworks using 4, 5, or more tiers of intervention. In choosing a number of tiers for their RTI framework, practitioners should recognize that the greater the number of tiers, the more complex the framework becomes. All students receive instruction within primary prevention level, which is often synonymous with tier 1.

Is RTI a special education program?

No. RTI is not synonymous with special education. Rather, special education is an important component of a comprehensive RTI framework that incorporates primary, secondary, and tertiary levels of prevention. All school staff (e.g., principal, general educators, special educators, content specialists, psychologists) should work together to implement their RTI framework and make decisions regarding appropriate intensity of interventions for students. Movement to less intensive levels of the prevention framework should be a high priority, as appropriate.

What does RTI have to do with identifying students for special education?

IDEA 2004 allows states to use a process based on a student's response to scientific, research-based interventions to determine if the child has a specific learning disability (SLD). In an RTI framework, a student's response to or success with instruction and interventions received across the levels of RTI would be considered as part of the comprehensive evaluation for SLD eligibility.

How does an RTI framework work in conjunction with inclusive school models and Least Restrictive Environment? Aren't students requiring more intensive levels of instruction removed from the general education classroom to receive those services?

Within an RTI framework, the levels refer only to the intensity of the services, not where the services are delivered. Students may receive different levels of intervention within the general education classroom or in a separate location with a general education teacher or other service providers. This is an important decision for educators to consider carefully.



Can students move back and forth between levels of the prevention system?

Yes, students should move back and forth across the levels of the prevention system based on their success (response) or difficulty (minimal response) at the level where they are receiving intervention, i.e., according to their documented progress based on the data. Also, students can receive intervention in one academic area at the secondary or tertiary level of the prevention system while receiving instruction in another academic area in primary prevention.

What's the difference between RTI and PBIS?

RTI and PBIS are related innovations that rely on a three-level prevention framework, with increasing intensity of support for students with learning or behavioral problems. Schools should design their RTI and PBIS frameworks in an integrated way to support students' academic and behavioral development. For more information on PBIS, see <http://www.pbis.org>.

I've got the basics, where should I go from here?

The NCRTI library provides more information on a variety of RTI topics. In particular, we suggest that you take a look at the following resources:

- NCRTI's *What is Response to Intervention?* webinar
- NCRTI's *Planning for the Implementation of RTI* webinar
- *Getting Started with SLD Determination*
- *Addressing Disproportionality through Culturally Responsive Educational Systems*
- NCRTI's *Screening and Progress Monitoring Tool Charts*
- *Using Differentiated Instruction to Address Disproportionality*
- NCRTI's *Glossary of RTI Terms*



National Center on Response to Intervention

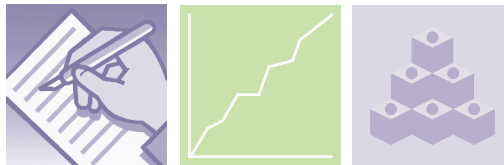
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TERRIEN REPORT

Exhibit E



UNITED STATES DEPARTMENT OF EDUCATION
OFFICE OF SPECIAL EDUCATION AND REHABILITATIVE SERVICES


JAN 21 2010

Contact Persons:	
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OSEP 11-07

MEMORANDUM

TO: State Directors of Special Education

FROM: Melody Musgrove, Ed.D. 
Director
Office of Special Education Programs

SUBJECT: A Response to Intervention (RTI) Process Cannot Be Used to Delay-Deny an Evaluation for Eligibility under the Individuals with Disabilities Education Act (IDEA)

The provisions related to child find in section 612(a)(3) of the Individuals with Disabilities Education Act (IDEA), require that a State have in effect policies and procedures to ensure that the State identifies, locates and evaluates all children with disabilities residing in the State, including children with disabilities who are homeless or are wards of the State, and children with disabilities attending private schools, regardless of the severity of their disability, and who are in need of special education and related services. It is critical that this identification occur in a timely manner and that no procedures or practices result in delaying or denying this identification. It has come to the attention of the Office of Special Education Programs (OSEP) that, in some instances, local educational agencies (LEAs) may be using Response to Intervention (RTI) strategies to delay or deny a timely initial evaluation for children suspected of having a disability. States and LEAs have an obligation to ensure that evaluations of children suspected of having a disability are not delayed or denied because of implementation of an RTI strategy.

A multi-tiered instructional framework, often referred to as RTI, is a schoolwide approach that addresses the needs of all students, including struggling learners and students with disabilities,

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and integrates assessment and intervention within a multi-level instructional and behavioral system to maximize student achievement and reduce problem behaviors. With a multi-tiered instructional framework, schools identify students at-risk for poor learning outcomes, monitor student progress, provide evidence-based interventions, and adjust the intensity and nature of those interventions depending on a student's responsiveness.

While the Department of Education does not subscribe to a particular RTI framework, the core characteristics that underpin all RTI models are: (1) students receive high quality research-based instruction in their general education setting; (2) continuous monitoring of student performance; (3) all students are screened for academic and behavioral problems; and (4) multiple levels (tiers) of instruction that are progressively more intense, based on the student's response to instruction. OSEP supports State and local implementation of RTI strategies to ensure that children who are struggling academically and behaviorally are identified early and provided needed interventions in a timely and effective manner. Many LEAs have implemented successful RTI strategies, thus ensuring that children who do not respond to interventions and are potentially eligible for special education and related services are referred for evaluation; and those children who simply need intense short-term interventions are provided those interventions.

The regulations implementing the 2004 Amendments to the IDEA include a provision mandating that States allow, as part of their criteria for determining whether a child has a specific learning disability (SLD), the use of a process based on the child's response to scientific, research-based intervention¹. See 34 CFR §300.307(a)(2). OSEP continues to receive questions regarding the relationship of RTI to the evaluation provisions of the regulations. In particular, OSEP has heard that some LEAs may be using RTI to delay or deny a timely initial evaluation to determine if a child is a child with a disability and, therefore, eligible for special education and related services pursuant to an individualized education program.

Under 34 CFR §300.307, a State must adopt, consistent with 34 CFR §300.309, criteria for determining whether a child has a specific learning disability as defined in 34 CFR §300.8(c)(10). In addition, the criteria adopted by the State: (1) must not require the use of a severe discrepancy between intellectual ability and achievement for determining whether a child has an SLD; (2) must permit the use of a process based on the child's response to scientific, research-based intervention; and (3) may permit the use of other alternative research-based procedures for determining whether a child has an SLD. Although the regulations specifically address using the process based on the child's response to scientific, research-based interventions (i.e., RTI) for determining if a child has an SLD, information obtained through RTI strategies may also be used as a component of evaluations for children suspected of having other disabilities, if appropriate.

The regulations at 34 CFR §300.301(b) allow a parent to request an initial evaluation at any time to determine if a child is a child with a disability. The use of RTI strategies cannot be used to delay or deny the provision of a full and individual evaluation, pursuant to 34 CFR §§300.304-

¹ The Department has provided guidance regarding the use of RTI in the identification of specific learning disabilities in its letters to: Zirkel - 3-6-07, 8-15-07, 4-8-08, and 12-11-08; Clarke - 5-28-08; and Copenhaver - 10-19-07. Guidance related to the use of RTI for children ages 3 through 5 was provided in the letter to Brekken - 6-2-10. These letters can be found at <http://www2.ed.gov/policy/speced/guid/idea/index.html>.

300.311, to a child suspected of having a disability under 34 CFR §300.8. If the LEA agrees with a parent who refers their child for evaluation that the child may be a child who is eligible for special education and related services, the LEA must evaluate the child. The LEA must provide the parent with notice under 34 CFR §§300.503 and 300.504 and obtain informed parental consent, consistent with 34 CFR §300.9, before conducting the evaluation. Although the IDEA and its implementing regulations do not prescribe a specific timeframe from referral for evaluation to parental consent, it has been the Department's longstanding policy that the LEA must seek parental consent within a reasonable period of time after the referral for evaluation, if the LEA agrees that an initial evaluation is needed. See Assistance to States for the Education of Children with Disabilities and Preschool Grants for Children with Disabilities, Final Rule, 71 Fed. Reg., 46540, 46637 (August 14, 2006). An LEA must conduct the initial evaluation within 60 days of receiving parental consent for the evaluation or, if the State establishes a timeframe within which the evaluation must be conducted, within that timeframe. 34 CFR §300.301(c).

If, however, the LEA does not suspect that the child has a disability, and denies the request for an initial evaluation, the LEA must provide written notice to parents explaining why the public agency refuses to conduct an initial evaluation and the information that was used as the basis for this decision. 34 CFR §300.503(a) and (b). The parent can challenge this decision by requesting a due process hearing under 34 CFR §300.507 or filing a State complaint under 34 CFR §300.153 to resolve the dispute regarding the child's need for an evaluation. It would be inconsistent with the evaluation provisions at 34 CFR §§300.301 through 300.111 for an LEA to reject a referral and delay provision of an initial evaluation on the basis that a child has not participated in an RTI framework.

We hope this information is helpful in clarifying the relationship between RTI and evaluations pursuant to the IDEA. Please examine the procedures and practices in your State to ensure that any LEA implementing RTI strategies is appropriately using RTI, and that the use of RTI is not delaying or denying timely initial evaluations to children suspected of having a disability. If you have further questions, please do not hesitate to contact me or Ruth Ryder at 202-245-7513.

References:

Questions and Answers on RTI and Coordinated Early Intervening Services (CEIS), January 2007

Letter to Brekken, 6-2-2010

Letter to Clarke, 4-28-08

Letter to Copenhaver, 10-19-07

Letters to Zirkel, 3-6-07, 8-15-07, 4-8-08 and 12-11-08

cc: Chief State School Officers
Regional Resource Centers
Parent Training Centers
Protection and Advocacy Agencies
Section 619 Coordinators

TERRIEN REPORT

Exhibit F

Educational Interventions for Children Affected by Lead



This paper was developed by an expert panel that included CDC and non-CDC authors.

April 2015

The information contained in this paper has been prepared and is presented for informational and educational purposes only. The information in this paper is not intended to be legal advice and should not be construed as legal advice or a legal determination about eligibility for any program or benefit.

This document is dedicated to the memory of Dr. Vivian A. Cross of Simsbury, Connecticut, who passed away May 3, 2014. She was an extraordinary educator, community activist, and champion for children with special needs. Dr. Cross implemented major educational and legislative informational forums, media conferences, and professional development training initiatives including the 2012 Legislative Informational Forum titled “A Call To Action to Eliminate a Preventable Contributor to the Achievement Gap—Childhood Lead Poisoning.” She was a guiding light on the expert panel and her thoughtful contributions will be deeply missed as the work moves forward.

Suggested citation: Educational Services for Children Affected by Lead Expert Panel. Educational interventions for children affected by lead. Atlanta: U.S. Department of Health and Human Services; 2015.

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Educational Interventions for Children Affected by Lead

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Preface

Lead is a neurotoxicant with well documented and lasting adverse health effects. Primary prevention strategies that control or eliminate lead sources before children are exposed remain the pre-eminent public health approach to the problem of lead poisoning and are the only effective way to prevent the neurodevelopmental and behavioral abnormalities associated with lead exposure. Unfortunately, though, hundreds of thousands of children already have experienced blood lead levels known to impair academic performance and affect life success. Thus, tertiary prevention (that is, strategies that restore individuals to an optimal level of functioning after damage is done) is also needed. Recognizing the need to ensure that children affected by lead receive timely and appropriate educational interventions, the Centers for Disease Control and Prevention and the Advisory Committee on Childhood Lead Poisoning Prevention convened a work group of recognized experts to review the existing scientific evidence for adverse effects of blood lead levels on academic performance and describe actionable steps that clinical and public health practitioners, parents, and educators can take to ensure that the children receive such services.

Educational Interventions for Children Affected by Lead outlines available scientific data describing the effects of lead, summarizes in plain language the Individuals with Disability Education Act (IDEA) parts B and C, and provides information on how these provisions relate to children affected by lead. The document also describes major gaps in our scientific understanding of the efficacy of educational interventions for reversing academic problems in children affected by lead. The importance of addressing these gaps could be considered as institutions design their research portfolios.

I wish to thank the members of the Advisory Committee on Childhood Lead Poisoning Prevention, members of the Educational Services for Children Affected by Lead Expert Panel, and consultants who developed this document and acknowledge their contribution to the health of the Nation's children. This document significantly advances our efforts to improve the lives of children negatively affected by lead exposure by providing information on the services designed to improve academic performance to the stakeholders and partners that are most in need it.

Patrick N. Breysse, PhD, CIH
Director, National Center for Environmental Health
and Agency for Toxic Substances and Disease Registry
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Executive Summary

Lead is a developmental neurotoxicant, and high blood lead levels (HBLLs) in young children can impair intellectual functioning and cause behavioral problems that last a lifetime. Primary prevention of HBLLs remains a national priority and is the only effective way to prevent the neurodevelopmental and behavioral abnormalities associated with lead exposure. Unfortunately, hundreds of thousands of children already have experienced blood lead levels known to impair academic performance. To ensure that such children are provided with the services that may help improve academic and other outcomes, in 2008 the CDC Advisory Committee on Childhood Lead Poisoning Prevention convened a work group charged with describing specific action steps parents, clinicians, educators, lead poisoning prevention programs, and others who work with children may be able to take to ensure that children affected by lead receive timely and appropriate educational interventions. This report was drafted by these experts, who were chosen for their diverse perspectives and technical expertise and reflects their insight, knowledge, and practical expertise.

The body of evidence cited in this document demonstrates the effects that low-level lead exposure has on the brain's learning systems: overall intellectual ability, speech and language, hearing, visual-spatial skills, attention, executive functions, social behavior, and fine and gross motor skills. It details the significant negative consequences of lead on learning and educational attainment found in study after study (see Table 1) and the costs associated with those consequences. It describes the challenges children face as they advance through the school system and how lead interferes with development and learning.

There are no studies that specifically examine the impact of early childhood educational interventions on cognitive or behavioral outcomes for children who have been exposed to lead. However, there are studies of educational interventions improving developmental outcomes for children who have conditions other than lead. This research demonstrates that children with developmental delays or at high risk for developmental delays benefit most from interventions that start at an early age.

This document reviews current knowledge and practice of the early care and educational systems and describes key ways that these systems can support improved outcomes for lead-exposed children, such as

- 1) Streamlined access to developmental assessment, intervention and special education services, and by conducting a neuropsychological assessment of executive function in addition to a developmental assessment to identify cognitive and functional deficits in lead-exposed children with HBLLs.
- 2) Consistent interpretation of provisions in the Individuals with Disabilities Education Act (IDEA) and Americans with Disabilities Act (ADA) that require provision of assessment and educational interventions, including mechanisms to ensure that children with a history of HBLLs receive the services to which they are entitled.
- 3) Technical advice on the implications of the connection between lead exposure and educational results for educators, state and local governments, parents, pediatric health care providers, lead poisoning prevention programs, and others who work with young children.

Educational Interventions for Children Affected by Lead

The document is designed to serve multiple audiences including public health and education professionals, decision makers, health care providers, and others who work with children. It delineates specific strategies for improved collaboration across disciplines and programs in terms of providing services to children affected by lead. In addition, it describes a research agenda to develop the evidence base regarding the effectiveness of educational interventions particularly for children with blood lead levels at or above the Centers for Disease Control and Prevention upper value of the reference range for blood lead in young children established in 2012 as 5 micrograms per deciliter ($\mu\text{g}/\text{dL}$).

Lead poisoning prevention has been correctly characterized as a U.S. public health success story due to the rapid and sustained decreases in the number of children affected by lead. But the rate of decrease in cases has slowed and research shows that no safe blood lead level has been identified. Although efforts continue to successfully shrink the incidence of lead poisoning, continued vigilance and collaboration are necessary to ensure that those children negatively affected by lead exposure receive services designed to compensate for lead's effect on the brain and behavior of children.

Table 1. Studies on Lead and Educational Outcomes

Blood Lead Levels	Educational Impact	Size of Study	Location of Study
$\leq 3 \mu\text{g}/\text{dL}$	Decreased end of grade test scores	More than 57,000 children	North Carolina (Miranda et al. 2009) ¹
4 $\mu\text{g}/\text{dL}$ at 3 years of age	Increased likelihood learning disabled classification in elementary school	More than 57,000 children	North Carolina (Miranda et al. 2009) ¹
	Poorer performance on tests	35,000 children	Connecticut (Miranda et al. 2011)
5 $\mu\text{g}/\text{dL}$	30% more likely to fail third grade reading and math tests	More than 48,000 children	Chicago (Evens et al. unpublished data)
	More likely to be non-proficient in math, science, and reading	21,000 children	Detroit (Zhang et al. 2013)
5-9 $\mu\text{g}/\text{dL}$	Scored 4.5 points lower on reading readiness tests	3,406 children	Rhode Island (McLaine et al. 2013)
$\geq 10 \mu\text{g}/\text{dL}$	Scored 10.1 points lower on reading readiness tests	3,406 children	Rhode Island (McLaine et al. 2013)
10 and 19 $\mu\text{g}/\text{dL}$	Significantly lower academic performance test scores in 4th grade	More than 3,000 children	Milwaukee (Amato et al. 2012)
$\geq 25 \mu\text{g}/\text{dL}$	\$0.5 million in excess annual special education and juvenile justice costs	279 children	Mahoning County, Ohio (Stefanak et al. 2005)

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Abbreviations

AAP	American Academy of Pediatrics
ADA	Americans with Disabilities Act
ADAAA	Americans with Disabilities Act Amendments Act
ADHD	Attention-Deficit/Hyperactivity Disorder
AmCHP	Association of Maternal Child Health Programs
BLL	Blood lead level
CDC	Centers for Disease Control and Prevention
CEIS	Coordinated Early Intervention Services
CLPPP	Childhood Lead Poisoning Prevention Program
CPIR	Center for Parent Information and Resources
CPRC	Community Parent Resource Centers
DSM-IV	<i>Diagnostic and Statistical Manual of Mental Disorder</i> , Fourth Edition
EPSDT	Early and periodic screening diagnosis and treatment program
fMRI	Functional Magnetic Resonance Imaging
GED	General Educational Development Test
HBLL	High Blood Lead Level
IDEA	Individuals with Disabilities Education Act
IFSP	Individualized Family Service Plan
IQ	Intelligence Quotient
MRI	Magnetic Resonance Imaging
NCPIE	National Coalition for Parent Involvement in Education
NHANES	National Health and Nutritional Examination Survey
OSEP	Office of Special Education Programs
OSERS	Office of Special Education and Rehabilitative Services
PPT	Planning and Placement Team
PTI	Parent Training and Information Center

Chapter 1: Introduction

Childhood lead exposure, even at blood lead levels (BLLs) currently seen in the United States, remains a critical public health issue. It is estimated that tens of millions of U.S. children have been adversely affected by lead over the last 20 years, and these effects can be lifelong. Children are exposed to lead in their homes from deteriorating lead paint and the contaminated dust and soil it generates, to lead in water from lead water pipes or plumbing, and to lead from other sources. Once a child's health or cognition has been harmed by lead, the effects can be permanent and continue into adulthood (Barker 1995; Bellinger et al. 1992; Ris et al. 2004). As no safe blood lead level in children has been identified, the Centers for Disease Control and Prevention (CDC) adopted a reference range for blood lead based on the distribution of blood lead in children 1-5 years old. In 2010 the upper limit of this range was 5 micrograms per deciliter ($\mu\text{g}/\text{dL}$).

The effects of lead are also costly; recent estimates indicate that more than \$50 billion in a single year is lost as a result of reduced cognitive potential and associated lost productivity (Gould 2009; Landrigan et al. 2002).

The CDC Advisory Committee on Childhood Lead Poisoning Prevention (ACCLPP) identified the need to review new evidence of the impact of BLLs on children's academic performance and in 2008 empanelled the Educational Interventions for Lead-Exposed Children Work Group. The group's charge was to

- Compile existing evidence of the neurodevelopmental and cognitive impact of lead.
- Summarize the Individuals with Disabilities Education Act (IDEA) Parts B and C and provide information on how these provisions relate to children affected by lead.
- Describe specific action steps parents, clinicians, educators, lead poisoning prevention programs, and others who work with children may be able to take to ensure that children affected by lead receive timely and appropriate educational interventions.

Children with lead exposures cannot avoid negative impacts on their neurodevelopmental abilities. The only way to prevent lead-induced morbidity is to prevent lead exposure. While sources of lead and ways to avoid lead exposures are known, many children continue to be exposed through unsafe housing, painting or other renovation work that disturbs painted surfaces, water, and other sources. Further, under-identification of unsafe environments and children with past exposures is common.

Exposure to lead hazards is common, and the Healthy People 2020 goal to eliminate blood lead levels of 10 $\mu\text{g}/\text{dL}$ or higher has not been met. Therefore, clinicians, public health workers, educators, and other professionals will continue to encounter lead poisoned patients and students in their practices and classrooms for some time to come.

Rigorous clinical trials and other studies have demonstrated that the effects of early exposure to lead on IQ and other measures of cognitive attainment and behavior are not reversible through pharmacologic or nutritional interventions (Dietrich et al. 2004; Kordas et al. 2006; Rico et al. 2006; Rogan et al. 2001). Furthermore, studies that have examined the association between the rate of natural reductions in

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blood lead concentrations and neurodevelopment have found that deficits related to early exposure are not reversible in the absence of educational interventions or other deficit related services (Tong et al. 1996). Therefore, the only certain way to avoid lead-associated neurodevelopmental morbidity is to prevent exposure in the first place—primary prevention remains the best course of action (CDC 2012). However, physicians as well as public health and housing agencies often lack the resources needed to fully protect children from lead poisoning (Lanphear 2005). Thus children continue to be exposed to lead in concentrations known to affect academic performance. These children may benefit from available educational interventions.

There is compelling evidence that children benefit from childrearing in an environment that has varied and age-appropriate educational opportunities and early intervention services if provided early in life and at the correct level of intensity prior to elementary school enrollment. An Institute of Medicine (IOM) report (2000) promoted the benefits of early environmental stimulation, stating that “the course of development can be altered in early childhood by effective interventions that change the balance between risk and protection, thereby shifting the odds in favor of more adaptive outcomes.”

This report reviews new information on meeting the educational needs of children affected by lead (i.e., those with lead exposure who may manifest developmental delays now or in the future) and updates the Developmental Assessment and Interventions chapter in *Managing Elevated Blood Lead Levels Among Young Children* (CDC 2002). This report includes more-current research and a much expanded focus on the educational needs of children affected by lead. It is intended to inform the development and implementation of seamless processes to provide children whose developmental status or emotional regulation are affected by lead with a continuum of educational and other related services necessary for them to be successful.

This report provides

- Evidence of the impact of blood lead in early childhood on later academic performance and
- Evidence for the impact of delivering the optimal developmental environments, long-term monitoring through high school, care, and education for children who have been exposed to lead.

The early sections of the report provide the research and practice context, including the effects of lead on developmental and educational outcomes and types of interventions and educational resources that foster child learning and educational attainment. In addition, this report provides information on federal programs that can support the continuum of educational needs of children with a history of lead exposure. While this report is intended primarily for the educator, public health professional, and clinician, it is anticipated that this information will prompt the development and dissemination of resource materials for parents seeking services for their children. Finally, the report describes important research gaps on improving academic outcomes for children affected by lead.

Chapter 2: Neurodevelopmental Consequences of Lead Exposure

Blood Lead Levels and IQ

IQ is a measure of relative intelligence determined by an individually administered standardized test. Most IQ tests have a mean of 100 and standard deviation of 15. The range of “normal” on these tests is between 85 and 115. About seven out of ten individuals have IQs in this range. While these tests have been subject to criticism in the past (Montagu 1999), they consistently predict a variety of important social, educational, and vocational outcomes (Sternberg et al. 2001). These instruments have also proven to be highly sensitive and robust in the assessment of the effects lead and other developmental neurotoxicants on global intellectual ability (Dietrich 2010). For lead, IQ has been used as an overall index of neurodevelopmental morbidity by econometricians and policy makers to estimate the social and economic benefits of reducing exposures in the population (Grosse et al. 2002).

Over the past three decades, epidemiologic studies of lead and child development have demonstrated inverse associations between BLLs and other biomarkers and IQ at successively lower levels. In response to these observations, agencies such as CDC and others have repeatedly lowered the blood lead level considered elevated (CDC 1991; IPCS 1995; ACCLPP 2012; CDC 2012). In 2012, CDC adopted the use of an upper limit of the reference range for blood lead in children defined as 97.5% of the U.S. population 1–5 years old, based on the National Health and Nutritional Examination Survey (NHANES). For 2012–2015, the upper limit of the reference range was 5 µg/dL, and BLLs ≥ 5 µg/dL were defined as high (Wheeler and Brown 2013).

Recent epidemiologic studies and quantitative reviews suggest that there is no discernible threshold for lead effects on IQ, and deficits are measurable at least down to BLLs of 5 µg/dL. In a prospective study conducted in Rochester, New York, a decline of more than 7 IQ points was observed from lifetime average blood lead concentration of 1 to 10 µg/dL (Canfield et al. 2003). The Rochester findings of effects on IQ have been replicated in several other studies of children with BLLs below 10 µg/dL (Al-Saleh et al. 2001; Bellinger and Needleman 2003; Chiodo et al. 2004, 2007; Kordas et al. 2006; Téllez-Rojo et al. 2006).

Further evidence of low level lead effects on IQ comes from an international pooled analysis of seven prospective cohort studies (N = 1,333) by Lanphear et al. (2005). Although exposures in some cohorts were high by contemporary standards, by pooling data from these diverse studies a substantial number (N = 244) of children with BLLs that never exceeded 10 µg/dL were included in the analysis. The impact of lead effects on IQ was greater at lower BLLs, as indicated by curves relating BLL to IQ having steeper slopes downward at the lower BLLs. Lanphear et al. (2005) divided the data at two cutpoints *a priori*, a maximal BLL of 7.5 and 10 µg/dL. Additionally, children whose HBLL was < 7.5 µg/dL lost on average 2.94 IQ points (95% CI -5.16, -0.71) per 1 µg/dL increase in BLL compared to children with HBLLs 7.5–10 µg/dL, who on average lost 0.16 points (95% CI -0.24, -0.08) per 1 µg/dL.

The effects of lead on IQ of children have been reported with remarkable consistency across numerous studies of various designs, populations, and protocols. The negative impact of lead on IQ persists in most recent studies following adjustment for numerous confounding and covariate factors. In general, there

appears to be a loss of about 4–8 points in full scale IQ as BLLs increase to 10 µg/dL and at least an additional 2–4 point decrement as BLLs reach 20–25 µg/dL (Lanphear et al. 2005). The magnitude of this loss is substantial, amounting to two-thirds of a standard deviation or more.

Blood Lead Levels and Specific Abilities: Lead’s “Neurobehavioral Signature”

The focus of lead studies on global measures of intellectual aptitude such as tests of IQ has hampered attempts to identify deficits that may be specific to children with HBLLs. The aggregate or full-scale IQ is based on the sum of performance on multiple subtests that tap a vast array of cognitive and psychomotor functions. Thus, efforts to identify a neurobehavioral signature for children with HBLLs have been largely unsuccessful (Bellinger 1995a).

Nevertheless, findings from studies of specific abilities could help inform strategies for assessment and intervention. Such information would be potentially valuable to educational specialists who are involved in assessment and intervention. Due to the relative insensitivity of IQ tests to the precise effects of brain injury, the use of tests of specific neuropsychological abilities has received increasing attention for the description of the effects of lead exposure in children (Lidsky and Schneider 2006).

Recent studies have employed protocols that include finer grain assessments of cognitive, language, memory, learning, sensory, and neuromotor abilities, and a somewhat clearer picture of lead’s impact on neurodevelopment has begun to emerge. Areas of neuropsychological performance that appear to be impacted in particular are within the domains of attention, executive functions, visual-spatial skills, social behavior, speech and language, and fine and gross motor skills. None of these domains are independent of each other, but it is helpful at first to consider them separately.

Attention

The distracted, inattentive, and impulsive child is an old clinical observation in the lead literature (Needleman 2004). Attention is a complex, multifaceted psychological construct, but its various behavioral manifestations have been measured and quantified in a number of childhood lead studies over the past three decades (Bellinger 1994, 1995b; Chiodo et al. 2004; Hansen et al. 1989; Needleman et al. 1979; Needleman et al. 1996; Ris et al. 2004; Silva et al. 1988; Walkowiak et al. 1998; Yule et al. 1984). When measured experimentally or with parent and teacher questionnaires, a significant dose-response relationship has been observed between BLLs and deficits in sustained attention. In some cases, these effects were observed at BLLs well below 10 µg/dL, with no evidence of a threshold (Chiodo et al. 2007).

Deficits in attention are one aspect of attention-deficit/hyperactivity disorder (ADHD), which affects approximately 3%–7% of U.S. children (Polanczyk et al. 2007). Among clinicians who treat lead-poisoned children, it has been suspected for some time that these patients have a higher risk for developing ADHD (NTP 2012). The *Diagnostic and Statistical Manual of Mental Disorders* (DSM-V) defines ADHD as inattentive and/or hyperactive/impulsivity symptoms occurring before age 12 years (APA 2013). This disorder has a strong genetic component, but environmental factors such as lead may play a role in increasing the vulnerability of susceptible children.

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Lead in blood and/or shed deciduous teeth, even at low levels by current standards, has been associated with parent and/or teacher ratings of hyperactive behavior as well as attentional and behavioral problems in a number of earlier studies (Bellinger et al. 1994; Burns et al. 1999; Fergusson et al. 1988; Hatzakis et al. 1985; Needleman et al. 1979; Silva et al. 1988; Thomson et al. 1989; Wasserman et al. 1998; Yule et al. 1984).

Although attentional deficits and hyperactivity are frequently cited as common problems among children affected by lead, until recently there has been a lack of compelling evidence that directly links lead exposure with most or all of the features of ADHD, including distractibility, poor organization, lack of persistence in completing tasks, and daydreaming. In an investigation that used NHANES data (1999–2002), a significant relationship between concurrent BLLs and parent-reported ADHD diagnosis was observed in 4,704 children 4–15 years of age. Subjects in the fifth quintile for blood lead (>2.0 $\mu\text{g}/\text{dL}$ versus <0.8 $\mu\text{g}/\text{dL}$) were four times more likely to have a physician diagnosis of ADHD and be on stimulant medication (Braun et al. 2006). In the first series of studies to examine the association between BLLs and ADHD by verified DSM-IV criteria, a significant relationship was observed in two independent samples between low concurrent BLLs and ADHD combined type in children between 6 and 18 years of age (Nigg et al. 2008, 2010).

Executive Functions

Very closely related to the domain of attention is what neuropsychologists refer to as the *executive functions*. Executive functions refer to strategic planning, control of impulses, organized searching, flexibility of thought and action, and self-monitoring of one's own behavior. Deficits in this area are overrepresented among children with ADHD and can severely impact academic achievement and behavior (Biederman et al. 2004). As previously discussed, lead studies have linked increased exposure with a higher frequency of negative ratings by teachers and/or parents on behaviors such as inattentiveness, impulsivity, distractibility, and less persistence in assigned tasks (Hatzakis et al. 1985; Hunter et al. 1985; Needleman et al. 1979; Raab et al. 1990; Thomson et al. 1989; Winneke et al. 1990).

The part of the brain known as the prefrontal cortex is highly innervated by projections of neurons from the midbrain and has the highest concentration of the neurotransmitter dopamine when compared to all other cortical areas. Dopamine plays a key role in cognitive abilities subsumed under the category of *executive functions* mediated by the prefrontal cortex, and it has been known for some time that the dopamine neurotransmitter system is particularly sensitive to lead (Cory-Slechta 1995). Recent studies have largely confirmed the link between lead and deficits in this cognitive domain. Higher tooth lead concentrations and BLLs have been associated with poorer performance on tasks requiring focused attention and flexibility of thought (Bellinger et al. 1994; Canfield et al. 2003, 2004; Stiles and Bellinger 1993). In a group of preschoolers with BLLs below 13 $\mu\text{g}/\text{dL}$ (80% with BLLs <10 $\mu\text{g}/\text{dL}$), Canfield and colleagues (2004) observed a direct association between BLLs and poorer performance on tasks requiring focused attention, cognitive flexibility, and inhibition of automatic response.

Visual-Spatial Skills

The *visual-spatial* domain is also complex and multifaceted. Performance on tests in this area often involves visual perception (not related to sensory acuity), memory, organization, and reasoning with

visually presented nonverbal problems. Fine motor skills are also a component of performance in many of the tests designed to measure these abilities. Deficits in this area can affect a wide range of academic outcomes including reading and mathematics. Skills in this domain have been explored in some investigations.

When studies of lead-exposed children have used global measures of IQ and conducted subscale analyses, it has been observed that performance IQ or subtests contributing to performance IQ (e.g., block design) are frequently among the most strongly associated with biomarkers of lead exposure (Baghurst et al. 1992, 1995; Chiodo et al. 2004; Dietrich et al. 1991, 1992, 1993a, 1993b; McMichael et al. 1988; Wasserman et al. 1994). In addition, studies employing specific measures of visual-motor integration skills, such as the Developmental Test of Visual Motor Integration, the Bender Visual-Motor Gestalt Test, and others, have found visual-motor integration skills to be among the most consistently associated with early lead exposure (al-Saleh et al. 2001; Baghurst et al. 1995; Dietrich et al. 1993b; Ris et al. 2004; Wasserman et al. 2000; Winneke et al. 1990).

Behavioral Challenges

Deficits in IQ and other formal measures of cognitive attainment may not be among the most important and persistent effects of early exposure to lead. It has long been recognized that children presenting with severe symptomatic lead intoxication suffer from neurobehavioral problems such as impulsivity, aggression, and short attention span (Byers and Lord 1943). This is an old observation in the clinical literature. It has been repeatedly observed that disturbances in behavior and social conduct are prototypical sequelae among victims of lead poisoning. Parents have reported that following recovery from an episode of acute poisoning, their child's behavior changed dramatically as the child became more restless, impulsive, inattentive, and aggressive (Needleman 2004).

As previously discussed, lead exposure may be associated with a higher risk for developing ADHD or at least some of its behavioral features. Children with ADHD and related behavioral problems are known to be at increased risk for disorders of conduct and behavior. Prospective studies of lead and child development have linked HBLLs with destructive and aggressive behaviors during the preschool years and early adolescence (Burns et al. 1999; Wasserman et al. 1998). In a nationally representative sample of over 3,000 children (75% with BLL <1.5 µg/dL), a significant association was observed between low concurrent BLLs and an increasing prevalence of conduct disorder symptoms. After adjustment for covariates, compared to children in the first quartile (blood lead 0.2–0.7 µg/dL), those in the second, third, and fourth quartiles had 7- to 12-fold increased odds of meeting DSM-IV conduct disorder criteria (Braun et al. 2008).

Data linking lead exposure with aggressive and disruptive behaviors and poor self-regulation have raised the prospect that early exposure may result in an increased likelihood of engaging in antisocial behaviors in later life. This link has been observed in recent studies of older children and adolescents (Dietrich et al. 2001; Fergusson et al. 2008; Needleman et al. 1996, 2002) as well as young adults (Wright et al. 2008). Ecological studies correlating leaded gasoline sales and atmospheric lead levels with crime rates 20 years later also support an association between lead exposure and criminal behavior (Nevin 2000, 2007; Stretesky and Lynch 2001).

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The specific biological mechanisms that may underlie lead effects on aggression, impulsivity, and poor self-regulation are not clearly understood. Lead-related behavioral problems also appear to be relatively independent of IQ (Chen et al. 2007). Lead impacts a large number of sites and processes in the brain (e.g., frontal and prefrontal lobes, dopaminergic systems) involved in impulse control (Lidsky and Schneider 2003). It is noteworthy that a volumetric MRI study of young adults with a history of HBLLs as children linked cortical gray matter loss in the prefrontal cortex with higher exposures to lead (Cecil et al. 2008). Further studies on this cohort have linked earlier exposure to lead with altered myelination and axonal integrity (Brubaker et al. 2009). Needleman et al. (2002) proposed that in addition to direct impacts on brain development and neuronal function, impaired cognitive abilities and subsequent academic failure in children affected by lead children may increase risk for subsequent delinquent behaviors. Students who have difficulties in school and fail to achieve academic goals are more likely to become lawbreakers (Schorr 1989).

Speech and Language

Speech and language deficits in children affected by lead is a relatively old clinical observation (Byers 1959), and some early leading investigators of asymptomatic children suggested that verbal behaviors may be among the more sensitive indices of lead-associated cerebral injury (e.g., de la Burd  and Choate 1975; Needleman et al. 1979). Language is a unique human neurocognitive function, and it is often the earliest marker of a developmental or acquired neurological disorder. The association between lead exposure and speech and language functions has been studied rather extensively (Mayfield 1983), but the majority of these early studies used knowledge-dependent measures of verbal ability that relied heavily on a child's existing vocabulary and comprehension (Campbell et al. 2000).

Some recent studies are of interest in that they focused on the relationship between lead exposure and language processing. For example, among subjects 11–14 years old in the Pittsburgh Youth Study, higher bone lead concentrations were associated with poorer performance on three processing-dependent language measures assessing phonological, lexical, and sentence processing (Campbell et al. 2000). Functional magnetic resonance imaging (fMRI) was used to assess the influence of childhood lead exposure on language processing among a subset of young adults in the Cincinnati Lead Study (Yuan et al. 2006). fMRI is a type of specialized MRI scan that measures the change in blood flow related to neural activity in the brain, often in response to stimuli or engaging in a specific cognitive task. In a verb generation task, higher childhood average BLLs were significantly associated with reduced activation in Broca's area, a recognized region of speech production in the left hemisphere. Higher BLLs were also associated with increased activation in the right temporal lobe, the homologue of Wernicke's area that is associated with speech perception. Results of this study suggest that elevated childhood BLLs influence neurosubstrates of semantic language function, resulting in an atypical reorganization of language function in young adults.

With respect to the relationship between lead exposure and the development of speech and language abilities in children, it is important to keep in mind that HBLLs have also been associated with small but significant deficits in hearing and central auditory processing (Dietrich et al. 1992; Osman et al. 1999; Schwartz and Otto 1987, 1991). However, a recent study did not identify significant relationships between lead level (mean 37.7 $\mu\text{g}/\text{dL}$) and tests of hearing (Buchanan et al. 2011). The control group in

this study had BLLs below 10 µg/dL. In the Osman et al. study (1999), the audiometric results indicated that auditory function in children is impaired at blood lead concentrations even below 10 µg/dL.

Fine and Gross Motor Skills

In the past, clinical investigators have noted unsteadiness, clumsiness, and fine-motor dysfunctions in symptomatic lead-poisoned children (Pueschel et al. 1972). Lead-associated deficits in both gross and fine motor functioning were noted among children residing in the vicinity of a longstanding lead smelter in Greece (Benetou-Marantidou et al. 1988). More recently, two prospective studies have assessed motor development in a comprehensive manner. In Cincinnati, BLLs assessed during infancy and the preschool years were associated with poorer scores on measures of bilateral coordination, visual-motor control, upper limb speed and dexterity, and especially on the fine motor composite score from the Bruininks scales (Dietrich et al. 1993b). These results were largely replicated in another prospective study of children residing in two towns in Kosovo province, Yugoslavia (Wasserman et al. 2000). In the Cincinnati series of studies, postural instability and unsteadiness have also been consistently associated with HBLLs in early childhood (Bhattacharya et al. 1995). Lead affects children's long-term injury risk by harming their balance, coordination, and other neuromuscular skills, resulting in falls and discouraging their participation in sports as teens, which is important in the development of social interactions (Kincl et al. 2006).

Summary

Although the evidence for signature neuropsychological outcomes related to childhood lead poisoning may seem compelling, it is vital to keep these findings in perspective, especially when considering the specific individual needs of children with a history of exposure. The apparent pattern of lead-associated neurodevelopmental deficits described above suggests, if anything, a general dampening of intellectual functioning. This pattern is not uncommon in the general population and can be ascribed to a number of environmental causes other than lead. It is likely that lead, like other causes of brain injury, does not produce the same or similar impairments in every affected child. (Schneider et al. 2001)

Chapter 3: Who Is At Risk? Vulnerable Populations and Risk Factors

Factors Affecting a Child's Risk for Neurologic Sequelae

Lead is an equal opportunity neurotoxicant in the sense that adverse neurobehavioral outcomes have been associated with exposure in studies that vary widely with respect to sociodemographic and other background factors. However, the effect of lead exposure on neurodevelopment might differ as a function of the child's economic and social environment; thus, some children may be at greater risk for poor academic performance compared to other children with similar BLLs. Factors that may affect a child's risk for neurologic sequel include socioeconomic circumstances and gender.

Socioeconomic Circumstance

Socioeconomic status is a complex construct that is typically but only partly captured as a score or ranking calculated from the parents' education and occupation. This variable is routinely treated as a confounding factor in lead studies. However, some investigators have examined the interaction between exposure to lead and socioeconomic status; that is, the extent to which socioeconomic status modifies the impact of lead on children's neurodevelopment.

Several earlier and some more recent studies reported that higher tooth or BLLs were associated with neurodevelopmental deficits of greater magnitude and/or persistence among children from lower socioeconomic strata (Bellinger et al. 1989, 1990; Dietrich et al. 1987; Harvey et al. 1984; Tong et al. 2000; Winneke and Kraemer 1984). However, these studies fail to provide specific insight into why lower socioeconomic status increases a child's susceptibility. Lower socioeconomic standing is associated with a number of factors that could enhance lead's toxicity, including exposure to other neurotoxicants (e.g., pesticides, environmental tobacco smoke), poorer nutrition (e.g., inadequate calcium and iron intake), inequities in medical coverage, increased stress, and fewer opportunities for stimulation.

Gender

Gender differences in vulnerability to environmental influences on central nervous system development have been posited for some time. It is well known that the prevalence of disorders such as autism and ADHD is higher in males. Men and women have brains of different sizes and have different trajectories of gray matter maturation. Several studies have observed stronger association between lead levels in males than females in both the cognitive (Bellinger et al. 1990; Dietrich et al. 1987; Froehlich et al. 2007; Pocock et al. 1987; Ris et al. 2004) and behavioral (Wright et al. 2008) outcomes, although these findings are not universal (Tong et al. 1996). In the Cincinnati Lead Study, the association between childhood lead exposure and gray matter volume loss in young adults was much more widespread and significant in males than females, despite comparable average childhood BLLs (Brubaker et al. 2010; Cecil et al. 2008).

Inter-Child Variability

One implication of the findings of the impact of demographic factors on the relationship between BLLs and developmental effects is that lead's association with children's neurodevelopment cannot be expressed as a single number because the magnitude of the association may vary depending on the characteristics of a particular child and his or her environment. A more promising implication, however,

is that the effects of lead on a child might be reduced by modifying critical aspects of the environment. This holds promise for the success of interventions to ameliorate effects. Two experimental animal studies have shown that rearing animals in a nurturing physical and social environment can attenuate lead's developmental neurotoxicity (Guilarte et al. 2003; Schneider et al. 2001). These studies suggest that the quality of the early rearing environment might play a role in the magnitude and persistence of neurobehavioral deficits displayed by lead exposed children.

The discussion above implies that the BLLs at which individual children show signs of clinical lead intoxication and/or neurobehavioral deficits will vary. Despite the consistent inverse association between children's BLL and IQ noted above, children will have varying sensitivity to the more subtle functional impairments associated with HBLLs (Lidsky and Schneider 2006). This suggests that not all children with a given BLL should be considered at equivalent neurodevelopmental risk (Bellinger 1995a). In other words, a HBLL should be viewed as a risk factor for neurodevelopmental problems, not a diagnosis.

Importance of Age at the Time of Lead Exposure

Identifying the age at which children are most sensitive to the neurodevelopmental effects of lead is complicated by the relatively high degree of stability in children's BLLs and the frequent confounding of age and peak BLL (Dietrich et al. 1993; McMichael et al. 1985). Data from some prospective cohort studies indicate that children's IQs may be particularly sensitive to lead-associated effects when the children are about 2 years old (e.g., Bellinger et al. 1992). However, more recent analyses (Chen et al. 2005; Hornung et al. 2009; Lanphear et al. 2005) suggest that lead exposure beyond 2 years of age, when BLLs tend to peak, may be even more strongly associated with cognitive development. If concurrent BLLs remain important until early school-age for optimum cognitive development, and if 6- and 7-year-olds are as or even more sensitive than 2-year-olds, then the difficulties in preventing lead exposure are magnified. But the potential benefits of prevention are even greater.

Time Lag in Expression of Neurobehavior Associated with High Blood Lead Levels

Age is also a consideration with respect to when neurotoxic effects are likely to be expressed. Overall, the literature strongly suggests that early exposure to lead affects central nervous system substrates and behaviors that are best measured in the older child, adolescent, and young adult. This lag may be the result of toxicological processes in which some period of time is required for past lead exposure to affect central nervous system function. Another explanation is that lead may primarily affect higher-order neurodevelopmental processes that are best tested or only measureable at later ages when children's response modalities are more highly differentiated (e.g., the *executive functions* discussed earlier).

One implication of this lag is that neurodevelopmental assessments conducted in young children when a child has an HBLL may fail to identify a child who is at risk for later neurodevelopmental dysfunction. Careful long-term surveillance of behavior and neurodevelopment of children with BLLs at or above the upper reference range value is thus needed to ensure that these impacts are identified should they appear in the future. The effects of high BLLs on the skills required for academic success and optimal

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adjustment may not manifest until a child reaches critical transition points in school and the larger social environment. Each of these transition points may present special physical, emotional, social, and academic challenges to the child affected by lead. The challenges that arise after each transition are described below.

Preschool

The child is required to sit quietly for short periods of time and listen and follow directions. The group nature of preschool typically requires the child to share supplies, activities, and attention. The child must relate to and adapt to a new set of peers and adult caregivers. The child begins to develop listening, attention, and memory skills in the context of learning (e.g., names of objects, animals, colors, and shapes). Children should be evaluated for speech and language delays at this stage because those affected by lead may have a shorter attention span, immature social skills, and decreased ability to listen and memorize new concepts (HHS National Institute on Deafness and Other Communication Disorders <https://www.nidcd.nih.gov/staticresources/health/voice/NIDCD-Speech-Language-Dev-Milestones.pdf>).

There is also strong evidence that social and emotional skills are as critical to school success as academic competency is. Left untreated, challenging behaviors such as aggression, tantrums, and noncompliance can develop into more serious conditions and lead to lower high school graduation rates, poor job outcomes, and limited incomes in affected children. Children should be evaluated for these problem behaviors which are often first manifested in preschool settings (Perry et al. 2011).

Early Elementary School (grades K-3)

The child is required to adjust to a longer and more structured school day. The child must develop the ability to understand and complete assignments and homework and face more objective rewards and consequences for their behavior. The child develops broader social networks and cooperative working skills. The child begins to acquire basic academic skills such as reading words and short stories for meaning, performing arithmetic operations, and answering questions. Compelling data indicate that children affected by lead are less likely to reach proficiency in reading, arithmetic, science, and social studies and develop social and working skills. Thus, their progress should be monitored and appropriate support provided if delays are identified (Wolf 2007).

Upper Elementary School (grades 4-5)

The child is challenged to become more independent in the face of increased physical, social, and academic demands. Social networks expand, and the child may experience isolation and bullying. Social and physical challenges include increased participation in competitive and team sports and accepting one's own skills and limitations as well as those of peers. Academic emphasis is no longer solely on acquisition of basic skills. The child must now use basic skills to acquire information and solve problems (e.g., "reading to learn" as opposed to "learning to read") (Wolf 2007).

Lead affects the development of the central nervous system and can affect a child's balance, coordination, and other neuromuscular skills, potentially discouraging his or her participation in sports. Children affected by lead may also experience difficulty making the transition from "learning to read" to "reading to learn" to learn new material because of poor language skills and attention deficits. This is

another time period when monitoring of children with history of HBLL is critical to identify problems early and provide additional support if needed.

Middle School (grades 6–8)

Transition to middle school is further complicated by the normative changes of puberty and its implications for social and emotional development. The adolescent must adapt to a more formal and impersonal academic structure with a number of teachers with different teaching styles and expectations. Academically, more independence is required, and the adolescent is challenged to develop and use higher-order cognitive and organizational skills necessary to master several unrelated classes and assignments. Social pressures mount and peer acceptance becomes critical.

Exposure to lead as a young child can interfere with the proper development of executive functioning, making it difficult for the child to attain these higher-order cognitive and organizational skills (Canfield et al. 2003). Animal models demonstrate that lead interferes with normal development of the brain, resulting in a reduction of volume in the frontal lobe, which is the region of the brain that reasons, judges, solves problems, and controls impulses and emotional response (Marchetti 2003). Serious academic problems at this stage result in a much higher probability of dropping out of school (more U.S. students fail ninth grade than any other grade of school, and many subsequently drop out). Lead exposure has been shown to be a strong predictor of failing in school, resulting in dropping out of high school (Needleman et al. 1990).

High School (Grades 9–12)

The adolescent is further challenged to adapt to a greater number of students and teachers and a more rigorous academic and disciplinary environment. Establishing new peer networks; achieving greater independence from family; managing part-time employment; and pressures to experiment with alcohol, drug, and sexual activities are among the many social challenges now being faced. Academic challenges include developing a more assertive, focused, and efficient learning style and applying good study and organizational skills. The student takes more responsibility for decisions regarding academic tracks, course selections, and making decisions regarding vocation and further education beyond high school. However, a teenager who was exposed to lead as a young child is more likely to smoke, be truant or drop out of high school, commit criminal offenses, and even become pregnant as a teenager (Denno 1990; Lane et al. 2008; Needleman et al. 1996; Nevin 2000).

Some children affected by lead may lack the physical, social, and cognitive skills to cope with the challenges posed by these critical transition periods. Evidence of this comes from the lead literature in the form of a long-term follow-up study of Massachusetts children. In this study, after controlling for other sociodemographic factors, the persistent toxicity of lead—as measured in shed deciduous teeth collected from asymptomatic children—was directly associated with serious impairments in academic success, including a seven-fold increase in failure to graduate from high school, lower class standing, greater absenteeism, and impairment of reading skills, as compared to the group with lowest teeth lead (Needleman et al. 1990). Other studies of lead exposure and academic achievement are discussed in Chapter 4.

Chapter 4: Consequences of Lead on Learning and Educational Attainment

Recent Studies

Several recent studies have explored the specific effects of lead on educational outcomes. These studies show a strong relationship between slightly HBLLs in young children and decreased scores on end-of-grade tests in elementary school. The recent studies summarized below demonstrate that the connection between rising blood lead and poorer educational outcomes remains true for BLLs only 1–2 µg/dL above the 2009–2010 geometric mean BLL of 1.3 µg/dL for U.S. children aged 1–5 years old. (Wheeler and Brown, 2013).

Together, these studies show a consistent link between low-level lead exposure and the reduced ability of children to do well in school and suggest that lead exposure is responsible for a significant and modifiable effect on the achievement gap. They also document that there are substantial costs to local communities to provide services to children.

North Carolina

A series of North Carolina studies of over 57,000 children (57% were white and 43% were black) found that children with a BLL as low as 4 µg/dL at 3 years of age were significantly more likely to be classified as learning-disabled than children with a BLL of 1 µg/dL (Miranda et al. 2009). Researchers also found a dose-response relationship between end-of-grade test scores and BLL—BLLs as low as 2 µg/dL were associated with decreases in test scores (Miranda et al. 2009). Furthermore, children with a higher BLL were less likely to place into advanced and intellectually gifted programs. These results held true even when researchers accounted for factors such as race, family income, and other factors that might affect learning-disabled status. The authors concluded that when HBLL is experienced with these other social factors, the negative impact on academic performance is cumulative.

Connecticut

Researchers in Connecticut observed the same associations between elevated BLL and decreased achievement on reading and math tests (Miranda et al. 2011). A study of approximately 35,000 Connecticut children examined associations of past lead levels with their fourth grade math and reading scores. Only data from non-Hispanic black and non-Hispanic white children with a lead test before age 7 years and who did not have limited English proficiency were analyzed. BLLs as low as 3–4 µg/dL were associated with poorer performance on tests.

Chicago, Illinois

In a study of over 48,000 school children in Chicago, BLLs as low as 5 µg/dL were associated with lower scores on third grade reading and math tests (Evens et al. 2013). Researchers determined BLL had a strong relationship with test scores, similar to factors such as birth weight, maternal education, and race/ethnicity. Non-Hispanic black students in this study had an average BLL more than twice that of non-Hispanic white students.

Detroit, Michigan

In a study of more than 21,000 Detroit children in grades 3, 5, and 8, Zhang et al. (2013) found a strong dose response relationship between BLLs as low as 5 µg/dL and poor performance on academic test scores through junior high school. Compared to children with non-detectable BLLs, children with detectable BLLs were 1.4 to 2.5 times more likely to be nonproficient in math, science, and reading.

Milwaukee, Wisconsin

In a study of more than 3,000 Milwaukee children in grades 4–9, Amato et al. (2012, 2013) found significantly lower academic performance test scores in fourth grade for those children with BLLs 10–19 µg/dL in early childhood compared to children with BLLs <5 µg/dL. The authors concluded that lead should not be considered as just a public health or environmental issue but also an educational issue with direct implications on policy. The same lead exposed children were found to have been suspended from school in the fourth grade at a rate of three to one compared with their peers with little or no exposure (Amato et al. 2013).

Milwaukee and Racine, Wisconsin

In another study of students in Milwaukee and Racine, researchers found that not only was poor school performance directly related to early lead exposure, but also parents were more likely to rate their child's health as "fair" compared to "excellent" (Magzemen et al. 2013). In 2010, the Department of Health Services estimated that if each Wisconsin child age 0–6 today were protected from any lead exposure, the improvement in the state high school graduation rate and the reduction in crime would save \$28 billion. These savings would multiply each year as new children are born in Wisconsin.

Providence, Rhode Island

In a study of 3,406 children in Providence, Rhode Island, linking historic BLLs and kindergarten reading readiness scores, McLaine et al. (2013) found that 20% of children had BLLs ≥ 10 µg/dL and 67% had BLLs ≥ 5 µg/dL. Compared to children whose average BLLs were < 5 µg/dL, reading readiness scores for children BLLs of 5–9 µg/dL or ≥ 10 µg/dL were 4.5 and 10 points lower, respectively. The authors recommend greater collaboration between educators and public health agencies and better use of existing data to identify children affected by lead.

New York

In an ecological study of third and eighth grade achievement scores for 57 counties in New York, excluding New York City, researchers found that the percent of children in a county with BLLs ≥ 10 µg/dL explained 8%–16% of the variance in reading and math test scores, even adjusting for country-level indicators of poverty. They also found that for eighth grade scores, the percent of children with a history of BLLs ≥ 10 µg/dL in a county was as predictive of country-level performance on these tests as using tests scores from four years earlier to forecast current scores (Strayhorn and Strayhorn 2012).

Massachusetts

In another ecological study comparing blood lead levels in the 1990s with school cohort test scores in the 2000s in Massachusetts, there was a strong relationship between BLL and elementary school test scores. The authors also found that over the time period under consideration, reductions in lead have yielded a drop of 1 to 2 percentage points in the share of children scoring unsatisfactory on the

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standardized test, a change equivalent to what would have resulted from a \$1,000–\$2,000 increase in income per capita. (Reyes, 2011)

Ohio

Korfmacher has argued that although the societal costs of not preventing HBLLs in children are well documented, these are long-term costs to society as a whole. Thus, they may not be as compelling to local policy makers as more short-term costs such as special education and juvenile justice resources expended on children (Korfmacher, unpublished data). Using methods developed by Korfmacher, researchers in Mahoning County, Ohio, quantified the juvenile justice and special education costs for the 279 children diagnosed with a BLL ≥ 25 $\mu\text{g}/\text{dL}$ in the county in 2002. They estimated that each yearly cohort of children of the same size and with similar BLLs costs the county \$0.5 million a year. These costs are cumulative across yearly cohorts and do not account for adverse effects of BLLs <25 $\mu\text{g}/\text{dL}$ (Stefanak et al. 2005).

Research Gaps

Although some studies have found that a nurturing home environment can have a positive impact on children with HBLLs (see Chapter 5), no studies have been published on the effectiveness of interventions, such as early childhood education, in ameliorating the effects of HBLLs. There is a critical need for better understanding of whether children with BLLs at or near the upper limit of the reference range respond positively to early childhood education and which aspects of early childhood education are most likely to reduce or ameliorate the neurocognitive effects of these BLLs. In addition, since the effects of BLLs at or near the upper limit of the reference range (reference value) are subtle and can vary widely from child to child with the same blood lead concentration, there may be a need to test which assessment tools are most valid and reliable for children with a history of BLLs at or above the reference value. The impact of parenting style and involvement as a therapy to provide enhanced developmental opportunities for these children is also worthy of study.

Learning to read involves the reorganization of brain structures whose specialized regions need to be integrated in order for children to achieve the nearly automatic fluency of the expert reader (Wolf 2007). For this reason, studies of children with reading difficulties including ADHD, traumatic brain injury, and dyslexia, are not helped by a one-size-fits-all approach but are better served by identifying and basing educational interventions that work best for individual children. It seems likely that a generic treatment program for all lead poisoned children is likely to be ineffective (Lidsky and Schneider 2006).

Randomized controlled trials of teaching modalities and programs that improve parenting skills and their impact on children affected by lead would expand our understanding of the efficacy of these interventions for reversing academic problems in children affected by lead.

Chapter 5: Effectiveness of Early Childhood Education Programs in Reducing Developmental Risks

Effectiveness of Educational Interventions

The effects of lead on a child vary if critical aspects of the environment differ. This holds promise for the success of interventions to ameliorate effects. For every child, a nurturing, supportive home environment can positively influence developmental and behavioral outcomes. Studies that examine the impact of lead on child outcomes—including measures to control for the resources within the home—find that a supportive home environment has a strong positive influence on a child’s IQ (Lanphear et al. 2005; Tong et al. 1996). A recent study assessed the conjoint influence of lead exposure and home environment on neurocognitive function and behavior for first-grade children living in a Mexican lead smelter community. The home environment (measured in this study by a mother’s support of schoolwork, mother’s support of extracurricular activities, and mother’s education) had a significant indirect mediation effect between lead and measures of the child’s behavior and cognition. Thus, an attentive home environment can lessen the effects of lead and improve educational outcomes (Moodie et al. 2013).

No studies specifically examine the impact of early childhood educational interventions on cognitive or behavioral outcomes for children who have been exposed to lead. However, there are studies of educational interventions improving learning and developmental outcomes for children who have conditions other than lead. This research demonstrates that children with developmental delays or at high risk for developmental delays benefit most from interventions applied at an early age (Anderson et al. 2003; Campbell et al. 2001; Glascoe 2000; Olds et al. 2010).

Early childhood education programs, including high-quality preschool and Head Start, have been shown to benefit both typically developing children and children with disabilities. They also benefit the parents of enrolled children. In a review of early childhood education programs enrolling typically developing children, researchers found that “within the cognitive domain, consistent improvements were found in measures of intellectual ability (IQ), standardized tests of school readiness, promotion to the next grade level, and decreased placement in special education classes because of learning problems” (Anderson et al. 2003).

The High/Scope Perry Preschool Study, a major longitudinal study, demonstrated many of the benefits of early education for young children from preschool until the age of 40. Researchers found that young children in the study had higher rates of high school graduation or GED completion (71% versus 54% of control group participants) and less time spent in special education through age 19 (an average of 16% of the time versus 28% in the control group) (Ju 2009; Schweinhart et al. 1993). Research has also demonstrated behavioral benefits for participants in high quality early childhood education programs (Reynolds et al. 2007; Schweinhart et al. 1993, 2005).

Early Childhood Education

There is a compelling base of evidence that suggests that large scale, short-term public preschool programs have positive impacts on children’s academic readiness and mixed impacts on children’s

socioemotional readiness. Two recent evaluations of at-scale urban prekindergarten programs in Tulsa and Boston found between a half year and a full year of additional learning in language, literacy, and math (Gormley et al. 2005). Improvements in the long-term outcomes of the participants of these programs indicate that, in terms of reduced criminal justice costs and improve productivity, these programs also save \$3 to \$7 for every dollar spent on the prekindergarten education (Yoshikawa et al. 2013).

Head Start Program

Among the range of early childhood education programs, the Head Start program has been shown to have modest measurable effects on enrolled children. Head Start is differentiated from the general early childhood education programs without a health focus, in that it focuses on children's health, nutrition, mental health, and social service needs. This focus on the whole child is designed to mitigate social and economic factors that may limit a young child's ability to learn in the classroom. For example, if a child is experiencing illness or a toothache, or perhaps domestic violence in the home, he may be less able to focus on the academic work at hand (Head Start Bureau 2002). To qualify for enrollment into the Head Start program, children must be low-income, recipients of public assistance, foster children, or homeless, or they must have a diagnosed disability. For these reasons, Head Start children may begin the preschool experience at a disadvantage as compared with their counterparts in other early childhood education programs (Lee et al. 1988).

Children who presented these risk factors were the focus of an assessment of Head Start reported in "The Impact of Head Start on Children, Families and Communities: Final Report of the Head Start Evaluation, Synthesis and Utilization Project" (McKey 1985). The study included both children enrolled in Head Start as well as children enrolled in other early childhood education programs. Head Start participants had below average skills in early literacy and math at the time of enrollment into the study, as compared with control children in other early childhood education programs (Ju 2009; McKey 1985). The study found that Head Start narrowed the gap in academic skills between program participants and all children over the program year in the areas of reading, writing, and vocabulary (Ju 2009; McKey 1985): "Clearly, Head Start has strong immediate effects on the cognitive and socio-emotional development of young children. These effects are both statistically and educationally meaningful." (McKey 1985).

In a review of multiple studies relating to outcomes for children enrolled in Head Start, Ju (2009) found that regardless of research design or outcome measure, Head Start children experienced significant gains in cognitive development. Children who participated in Head Start programs experienced elevated cognitive test scores of about a half standard deviation (Ju 2009).

A randomized controlled study of 4,700 preschool children compared school readiness outcomes such as language, literacy, prewriting, and math each year through the end of the first grade for children enrolled in Head Start with a control group of children who were not enrolled in a Head Start program (ACF 2010). The study found that the early gains in school readiness of the Head Start group "faded out" by the end of the first grade as control group children caught up to their Head Start peers. The long-term positive benefits found in earlier studies can be reconciled to the more recent study in two ways. First,

the long term benefits may reflect noncognitive benefits of Head Start that were not measured in the recent study. Second, as control group children could and did enroll in other early childhood education programs, the lack of positive benefits in the recent evaluation may reflect improvements in contemporary non-Head Start early childhood education programs (Bartik 2011).

Outcomes of Participation in Early Childhood Education Programs for Children with Disabilities

There is some research about the impact of participation in early childhood education services for children with disabilities (OSEP 2013). In a study of children with autism and pervasive developmental disorders who were enrolled in intensive early intervention programs, it was found that participating children had higher IQ scores, improved visual-spatial skills, and increased language development three to four years after the intervention as compared to children who received a parent training intervention alone. In addition, the same study demonstrated that "...many children who receive early intervention make substantial developmental gains and are able to be included in a general education classroom by the time they enter elementary school" (Smith et al. 2000).

The Head Start program has been shown to provide benefits for children with disabilities as well; specifically, for children with developmental, speech/language, and vision disorders. In addition, participation in a Head Start program has been shown to provide greater developmental and behavioral gains for children with physical disabilities, as well as significantly more motor ability for children with mental retardation, than children with similar disabilities who did not participate in a Head Start program (McKey 1985). Head Start programs, along with some other early childhood education programs, strive to create fully blended programs. Blending is defined as more than inclusion to the extent that children with disabilities are not only included in the activities of the classroom, but also "individual learning needs are honored and the curriculum is purposefully blended across ability levels and learning opportunities, which sets the stage for effective teaching and learning for all students" (Grisham-Brown et al. 2009). In a comparison of three very small interventions, children in blended classrooms made and maintained progress on a targeted early learning standard, indicating that using such techniques can assist children with disabilities in gaining important skills (Grisham-Brown et al. 2009).

Children with disabilities have been shown to make academic and developmental gains from their participation in inclusive early childhood education settings (Dickson 2000; Hanline and Daley 2002; Holahan and Costenbader 2000; Mogharreban and Bruns 2009). Mogharreban and Bruns (2009) report that "one of the most positive outcomes of the first 2 years was the successful transition of the majority of [Early Childhood Special Education] ECSE children into general kindergarten classrooms and most without the need of a designated ECSE aide." In short, children with disabilities have been shown to make profound progress with intensive and appropriate early childhood education services. Many of these gains are in the very areas that are the most challenging for children who have experienced lead poisoning and that children who have had lead exposure are most at risk for experiencing.

Costs and Benefits of Early Childhood Education Programs

The economic effects of early childhood education programs have been estimated in the range of \$2–\$3 in economic development at the state level per dollar of intervention costs and compare favorably with business incentive programs (Bartik 2011). The President’s Council of Economic Advisors estimated that each \$1 invested in early childhood education would provide \$8.60 in benefits to society and that if enrollment increased by 13%, in the long runs these gains translate into an increase in gross domestic product of 0.16%-0.44% (Executive Office of the President 2014). The benefits of early childhood education occur over the long term (i.e., the working life of the children enrolled) and seem to depend largely on the amount of time children spend in the programs and their quality. However, the implied long-term effect on national annual earnings of a well-run universal pre-K education is estimated at about \$300 billion (Bartik 2006).

Chapter 6: Applicable Federal Programs and Policies

Overview

Several programs and authorities apply to assessments of disability and the services that can be provided as interventions for children affected by lead (see Appendix 1). For example, the following programs and policies serve children aged 0 to 21:

- Individuals with Disabilities Education Act (IDEA) (20 U.S.C. § 1400 et seq.) Federal Special Education Law, including
 - Child Find: Gateway to Services.
 - Part C: Early Intervention Services for Children Under Age 3.
 - Part B: Special Education for Children 3-21 Years Old, including Section 619 Preschool Programs and Coordinated Early Intervening Services.
- Rehabilitation Act of 1973, Section 504: Federal Civil Rights Protections.
- Americans with Disabilities Act Amendments Act of 2008.
- Medicaid: Early and Periodic Screening, Diagnosis and Treatment (EPSDT) Program.
- Title V: Maternal and Child Health Block Grant.

IDEA: Federal Special Education Law

IDEA is a federal law ensuring that children with disabilities, ages 3 to 21, receive a free appropriate public education (see Tables 2 and 3). Originally called the Education for All Handicapped Children Act of 1975 (Public Law 94-142), IDEA has been amended several times, most recently in 2004 (20 U.S.C. § 1400 et seq.). The U.S. Department of Education, Office of Special Education Programs (OSEP), is responsible for implementing IDEA at the federal level. Although all U.S. states currently participate in IDEA, state and local implementation may vary, resulting in some differences in policies, services, and processes by state. Therefore, it is essential to understand state implementation policies to have a full understanding of the requirements and children's rights. (See <http://idea.ed.gov> for detailed information about the program provisions and requirements.)

IDEA provides federal funds and oversight for early intervention and special education and related services to infants, toddlers, children, and youth with disabilities. In 2011, an estimated 6.9 million children were eligible for these programs. The law also governs the allocation of these funds to states and public agencies that deliver these services. Part C of IDEA is a \$442.7 million (FY 12) program administered by states that serves infants and toddlers through age 2 with developmental delays or who have diagnosed physical or mental conditions with high probabilities of resulting in developmental delays. Part B of IDEA is an \$11.58 billion (FY 12) program of grants to state education agencies to partially fund special education and related services for children ages 3–21 with disabilities, including the Section 619 Preschool Program. In addition to the grant programs, IDEA specifies detailed due-

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process provisions for parental rights. Both Part B and Part C of IDEA contain explicit requirements for states to actively identify children with disabilities, determine their eligibility, and make referrals to services via a comprehensive Child Find system. The Department of Education requires that states must describe the planning and implementation of their Child Find systems in their grant applications.

In recent years, the U.S. Department of Education issued new federal regulations incorporating the 2004 amendments to IDEA:

- Final Part B regulations took effect on October 13, 2006 (34 C.F.R. Part 300; 71 Fed. Reg. 46540 (Aug. 14, 2006)).
- Final Part B regulations were augmented with supplemental regulations in 2008 in response to the No Child Left Behind Act of 2001; (73 Fed. Reg. 231 (Dec. 1, 2008)).
- Final Part C regulations took effect on October 28, 2011 (34 C.F.R. Part 303; 76 Fed. Reg. 73006 (Sept. 28, 2011)).

Child Find: Gateway to Services

All children with disabilities must be identified before receiving early intervention or special education services. Child Find is a child identification program that identifies and evaluates children and young people from ages 0 to 21 who are suspected of having disabilities, including those with a history of exposure to lead or a BLL ≥ 5 $\mu\text{g}/\text{dL}$.

Under IDEA, all states must have a comprehensive, continuous Child Find system with the purpose of identifying, locating, and evaluating all infants, toddlers, and children with disabilities in the state who are eligible for early intervention or special education services. Child Find systems vary by state, but they typically include public awareness activities, screening, referral, and evaluation activities.

The regulations in Part B of IDEA 34 C.F.R. § 300.111 state Child Find policies and procedures must identify all children with disabilities who are in need of special education and related services. This includes children—regardless of the severity of their disability—who are homeless, migrant, or “highly mobile”; wards of the state; attending private schools, as well as those who are advancing from grade to grade. States and local education agencies (i.e., school districts and charter schools) are responsible for compliance. School district offices or websites provide contact information for the personnel responsible for screening and referrals through Child Find (U.S. Department of Education 2010).

Part B Child Find has three primary purposes:

- 1) To ensure that no children with disabilities are denied a free appropriate public education because they have not been located.
- 2) To ensure cooperation between educational agencies and others such as health, mental health, and developmental disabilities agencies; social services; corrections departments; private schools; and private agencies.
- 3) To enable the states and local education agencies to appropriate funds, plan and deliver programs, and be held accountable to all children with disabilities.

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The lead agencies for the Part C Early Intervention Program must ensure that all infants and toddlers with disabilities who are eligible for early intervention services are identified, located, and evaluated. These agencies are also required to coordinate Child Find with Part B programs, via referrals and transition planning, as well as with other agencies responsible for relevant education, health, and social service programs. These other agency programs include the Maternal and Child Health program (including the Maternal, Infant, and Early Childhood Home Visiting Program); the Early and Periodic Screening, Diagnostic, and Treatment component of Medicaid; Head Start and Early Head Start; Supplemental Security Income programs; and other appropriate entities.

In most states, there is a designated point of contact for Child Find and early intervention at the state, county, and district levels, but it may not be the same agency responsible for Part B Child Find. Parents concerned about their child's development may request an evaluation at no cost through Child Find. Often, pediatricians or school personnel refer children for evaluation, which requires parental permission.

The following resources provide searchable links for state or local Child Find contacts:

- The Center for Parent Information and Resources (CPIR) provides a listing of all OSEP-funded parent training and information centers by region. Parent centers have information about Child Find procedures and contact information for the states in their regions. Also, CPIR has access to many of the materials produced by the National Dissemination Center for Children with Disabilities (NICHCY), which are available via the Center for Parent Information and Resources (<http://www.parentcenterhub.org>).
- The Early Childhood Technical Assistance Center provides state contact information for early intervention (Part C) coordinators and for preschool programs (Section 619 coordinators) (<http://ectacenter.org>).

In addition, there are many other resources for parents seeking information about education and services for children affected by lead. Parent centers provide training and assistance to families with children with disabilities. These centers—which include parent training and information centers (PTIs) and community parent resource centers (CPRCs)—are funded through OSEP under IDEA. Parent centers serve families of children of all ages (birth to 26 years) and with all disabilities (physical, cognitive, behavioral, and emotional). Every state has at least one PTI for underserved families, and those with larger populations may have more. CPRCs provide services to underserved families in smaller geographic areas. There are currently 94 parent centers in the United States (<http://www.parentcenterhub.org>). Additionally, pediatric health care providers, public schools, and local health departments are familiar with Child Find screening requirements and can refer children.

Part C: Early Intervention Services for Children Under Age 3

Since 1986, the IDEA Part C program has provided for early intervention services to infants and toddlers with disabilities to improve outcomes and prepare them to successfully transition to preschool and kindergarten. Part C authorizes assistance to state and local programs to serve children from birth through age 2 (through the 35th month of age), also known as “zero to three” or “infants and toddlers.”

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Part C has five main purposes:

- 1) To enhance the development of infants and toddlers to minimize their potential for developmental delays, recognizing that significant brain development occurs during a child's first three years.
- 2) To reduce the educational costs to society, including the nation's schools, by minimizing the need for special education and related services after infants and toddlers reach school age.
- 3) To maximize the potential of individuals with disabilities to live independently.
- 4) To enhance families' capacities to meet the needs of their children with disabilities.
- 5) To enhance the capacities of state and local agencies and service providers to identify, evaluate, and meet the needs of all children, particularly minority, low-income, inner-city, and rural children and infants and toddlers in foster care (20 U.S.C. § 1431 (a)).

Part C provides funding for services to infants and toddlers. Infants and toddlers who qualify for the services must meet their state's eligibility definition of developmental delay or have a diagnosed physical or mental condition that carries a high probability of causing developmental delays (20 U.S.C. § 1432(5)). Part C regulations identify required services that may include speech-language services, occupational therapy, physical therapy, and special instruction. There are also services that must be provided at no cost to the family; they include child find, evaluation and assessment, service coordination, individual family service planning, and procedural safeguards. After a child is referred and evaluated to determine eligibility and service needs, a team of professionals and the child's parents meet to develop a written plan for providing early intervention services to the child and family. This document is called the individualized family service plan (IFSP).

Infants and toddlers with disabilities are defined as children who

- 1) Are experiencing developmental delays, as measured by appropriate diagnostic instruments and procedures, in one or more of the following five areas: cognitive development, physical development, communication development, social or emotional development, or adaptive development **OR**
- 2) Have a condition of established risk, which is defined as "a diagnosed physical or mental condition which has a high probability of resulting in developmental delay" whether or not a measurable delay has been identified (<http://aspe.hhs.gov/hsp/08/devneeds/apa.htm>). Children affected by lead may qualify under this definition.

States have the discretion to provide services to infants and toddlers who are at risk for substantial developmental delays if they do not receive appropriate early intervention services (20 U.S.C. § 1432(1); 20 U.S.C. § 1432(5)(B)).

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Established risk conditions include (<http://aspe.hhs.gov/hsp/08/devneeds/apa.htm>), but are not limited to,

- chromosomal abnormalities, genetic or congenital disorders, severe sensory impairments, including hearing and vision;
- inborn errors of metabolism, disorders reflecting disturbance of the development of the nervous system, congenital infections;
- disorders secondary to exposure to toxic substances, including fetal alcohol syndrome; and
- severe attachment disorders.

States have considerable discretion in establishing Part C eligibility because they define criteria for the developmental delay that an infant or toddler must be either experiencing or have a high probability of experiencing as a result of a diagnosed established risk condition. The federal regulation does not explicitly mention lead exposure for Part C eligibility. States may include a child who is at risk for experiencing developmental delays because of biological or environmental factors that can be identified (20 U.S.C. § 1432(3)(B); 34 C.F.R. § 303.10). In the discussion of public comments accompanying the final regulation related to optional coverage of at-risk children, mandatory referrals for children who have been exposed to “lead paint,” (76 Fed.Reg. 60140) was not included in the regulation, thus allowing states to have flexibility to designate subgroups at risk.

According to a 2012 survey of states’ early intervention program documents, eight states explicitly mention lead exposure as an eligible condition for services or tracking (i.e., either by itself or in combination with its adverse effect on educational performance). Another 12 states specify BLL thresholds ranging from >10 µg/dL to >45 µg/dL as a criteria for early intervention eligibility. Thirteen states mention nonspecific “toxic” exposures as eligibility criteria (see Appendix 2).

Although Part C is primarily for children under 3 years of age, states have the option of extending services until the child is eligible under state law to enter kindergarten or elementary school, as appropriate. This option reduces the need for an additional transition to separate preschool services before the transition to primary school.

The state-designated Part C lead agency is typically the agency responsible for health or rehabilitative services and facilitates linkages to Medicaid and early intervention service providers. Also, some state education agencies operate their states’ Part C program. Informational resources and research findings about IDEA Part C—including program contact information, state Part C regulations, and state eligibility definitions—can be found at <http://ectacenter.org/partc/partc.asp>.

Part B: Special Education for Children, 3–21 Years Old

IDEA Part B is the federal special education law for children ages 3–21 with disabilities, whose purpose is

- a) To ensure that all children with disabilities have available to them a free appropriate public education that emphasizes special education and related services designed to meet their unique needs and prepare them for further education, employment, and independent living.
- b) To ensure that the rights of children with disabilities and their parents are protected.

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- c) To assist states, localities, educational service agencies, and federal agencies to provide for the education of all children with disabilities.
- d) To assist states in the implementation of a statewide, comprehensive, coordinated, multidisciplinary, interagency system of early intervention services for infants and toddlers with disabilities and their families.
- e) To ensure that educators and parents have the necessary tools to improve educational results for children with disabilities by supporting system improvement activities; coordinated research and personnel preparation; coordinated technical assistance, dissemination, and support; and technology development and media services.
- f) To assess and ensure the effectiveness of efforts to educate children with disabilities.

As noted above, public school districts and charter schools are the lead agencies for Part B, including the Section 619 Preschool Program. Part B requires that schools provide special education and related services to eligible children in the least restrictive environment and to comply with important specifications regarding processes, payment, quality assurance, parental rights, dispute resolution, and other administrative aspects. As with Part C, states issue their own regulations that must comply with federal requirements for Part B, at a minimum, and may contain additional services or requirements. (Links to state Part B regulations can be found at <http://idea.ed.gov/explore/home>).

Despite the variation by state, the core elements of the Part B process, described below, are consistent.

1. Child is identified as possibly needing special education services. As with Part C, children may be identified by Child Find or by an individual request from a parent/guardian, health care provider, or social service provider. Schools may also initiate an evaluation.
2. Child is evaluated. The purpose of this multidisciplinary evaluation is to determine if the child has a disability that requires special education and related services.
3. Eligibility for special education is decided. School professionals and the parents together review the evaluation findings and make a determination as described in 34 CFR § 300.301-306.
4. Child is determined to be eligible for services.
5. Individualized education program (IEP) meeting is scheduled and must be held within 30 days of eligibility determination.
6. Team meeting is held to write the IEP with parental participation.
7. Services are provided consistent with the developmental problems outlined in Chapter 4.
8. Progress is measured and reported to parents through the report card or as requested at any time by parents. Parents can initiate a process to evaluate progress toward IEP goals more frequently based on their child's needs.
9. IEP is reviewed [at least annually].
10. Child is reevaluated, at least every 3 years, to ensure that academic transitions have been successful as described in Chapter 4.

Students who meet both the following conditions are eligible for Part B special education services under IDEA (20 U.S.C. § 1401(3)(A); 34 C.F.R. § 300.8(a)):

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- The student must be determined to have one (or more) of the 13 disabilities listed in the IDEA.
- The student must, as a result of that disability, need special education to make progress in school and to receive benefit from the general educational program.

Children affected by lead maybe eligible because they have “other health impairment,” a specific learning disability or, if 3–9 years old, they are experiencing developmental delay as defined by the state. In states where lead poisoning is not specified as a disability, the child may qualify under the “other health impairments” option. If a child is determined to have a disability yet not be in need of special education, he or she may still be eligible under an optional designation known as “developmental delay.” Under this designation, states can provide special education services to young children (ages 3–9) who are experiencing developmental delays but do not satisfy the criteria for a disability category. This approach avoids the need to diagnose specific learning disabilities, which some have argued is inaccurate and inappropriate for young children, and avoids labeling them at such a young age and stage of development. [Table 4 summarizes potential eligibility categories.]

States may decide whether to use a developmental delay designation, how to define it, and what age ranges it should apply to. The second Part B condition also applies as well: Even if a developmental delay is identified, a child must be shown to need special education in order to be eligible for services. [For more information, see <http://www.ectacenter.org/~pdfs/pubs/nnotes27.pdf>].

Children affected by lead may be eligible for Part B special education in several ways. First, they may qualify as having an “other health impairment,” which is one of the 13 disability categories listed in IDEA. The federal statute explicitly includes lead poisoning as a covered impairment. Second, a child might have a “specific learning disability,” which is another of the 13 IDEA disability categories (see Appendix 3 for a list of the specific disabilities). In both cases, a child would also have to meet the second criterion of needing special education as a result of the health condition. Finally, in some states, children affected by lead might be found to have developmental delays consistent with the state’s definition.

Part B: Section 619 Preschool

Young children aged 3 to 5 or, at the state’s discretion, those who will turn 3 during the school year and who have been identified as having any of the conditions named in Part B, including developmental delays, are eligible to receive services under the Section 619 (20 U.S.C. § 1419(a)). Just like school-age children, preschoolers with disabilities are entitled to special education and related services in the least restrictive environment (20 U.S.C. § 1412(a)(5)). Each state has a designated individual who is responsible for coordinating the state’s Section 619 Preschool Grant. (For more information, see <http://ectacenter.org/sec619/sec619.asp#contact>).

The 2004 reauthorization of IDEA allows local educational agencies to use up to 15% of funds received under Part B to develop and apply coordinated early intervening service (CEIS) for students without disabilities. Unlike Part C early intervention, which provides services for children birth through age 2, Part B CEIS provides non-special education services to students in kindergarten through grade 12 (with primary focus on children in kindergarten through grade 3). In particular, CEIS provides for those who

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have not been identified as needing special education or related services, but who need additional academic and behavioral supports to succeed in a general education environment.

CEIS requires that schools use a scientifically based academic and behavioral intervention as emphasized by the No Child Left Behind Act (34 C.F.R. § 300.226(b)). This has resulted in two major intervention models (U.S. Department of Education 2004):

- Response to Intervention for children who are struggling academically.
- Positive Behavioral Support for children who have problem behaviors.

Thus, a local educational agency could possibly explore using CEIS funds to develop a monitoring plan within a scientific research-based intervention framework for addressing the needs of lead-affected students who have reading, math, or behavioral problems but are not identified as having disabilities under IDEA or Section 504.

There are public agencies and private sector organizations that have developed extensive informational, training, and reference materials on special education under IDEA targeted to specific audiences. These agencies may be able to help parents and caregivers assess which services their children would be able to access and which agencies to contact regarding assessments and interventions.

Detailed information on Part B is available from the U.S. Department of Education (<http://idea.ed.gov>). Guides written for parents are available from various sources, including the Center for Parent Information and Resources (<http://www.parentcenterhub.org/>). In all cases, parents will need to focus specifically on what their state and local school districts do to administer and implement these regulations.

Rehabilitation Act of 1973, Section 504: Federal Civil Rights Protections

Section 504 of the Rehabilitation Act of 1973 is a federal civil rights law that protects individuals with disabilities in programs that receive federal financial assistance. The regulations provide two additional layers of protection:

- 1) Ensuring services for children with disabilities who are not eligible for IDEA.
- 2) Requiring that schools meet the specialized needs of all children with disabilities while providing access to the same resources provided to children who do not have disabilities.

Section 504 provides that, “No otherwise qualified individual with a disability in the United States ... shall, solely by reason of her or his disability, be excluded from the participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance...” (29 U.S.C. § 794).

While not an education-specific law, Section 504 applies to public school districts, state and local education agencies, and institutions of higher learning, among others. Section 504 regulations require school districts to provide a “free appropriate public education” to each qualified person with a

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disability who is in the school district's jurisdiction, regardless of the nature or severity of the person's disability. Under the regulations a free appropriate public education consists of the provision of regular or special education and related aids and services designed to meet the student's individual educational needs as adequately as the needs of nondisabled students are met (34 C.F.R. § 104.33).

Section 504 regulations define a person with a disability¹ as "any person who: (i) has a physical or mental impairment which substantially limits one or more major life activities, (ii) has a record of such an impairment, or (iii) is regarded as having such an impairment" (34 C.F.R. § 104.3). The regulations also define learning as a major life activity. Under Section 504, lead-exposed students may have impairment (lead poisoning) that substantially affects their major life activities, such as learning and attention. Due to a broader definition of disability, Section 504 covers more children than IDEA does. Another important difference between IDEA and Section 504 is that 504 does not provide funding for services.

Under the law, recipients of federal funding are required to eliminate barriers that prevent students with covered disabilities from participating fully in the programs offered. Schools must make necessary accommodations and provide support to allow qualified students to participate. Federal regulations specify that an appropriate education includes the following:

- Education services designed to meet the individual education needs of students with disabilities as adequately as they meet the needs of nondisabled students.
- The education of each student with a disability with nondisabled students, to the maximum extent appropriate to the needs of the student with a disability.
- Evaluation and placement procedures established to guard against misclassification or inappropriate placement of students, and a periodic reevaluation of students who have been provided special education or related services.
- Establishment of due process procedures that enable parents and guardians to receive required notices; review their child's records; and challenge identification, evaluation, and placement decisions.

School districts typically have documented processes that they follow and designated personnel to coordinate and document implementation. The typical process for provision of Section 504 services in schools begins with a team meeting to review a student's circumstances; plan an evaluation (if necessary); and provide services, accommodations, or modifications based upon the student's needs. This plan could include modified schedules, alternative test settings, extra time to complete projects, reasonable modification of policy or procedures, and other reasonable accommodations to the

¹The regulations actually use the term "handicapped" rather than "disability." However, because the common usage is "disability," we use that term rather than "handicapped."

student's disability. While Section 504 regulations specify various due-process requirements, the law does not contain set time limits for schools to act.

Americans with Disabilities Act

Since 1990, the Americans with Disabilities Act (ADA) has provided federal civil rights protection for people with disabilities. ADA applies to all state and local government programs, including public schools. The Americans with Disabilities Act Amendments Act of 2008 (ADAAA) restored the scope of protections intended in the original 1990 ADA that had been limited by court rulings in the interim. Similar to Section 504, the ADA defines a "disability," in part, as a physical or mental impairment that substantially limits a major life activity of an individual. ADAAA did not revise its definition of disability, but broadened its interpretation to include an expanded list of illustrative major life activities, along with other clarifications about determining impact of disabilities on these activities. Of particular relevance to lead-poisoned children, major life activities now include learning, reading, concentrating, and thinking, among others. These changes may enable more students to be considered eligible under Section 504. The law also made the ADA definition of "individual with a disability" applicable to the Rehabilitation Act.

ADAAA also adds a new category by stating that a major life activity includes "the operation of a major bodily function" including but not limited to neurological and brain functions. In addition, the law makes clear that an impairment that substantially limits a major life activity need not also limit other major life activities in order to be considered a disability. Moreover, it clarifies that impairments that are episodic or in remission are considered disabilities if the impairment would substantially limit a major life activity when the condition is considered in its active status (Pub. L. 110-325, § 4).

ADAAA makes clear that no child should have the door to Section 504 shut because of old, outdated ADA law. ADAAA contains an amendment that amends the Rehabilitation Act of 1973 to ensure that entities such as "public schools, institutions of higher education, childcare facilities, and other entities receiving federal funds" operate under "one consistent standard" because these entities are required to comply with both laws (Congressional Record, Vol. 154, No. 147, Sept. 16, 2008, p. S8843). The ADA aspects of ADAAA are also relevant as youth with disabilities transition from school into employment. These changes may enable more students, including those who are affected by lead, to be considered eligible under Section 504.

Medicaid: Early and Periodic Screening, Diagnosis, and Treatment (EPSDT)

The EPSDT program is a comprehensive and preventive child health program that emphasizes the early assessment of children's health care needs. The EPSDT program requires state Medicaid agencies to cover necessary health care, diagnostic services, and treatment to correct and ameliorate defects and physical and mental illnesses and conditions discovered by screening of individuals aged 21 years and younger (http://www.medicaid.gov/medicaid-chip-program-information/by-topics/financing-and-reimbursement/downloads/2003_sbs_admin_claiming_guide.pdf). The scope of covered services can be broader than what is otherwise included under a state's Medicaid state plan in general. Covered under EPSDT, children enrolled in Medicaid are required to have a blood lead test at about 12 months and again at about 24 months. If the child is 3 to 5 years of age and does not have a record of any previous

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blood lead test, the child should receive a blood lead test. In addition, a child must be tested if the parent, guardian, or provider requests blood lead testing due to suspected exposure.

In many states, schools play a large role in many EPSDT activities, particularly with respect to outreach, screening, diagnosis, and treatment.

School-based health services are important to ensuring that children and adolescents receive needed health care in a setting that is appropriate and with minimum disruption of education. Many school-based health programs deliver services that are covered by Medicaid. For Medicaid to cover these services, they must be primarily medical and not educational in nature, medically necessary for the child, and provided by a qualified Medicaid provider to families that meet income eligible requirements (i.e., not provided free of charge to non-Medicaid children). These can include

- Routine and preventive screenings and examination including blood lead testing and follow-up for BLLs,
- Diagnosis and treatment of acute uncomplicated problems,
- Monitoring and treatment of chronic medical conditions, and
- Provision of medical services to children with disabilities under the IDEA.

States and schools have flexibility in how they choose to implement these services. To gain access to the most appropriate services for their child, parents and caregivers will have to determine how the services are implemented in their jurisdiction.

American Academy of Pediatrics Recommendations

- If a child has had a venous BLL ≥ 5 $\mu\text{g}/\text{dL}$ before age 6 years, that child should have annual developmental surveillance and screening at ages 3, 4 and 5 years.
- For children with a venous BLL ≥ 5 $\mu\text{g}/\text{dL}$ at any age, developmental surveillance during medical visits should continue annually (no age limit) to identify emerging or unaddressed behavioral/developmental/cognitive concerns.
- For children of any age, if problems/issues arise between annual visits, parents should be encouraged to bring them to attention of the appropriate school personnel or clinician.

(<http://www.health.state.mn.us/divs/fh/mch/ctc/factsheets/lead.pdf>)

Every child less than 3 years old should have developmental surveillance (also called “developmental monitoring”) and screening as proposed by the American Academy of Pediatrics (AAP)—surveillance at every well-child visit and screening at 9 months, 18 months, and either 24 or 30 months (AAP 2006). CDC’s *Learn the Signs. Act Early* program provides information and tools to help parents of all young children, healthcare providers, and early educators monitor young children’s development and act early

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if there is a concern. (www.cdc.gov/actearly). Developmental screening is now considered a covered preventive health service under the Patient Protection and Affordability Act (ACA 2010).

Title V: Maternal and Child Health Services Block Grant Program

For over 75 years, the federal Title V Maternal and Child Health program has provided a foundation for ensuring the health of the nation's mothers, women, children, and youth, including children and their families. At least 30% of the federal Title V funds are designated for services for children with special health care needs. States can use these funds to provide education and counseling to families with BLLs at or above 5 µg/dL (for example, Louisiana 2013). Specifically, the Title V Maternal and Child Health program seeks to

- Assure access to quality care, especially for those with low-incomes or limited availability of care,
- Reduce infant mortality,
- Provide and ensure access to comprehensive prenatal and postnatal care to women (especially low-income and at-risk pregnant women),
- Increase the number of children receiving health assessments and follow-up diagnostic and treatment services,
- Provide and ensure access to preventive and child care services as well as rehabilitative services for certain children,
- Implement family-centered, community-based systems of coordinated care for children with special healthcare needs, and
- Provide toll-free hotlines and assistance in applying for services to pregnant women with infants and children who are eligible for Title XIX (<http://mchb.hrsa.gov/programs/titlevgrants/>).

States and jurisdictions use their Title V funds to design and implement a wide range of activities that address national and state needs. Unique in its design and scope, the Maternal and Child Health Block Grant

- Focuses exclusively on the entire maternal and child health population;
- Encompasses infrastructure, population-based, enabling, and direct services for the maternal and child health population;
- Requires a unique partnership arrangement between federal, state, and local entities;
- Requires each state to work collaboratively with other organizations to conduct a statewide comprehensive needs assessment every 5 years;

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- Requires each state—based on the findings of the needs assessment—to identify priorities to comprehensively address the needs of the maternal and child health population and guide the use of the Maternal and Child Health Block Grant funds; and
- May serve as the payer of last resort for direct services for the maternal and child health population that are not covered by any other program.

IDEA/ADA Resources

Resources on understanding and using IDEA and ADA can be found at the following websites:

- National Dissemination Center for Children with Disabilities (<http://www.parentcenterhub.org/>).
- IDEA Parent Guide (<https://www.understood.org/en/tools/through-your-childs-eyes>).
- Free Appropriate Public Education for Students with Disabilities: Requirements under Section 504 of the Rehabilitation Act of 1973 (<http://www2.ed.gov/about/offices/list/ocr/docs/edlite-FAPE504.html>)
- Coordinated Early Intervention Services (CEIS) (http://www2.ed.gov/policy/speced/guid/idea/ceis_pg3.html).

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Table 2: Summary of Educational Resources: The Individuals with Disabilities Education Act (IDEA)

This table displays federal statute and grant funding that ensures free and appropriate education for children with a specific disability as defined by IDEA.

Provision	Population	Services	Key Element	Activities
IDEA: Child Find	Children from birth–21 years of age, including those enrolled in all public and private schools.	Policies and procedures to identify, locate, and evaluate children suspected of having a disability.	Coordination with referral sources such as physicians and agencies.	Public awareness, referral, screening, eligibility determination, tracking, and interagency coordination.
IDEA: Part B	Children 3–21 years of age.	Provides for special education and related services.	Individualized education program (IEP) specifying services and supports the child will receive.	Education in the least restrictive environment appropriate. Early intervening services provide additional support to struggling students in general classroom.
IDEA: Part B, Section 619	Children 3–5 years of age (Section 619 preschool program).	Provides grants for preschool services.	Children with disabilities receiving services in inclusive settings.	Transition activities between IDEA Part C and Part B.
IDEA: Part C	Children birth through third birthday. State option—extended Part C service from third birthday through kindergarten.	Provides early intervention services for infants and toddlers with developmental delays or diagnosed conditions with high probabilities of resulting in developmental delays.	Uses an individualized family service plan (IFSP) specifying services for a child and his/her family.	Provides services and education to children in their natural environment.
IDEA: Part B, CEIS	Students from kindergarten through grade 12 (with a focus on kindergarten through grade 3).	Provides scientifically based academic and behavioral interventions.		Professional development for teachers and other school staff in scientifically based academic and behavioral interventions, including literacy instruction and, where appropriate, instruction on the use of adaptive and instructional software. Providing educational and behavioral evaluations, services, and supports, including scientifically based literacy instruction.

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Table 3: Summary of Educational Resources: Provisions under Section 504, ADA, EPSDT

This table displays federal statute and grant funding that ensures free and appropriate education for children with a specific disability as defined by Section 504, ADA, and EPSDT.

Provision	Population	Services	Key Element	Activities
Section 504 of the Rehabilitation Act of 1973	<p>Individuals with disabilities in any institution, school, or agency receiving federal funding.</p> <p><i>Children with disabilities eligible under Section 504 are not necessarily eligible under IDEA because of the broader disability definitions under Section 504.</i></p>	<p>Protects rights of those in the Population column.</p> <p>Requires a school district to provide a “free appropriate public education” to each qualified person with a disability who is in the school district’s jurisdiction, regardless of the nature or severity of the person’s disability.</p>	<p>Generally regarded as the basis for disability protection in the schools.</p> <p>Schools provide accommodations, supports, and aides necessary for child to receive education comparable to the one provided to general students.</p>	<p>No additional funds are provided to state or local school districts.</p> <p>IDEA funds may not be used for children eligible under 504 only.</p>
Americans with Disabilities Act, as amended by the Americans With Disabilities Act Amendments Act of 2008 (ADA)	<p>People with disabilities.</p> <p><i>Title II makes ADA applicable to all state and local government programs, including public schools.</i></p>	<p>Provides federal civil rights protection for those in the Population column.</p> <p>Restored the scope of protections intended in the original 1990 ADA that were limited by court rulings in the interim.</p> <p>Made the ADA definition of “individual with a disability” applicable to the Rehabilitation Act.</p>	<p>ADA left unchanged the definition of disability but broadened its interpretation to include an expanded list of illustrative major life activities to show limitation and removes consideration of mitigation measures.</p>	<p>These changes may enable more students to be considered eligible under Section 504.</p>

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Provision	Population	Services	Key Element	Activities
Medicaid: EPSDT	Children eligible for Medicaid	<p>EPSDT screening may identify children with disabilities needing special education services or accommodations.</p> <p>Requires screening for blood lead level at specified ages.</p> <p>Agencies implementing IDEA must coordinate with Medicaid.</p> <p>Schools may be reimbursed for certain medical services under Medicaid; IDEA is funder of last resort for medical services.</p>		

Table 4: Potential Eligibility of Children with Lead Exposure/Poisoning

Provision	Requirement for Disability	Basis for Eligibility of Lead Poisoned Children	Comment
IDEA: Part B (including Section 619 Preschool)	<p>Child aged 3 to 21 must have one (or more) of 13 disabilities listed in IDEA and, as a result of that disability, need special education (20 U.S.C. §§ 1401(3)(A), 1412(a)).</p> <p>In some states, a child aged 3–9 who is experiencing developmental delays, as defined by the state (20 U.S.C. § 1401(3)(B)).</p>	<p>Other health impairment is one of the 13 disabilities in IDEA, with lead poisoning explicitly included in statute as a covered impairment (34 C.F.R. § 300.8(c)(9)(i)).</p> <p>Specific learning disability is also one of the 13 disabilities listed in IDEA (34 C.F.R. § 300.8(c)(10)).</p> <p>In some states, children affected by lead with lead poisoning might be eligible if they are determined to have developmental delays (20 U.S.C. § 1401(3)(B)).</p>	<p>Note that lead poisoning is not sufficient alone; the condition must also adversely affect the child’s educational performance (20 U.S.C. § 1401(3)(A)(ii)). Also, neither the statute nor the regulation specifies a definition for lead poisoning.</p>

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Provision	Requirement for Disability	Basis for Eligibility of Lead Poisoned Children	Comment
IDEA: Part C	Infants and toddlers are eligible for early intervention if they meet the State's definition of developmental delay or have a condition with a high probability of developmental delays (20 U.S.C. §§ 1432(5)(A), 1435 (a)(2)).	Examples of these conditions include disorders reflecting disturbance of the development of the nervous system and disorders secondary to exposure to toxic substances. http://aspe.hhs.gov/hsp/08/devneeds/apa.htm .	Under the most recent regulations, states must develop rigorous definitions of developmental delay (34 C.F.R. § 303.111).
ADA and Section 504 of the Rehabilitation Act	Individuals who have or had a physical or mental impairment that substantially limits a major life activity such as walking, seeing, hearing, thinking, reading, learning, or concentrating (42 U.S.C. § 12102(1)-(3)).	Federal regulations have expanded the interpretation of the term "major life activities" to include learning and reading, among others (45 C.F.R. § 84.3; 28 C.F.R. § 104).	Does not require that a child needs special education to qualify (45 C.F.R. § 84.33(b)).

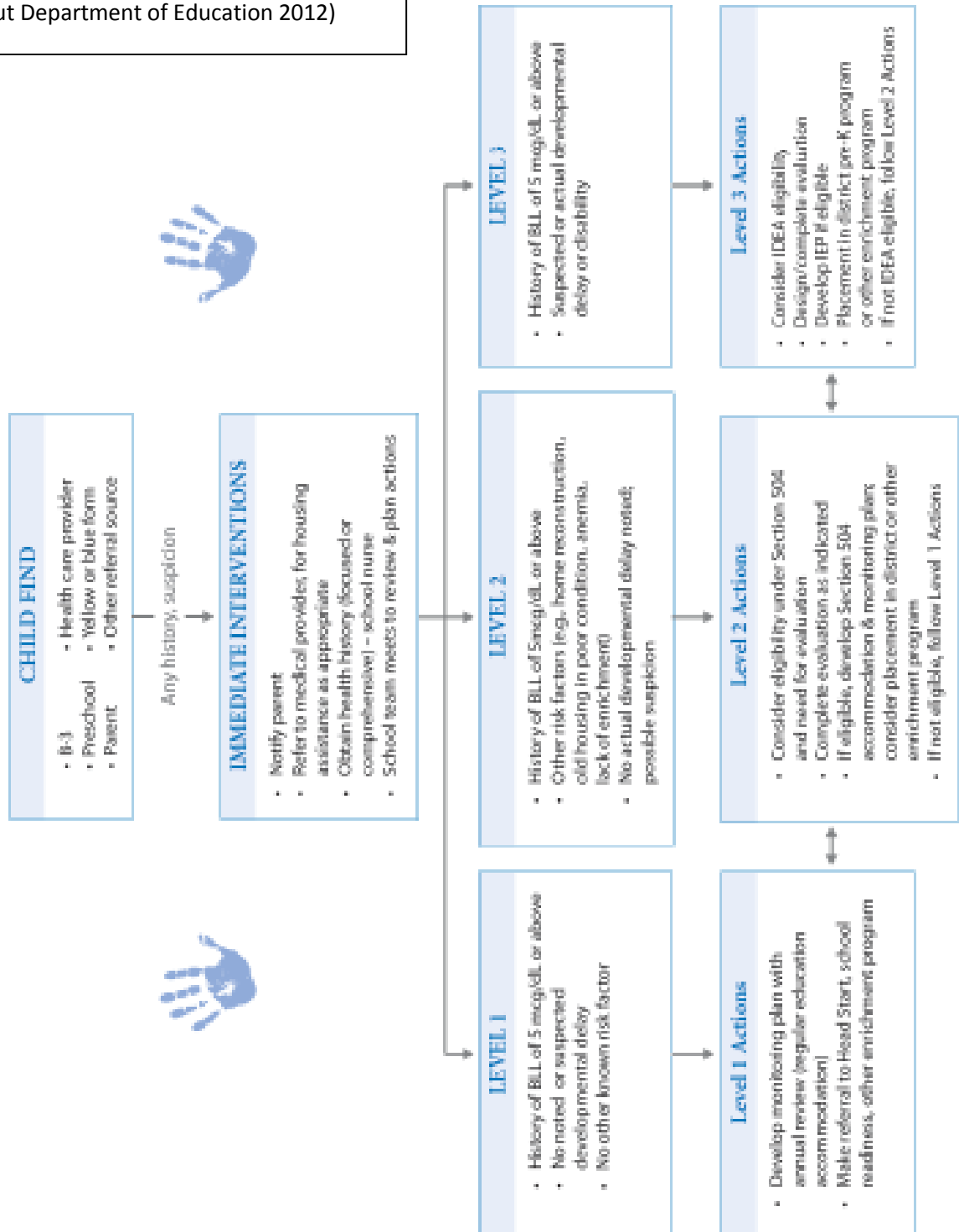
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Figure 1: The Connecticut Model for Providing Education Services to Preschool Children Affected by Lead

(Connecticut Department of Education 2012)

MANAGING PRESCHOOL STUDENT WITH LEAD EXPOSURE

Every child presents differently.



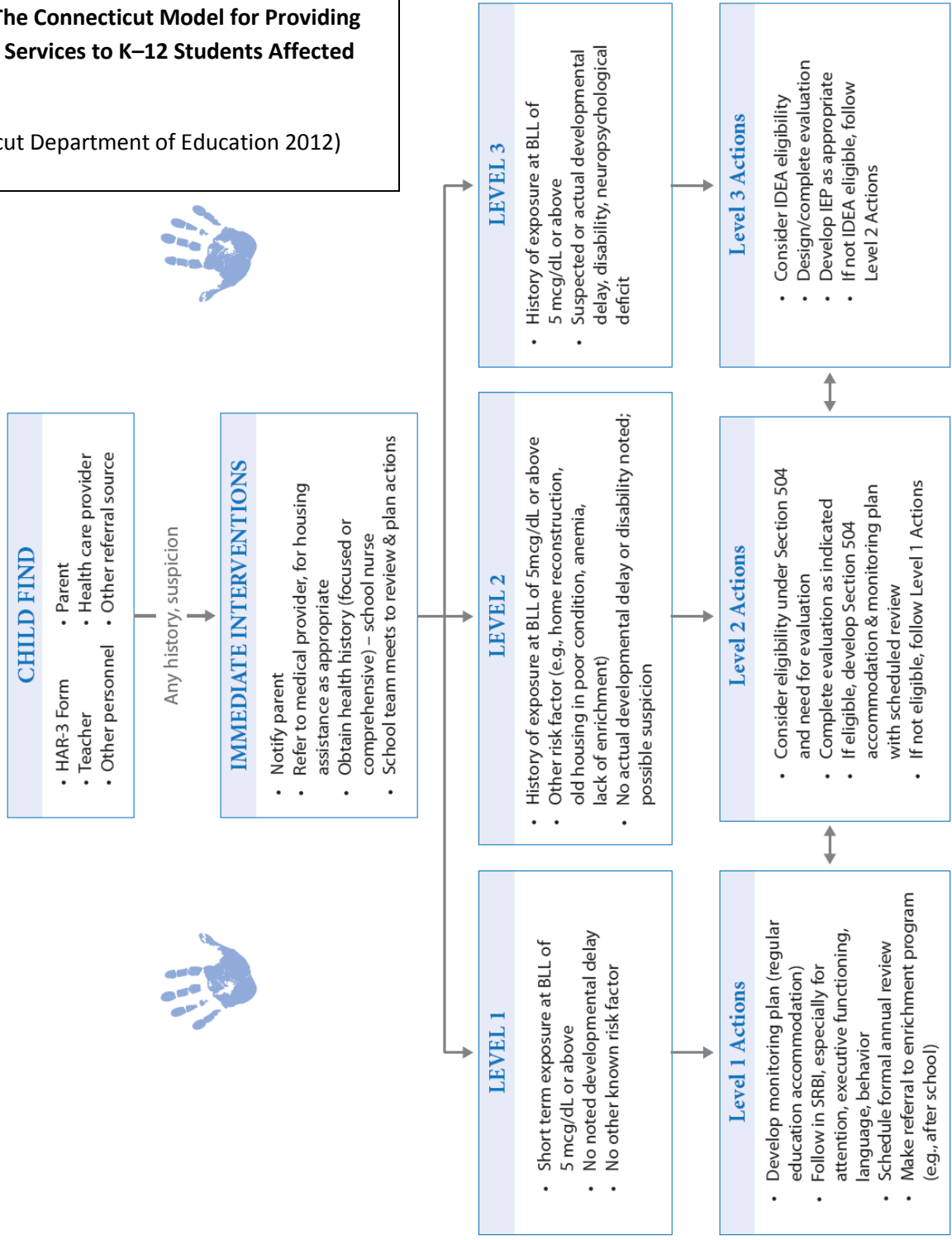
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Figure 2: The Connecticut Model for Providing Education Services to K–12 Students Affected by Lead

(Connecticut Department of Education 2012)

MANAGING K–12 STUDENT WITH LEAD EXPOSURE

Every child presents differently.



Chapter 7: Services Available for Lead-Exposed Children

This chapter provides a summary of the services available for children with learning disabilities under IDEA. The expert panel identified some opportunities to increase access to these services for children affected by lead.

The Education Community and the Child Affected by Lead

The specific effects of lead on children's academic and behavioral outcomes are not well known within education and other fields responsible for achieving the nation's ambitious academic goals. Similar to children with traumatic brain injury (Wayne et al. 2013), children who have been exposed to lead may not be identified in school records or appropriately tracked. Therefore, problems triggered by lead may never receive the appropriate response. Professionals in the fields of early intervention, early childhood, and elementary and secondary education need information from lead poisoning prevention programs and providers to ensure that they understand and fulfill their unique roles.

Children with BLLs at or above the CDC reference value for lead (5 µg/dL in 2012) are at greater risk for developmental delay and behavioral issues that result in academic failure and diminished life success compared to children who do not have a history of HBLLs. Some children are more affected than others by a given blood lead concentration, will experience different levels of delay, and require different interventions (CDC 2002). Thus it is important that children are screened for adverse neurocognitive effects using the appropriate screening tools. Connecting at-risk children to early intervention services is likely key to reducing long term effects. Also, educators, parents, and health care providers can identify delays at critical transition points in educational expectations such as first, fourth, and sixth grades (see Chapter 3). Affected children may exhibit little to no development difficulties early in life but begin to exhibit learning delays at these transition points. Behavioral difficulties may also become apparent as the child ages and higher expectations for self-regulation and interpersonal skills are expected.

Identifying children with HBLLs is critical to determining their specific detriments and then identifying the most appropriate early or elementary school interventions necessary. Thus it is important that all children with HBLLs are screened for adverse neurocognitive effects using neuropsychological evaluation tools that provide a complete assessment to identify the complex subsystems in the brain that work differently when affected by lead. While no specific intervention programs have been demonstrated to improve outcomes for children affected by lead, there are interventions proven to help children with brain dysfunctions who have not had HBLLs and lack lead poisoning.

U.S. Department of Education

OSEP, within the Department of Education's Office of Special Education and Rehabilitative Services (OSERS), is responsible for administration, implementation, and monitoring of state and local service delivery under the laws described in Chapter 6.

Additionally, OSERS funds parent training and information centers to provide technical assistance and education to parents and other involved with children with developmental delays.

States' IDEA Child Find Programs

Federal regulations require that each state have a comprehensive Child Find system with the purpose of identifying, locating, and evaluating all infants and toddlers with disabilities birth to age 3 as early as possible (U.S. Department of Education OSER 2010). The Child Find system has the authority and obligation to refer children with disabilities or risk conditions—such as children who have ever had a BLL at or above the reference value—to needed early intervention services. This gateway to services could be expanded formally to better meet the needs of lead-exposed children:

- States can consider adding a member from the state's childhood lead poisoning prevention program to the required interagency coordinating council with designees who administer the Title V Maternal and Child Health, Early and Periodic Screening, Diagnosis and Treatment program (EPSDT), Medicaid, Head Start, and Developmental Disabilities programs.
- Child Find programs can consider requesting that the state's childhood lead poisoning prevention and Medicaid programs, managed care organizations, hospitals, primary care physicians, and other health care providers refer children who have ever had a BLL at or above reference value to Child Find and/or inform the parents that they can request a screening at no cost through Child Find.
- Child Find programs can consider collaborating with parent centers in outreach to parents of lead-exposed children.
- Child Find programs may consider using a neuropsychological assessment of executive function (in addition to a developmental evaluation) to identify cognitive and functional deficits in all lead-exposed children with BLLs at or above the reference value.

States' IDEA Part C Programs (for Children under Age 3)

Congress established the Part C program in recognition of “an urgent and substantial need” to enhance the development of infants and toddlers with disabilities and minimize the need for special education at older ages because of the early intervention. Although the state education agency is responsible for administering Part B of IDEA, some also manage the Part C program as well. However, most Part C programs are housed in state health departments and human/social services departments. A few are operated by other entities (<http://ectacenter.org/partc/ptclead.asp>).

States can consider classifying the neurocognitive and developmental deficits associated with BLLs above the current reference value as conditions that qualify for early intervention in Part C services in order to ensure that children affected by lead receive the services they need. Since some developmental problems do not manifest until later years, early intervention could be provided to fortify a child's early learning even if a developmental assessment does not yet indicate that services are needed.

States' IDEA Part B Programs (for Children and Young People Ages 3–21 Years)

Congress enacted Part B to ensure that all children and young people with disabilities, including those who have been identified as “other health-impaired” due to lead poisoning, have available to them a free appropriate public education that emphasizes special education and related services designed to

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meet their unique needs and prepare them for further education, employment, and independent living. State education departments are responsible for Part B implementation and compliance.

The Part B program could also work with the childhood lead poisoning prevention programs to ensure that local education agency staff members understand the scope of the childhood lead poisoning problem in their locale, geographic areas where risk is highest, and other important information to help target resources such as additional early childhood education programs.

The State Education Department could develop and ensure delivery of training and appropriate programming for educators, including special educators, in identifying lead-exposure related disabilities and behaviors that impede educational success.

Local Education Agencies

Boards of education, school superintendents, principals, teachers, school nurses, and counselors can work with parents to ensure that children affected by lead are identified, assessed and receive educational support. School districts can develop policy and procedures regarding services for children who may be affected by lead, with the following possible components (See Figure 3 for a decision chart):

- Request that parents provide results of all blood lead tests and developmental assessments (or authorize the child's health care provider to provide this information), maintain these reports in the child's confidential school record, and consider this information in any future developmental assessment.
- Ensure that each teacher new to a child affected by lead is aware at the beginning of each school year that this lead exposure may affect health, learning, and behaviors and monitors progress of at-risk children lacking a documented BLL.
- Use Child Find processes to identify and refer as early as possible students and their families who are in need of special education under Part C or Part B of IDEA or refer to Section 504 team or planning and placement team (PPT) for determination of a disability and eligibility under Section 504.
- Develop a monitoring plan within a Scientific Research-Based Intervention (SRBI) framework to address the needs of all students ages 3–21 affected by lead, including follow-up developmental assessments annually or at least at the first and fourth grade levels, for any such children who were determined ineligible for any special education services at an earlier age. Use SRBI for students with cognitive and/or behavioral problems but not determined as having a disability under IDEA or Section 504 and monitor for progress.
- Refer students to a Section 504 team or PPT for determination of disability and eligibility under Section 504 or IDEA when indicated.
- Provide comprehensive interventions that match the needs of individual students and families for students who do not respond to the initial evidence-based interventions and follow up developmental assessment especially in executive function, language, and behavior.
- Educate school personnel about the adverse effects of HBLLs on academic performance and behavior.

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- Collaborate with parent centers, parents, and other community partners to educate families and students about the adverse effects of HBLLs on academic performance and behavior.
- Obtain census tract level blood lead data from the childhood lead poisoning prevention programs, use the data to identify populations where the risk for HBLLs is disproportionately high, and prioritize these areas for early childhood education referrals and resources.
- Communicate with the managed care organizations and other providers who serve their students regarding the needs of children affected by lead.

Pediatric Health Care Providers

The medical home and other pediatric health care providers might consider ways to optimize the identification of children affected by lead by testing children at 12 and 24 months of age (or as recommended by their state health department) and by following AAP recommendations for developmental surveillance and referral.

The medical home model shares many of the same goals and purposes with state IDEA programs. Health care providers can proactively provide services and tools to support optimal development that is family centered and collaborates with early intervention services and services provided through the local school system (Adams et al. 2013). The medical home early intervention referral form is available at <http://www.medicalhomeinfo.org>.

Pediatric health care providers and practices might also

- Encourage parents or other caregivers to be involved in monitoring their child's development (www.cdc.gov/actearly).
- Maintain developmental and behavioral surveillance throughout childhood and adolescence, as impacts of lead may manifest remotely from the exposure period.
- Initiate an early intervention referral (i.e., they need not wait for a specific diagnosis).
- Implement a system for referral tracking and obtain family permission at the time of the referral to facilitate communication between the early intervention program or school and the medical home.
- Become knowledgeable about state eligibility criteria and the definition of developmental delay.
- Proactively plan for children to transition from IDEA Part C programs to IDEA Part B programs.
- Submit requests to local school districts for developmental evaluations and services for children ages 3 years and older, as needed, and assist families with obtaining needed services.

Childhood Lead Poisoning Prevention Programs

In many areas, state and local health departments provide services for children with BLLs meeting regulatory or programmatic thresholds. The BLLs that trigger services vary by jurisdiction, as does the location of the program that may be in a health department or an environmental quality department.

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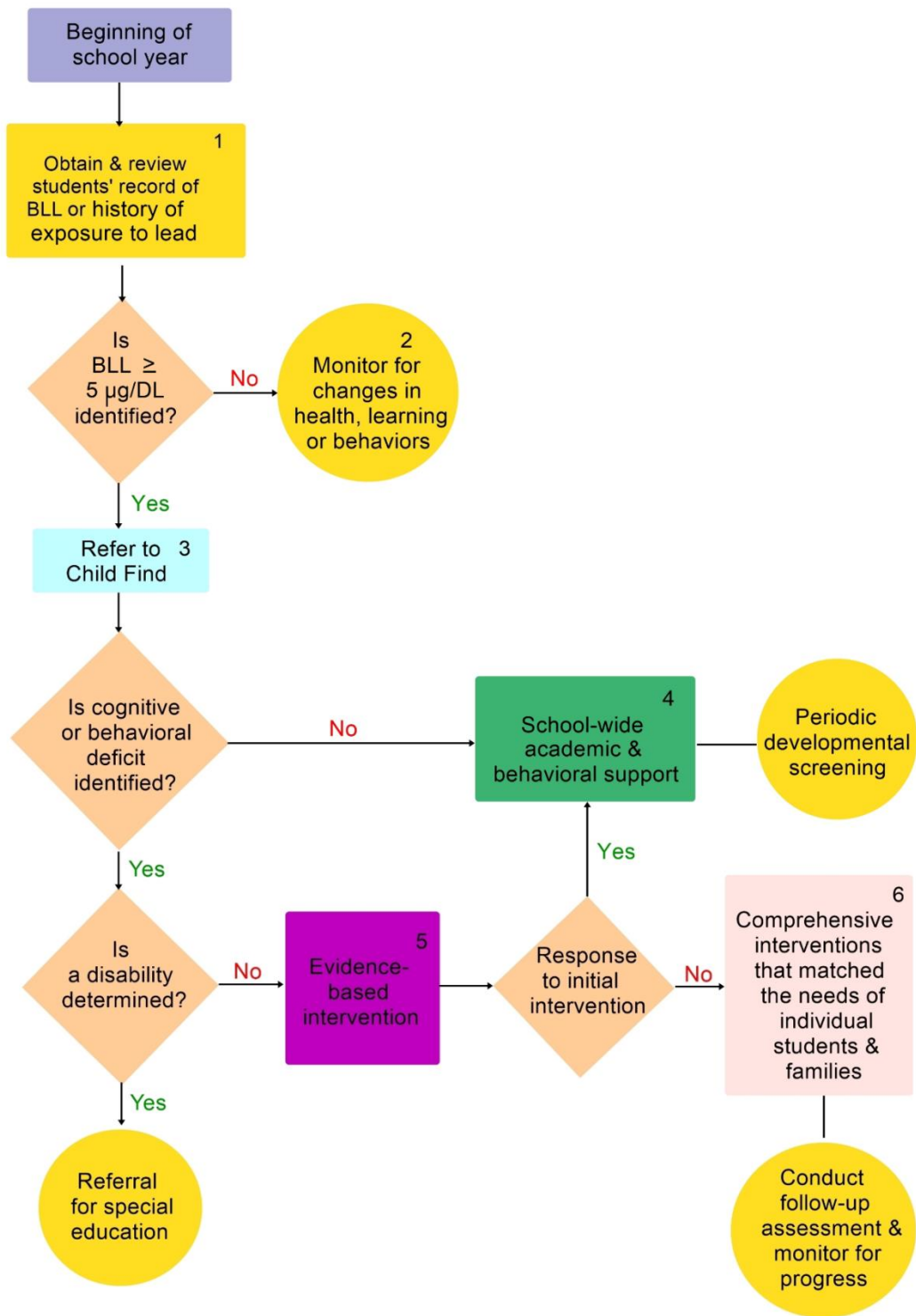
State and local childhood lead poisoning prevention programs (CLPPPs) can educate parents and health care providers. Parents and providers may need to be informed about the importance of age-appropriate blood lead testing and of primary prevention efforts. They may also need to be informed about the need for vigilance in the period after a test result and at critical transition points in educational expectations such as first, fourth, and sixth grades, and about early intervention programs and the merits of accepting a referral to them. Providers might consider performing developmental assessments known to identify the deficits associated with HBLLs and referring families of children with BLL above the reference value to Child Find and early childhood education.

CLPPPs might also

- Develop interagency agreements to provide the names of children with blood lead at or above the CDC reference value, currently 5 µg/dL, to the Child Find system for Part C (AAP 2006) and local education agency including Part B. [The National Early Childhood Assistance Center posts contact information for state coordinators at <http://www.nectac.org/search/mapfinder.asp>.]
- Consider adding referral to Child Find for Part C early intervention services to their case management protocol and track enrollment results.
- Develop a system for making contact with families to ensure that they are referred to early childhood education and in-school programs at the time the child becomes eligible (i.e., third birthday and the year the child reaches school age) even if the child has been discharged from lead case management. For example, CLPPPs can engage with the Title V Children with Special Health Care Needs state program to identify strategies for long-term follow up of lead-exposed children; parent centers and health information centers can play an advocate role with families, especially as the child and parents try to negotiate the school system.
- Enlist the Child Find agency and early intervention service providers in the screening and surveillance effort so that children identified through those systems and their siblings are screened.
- Help the Child Find agency and local education agencies to target outreach and services to children most likely to have BLLs at or above the reference value. Blood lead surveillance data can be used to determine which districts or individual schools or school feeder areas have large populations of children with BLLs \geq the reference value.

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Figure 3: Decision Chart for Children Affected by Lead



Appendix 1: Resources for Obtaining Services and Improving Systems

The Early Childhood Technical Assistance Center

<http://ectacenter.org/partc/partc.asp>.

The Early Childhood Technical Assistance Center coordinates and delivers intensive technical assistance for implementing, sustaining, and scaling up evidence-based practices and serves as a national resource for states and school districts. It is a program of the Child Development Institute of the University of North Carolina at Chapel Hill. This center maintains up-to-date listings of the state agencies that coordinate Part C (e.g., the lead agencies can be found at <http://ectacenter.org/partc/ptclead.asp> and the coordinators' contact information can be found at <http://ectacenter.org/contact/ptccoord.asp>). It also provides materials that can help families and health care and social service providers learn more about the effectiveness of early intervention and early education for young children with disabilities (<http://www.ectacenter.org/topics/effective/effective.asp>).

Parent Centers

<http://www.parentcenterhub.org/>

Parent training and information centers (PTIs) and community parent resource centers (CPRCs) provide training and assistance to the families of the nation's 7 million children with disabilities. There are currently 94 parent centers in the United States funded through the U.S. Department of Education's Office of Special Education Programs under IDEA. Every state has at least one PTI, and those with larger populations may have more. CPRCs provide services to underserved families in smaller geographic areas.

Parent centers serve families of children of all ages (birth to 26) and with all disabilities (physical, cognitive, behavioral, and emotional). The majority of parent center staff members and board members are parents of children with disabilities so they are able to bring personal experience, expertise, and empathy when working with families. Through the provision of one-to-one support and assistance, workshops, publications, and websites, the centers help families to better understand their children's disabilities and educational, developmental, and transitional needs; understand their rights and responsibilities under IDEA; and obtain appropriate services for their children through participation in the individualized education program and individualized family service plan decision making process. Parent centers work collaboratively with other local, state, and national resources that assist children with disabilities to improve outcomes for children with disabilities. They also collect and share data.

National Coalition for Parent Involvement in Education (NCPIE)

<http://www.ncpie.org>

NCPIE's mission is to advocate the involvement of parents and families in their children's education and to foster relationships among home, school, and community to enhance the education of all of the nation's young people. NCPIE seeks to serve as a visible representative for strong parent and family

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involvement initiatives at the national level and conducts activities that involve the coalition's member organizations and their affiliates and constituencies in efforts to increase family involvement.

NCPIE was founded in 1980 at the initiative of what was then the National School Volunteer Program [now the National Association for Partners in Education] with funding from the Ford Foundation and Union Carbide. From the outset, the participating organizations included parent organizations and advocacy groups as well as national education organizations representing teachers and administrators. NCPIE is a member of the IDEA Partnership, which is dedicated to improving outcomes for students and youth with disabilities by joining state agencies and stakeholders through shared work and learning. The IDEA Partnership reflects the collaborative work of more than 50 national organizations, technical assistance providers, and organizations and agencies at the state and local level. Together with OSEP, the partner organizations form a community with the potential to transform and improve outcomes for students and youth with disabilities. For more information IDEA Partnership, go to <http://www.ideapartnership.org>.

Association of Maternal and Child Health Programs (AMCHP)

<http://www.amchp.org>

AMCHP is a national resource, partner, and advocate for state public health leaders and others working to improve the health of women, children, youth, and families, including those with special health care needs. AMCHP also provides a forum for state leaders to improve policy, systems, services, and quality of care for maternal and child health populations.

AMCHP's members come from the highest levels of state government and include directors of maternal and child health programs, directors of programs for children with special health care needs, and other public health leaders who work with and support state maternal and child health programs. AMCHP's members administer critical public health education and screening services and coordinate preventive, primary, and specialty care. The central framework for these services is the Title V Maternal and Child Health Services Block Grant to states. Within a vast array of other services, state Title V programs ensure family-centered, community-based coordinated care for children with special health care needs, including chronic conditions and disabilities (<http://mchb.hrsa.gov/programs/titlevgrants/>).

Family-to-Family Health Information Centers

<http://mchb.hrsa.gov/programs/familytofamily/>

These centers assure that families of children with special health care needs are able to participate in decision-making at all levels and be satisfied with the services they receive. These statewide centers are staffed by families who have children with special health care needs and, therefore, have firsthand experience navigating the maze of health care services and programs. With expertise in federal and state public and private health care systems, staff at each center assist families to make informed choices about health care in order to promote good treatment decisions, cost effectiveness, and improved health outcomes. They also provide information, training, and guidance regarding children's special health care needs; identify successful health delivery models; and model collaborations between

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families and health care providers, managed care organizations, health care purchasers, and appropriate state agencies.

Appendix 2: State Summary of Early Intervention Eligibility, 2013

General Mention of Lead	Mention of Specific Elevated Blood Lead Level	General Mention of Exposure to Toxic Substances	No Reference to Lead Exposure
Delaware: Lead poisoning with elevated blood levels requiring chelation.	Connecticut: $\geq 45 \mu\text{g/dL}$	Arizona	Alabama
Idaho: Illness of a chronic nature with prolonged convalescence (e.g., lead poisoning...).	Georgia: $\geq 20 \mu\text{g/dL}$	Arkansas	Alaska
Louisiana: Elevated blood lead level requiring chelation	Iowa: $\geq 20 \mu\text{g/dL}$	Hawaii	California
Nebraska: Lead poisoning	Kansas: $\geq 45 \mu\text{g/dL}$	Indiana	Colorado
New Hampshire: Lead poisoning	Michigan: $\geq 10 \mu\text{g/dL}$	Maryland	Florida
New Mexico: Central nervous system toxins, e.g., lead poisoning	Minnesota: $\geq 15 \mu\text{g/dL}$	Missouri	Illinois
Wisconsin: Central nervous system toxins, e.g., lead poisoning	Ohio: $\geq 10 \mu\text{g/dL}$	Montana	Kentucky
	Oregon: $\geq 10 \mu\text{g/dL}$	New Jersey	Maine
	Rhode Island: $\geq 15 \mu\text{g/dL}$	New York	Massachusetts
	Tennessee: $\geq 10 \mu\text{g/dL}$	North Dakota	Mississippi
	Vermont: $\geq 20 \mu\text{g/dL}$	Oklahoma	Nevada
	West Virginia: $\geq 15 \mu\text{g/dL}$	Virginia	North Carolina
		Wyoming	Pennsylvania
			South Carolina
			South Dakota
			Texas
			Utah
			Washington

Part C eligibility is determined by each state's definition of developmental delay and includes children with established physical or mental conditions with a high probability of resulting in developmental delay. States may choose to include children at risk for disabilities in the eligible group (<http://ectacenter.org/topics/earlyid/partcelig.asp>).

Federal Regulation:

34 C.F.R. § 303.21 Infant or toddler with a disability.

(a) *Infant or toddler with a disability* means an individual under three years of age who needs early intervention services because the individual—

(2) Has a diagnosed physical or mental condition that—

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- (i) Has a high probability of resulting in developmental delay; and
- (ii) Includes conditions such as chromosomal abnormalities; genetic or congenital disorders; sensory impairments; inborn errors of metabolism; disorders reflecting disturbance of the development of the nervous system; congenital infections; severe attachment disorders; and disorders secondary to exposure to toxic substances, including fetal alcohol syndrome.

Appendix 3: Federal Definitions of Child with a Disability

IDEA Part B - Assistance to States for the Education of Children with Disabilities

34 C.F.R. §300.8 Child with a disability.

(a) *General.*

(1) *Child with a disability* means a child evaluated in accordance with §§300.304 through 300.311 as having mental retardation, a hearing impairment (including deafness), a speech or language impairment, a visual impairment (including blindness), a serious emotional disturbance (referred to in this part as “emotional disturbance”), an orthopedic impairment, autism, traumatic brain injury, another health impairment, a specific learning disability, deaf-blindness, or multiple disabilities, and who, by reason thereof, needs special education and related services.

(2)(i) Subject to paragraph (a)(2)(ii) of this section, if it is determined, through an appropriate evaluation under §§300.304 through 300.311, that a child has one of the disabilities identified in paragraph (a)(1) of this section, but only needs a related service and not special education, the child is not a child with a disability under this part.

(ii) If, consistent with §300.39(a)(2), the related service required by the child is considered special education rather than a related service under State standards, the child would be determined to be a child with a disability under paragraph (a)(1) of this section.

(b) *Children aged three through nine experiencing developmental delays.* *Child with a disability* for children aged three through nine (or any subset of that age range, including ages three through five), may, subject to the conditions described in §300.111(b), include a child—

(1) Who is experiencing developmental delays, as defined by the State and as measured by appropriate diagnostic instruments and procedures, in one or more of the following areas: Physical development, cognitive development, communication development, social or emotional development, or adaptive development; and

(2) Who, by reason thereof, needs special education and related services.

(c) *Definitions of disability terms.* The terms used in this definition of a child with a disability are defined as follows:

(1)

(i) *Autism* means a developmental disability significantly affecting verbal and nonverbal communication and social interaction, generally evident before age three, that adversely affects a child's educational performance. Other characteristics often associated with autism are

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engagement in repetitive activities and stereotyped movements, resistance to environmental change or change in daily routines, and unusual responses to sensory experiences.

(ii) Autism does not apply if a child's educational performance is adversely affected primarily because the child has an emotional disturbance, as defined in paragraph (c)(4) of this section.

(iii) A child who manifests the characteristics of autism after age three could be identified as having autism if the criteria in paragraph (c)(1)(i) of this section are satisfied.

(2) *Deaf-blindness* means concomitant hearing and visual impairments, the combination of which causes such severe communication and other developmental and educational needs that they cannot be accommodated in special education programs solely for children with deafness or children with blindness.

(3) *Deafness* means a hearing impairment that is so severe that the child is impaired in processing linguistic information through hearing, with or without amplification, that adversely affects a child's educational performance.

(4)

(i) *Emotional disturbance* means a condition exhibiting one or more of the following characteristics over a long period of time and to a marked degree that adversely affects a child's educational performance:

(A) An inability to learn that cannot be explained by intellectual, sensory, or health factors.

(B) An inability to build or maintain satisfactory interpersonal relationships with peers and teachers.

(C) Inappropriate types of behavior or feelings under normal circumstances.

(D) A general pervasive mood of unhappiness or depression.

(E) A tendency to develop physical symptoms or fears associated with personal or school problems.

(ii) Emotional disturbance includes schizophrenia. The term does not apply to children who are socially maladjusted, unless it is determined that they have an emotional disturbance under paragraph (c)(4)(i) of this section.

(5) *Hearing impairment* means an impairment in hearing, whether permanent or fluctuating, that adversely affects a child's educational performance but that is not included under the definition of deafness in this section.

(6) *Mental retardation* means significantly subaverage general intellectual functioning, existing concurrently with deficits in adaptive behavior and manifested during the developmental period, that adversely affects a child's educational performance.

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(7) *Multiple disabilities* means concomitant impairments (such as mental retardation-blindness or mental retardation-orthopedic impairment), the combination of which causes such severe educational needs that they cannot be accommodated in special education programs solely for one of the impairments. Multiple disabilities does not include deaf-blindness.

(8) *Orthopedic impairment* means a severe orthopedic impairment that adversely affects a child's educational performance. The term includes impairments caused by a congenital anomaly, impairments caused by disease (e.g., poliomyelitis, bone tuberculosis), and impairments from other causes (e.g., cerebral palsy, amputations, and fractures or burns that cause contractures).

(9) *Other health impairment* means having limited strength, vitality, or alertness, including a heightened alertness to environmental stimuli, that results in limited alertness with respect to the educational environment, that—

- (i) Is due to chronic or acute health problems such as asthma, attention deficit disorder or attention deficit hyperactivity disorder, diabetes, epilepsy, a heart condition, hemophilia, lead poisoning, leukemia, nephritis, rheumatic fever, sickle cell anemia, and Tourette syndrome; and
- (ii) Adversely affects a child's educational performance.

(10) *Specific learning disability*—

(i) *General.* Specific learning disability means a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, that may manifest itself in the imperfect ability to listen, think, speak, read, write, spell, or to do mathematical calculations, including conditions such as perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia.

(ii) *Disorders not included.* Specific learning disability does not include learning problems that are primarily the result of visual, hearing, or motor disabilities, of mental retardation, of emotional disturbance, or of environmental, cultural, or economic disadvantage.

(11) *Speech or language impairment* means a communication disorder, such as stuttering, impaired articulation, a language impairment, or a voice impairment, that adversely affects a child's educational performance.

(12) *Traumatic brain injury* means an acquired injury to the brain caused by an external physical force, resulting in total or partial functional disability or psychosocial impairment, or both, that adversely affects a child's educational performance. Traumatic brain injury applies to open or closed head injuries resulting in impairments in one or more areas, such as cognition; language; memory; attention; reasoning; abstract thinking; judgment; problem-solving; sensory, perceptual, and motor abilities; psychosocial behavior; physical functions; information processing; and speech. Traumatic brain injury does not apply to brain injuries that are congenital or degenerative, or to brain injuries induced by birth trauma.

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(13) *Visual impairment including blindness* means an impairment in vision that, even with correction, adversely affects a child's educational performance. The term includes both partial sight and blindness.

(Authority: 20 U.S.C. 1401(3); 1401(30)) [71 FR 46753, Aug. 14, 2006, as amended at 72 FR 61306, Oct. 30, 2007]

IDEA Part C – Early Intervention Program for Infants And Toddlers with Disabilities

34 C.F.R. §303.21 Infant or toddler with a disability.

(a) *Infant or toddler with a disability* means an individual under three years of age who needs early intervention services because the individual—

(1) Is experiencing a developmental delay, as measured by appropriate diagnostic instruments and procedures, in one or more of the following areas:

- (i) Cognitive development.
- (ii) Physical development, including vision and hearing.
- (iii) Communication development.
- (iv) Social or emotional development.
- (v) Adaptive development; or

(2) Has a diagnosed physical or mental condition that—

- (i) Has a high probability of resulting in developmental delay; and
- (ii) Includes conditions such as chromosomal abnormalities; genetic or congenital disorders; sensory impairments; inborn errors of metabolism; disorders reflecting disturbance of the development of the nervous system; congenital infections; severe attachment disorders; and disorders secondary to exposure to toxic substances, including fetal alcohol syndrome.

(b) *Infant or toddler with a disability* may include, at a State's discretion, an *at-risk infant or toddler* (as defined in §303.5).

(c) *Infant or toddler with a disability* may include, at a State's discretion, a child with a disability who is eligible for services under section 619 of the Act and who previously received services under this part until the child enters, or is eligible under State law to enter, kindergarten or elementary school, as appropriate, provided that any programs under this part must include—

- (1) An educational component that promotes school readiness and incorporates pre-literacy, language, and numeracy skills for children ages three and older who receive part C services pursuant to §303.211; and

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(2) A written notification to parents of a child with a disability who is eligible for services under section 619 of the Act and who previously received services under this part of their rights and responsibilities in determining whether their child will continue to receive services under this part or participate in preschool programs under section 619 of the Act.

(Authority: 20 U.S.C. 1401(16), 1432(5))

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TERRIEN REPORT

Exhibit G



Education Guidelines for the
PREVENTION AND MANAGEMENT
OF LEAD POISONING
in Children



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Preface

A Call to Action!

Childhood lead poisoning remains a critical environmental health concern in Connecticut. Childhood lead exposure has been linked to a number of adverse cognitive outcomes, including reduced performance on standardized intelligence quotient tests, decreased performance on cognitive functioning tests, adverse neuropsychological outcomes, neurobehavioral deficits, decreased end-of-grade test scores and classroom attention deficit behaviors.

In response to these health concerns, the Connecticut State Department of Education (CSDE) and the State Department of Public Health (DPH) engaged researchers at Duke University's Children's Environmental Health Initiative to conduct an analysis of the effects of early childhood lead exposure on test performance among Connecticut schoolchildren.

Results from this study include the following:

- early childhood lead exposure negatively affected Connecticut Mastery Test scores in both reading and mathematics;
- disparate exposures by race suggest that exposure to lead may account for part of the achievement gap among Connecticut schoolchildren; and
- negative associations were statistically significant at blood lead levels well below the current Centers for Disease Control and Prevention's blood lead action level of 10µg/dl.

The importance of these results prompted the CSDE's development of the *Education Guidelines for the Prevention and Management of Lead Poisoning in Children* to inform the practice within school districts in:

- lead prevention;
- early identification of students exposed and affected by lead; and
- educational programming in response to lead exposure in order to mitigate existing or potential deficits.

The *Education Guidelines for the Prevention and Management of Lead Poisoning in Children* is available on the CSDE's Health Promotion Services/School Nurse Web site at <http://www.sde.ct.gov/sde/cwp/view.asp?a=2678&q=320768>. For more information, contact:

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Introduction

Why is learning about lead exposure in children important?

Lead is a poisonous metal found in small amounts in the earth's crust. It is ever-present in the human environment today because of industrialization.¹ Lead provides no known physical benefit for human beings, and its toxic effects, which are extensive, are especially dangerous for children. Children are more vulnerable than adults are to these toxic effects because:

- a greater proportion of ingested lead is absorbed from the gastrointestinal tract of children than of adults;
- a greater proportion of lead circulating in the body gains access to the brains of children, especially those 5 years of age or younger, than of adults; and
- the developing nervous system is far more vulnerable to lead's toxic effects than the mature brain.²

Lead poisoning, for the most part, is silent: most poisoned children have no symptoms and the vast majority of cases go undiagnosed and untreated. Although lead poisoning is disproportionately a problem of inner city and minority children, no socioeconomic group, geographic area, or racial or ethnic population is spared.³ While lead poisoning can affect every system in the body, it is especially dangerous to the developing brains and nervous systems of unborn children and children under 6 years old.

Lead poisoning in children presents a critical challenge for educators because even at very low levels of exposure evidence shows that:

- it can cause serious, permanent damage to a child's developing brain;
- its neurotoxic effects can interfere with a child's ability to think, learn, pay attention, and behave appropriately;
- it is directly associated with lower IQ scores and lower scores on standardized performance tests; and
- research shows that it is a contributing factor to the achievement gap among Connecticut children.



It is also important for educators to address because:

- lead poisoning is entirely preventable;
- its neurotoxic and behavioral effects may be ameliorated by early enrichment; and
- educators have abundant opportunity, in collaboration with others, to contribute to the prevention and effective management of lead poisoning in children.

History of lead poisoning — an overview

The toxic effects of lead exposure in children were observed and reported in the medical literature as early as the late 1800s. Initially, the most severe cases were recognized by major symptoms such as seizures and other neurological abnormalities, mental retardation, coma, and death. As physicians in the 1920s and 1930s were better prepared to recognize the symptoms of lead poisoning, including milder symptoms such as vomiting, colic, abdominal pain and irritability, the majority of cases still went undiagnosed because symptoms were easily confused with those related to other conditions, such as meningitis, brain tumors, and gastrointestinal conditions. Nevertheless, before 1940, both the medical community and the lead industry recognized that lead posed a major public health problem, especially for children.

Early in the 1900s, paint containing lead was recognized internationally as a major source of lead poisoning in young children, and by the end of the 1920s, several countries had banned the use of lead paint indoors and on certain products such as cribs and toys. By the 1940s, the lead industry in the United States had begun to decrease the amount of lead used in interior paints, but it was not until 1978 that lead-based paint was actually banned from use and subsequently phased out. Most homes built before 1978, like so many in Connecticut, were painted both inside and out with lead paint. In 1998, of the 16.4 million US homes with one or more children younger than 6 years, 25 percent still had significant amounts of lead-contaminated deteriorated paint, dust, or adjacent bare soil.⁴



It takes very little exposure to cause high blood lead levels.

Dust and soil become a final resting place for airborne lead from gasoline and dust from old paint and industrial sites. Lead in dust and soil can re-contaminate cleaned houses and contribute to elevating blood lead concentrations in children who play on bare, contaminated soil.⁵ When old paint deteriorates,

or during remodeling, paint dust becomes prevalent in the environment. Exposed pregnant women can inhale the dust, increasing lead in their blood and in the blood of the fetus. Exposed young children can breathe in paint dust and ingest it by putting their dust-covered hands and toys to their mouths. They may also be exposed to lead by playing with paint chips or contaminated soil, or chewing on painted toys, cribs, or windowsills. It takes very little exposure to cause high blood lead levels.

While dust from old paint is not the only source of potential lead exposure for children, today it is the main source of high-dose exposure.⁶ Contaminated soil and water from lead pipes also continue to be sources of lead exposure. Leaded gasoline was considered the greatest source of environmental lead contamination in the United States from the 1950s through the 1980s; it was phased out for use in cars starting in 1973 and completely banned for use in on-road vehicles in 1996. This phase-out resulted in an estimated 78 percent drop in average blood lead levels in this country between 1976 and 1991. Leaded gas can still be sold for off-road uses, such as farm equipment, racing cars, and aircraft. Furthermore, individual children may still be exposed to airborne lead in fumes or breathable dust resulting from sanding or heating old paint, burning or melting automobile batteries, or melting lead for use in a hobby or craft.⁷

Scientific Evidence

The Centers for Disease Control and Prevention (CDC) defines lead poisoning according to the amount of lead found in a person's blood; it is measured in micrograms (mcg) per deciliter (dL). Over time, the CDC has identified a "blood lead level of concern" based on available scientific evidence. This level of concern, which designates the standard for diagnosis and intervention by public health officials and physicians, has significantly changed over time. In 1960, the CDC minimum level of concern was 60 mcg/dL; in 1985, it was 25 mcg/dL, and in 1991, it was decreased to 10 mcg/dL. In June 2012, the CDC eliminated the term "blood lead level of concern" and adopted the term "reference value." The "reference value" is based on the population of children ages 1–5 years in the United States whose blood lead levels are in the highest 2.5 percent of children tested. Today, that level is 5 mcg/dL. However, current scientific evidence has established that there is no safe level of lead in a child's body.⁸



Any lead is too much lead!⁹

Scientific research findings provide evidence that blood lead levels (BLLs) in children between 1 mcg/dL and 5 mcg/dL and 5 mcg/dL and 9 mcg/dL cause a more precipitous drop in IQ than BLLs in ranges above 10 mcg/dL.^{10, 11} Of greater concern, research demonstrates that even when the drop in IQ is small (two to three points),

there can be significant neuropsychological deficits in one or more domains of brain function.^{12, 13, 14} Research in children further suggests that the adverse health effects of BLLs less than 10 mcg/dL extend beyond cognitive function to include cardiovascular, immunological, and endocrine effects. The evidence is based on studies with large numbers and diverse groups of children with low BLLs and associated IQ and neuropsychological deficits. Effects at BLLs under 10 mcg/dL are also reported for behavioral domains, particularly attention-related behaviors and academic achievement, and do not appear to be confined



Effective interventions to improve cognitive functioning in children with lead poisoning must be multifaceted.

to lower socioeconomic status populations.^{15, 16, 17}

Research confirms that elevated lead concentrations in the blood are more common among children living in poverty and provides some evidence that socioeconomic status and parenting influence associations between lead and child outcomes.^{18, 19} Micronutrients that have been shown to influence the effects of lead include iron and zinc, indicating a relationship between lead poisoning and nutritional status. Also of importance, research findings indicate that effective interventions to improve child cognitive functioning must be multifaceted, including identification and reductions of toxins in the environment; monitoring and addition of appropriate nutrients in children's diets; parental education to increase involvement and other parenting skills such as limit setting and effective requests for child compliance,²⁰ and early enrichment.

Despite strong evidence of the harmful effects of lead poisoning in children demonstrated through population-based research, individual case studies also confirm that there can be considerable variability in functional outcomes among children with lead poisoning. One child with exposure to lead resulting in BLLs between 5 mcg/dL and 9.9 mcg/dL may sustain brain damage resulting in significant neurocognitive and behavioral deficits, while another child with an exposure level resulting in BLLs far exceeding 10 mcg/dL may not show any functional deficits in cognition or behavior.^{21, 22} The reasons for this variability in functional outcomes are not fully understood, and are likely to be multifactorial. Furthermore, study outcomes vary on the relative importance of duration of exposure, peak BLL, and age of exposure.

Several studies indicate that concurrent (current BLL of school age child) or lifetime average blood lead concentrations are better predictors of children's IQ scores than measures taken in early childhood.²³ In any event, a blood lead level alone is not a reliable biomarker of total lead exposure, except for short-term exposure, since the half-life of lead in the blood is 36 days. From the blood stream, lead is deposited in the brain, other soft tissues of the body, bones, and teeth, where it may remain for years; some of it is eliminated through the kidneys and gastrointestinal tract. Blood lead levels do not measure lead deposits in the brain or other tissues of the body. Additionally, lead stored in the bones and other tissues can leach back into the blood stream and recirculate through the body under certain circumstances, for example, during pregnancy.

The next section discusses research specific to the effects of lead exposure on Connecticut children.

Lead Exposure: A Contributor to the Achievement Gap in Connecticut

In response to the health concerns cited by experts in Connecticut and nationally, the Connecticut State Department of Education (CSDE) in collaboration with the State Departments of Public Health (DPH) and Social Services engaged researchers at Duke Uni-



One child with exposure to lead resulting in BLLs between 5 mcg/dL and 9.9 mcg/dL may sustain brain damage resulting in significant neurocognitive and behavioral deficits, while another child with an exposure level resulting in BLLs far exceeding 10 mcg/dL may not show any functional deficits in cognition or behavior.

versity's Children's Environmental Health Initiative (CHEI) to conduct an analysis of the effects of early childhood lead exposure on test performance among Connecticut school children. Early in 2011, the first phase of the study results were released in a report titled, *The Impact of Early Childhood Lead Exposure on Educational Test Performance among Connecticut Schoolchildren, Phase I Report* (also referred to as "The Miranda Study"). Phase II of the Miranda Study was released in 2013 (<http://www.sde.ct.gov/sde/lib/sde/pdf/deps/student/health/linking.lead.and.education.data.phaseii.pdf>). Based on scientific analysis of the Connecticut data, Dr. Marie Lynn Miranda and other researchers at CHEI found the following:

- early childhood lead exposure negatively affected Connecticut Mastery Test scores in reading and mathematics;
- disparate exposures by race suggest that exposure to lead may account for part of the achievement gap among Connecticut schoolchildren;²⁴ and
- negative associations were statistically significant at blood lead levels below the current Centers for Disease Control and Prevention's blood lead action level of 5 mcg/dL.²⁵

These results emphasize the ongoing, critical necessity of protecting children from lead exposure, and underscore important implications for Connecticut's students and educators. Indeed, the study's outcomes provided the motivating force for the development of these guidelines and collaborative statewide efforts to inform practice within school districts regarding:

- lead poisoning prevention;
- effects of lead exposure on early childhood development;
- early identification of students with a history of exposure to lead;
- educational programming in response to lead exposure in order to mitigate or eliminate existing and potential deficits; and
- educational resources available for educators.

Prevalence of Childhood Lead Poisoning in the U.S. and Connecticut

Approximately 250,000 children in the United States today are identified with blood levels equal to or greater than 10 mcg/dL.²⁶ Approximately 450,000 U.S. children have BLLs at or above 5 mcg/dL, almost double the total number with BBLs at or above 10 mcg/dL.

In Connecticut, state and local officials follow the current CDC standard for public health and medical interventions (see appendixes E and F). Based on the 2011 Connecticut screening data, 84,008 children, age birth to 6 years, were screened in 2011.²⁷ Of the 84,008 children tested, 4,365 (6.5%) had blood lead levels (BLLs) between 5 mcg/dL and 9.9 mcg/dL, 355 (0.8%) had BLLs between 10 mcg/dL and 14.9 mcg/dL, 153 (0.3%) had BLLs between 15 mcg/dL and 19.9 mcg/dL, and 111 (0.1%) had BLLs greater than or equal to 20 mcg/dL.



In Connecticut, public health officials follow the current CDC standard of BLL equal to or greater than 5 mcg/dL to activate public health and medical interventions for children with lead poisoning.

Primary Prevention Goals and Persistence of Lead Poisoning

In 1991, the U.S. Department of Health and Human Services made eradication of lead poisoning in children a public health goal for the nation.^{28,29} Also in 1990–91, the U.S. Department of Housing and Urban Development and the Environmental Protection Agency released plans dealing with the elimination of lead hazards. Eradication of lead poisoning in children was also included in *Healthy People 2010: Objectives for Improving Health*, as a priority health goal for the nation to achieve within the 2000–2010 decade.³⁰ Eradication of lead paint and dust in housing and soil was deemed the best method of primary prevention because it eliminates the source of the problem before exposure occurs. Early screening of young children and rapid intervention to prevent lead poisoning as defined by the CDC was recognized as the next best step in prevention efforts.



Despite the significant reduction in average BLLs in recent decades, exposure in unborn and young children persists, as do racial and income disparities.

Although progress has been made with state and federal funding targeted both to educational programs about lead poisoning, housing improvement and abatement projects, and early childhood screening and intervention programs, many children in Connecticut and across the country continue to live and play in homes where they are exposed to lead. In the objectives for environmental health in *Healthy People 2020*, the U.S. Department of Health and Human Services states:

*The number of children with elevated blood lead levels in the U.S. is steadily decreasing. As a result, determining stable national prevalence estimates and changes in estimated prevalence over time...is increasingly difficult. **Eliminating elevated blood lead levels in children remains a goal of utmost importance to public health.** The sample sizes available...preclude the ability to have a viable target for HP2020...Efforts must and will continue to reduce blood lead levels and to monitor the prevalence of children with elevated blood lead levels.*³¹

Thus, reducing lead poisoning remains a high public health priority at the federal, state, and local levels for the 2011–2020 decade. While a priority objective, it is unclear what level of funding will be available to support ongoing primary prevention programs over this decade.

Despite the significant reduction in average BLLs in recent decades, exposure in unborn and young children persists, as do racial and income disparities.^{32,33} According to the ACCLPP report, racial and income differences can be traced to differences in housing quality, environmental conditions, nutrition, and other factors.³⁴ Others point out that those who are poor and disadvantaged are more likely to:

- live in lead-contaminated environments, especially in dilapidated housing with flagrant lead paint hazards;
- live in urban neighborhoods where years of traffic have left tons of lead deposits from leaded gasoline; and
- live near point sources of lead, such as smelters, or hazardous waste sites.³⁵

Public Health Standard for Intervention

"In January 2012, the Advisory Committee on Childhood Lead Poisoning Prevention (ACCLPP) recommended that the CDC change its 'blood lead level of concern,' which has been 10 micrograms of lead per deciliter. Over the last several years, a growing body of scientific evidence has suggested adverse effects in children with BLLs below 10 micrograms of lead per deciliter of blood. On May 16, 2012, the ACCLPP officially announced their agreement with that recommendation and the change in the CDC policy.

The ACCLPP recommends that CDC eliminate the term 'level of concern.' Instead, the committee recommends linking elevated blood lead levels to data from the National Center for Environmental Health (NCEH) National Exposure Report to identify children living or staying for long periods in environments that expose them to lead hazards. This new level, called a 'reference value,' is based on the population of children aged 1-5 years in the United States whose blood lead levels are in the highest 2.5 percent of children tested. Today, that level is 5 micrograms of lead per deciliter of blood.

For more than 20 years, NCEH's work to eliminate lead poisoning in children has been one of CDC's most visibly successful initiatives. It has contributed significantly to lowering blood lead levels, increasing the number of children tested for elevated blood lead levels, and promoting state and local lead screening plans and abatement laws."³⁶

2

Educational Implications

BASED ON CURRENT RESEARCH FINDINGS RELATED TO THE EFFECTS OF LEAD POISONING ON THE LEARNING AND behavior of individual children, schools have a responsibility to contribute to primary prevention and early intervention efforts to eliminate the occurrence of lead poisoning and address its effects on children. It is critical that communities work together to:

- prevent lead exposure in children through elimination of lead paint in old homes, improvement of dilapidated housing, enhancing the nutrition status of at-risk children and parent education (primary prevention); and
- intervene rapidly when exposure has occurred to counteract potential toxic effects on neurocognitive development, learning, and behavior (early intervention).



The purpose of these guidelines is to clarify the role of schools in meeting the needs of children and families affected by lead.

While much work to prevent and to intervene early with lead poisoning in children has already been achieved through public health, housing, and medical officials, the role of schools in identifying and providing appropriate educational services to children who may have been exposed to lead has been less clear. The purpose of these guidelines is to clarify that role and assist educators in meeting the needs of children and families affected by lead.

What can schools do?

There are important steps that school districts can take to contribute to both primary prevention and early intervention efforts on behalf of children in their communities. Those steps are listed below. Specific details and issues related to each of these steps are then provided in individual sections that follow. In addition, two flowcharts are provided to visually demonstrate the process for steps 4 and 7 through 10; one is for preschoolers and the second is for students in kindergarten through Grade 12.

1. Develop school district policy and procedures regarding children who may be affected by lead.
2. Educate school personnel.
3. Collaborate with parents and community partners to educate families and students.
4. Immediately refer any child known to have exposure to lead to their medical provider and if appropriate, referral for housing assistance. Students with symptoms consistent with lead toxicity should be referred for urgent medical evaluation.
5. Use Child Find processes to locate, identify and refer as early as possible children with disabilities and their families who are in need of Birth-to-Three (Part C) or Preschool Special Education (Part B) services of the Individuals with Disabilities Education Improvement Act (IDEA).
6. Monitor children and young people birth to 21 who are at high risk for lead poisoning but do not have evidence of a BLL equal to or greater than 5 mcg/dL.
7. Obtain a lead history for all students ages 3–21 identified as having a BLL equal to or greater than 5 mcg/dL.
8. Develop a monitoring plan within a Scientific Research-Based Intervention (SRBI) framework, addressing the needs of all students ages 3–21, as appropriate, with a history of BLLs equal to or greater than 5 mcg/dL.
9. Refer preschoolers and young school-age children with a history of BLLs equal to or greater than 5 mcg/dL for enrichment opportunities as indicated.
10. Refer students, when indicated, to a Section 504 team or PPT for determination of a disability and eligibility under Section 504 of the Rehabilitation Act or the IDEA.



Step 1: Develop school district policy and procedures

A policy addressing students affected by lead poisoning should briefly state a school district's commitment to collaboration with parents and community partners to identify and intervene early with children who have been exposed to lead. Alternatively, if the district already has a policy on educating students with special health care needs, lead poisoning can be one of the health conditions that is addressed within the broader policy.

School district policy and procedures regarding students who may be affected by lead should include:

- a. staff education;

- b. collaboration with community partners;
- c. parent education strategies;
- d. child find identification of children suspected of having a disability;
- e. referral of identified students to the appropriate school team for monitoring;
- f. referral of identified students for enrichment opportunities, lead screening, medical care, public health interventions and housing assistance; and
- g. when indicated, referral for an evaluation to determine eligibility for special education or accommodations/modifications under Section 504.

Generally school districts already have procedures in place for Child Find, general education accommodations (e.g., individualized health care plans), SRBI, Section 504, and special education. Districts should review those procedures and ensure that they properly address the prevention, early intervention, or other needs of students with a positive history of lead exposure at BLLs equal to or greater than 5 mcg/dL. A district can use the steps outlined in these guidelines to develop new procedures specific for these students or revise existing ones to include the recommended actions.

Step 2: Educate school personnel

All members of a school team need to understand that:

- a. Lead poisoning, even at low levels of exposure (under 10 mcg/dL), may cause serious, permanent damage to an individual child's developing brain and interfere with a child's ability to:
 - i. think
 - ii. learn
 - iii. pay attention
 - iv. behave appropriately
- b. Lead poisoning can be found in any child regardless of race, socioeconomic status or location of home.
- c. Lead poisoning disproportionately affects urban and minority populations.
- d. A history of lead exposure, even with BLLs levels at higher levels, does not, in an individual child, automatically indicate adverse effects.
- e. Interventions to improve child outcomes should be multifaceted.
- f. Prevention and early intervention strategies, such as enrichment, good nutrition, and effective parenting skills, can improve learning and behavior outcomes.
- g. Educational interventions must be provided equitably within the context of applicable laws and regulations.

Many health and education providers today are not knowledgeable about the continuing existence of lead poisoning among children in Connecticut or the current research that provides evidence of neurotoxic effects of lead on the developing brain, even at low levels of exposure previously considered safe. It is important for staff to learn about the current research, understand the potential for permanent harm in affected children, and recognize their responsibilities in the prevention, identification of children exposed to lead, and early interventions to counteract the harmful effects of lead poisoning.

Staff members also need guidance in understanding both the obligations and the limitations for addressing the needs of children with lead poisoning that federal law and regulation impose on school districts, particularly those related to discrimination and the education of children with disabilities. These guidelines are intended to help educators pursue best practice standards for educational interventions given those obligations and restrictions.

It may be helpful for school districts to identify a core group of professional staff (i.e., school nurses, school psychologists, school social workers and school counselors) to be responsible for providing consistent professional development programs within the district.

This core group must first gain knowledge about lead poisoning and a more in-depth understanding of the research and its implications for education than other staff may require. They can review the resources for educators discussed in [section 3](#), use the PowerPoint provided in the Lead Action for Medicaid Primary Prevention (LAMPP) program, discussed in that section, and access some of the professional literature regarding the effects of lead poisoning on children.

Step 3: Collaborate with parents and community partners to educate families and students

Schools should collaborate with parents and community partners to educate families and students about:

- a. lead poisoning;
- b. lead exposure prevention strategies;
- c. sources of lead exposure;
- d. lead screening;
- e. the importance of enrichment and effective parenting; and
- f. resources for education and intervention.



Primary prevention of lead poisoning and early intervention with those affected by lead's presence in the environment require a broad community approach.

Primary prevention of lead poisoning and early intervention with those affected by lead's presence in the environment require a broad community approach. Schools can contribute to primary prevention programs already established by local health departments and housing and medical providers funded to provide such programs in several ways. They can:

- a. incorporate lead poisoning prevention information into health and science curricula for students;
- b. collaborate with public health officials and pediatric medical providers in delivering educational programs for parents on lead poisoning prevention and effective parenting skills, and distributing educational information to families in the community;
- c. alert staff, parents and community partners of known or potential lead hazards affecting the community or a segment of the community; and
- d. identify children at high risk for lead poisoning and intervene through collaborations with public health officials before exposure occurs.

Schools can — and are obligated to — contribute to early intervention efforts through Child Find activities, which are discussed in the next subsection. Schools should also establish working relationships

with providers of preschool enrichment opportunities, such as Head Start and School Readiness programs, to facilitate referral and placement.

Step 4: Immediately refer any children known to have exposure to lead to their medical provider and, if appropriate, refer for housing assistance. Students with symptoms consistent with lead toxicity should be referred for urgent medical evaluation.

School personnel are often in a good position to identify children who may have been exposed to lead. When this information comes to their attention, school personnel should make a referral to the child's medical provider and refer the family for housing assistance, if indicated. It is important to make these referrals as early as possible since lead poisoning often occurs with no obvious symptoms and, therefore, goes unrecognized.³⁷



Schools should establish working relationships with providers of preschool enrichment opportunities, such as Head Start and School Readiness programs, to facilitate referral and placement.

Signs and symptoms, if any, usually do not appear until dangerous amounts of lead have accumulated in the child's brain and body. Severe symptoms of acute lead poisoning are rare, and are usually seen at levels of 70 mcg/dL and above. They require emergency intervention and include:

- a. seizures;
- b. unconsciousness;
- c. paralysis; and
- d. swelling in the brain.

Children may show symptoms after extended periods of blood lead levels at lower levels. The following symptoms, while not specific to lead poisoning, may be indicative of lead poisoning, and should be considered by school nurses and other educators in assessing students who demonstrate:

- a. irritability;
- b. loss of appetite;
- c. weight loss;
- d. fatigue;
- e. sluggishness, lethargy;
- f. abdominal pain;
- g. vomiting;
- h. constipation;
- i. learning difficulties; and
- j. behavior problems, including hyperactivity and aggression.



State law requires that health care providers consider blood lead testing for any child regardless of age with the following: unexplained seizures, neurologic symptoms, hyperactivity, behavior disorders, growth failure, abdominal pain, or other symptoms consistent with lead poisoning or associated with lead exposure; recent history of ingesting, or an atypical behavior pattern of inserting, any foreign object (even if the foreign object is unleaded) into a body orifice.

Students with symptoms should be referred for medical evaluation and, if not already provided, a BLL screening.

Step 5: Use Child Find processes to locate, identify and refer as early as possible children with disabilities and their families who are in need of Early Intervention Program (Part C) or Preschool Special Education (Part B) services of the Individuals with Disabilities Education Improvement Act (IDEA).

Schools must actively use Child Find processes and collaborate with parents and community partners to identify, locate, and evaluate children from birth through age 21 who are suspected of having a disability or who have a known disability. This includes children who have a history of exposure to lead or a BLL equal to or greater than 5 mcg/dL. While not mandated by Child Find under IDEA or Section 504, school districts can also help identify children in the community at high risk for lead exposure and refer them for housing and public health assistance.

School districts are required under Section 504 of the Rehabilitation Act of 1973, the Americans with Disabilities Amendments Act of 2008 and the IDEA of 2004 to actively identify children who may have a disability, as defined in the laws, and who may require accommodations in the classroom or special education. Because children who have BLLs equal to or greater than 5 mcg/dL may have sustained permanent brain damage, they should be identified through Child Find activities in collaboration with community providers such as Birth to Three, local hospitals, pediatric providers, public housing authorities, child care providers, school readiness programs, and nursery schools.

Among children from birth to attendance in kindergarten, Child Find activities may include:

- a. identifying all infants, toddlers, and preschoolers with elevated BLLs equal to or greater than 5 mcg/dL;
- b. monitoring those identified for early identification of neuropsychological and behavioral deficits or developmental delays that may develop, indicating the need for further assessment; and
- c. referring families of those identified for assistance with parent education, housing, medical care, social services, and child enrichment opportunities, such as Head Start and School Readiness programs.



Child Find

The Child Find process is used to identify, locate, and evaluate children from birth through age 21 who are suspected of having a disability or who have a known disability.

To attend early childhood programs in Connecticut, attendees must provide the program with the state mandated Early Childhood Health Assessment (“yellow” form) completed by their health care provider. This form asks for information on the child’s BLL screening results at one and two years and the health care provider must check “yes” or “no” to indicate if the child had a BLL equal to or greater than 5 mcg/dL. Community preschool providers, including public schools, should review those forms and identify children who should receive monitoring and referral services as identified above. That applies to all those meeting the current CDC standard of equal to or greater than 5 mcg/dL.

Infants and toddlers from birth to 3 years are automatically eligible for IDEA Part C early intervention

supports when a BLL greater than 45 mcg/dL has been confirmed. Infants and toddlers with lower BLLs are eligible when two standard deviations (SD) below the mean is found in one developmental domain or a 1.5 SD below the mean is found in two or more developmental areas, whether or not the delay is due to lead exposure. It is critical to collaborate with Birth to Three providers to ensure a smooth transition to school services and to request any information they may have regarding a child's BLL history, which may be shared with parent consent. This information can help Child Find teams to identify children with a history of lead exposure for monitoring and referral purposes as described above.

Early identification as well as Child Find efforts to identify students in kindergarten through Grade 12 also require collaborative parent and community partnerships since it may be parents, pediatric providers, hospitals, public health officials and housing authorities who can alert schools to a family that is newly exposed to lead (e.g., through building reconstruction or industry) or a school-age child who is newly diagnosed with lead poisoning. Educational programs for parents and periodic communications with community partners are useful strategies.

School nurses have a special role to play in the early identification and Child Find processes for students entering public schools, regardless of age. At entry into school, every child is required to have a health assessment documented on either the Early Childhood Health Assessment Record ("yellow") form or the Health Assessment Record (HAR-3) ("blue") form. The HAR-3 has been revised to ask health care providers to document whether a student has a *history* of BLL equal to or greater than 5 mcg/dL, rather than the student's current BLL (see [appendix A](#)). Since school nurses should always review these forms for health information relevant to school attendance and learning, this is not an added burden for school districts and nurses. See the next subsection on obtaining a lead history for children with a BLL equal to or greater than 5 mcg/dL.

All school personnel must understand their responsibilities under the Child Find requirements. Any staff member who has a reason to suspect that a child may have been exposed to lead or has had elevated BLLs equal to or greater than 5 mcg/dL, should notify the appropriate school team, which includes any of the following:

- Child Find
- Preschool
- General education team
- SRBI
- IHCP (individualized health care plan) team
- Building pupil services team
- Section 504 team
- Planning and Placement Team (PPT)



School nurses have a special role to play in the early identification of children exposed to lead and in the Child Find process for students entering public schools, regardless of age.

The team may now ask the school nurse to gather more specific lead and other health history informa-

tion before meeting to decide the next appropriate action.

Step 6: Refer and monitor children and young people birth to 21 who are at high risk for lead poisoning but do not have evidence of a BLL equal to or greater than 5 mcg/dL

For children at high risk for lead poisoning due to their environment, but without evidence of a blood level at or above 5 mcg/dL, it is important to:

- a. Ensure that they have been screened appropriately for blood lead. If not, referral for screening and medical monitoring is critical.
- b. Refer, as appropriate, to social services, public health officials and medical providers for information regarding and assistance with prevention, housing, parenting, and financial, nutritional, and health care needs.
- c. Monitor for screening results and changes in health status or living arrangements.
- d. Re-refer as needed.

At-risk infants and toddlers (under age 3) are followed by their medical providers and may also be followed by local public health and social service officials.

Step 7: Obtain a lead history for all students ages 3-21 identified as having a BLL equal to or greater than 5 mcg/dL

For all students ages 3–21 attending school and identified as having a BLL equal to or greater than 5 mcg/dL, the school nurse at a minimum should:

- a. obtain a focused BLL history from the child's pediatrician or health care provider (see [appendix B](#) for a sample Blood Lead History form); and
- b. refer the child to the appropriate school team after obtaining the child's complete lead history.



While it is neither required nor appropriate to evaluate every child who has been exposed to lead, it is reasonable and important to monitor them for early signs of a disability.

A history of a child's blood lead levels over time is a much better indicator of overall exposure to lead than a single blood lead level (see [Scientific Evidence](#) in the Introduction). Even though the child may not show a functional deficit at an early age, research supports that educators should have a very high level of suspicion of brain damage from lead poisoning, including BLLs below 10 mcg/dL. Only individual assessment provides evidence of such effects and their specific nature in any given child. Deficits may persist³⁸ and not be evident until the child is older³⁹ and learning tasks are more challenging. While it is neither required nor appropriate to evaluate every child who has been exposed to lead, it is reasonable and important to monitor them for early signs of a disability.

In the case of a child with a complex health or education history, it may be appropriate to request

permission from the parent to complete a comprehensive health history and summary for the school team before referral is made to determine a child's eligibility for special education or accommodations/modifications under Section 504. A comprehensive health history includes the lead history. The school nurse, in consultation with the school nurse supervisor, school district medical advisor and other team members as appropriate, should make this decision.

For students in prekindergarten through Grade 12 attending public schools or private, nonprofit schools receiving health services through the public schools, the school nurse may obtain the information in any of the following ways:

- a. the health care provider checks "yes" to the question of "history of elevated BLL" on the HAR-3 ("blue") form;
- b. the health care provider indicates a BLL at or above 5 mcg/dL on the Early Childhood Health Assessment Record ("yellow") form; or
- c. a parent or community partner reports that a child has a BLL equal to or greater than 5 mcg/dL.

Parental permission signed on the HAR-3 and Early Childhood Health Assessment Record form permits the school nurse to follow up with the child's health care provider regarding details of the child's history of elevated BLLs. Nevertheless, best practice is to inform the parent in advance of the nurse's concern, plan to communicate with the physician, and anticipated next steps.

In the case of a preschooler attending a program not receiving health services through the public schools (e.g., a community nursery school), parental permission signed on the Early Childhood Health Assessment Record form permits the program's health/nurse consultant/coordinator to contact the health care provider for the lead history.



See pages 21 and 22 for flowcharts that demonstrate the process schools should follow for steps 7 through 10; one is for preschoolers and the second is for students in kindergarten through Grade 12.

As above, best practice is to inform the parent, in advance, of the consultant or coordinator's concern, plan to communicate with the physician, and anticipated next steps. Next steps in this situation should include, with parental permission, sharing the information with the family's local school district Child Find coordinator. The school district's Child Find coordinator, preschool nurse, or other staff member should be designated to follow up on the history obtained and the need for a monitoring or other action plan.

Step 8: Develop a monitoring plan within a Scientific Research-Based Intervention (SRBI) framework, addressing the needs of all students ages 3–21, as appropriate, with a history of BLLs equal to or greater than 5 mcg/dL.

Students with a history of BLLs equal to or greater than 5 mcg/dL should be monitored as discussed above. The plan can be very simple, for example,

The general education team will meet to review the child's progress on an annual basis, or more frequently (e.g., at progress monitoring intervals within the SRBI framework) should changes in health status, learning, or behavior occur.

These monitoring plans can be IHCPs, SRBI plans, student success plans, or if eligible, part of a Section 504 plan or IEP.

Step 9: Refer preschoolers and young school-age children with a history of BLLs equal to or greater than 5 mcg/dL for enrichment opportunities as indicated

Since the research demonstrates that early enrichment and effective parenting skills can significantly enhance neuropsychological outcomes for students exposed to lead, school district teams should actively seek enrichment opportunities for these students. For preschoolers, districts can work with local program administrators of such programs, for example Head Start and School Readiness, to establish and facilitate placement of lead poisoned children in these programs. Young school age students with lead exposure may also benefit from enrichment through afterschool programs in the school district or community.

School teams should facilitate parental participation in educational programs related to enrichment activities at home and effective parenting skills when available.

Step 10: Refer students, when indicated, to a Section 504 team or PPT for determination of a disability under Section 504 of the Rehabilitation Act or the Individuals with Disabilities Education Act

If at any point in the Child Find process, regardless of age or grade, a staff member or team *suspects* that a child may have a disability related to lead exposure, the staff member or team must refer the child to a Section 504 team or PPT for determination of eligibility under Section 504 of the Rehabilitation Act or the IDEA. The respective team must decide what evaluation is needed in order to determine eligibility and should follow established policy and procedures for making decisions regarding evaluation and eligibility.

If a 504 team determines that a child has an impairment (lead poisoning) and the impairment, without the use of mitigating measures, substantially affects learning, or another major life activity such as attention that in turn substantially limits learning, the 504 team should refer the child for evaluation under IDEA.



Intelligence tests alone are unsatisfactory for evaluating children with lead poisoning because they do not satisfy the requirements of a comprehensive evaluation and are not sufficiently sensitive to the effects of brain injury.

If the PPT is considering whether a child may be disabled due to lead poisoning, best practice suggests a two-step evaluation.⁴⁰ The first step should be an evaluation to confirm deficient performance in the area where the deficiency is suspected. If a deficiency is confirmed, the PPT should consider if the child with a history of lead poisoning needs a comprehensive neuropsychological evaluation to look for other cognitive and functional deficits.^{41, 42} Brain injury from lead poisoning is similar to other types of brain injury where there is no single cognitive profile. Therefore, specific areas of the brain affected and the extent of the damage in any one area are variable child to child. The results of a neuropsychological assessment help the team to understand the discrete areas of the brain affected, including specific deficits, as well as compensatory strengths. This information helps the team to develop an appropriate IEP to meet the child's individual learning needs.

Intelligence tests alone do not satisfy the requirements of a comprehensive evaluation and, therefore, are unsatisfactory for evaluating children with lead poisoning. They are not sufficiently sensitive to the effects of brain injury. IQ or its equivalent is a single number that is determined based on the child's overall performance on a battery of subtests that assess multiple and often unrelated functions. Brain injury, whether from trauma, oxygen deprivation or toxic exposures such as lead, frequently affects functioning in a limited number of neurobehavioral systems. Intelligence test batteries underestimate the effects of such injuries.⁴³

It is for this reason that, once a deficit is identified in one area, consideration of a neuropsychological assessment of all areas is warranted. These areas include, depending on the age of the child:

- Executive function
- Working Memory Capacity
- Processing Speed
- Attention
- Memory
- Language - Perception
- Language - Reading
- Language - Speech Comprehension
- Language - Expressive Speech
- Language - Writing
- Perceptual - Motor
- Social/Emotional Behavior
- Adaptive Behavior⁴⁴

See [appendix C](#) for a sample neuropsychological assessment model for lead poisoning. This model is especially targeted for school-age students.

In preschoolers, comprehensive developmental assessment is the best method for identifying neuropsychological deficits.⁴⁵ This assessment should include the following domains:

- Measure of intelligence
- Executive functioning
- Working memory capacity
- Processing speed
- Attention
- Memory
- Language – perception
- Language – early reading
- Language – speech comprehension
- Language – expressive speech
- Language – early writing
- Perceptual-motor
- Social-emotional behavior⁴⁶

See [appendix D](#) for a sample assessment model for lead poisoning in preschool children. This model is very comprehensive. The PPT can use this model as guidance in developing an evaluation for an individual child.

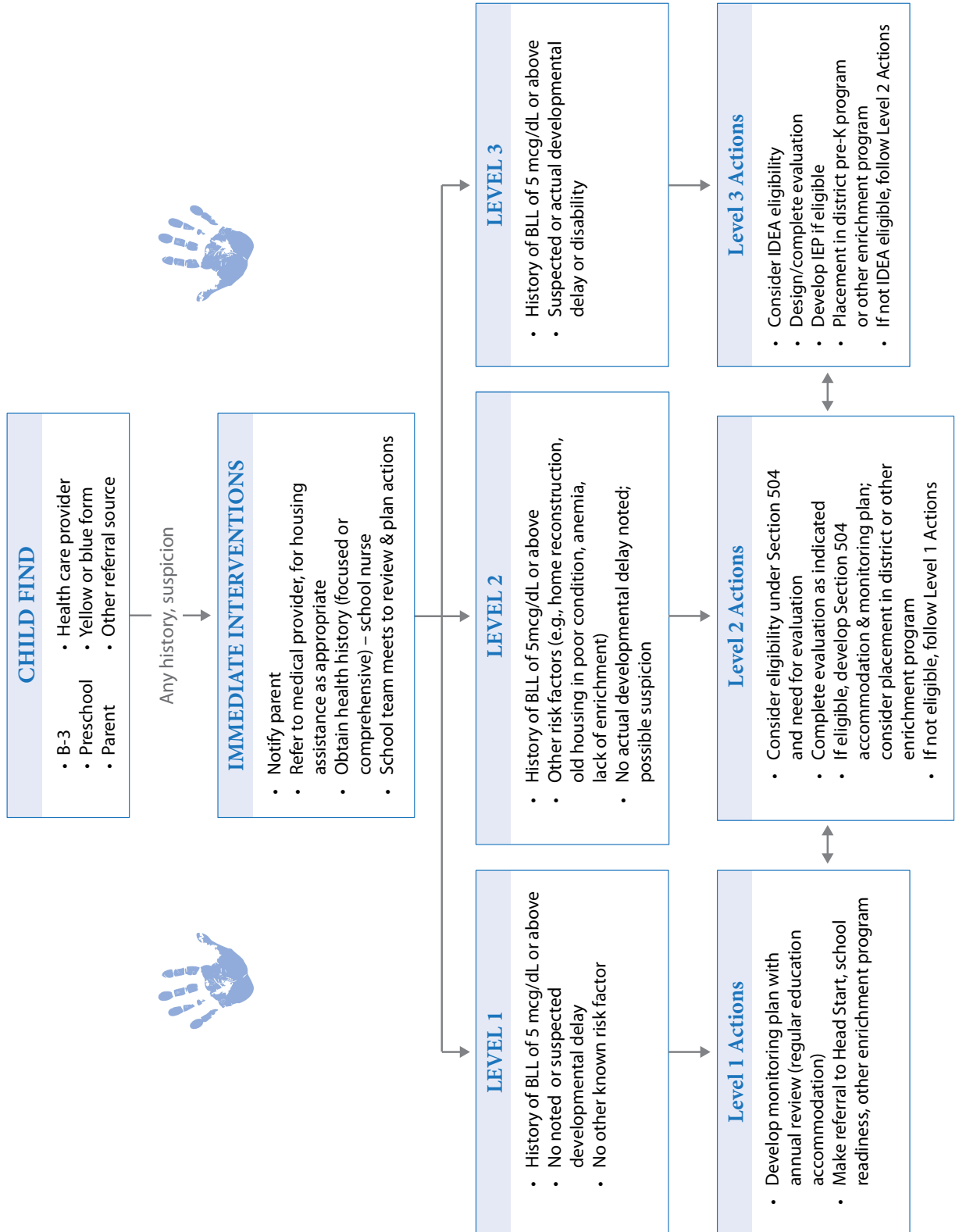
Eligibility determination for special education must be made according to the evaluation results. Children with lead poisoning may be found eligible under the category “Other Health Impairment.” Lead poisoning is one chronic condition mentioned in the definition as defined in the federal regulations:

Other health impairment means having limited strength, vitality or alertness, including a heightened alertness to environmental stimuli, that results in limited alertness with respect to the educational environment, that—(i) Is due to chronic or acute health problems such as asthma, attention deficit disorder or attention deficit hyperactivity disorder, diabetes, epilepsy, a heart condition, hemophilia, lead poisoning, leukemia, nephritis, rheumatic fever, and sickle cell anemia; and (ii) Adversely affects a child’s educational performance.⁴⁷

In addition, children may be found eligible under other categories, such as “Specific Learning Disability,” “Developmental Delay (3 through 5 years of age),” and “Speech or language impairment.” It is the evaluation results, rather than the history of lead poisoning per se, that should determine the most appropriate category for eligibility.

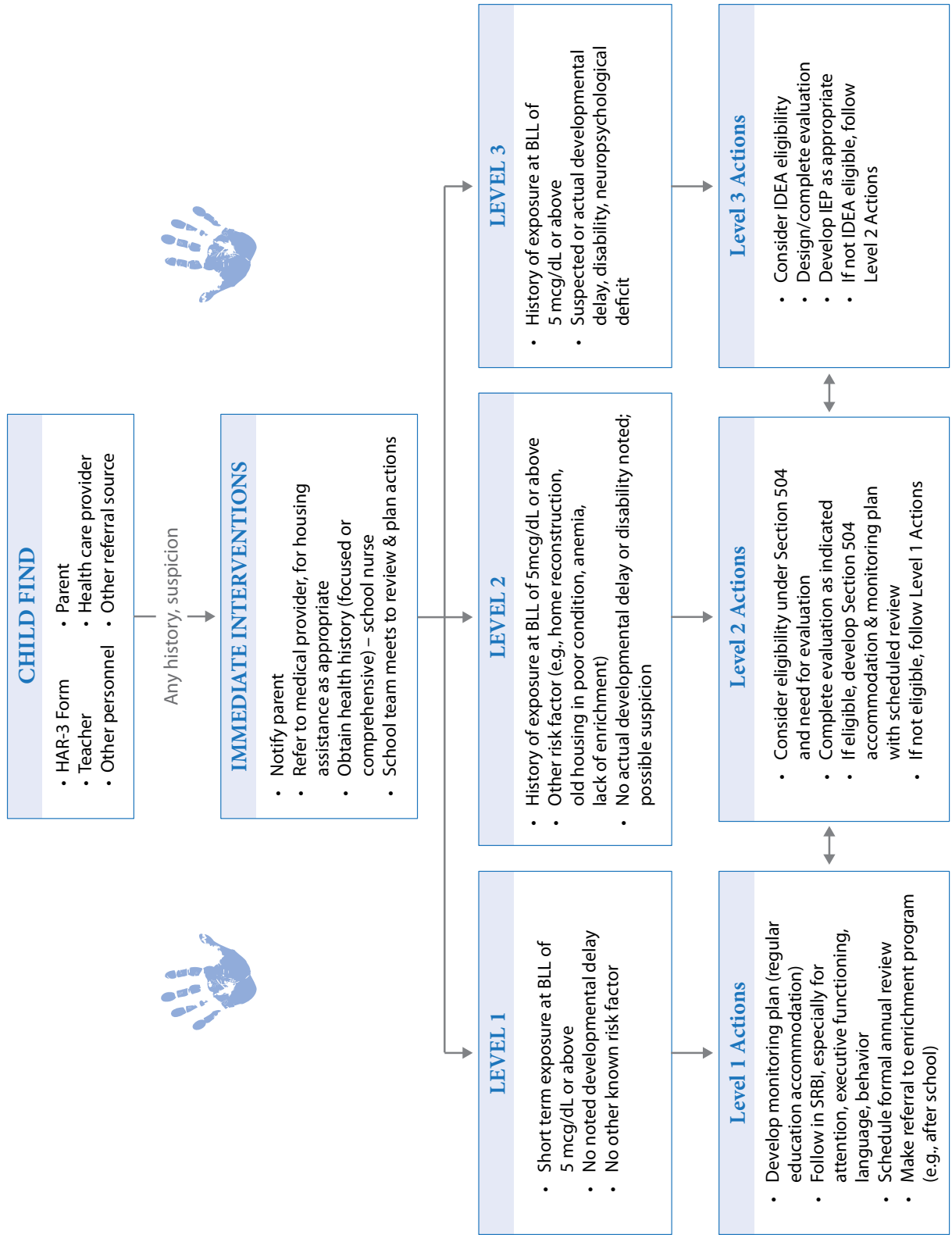
MANAGING PRESCHOOL STUDENT WITH LEAD EXPOSURE

Every child presents differently.



MANAGING K-12 STUDENT WITH LEAD EXPOSURE

Every child presents differently.



Professional Development Opportunities for Educators

3

E DUCATORS, IN COLLABORATION WITH FAMILIES AND OTHER PROFESSIONALS, CAN MAKE A SIGNIFICANT DIFFERENCE for children who have been exposed to lead. To do so, they need to be well informed about lead poisoning, especially:

- educators' roles in prevention;
- current research establishing the relationship between early lead exposure and neurocognitive deficits, learning disabilities, and negative behavioral outcomes *even at very low levels of exposure*;
- its general presentation and course; and
- individual differences in presentation and course.

Connecticut currently has available three educational programs for educators. The first is a funding and workshop opportunity (see *Lead Awareness and Management Challenge: A Funding and Workshop Opportunity* below).

The other two programs are both online courses that address lead poisoning prevention and management in children and the effects of lead exposure on child development, learning and behavior. These online courses are different. Both are valuable, and educators can read the descriptions below to determine if one or both courses are appropriate for their professional background, level of responsibility, knowledge, and interest. Each course is described below: *Lead Poisoning: Limiting the Ability to Learn* and *The Health Education Lead Poisoning (H.E.L.P.) Course Series*.

Lead Awareness and Management Challenge: A Funding and Workshop Opportunity

In May 2012, the Connecticut State Department of Education (CSDE), in collaboration with the Connecticut State Department of Public Health (DPH) offered a funding opportunity for public school districts and private non-profit schools, titled the *Lead Awareness and Management Challenge*. This funding opportunity provided support for school districts to form “Lead Advisory Teams,” and released the teams to participate in a “train-the-trainer” workshop on lead poisoning prevention and intervention for educators. The advisory teams were expected to assist their agency to develop policy and procedures related to the education of staff and the prevention and management of lead poisoning among students. The CSDE may offer additional workshops in 2012, 2013, and 2014 so long as funding continues to be available. Accordingly, school superintendents will receive information regarding the *Lead Awareness and Management Challenge*.



Lead Poisoning: Limiting the Ability to Learn

Lead Poisoning: Limiting the Ability to Learn is an awareness training course for educators regarding lead poisoning in children. This training was developed for the LAMPP Project (Lead Action for Medicaid Primary Prevention Project) by the Healthy Environments for Children Initiative, Department of Extension, University of Connecticut and is available on the Connecticut Children’s Medical Center’s Web site at <http://www.connecticutchildrens.org/community-child-health/lampp-green-healthy-homes-project/lead-poisoning-training/>.

This course provides content developed specifically for administrators, educators, and child care personnel. It covers current research, prevention, interventions, and specific implications for teaching and learning. The complete course takes a little more than one hour. It has both a PowerPoint and audiovisual component; both the PowerPoint and audio script are available for download and make excellent resources for staff awareness and professional development programs from the homepage. Also available on the homepage (see above), the course provides a certificate of completion (not continuing education units) and additional resources for parents. The information is up-to-date and pertinent for all educators.

The Health Education Lead Poisoning (H.E.L.P.) Course Series

The Health Education Lead Poisoning (H.E.L.P.) Course Series is sponsored in partnership with Connecticut Television Network (CT-N), the Foundation for Educational Advancement, Inc., Connecticut State Department of Public Health and Central Connecticut State University. The course information and directions for accessing continuing education units is found at <http://feact.org/training/help.html>. It is also available at the Connecticut Department of Public Health (DPH) Lead Poisoning and Control Program Web

site under education and Training: http://www.ct.gov/dph/cwp/view.asp?a=3140&q=387550&dphNav_GID=1828&dphPNavCtr=%7C#47067.

The course is made up of eight separate modules. Each module consists of an audiovisual presentation by an expert in the field of lead poisoning, along with the expert's PowerPoint slides. These presentations were delivered in Connecticut between 2006 and 2008. Neither the PowerPoint slides nor the audiovisual program are available for download. Each module has additional reading material available, primarily professional, peer-reviewed articles from medical and scientific journals, authored by the presenters. These articles may be downloaded.

This course is targeted to all health and education professionals interested in accessing original sources to learn about lead poisoning, its history in this country and toxic effects on the development of fetuses and young children, especially brain development, as well as the scientific research that has provided evidence of lead poisoning effects on learning, behavior, and lifelong achievement. It takes several hours to complete all eight modules, including the audio-video presentations and related journal articles for each module, but participants may complete the modules separately and may revisit each module repeatedly. Three continuing education units (CEUs) — or 30 professional development contact hours — are available for completion of the course if the participant registers for CEUs at the beginning of the course. To take the course for CEUs, it is essential to click on the button at the top of the course homepage (above) to get directions for how to sign up for the CEUs. Each module has a posttest to assess the participants' understanding of the material. CEUs are provided through the Foundation for Educational Advancement Inc., a provider of CEUs through the Connecticut State Department of Education.

Through collaboration with the DPH, this Course series is available online through *TRAIN Connecticut*, a learning resource targeted to the public health community. *TRAIN Connecticut* is an active member of and participant in *TRAIN*, the nationwide learning resource available for the benefit of all members of the public health community. Courses and content available through *TRAIN* include those established by state providers and by the CDC as well. Access to this particular course in *TRAIN Connecticut* is easiest via the two Web sites provided above. It is also possible to access the course at the Web site for *TRAIN Connecticut* at <https://ct.train.org/DesktopShell.aspx?tabid=1>; click on the "Search" tab, and in the search box, enter "Modules 1–8 H.E.L.P". This search should bring up all eight modules.

4

Lead Prevention and Intervention: Resources and Services for Parents

BECAUSE OF THE NATIONAL OBJECTIVES IN *HEALTHY PEOPLE 2000, 2010* AND *2020* RELATED TO ERADICATING LEAD poisoning in children, funding has been made available to state and local agencies to:

- develop educational literature and training programs for parents and health and education professionals;
- support housing improvement and abatement projects;
- ensure medical monitoring of poisoned children; and
- provide screening programs to identify affected children and assess the success of prevention activities.

Since these funding opportunities have resulted in the development of prevention and intervention programs and educational resources in and beyond Connecticut, the purpose of this section is to identify and assist parents to access some of those services and resources. This section can also assist educators in collaborating with others in helping parents access public health, housing, social service and medical resources in their communities, and making appropriate referrals.

Resources for parents are numerous. Many of them in Connecticut are listed below, first by agency provider and type of resource, as follows:

- Connecticut Department of Public Health: resources for prevention, screening, and education
- Connecticut Department of Education: resources on Section 504 and special education (IDEA)
- Other Connecticut resources: education, medical treatment, and housing

A few national resources are also provided following the Connecticut resources.

Connecticut Department of Public Health: Resources for Prevention, Screening, and Education

- a. The Connecticut State Department of Public Health (DPH), Lead Poisoning and Control Program homepage, provides links to many prevention and intervention resources, relevant laws and standards, the mandated lead poisoning screening program, educational programs on lead poisoning and other information. It is located online at <http://www.ct.gov/dph/lead>.
- b. The specific statutes and regulations relating to lead in Connecticut are available online at <http://www.ct.gov/dph/cwp/view.asp?a=3140&q=387554>.

- c. **Universal Blood Lead Screening:** Connecticut law requires that health care providers screen for blood lead all children at age 12 months and again at age 24 months using a blood lead test. Health care providers are also required to screen any child between 25–72 months of age who has not previously been screened, regardless of risk. Additional blood lead screening is indicated for any child less than 72 months of age with developmental delays, especially if associated with pica. Finally, all children six–72 months of age in HUSKY Part A Medicaid must be assessed for risk, and at a minimum, screened at 12 months and 24 months of age per federal requirements. In addition, blood lead testing must be considered for any child regardless of age with the following: unexplained seizures, neurologic symptoms, hyperactivity, behavior disorders, growth failure, abdominal pain, or other symptoms consistent with lead poisoning or associated with lead exposure; recent history of ingesting, or an atypical behavior pattern of inserting, any foreign object (even if the foreign object is unleaded) into a body orifice.



- d. For information on Connecticut screening results for 2010, the most recent data available, see online at http://www.ct.gov/dph/lib/dph/environmental_health/lead/pdf/CY_2010_Surveillance_Report_final_12-21-2012.pdf (it may be necessary to copy and paste this URL into your computer URL address box).
A map of towns indicating the rate of screening by town is provided on page 8 of the report, Map #1. Prior years are available at <http://www.ct.gov/dph/cwp/view.asp?a=3140&q=387576>.
- e. Officials in the DPH Lead Program and in local health departments are very knowledgeable about lead poisoning prevention, screening and intervention. Local school district personnel are encouraged to collaborate with local health department representatives in identifying educational, prevention and intervention resources for families in their community. Find your local health department at <http://www.ct.gov/dph/lead>.

f. Educational Literature for Parents

- The DPH Lead Poisoning and Control Program's homepage provides links to many resources for families and professionals. The following link brings the reader to that homepage: http://www.ct.gov/dph/cwp/view.asp?a=3140&q=387550&dphNav_GID=1828&dphPNavCtr=%7C.
- In the same location, there is an educational form for parents, *Birth to Three Developmental Milestones*, or click on http://www.ct.gov/dph/lib/dph/environmental_health/lead/pdf/b-2-3_letter_milestones.pdf.

- **Educational documents**

On the Lead Program's Homepage (http://www.ct.gov/dph/cwp/view.asp?a=3140&q=387550&dphNav_GID=1828&dphPNavCtr=%7C), many DPH documents are provided under the Resources link. There are educational documents. Many of those listed below are available in Spanish and the top three are available in many other fact sheets in many different languages as well. To access any of these documents, including translated versions, it will be necessary to have a PDF reader to open the files. The Adobe Acrobat Reader can be downloaded free from get.adobe.com/reader/.

Child prevention topics

Keep Your Child Safe From Lead: http://www.ct.gov/dph/lib/dph/environmental_health/lead/pdf/Keep_Your_Child_Safe_From_Lead.pdf

Protect your Child from Lead Poisoning: http://www.ct.gov/dph/lib/dph/environmental_health/lead/pdf/Protect_your_Child_LP.pdf

Keep Your New Baby Lead Safe

Toys and Childhood Lead Exposure: http://www.ct.gov/dph/lib/dph/environmental_health/lead/pdf/NCHH_Factsheet_-_Toys_and_Childhood_Lead_Exposure.pdf

Lead Poisoning Prevention

How Eating Right Helps Fight Lead Poisoning

Housing topics

Protect your Family from Lead in your Home

Lead in your Home: A Parents Reference Guide

A Parent's Guide for the Interim Control of Lead Hazards in Housing

What You Need to Know About Childhood Lead & Imported Vinyl Mini Blinds

Ways to Reduce Lead Dust in your Home or Apartment

How to Check for Lead Hazards in your Home

Reducing Lead Hazards in the Home

A Landlord's Guide for the Interim Control of Lead Hazards in Housing

Other Topics

Lead Poisoning and Pregnancy

A Resource for Child Day Care Providers - Fact Sheet

Preventing Childhood Lead Poisoning in Connecticut

Testing for Lead Poisoning
 Occupations & Hobbies May Expose You to Lead
 What is Lead Paint Abatement?

Other documents not listed here, such as technical information on encapsulation, may also be found at <http://www.ct.gov/dph/cwp/view.asp?a=3140&q=387548>.

Connecticut State Department of Education: Resources on Section 504 and special education (IDEA)

Parents are encouraged to ask representatives from their local schools for written resources on Section 504 and IDEA (special education), including information on the rights of students with disabilities under each law. They may also want to review school district procedures implementing these federal laws, and speak with a school official regarding questions they may have. Parents can also make a referral to the school team if they suspect that their child has a disability.

An excellent resource for parents is the State Education Resource Center (SERC) in Middletown, Connecticut. Parents can become members at no cost and can request information and publications for review. SERC is located at 25 Industrial Park Road, Middletown, CT, near exit 21 off Interstate 91 in Cromwell. Parents can also call SERC for assistance at 860-632-1485.

The best publication for parents to request for information on special education is *A Parent's Guide to Special Education in Connecticut* (2007).

See the list below for further information with links to the Parents Guide, as well as other CSDE publications.

Special Education Publications	Best Practice Resources; Eligibility Documents; Guidance Documents/Topic Briefs; Parent/Family Resources; and Secondary Transition Resources.	http://www.sde.ct.gov/sde/cwp/view.asp?a=2626&q=322672
<i>The State Board of Education's Position Statement On the Education of Students with Disabilities</i> (2001)	Position Statement On the Education of Students with Disabilities	http://www.sde.ct.gov/sde/LIB/sde/pdf/board/disabilities.pdf
CSDE's Division of Legal and Governmental Affairs Law: <i>Individuals with Disabilities Education Act (IDEA)</i>	Individuals with Disabilities Education Act (IDEA)	http://www.sde.ct.gov/sde/cwp/view.asp?a=2683&q=320334

<i>A Parent's Guide to Special Education in Connecticut</i> (2007)	Provides information for parents, guardians and other family members about laws, regulations, and policies affecting special education programs and services.	http://www.sde.ct.gov/sde/lib/sde/PDF/DEPS/Special/Parents_Guide_SE.pdf
<i>Before, During & After the PPT Meeting</i> <i>Preparing for the PPT Meeting & Development of The Individualized Education Program</i> (2008)	Planning and Placement Team (PPT) Checklist	http://www.sde.ct.gov/sde/lib/sde/PDF/DEPS/Special/Before_PPT.pdf
<i>PPT 101: Understanding the Basics of the Planning and Placement Team Meeting</i>	Provides information on the process and procedure for referral and eligibility for special education; Individualized Education Programs; PPT; and parent's role in the PPT process.	http://www.sde.ct.gov/sde/lib/sde/PDF/DEPS/Special/PPT101.pdf
<i>Making the PPT Process More Effective for You and Your Child</i>	Provides information on the PPT process.	http://www.sde.ct.gov/sde/lib/sde/PDF/DEPS/Special/PPT_Process.pdf
<i>IEP Manuals and Forms</i> (2010)	CSDE's guidance to school districts in Connecticut to assist in utilizing the IEP forms.	http://www.sde.ct.gov/sde/lib/sde/PDF/DEPS/Special/IEPManual.pdf
<i>Writing Standards-based IEP Goals and Objectives</i>	This multimedia presentation is designed to provide a tool and a process for helping Connecticut educators develop standards-based IEPs.	http://ctserc.org/s/index.php?option=com_content&view=article&id=516:using-a-word-bank-process-to-develop-standards-based-iep-goals-a-objectives-&catid=51:8-professional-development&Itemid=144
<i>Guidelines for Identifying Children with Learning Disabilities</i> (2010)	This document provides a comprehensive description of the changes in IDEA 2004 regarding the identification and eligibility determination of children with a specific learning disability.	http://www.sde.ct.gov/sde/lib/sde/PDF/DEPS/Special/2010_Learning_Disability_Guidelines_Acc.pdf

The most current information regarding the rights of students with disabilities under Section 504 is found online at the following two sites:

- <http://www2.ed.gov/about/offices/list/ocr/docs/dcl-504faq-201109.pdf>
- <http://www2.ed.gov/about/offices/list/ocr/504faq.html>

The following list provides other publications about Section 504 with associated links.

CSDE's Circular Letter C-13, Series 2008-09, <i>Section 504 of the Rehabilitation Act of 1973: Procedural Safeguards Reissue of CIRCULAR LETTER C-9, Series 2000-2001</i>	Section 504 of the Rehabilitation Act of 1973: Procedural Safeguards	http://www.sde.ct.gov/sde/lib/sde/pdf/circ/circ08-09/c13.pdf
Protecting Students With Disabilities: Frequently Asked Questions About Section 504 and the Education of Children with Disabilities	This document is a revised version of a document originally developed by the Chicago Office of the Office for Civil Rights (OCR) in the U.S. Department of Education (ED) to clarify the requirements of Section 504 of the Rehabilitation Act of 1973, as amended (Section 504) in the area of public elementary and secondary education. The primary purpose of these revisions is to incorporate information about the Americans with Disabilities Act Amendments Act of 2008 (Amendments Act), effective January 1, 2009, which amended the Americans with Disabilities Act of 1990 (ADA) and included a conforming amendment to the Rehabilitation Act of 1973 that affects the meaning of disability in Section 504.	http://www2.ed.gov/about/offices/list/ocr/504faq.html
CSDE's Division of Legal and Governmental Affairs Law: <i>Section 504</i>	Section 504 Law	http://www.sde.ct.gov/sde/cwp/view.asp?a=2683&q=320334
<i>CSDE's Accommodating Special Dietary Needs in School Nutrition Programs</i> (2011)	Contains information on providing meals for children with special dietary needs, based on federal laws, U.S. Department of Agriculture regulations and Connecticut laws and regulations.	http://www.sde.ct.gov/sde/lib/sde/PDF/DEPS/Student/NutritionEd/AccommodatingSpecialDiets.pdf
School Readiness Technical Assistance Alert (1999), Number TA/SR # 99-02: Serving 3-, 4-, and 5-year-old Children with Disabilities	Section 504 and School Readiness Programs	http://www.sde.ct.gov/sde/LIB/sde/pdf/deps/readiness/SR/TA_SR_99_02.pdf
<i>CSDE's Guidelines for Managing Life-Threatening Food Allergies in Connecticut Schools</i>	Allergy management in schools	http://www.sde.ct.gov/sde/lib/sde/PDF/deps/student/health/Food_Allergies.pdf
<i>CSDE's Guidelines for Blood Glucose Self-Monitoring in School</i>	Diabetes management	http://www.sde.ct.gov/sde/lib/sde/PDF/deps/student/health/GlucoseGuidelines.pdf

Connecticut Resources for Education, Medical Treatment, and Housing

- Connecticut Children’s Medical Center, Lead Action for Medicaid Primary Prevention (LAMPP): see general information and “Related Links” related to housing and education at http://www.connecticutchildrens.org/body_dept.cfm?id=1183&fr=true. For treatment, see information at http://www.connecticutchildrens.org/body_dept.cfm?id=66.
- Hartford Regional Lead Treatment Center at St. Francis Hospital: See temporary housing information and links to prevention and treatment information at http://www.saintfranciscare.org/Lead_Treatment_Center.aspx.
- Yale-New Haven Children’s Hospital Lead Poisoning and Regional Treatment Center: See information on local resources for treatment, housing and education at <http://www.ynhh.org/yale-new-haven-childrens-hospital/medical-services/lead-program-regional-treatment-center.aspx>.

U.S. Centers for Disease Control and Prevention: Education and General Information

- Prevention Tips: <http://www.cdc.gov/nceh/lead/tips.htm>
- Lead Recalls: <http://www.cdc.gov/nceh/lead/Recalls/default.htm>
- CDC’s Childhood Lead Poisoning Prevention Program: <http://www.cdc.gov/nceh/lead/about/program.htm>

Lead Prevention and Intervention: Resources for Educators

BECAUSE EDUCATORS WORK CLOSELY WITH CHILDREN AND FAMILIES, THEY ARE LIKELY TO KNOW OF A FAMILY OR child in the community who may be at high risk for exposure to environmental lead or who has recently been identified as having an elevated blood lead level. Because preventive education and early intervention are critical in reducing the toxic effects of lead on children, educators should become familiar with the resources and services for families identified in section 4 “Lead Prevention and Intervention: Resources and Services for Parents.” Educators must be knowledgeable about these resources in order to provide or direct families to them, and to refer families to appropriate medical, public health, social service, and housing services. Educators should also review the DPH screening data and map indicating the rate of screening by town (see [section 4](#) under *Connecticut Department of Public Health: Resources for Prevention, Screening, and Education*). In towns where compliance has been low, school districts should encourage provider and parent compliance with mandated screening requirements.

This section contains citations for many professional articles published in peer-reviewed professional journals and a few related publications covering a variety of topics on lead poisoning in children, prevention and intervention, and the effects of lead exposure on the developing brains of children, including effects related to intelligence, learning, and behavior. For articles where a link for access to a free copy existed at the time of publication of the guidelines, that link is provided. If the link does not work directly, the reader can copy the URL and paste it into a computer’s URL address box.

For other articles, readers can search for access to a free copy online and seek assistance from a medical library. School nurses can access most, if not all, of these articles through the Yale School of Nursing

School "Information Resources for School Nurses" program. Information is available at http://doc.med.yale.edu/school_nursing/. School nurses can contact a librarian for assistance from this online location.

The articles cited below include those where controversy exists among experts, particularly related to the effects of lead exposure on brain development. It is important to read many of these articles in order to understand all sides of the controversies regarding lead, its effects in children, and the research methodologies used to identify those effects. Past controversies are critical to understand and must also be considered in light of the current literature and the breadth and depth of the research available today.

Best Review Article

The following article is recommended as an excellent overview of the state of knowledge, as of 2003, related to lead exposure in children, dispersion of lead in the body, effects on the brain, effects on cognitive/behavioral development, and strengths and limitations of related research. It is available online, if not by clicking directly on the "Full Text (PDF)" option, then by copying the URL and pasting it into your computer's URL address box. Readers are advised to read other articles, especially those published after this one for more recent studies.



Lidsky TI; Schneider JS. Lead neurotoxicity in children: basic mechanisms and clinical correlates. *Brain*. 2003;126(1):5-19. AbstractFull TextFull Text (PDF). Available online at <http://brain.oxfordjournals.org/content/126/1/5.full.pdf>.

Articles Providing a General Overview of Lead Poisoning in Children and Lead Poisoning Prevention

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6

Appendixes

Appendix A

Connecticut State Department of Education Health Assessment Record (HAR-3)

Located on the CSDE Health Promotion Services/School Nurse Web site at <http://www.sde.ct.gov/sde/cwp/view.asp?a=2678&q=320768>.

Appendix B

Blood Lead Level (BLL) History Form (to be completed by child/student's health care provider)

To the Attention of the Parent/Guardian: (Please complete this section)

Child/student's Name: (last) _____ (first) _____ DOB: _____

Parent/Guardian's Name: _____ Signature: _____ Date: _____

To the Attention of the Health Care Provider: (Please answer the following questions)

1. What was the age and blood lead level when diagnosed with elevated BLL (BLLs \geq 5mcg/dL)?

2. What is the highest BLL this child/student has had? _____
3. What was the duration of exposure to lead (if known)? _____
4. What was the duration of the child/students' BLL? _____
5. What kind of treatment did the child/student have? _____ AND
How many courses of treatment? _____

Please complete this section by listing all documented BLL results for this child/student (continue over)

Blood Lead Test Date	Blood Lead Results (<i>Indicate if venous or capillary</i>)		
	_____ mcg/dL	_____ Venous or	_____ Capillary
	_____ mcg/dL	_____ Venous or	_____ Capillary
	_____ mcg/dL	_____ Venous or	_____ Capillary
	_____ mcg/dL	_____ Venous or	_____ Capillary
	_____ mcg/dL	_____ Venous or	_____ Capillary
	_____ mcg/dL	_____ Venous or	_____ Capillary
	_____ mcg/dL	_____ Venous or	_____ Capillary
	_____ mcg/dL	_____ Venous or	_____ Capillary

Name of Health Care Provider: _____

Signature _____ Date _____

Telephone _____ Email _____

Appendix C

Sample Assessment Model for Lead Poisoning

While criteria referenced, curriculum referenced, and informal assessments can be employed to identify specific deficiencies, a comprehensive assessment is recommended employing norm referenced tests with adequate validity and reliability and preferably yielding scaled scores or standard scores with confidence intervals and percentile scores. The following is a suggested model for a comprehensive evaluation of mental abilities.

FUNCTION/DOMAIN	TEST/SCALE EXAMPLES
Measure of Intelligence	WISC-IV, KABC-II
Executive	D-KEFS, WCST, BRIEF, BASC-2 Executive
Working Memory Capacity	WISC-IV Working Memory, CMS Working Memory
Processing Speed	WISC-IV Processing Speed, W/J-III (NU) Processing Speed or Academic Fluency Clusters
Attention	Connors-3, BASC-2 scales, PADDs, CPT-II, NEPSY-2
Memory	CMS, WRAML-2
Language - Perception	CTOPP, W/J-III Phonemic Awareness, Visual Matching, LAC-3
Language - Reading	W/J-III (NU), WIAT-III, GORT-4, GSRT
Language - Speech Comprehension	PPVT-4, OWLS Listening Comprehension CASL, CELF-4
Language - Expressive Speech	CASL, WIAT-III, W/J-III (NU), CELF-4
Language - Writing	WIAT-III, W/J-III (NU), TOWL-4
Perceptual-Motor	NEPSY-2, Rey-Osterrieth Complex Figure,
Social/Emotional Behavior	BASC-2, Connors-3, M-PACI, SMALSI, CAIR
Adaptive Behavior (optional)	VADS- II

The suggested tests are not meant to constitute endorsements for using those methods. Mental processes and domains of cognitive abilities are multi-dimensional. Alternative or additional measures may be employed, particularly when specific deficiencies have been identified.

Key to Test Abbreviations

BASC-2	Behavioral Assessment System for Children - Second Addition
BRIEF	Behavioral Rating Inventory of Executive Function
CAIR	Clinical Assessment of Interpersonal Relationships
CASL	Comprehensive Assessment of Speech and Language
\	
CELF-4	Clinical Evaluation of Language Fundamentals - Fourth Edition
CMS	Children's Memory Scale
CPT-II	Connors Continuous Performance Test - Second Edition
CTOPP	Comprehensive Test of Phonological Processing
D-KEFS	Delis-Kaplan Executive Function System
GORT-4	Gray Oral Reading Test - Fourth Edition
GSRT	Gray Silent Reading Test
KABC-II	Kaufman Assessment Battery for Children - Second Edition
LAC-3	Lindamood Auditory Conceptualization Test - Third Edition
M-PACI	Millon Pre-Adolescent Clinical Inventory
NEPSY-II	(Not an acronym - "neuropsychological" assessment battery)
OWLS	Oral and Written Language Scales
PADD5	Pediatric Attention Disorders Diagnostic Screener
PPVT-4	Peabody Picture Vocabulary Test - Fourth Edition
SMALSI	School Motivation and Learning Strategies Inventory
WCST	Wisconsin Card Sorting Test
WIAT-III	Wechsler Individual Achievement Test - Third Edition
WISC-IV	Wechsler Intelligence Scale for Children - Fourth Edition
W/J-III (NU)	Woodcock-Johnson Psychoeducational Battery - Third Edition (Norms Updated)
VADS-II	Vineland Adaptive Behavior Scales - Second Edition

Appendix D

Sample Assessment Model for Lead Poisoning – Preschool Children

While criteria referenced, curriculum referenced, and informal assessments can be employed to identify specific deficiencies, a comprehensive assessment is recommended employing norm referenced tests with adequate validity and reliability and preferably yielding scaled scores or standard scores with confidence intervals and percentile scores. The following is a suggested model for a comprehensive evaluation of mental abilities.

FUNCTION/DOMAIN	TEST/SCALE EXAMPLES
Measure of Intelligence	WPPSI-IV, KABC-II, DAS-2
Executive Functioning	BRIEF-P, BASC-2, NEPSY-2
Working Memory Capacity	WPPSI-IV Working Memory, DAS-2 Working Memory Cluster
Processing Speed	WPPSI-IV Processing Speed, DAS-2 Processing Speed Cluster
Attention	BASC-2, NEPSY-2
Memory	WJ-III(NU) Memory for Words, Memory for Sentences, Retrieval Fluency; NEPSY-2, DAS-2
Language - Perception	W/J-III Sound Awareness, CTOPP
Language – Early Reading	W/J-III (NU) (Letter-Word Identification, Passage Comprehension, Word Attack), KTEA-2 Letter and Word Recognition, DAS-2 School Readiness Cluster
Language - Speech Comprehension	PPVT-4, OWLS Listening Comprehension, CASL, CELF-4, KTEA-2 Listening Comprehension, PLS-5, NEPSY-2 Comprehension of Instructions
Language - Expressive Speech	CASL, W/J-III (NU), OWLS Oral Expression, CELF-4, KTEA-2 Oral Expression, KTEA-2 Oral Fluency Composite, PLS-5, EVT-2
Language – Early Writing	OWLS Written Expression, KTEA-2 Written Expression
Perceptual-Motor	NEPSY-2, Beery-Buktenica Developmental Test of Visual-Motor Integration (VMI)

Social/Emotional Behavior	BASC-2, ITSEA
Adaptive Behavior (optional)	VABS- II

The suggested tests are not meant to constitute endorsements for using those methods. Mental processes and domains of cognitive abilities are multi-dimensional. Alternative or additional measures may be employed, particularly when specific deficiencies have been identified.

Suggested tests/subtests are not necessarily appropriate for all ages of the preschool years, and care should be used in selecting tests/subtests that are suitable. In some situations, developmental testing may be preferable.

Key to Test Abbreviations

BASC-2	Behavioral Assessment System for Children - Second Addition
BRIEF-P	Behavioral Rating Inventory of Executive Function – Preschool Version
CASL	Comprehensive Assessment of Speech and Language
CELF-4	Clinical Evaluation of Language Fundamentals - Fourth Edition
CTOPP	Comprehensive Test of Phonological Processing
DAS-2	Differential Abilities Scales – Second Edition
EVT-2	Expressive Vocabulary Test – Second Edition
KABC-II	Kaufman Assessment Battery for Children - Second Edition
KTEA-2	Kaufman Test of Educational Achievement – Second Edition
NEPSY-II	(Not an acronym - “neuropsychological” assessment battery)
OWLS-2	Oral and Written Language Scales
PLS-5	Preschool Language Scales – Fifth Edition
PPVT-4	Peabody Picture Vocabulary Test - Fourth Edition
WPPSI-IV	Wechsler Preschool and Primary Scales - Fourth Edition (As of Fall, 2012)
W/J-III (NU)	Woodcock-Johnson Psychoeducational Battery – third Edition (Norms Updated)
VABS-II	Vineland Adaptive Behavior Scales - Second Edition

Appendix E

Connecticut Department of Public Health Lead Provider Letter

STATE OF CONNECTICUT

DEPARTMENT OF PUBLIC HEALTH

Jewel Mullen, M.D., M.P.H., M.P.A.
Commissioner



Dannel P. Malloy
Governor
Nancy Wyman
Lt. Governor

April 12, 2013

Dear Clinical Partners:

On January 4, 2012, the national Advisory Committee on Childhood Lead Poisoning Prevention (ACLPP) released a report to the U.S. Department of Health and Human Services, Centers for Disease Control and Prevention (CDC) which acknowledged the cumulative scientific evidence concerning a range of health impacts associated with blood lead levels less than 10µg/dL in children. The ACLPP recommendations and the CDC responses can be found on the CDC website at: www.cdc.gov/nceh/lead/ACCLPP/CDC_Response_Lead_Exposure_Recs.pdf.

Specific recommendations that were made by the ACLPP and accepted by the CDC were to:

- (1) base blood lead re-testing requirements and timelines on a 'reference value'¹ of 5 µg/dL; and
- (2) have clinicians take the primary role in educating families about *preventing* childhood lead exposure during well-child visits prior to blood lead testing occurring.

The Connecticut Department of Public Health (CT DPH) reconvened the state's Childhood Lead Poisoning Prevention Screening Advisory Committee to revise Connecticut's blood lead screening requirements and medical follow-up guidelines to align with the national recommendations. The two-page advisory entitled, *Requirements and Guidance for Childhood Lead Screening by Health Care Professionals in Connecticut* are attached.

Major revisions to the requirements and guidelines include: (1) lowering the blood lead level for retesting from 10µg/dL to 5µg/dL; (2) testing and re-testing timelines; and (3) streamlining the risk assessment questions.

The CT DPH has developed a simple educational packet, to be provided at well child visits, consisting of two informational sheets that cover the basics about lead poisoning prevention and nutrition. The information included is: *Lead Poisoning Prevention* and *Eating Right Helps Fight Lead Poisoning*.



If you require aid or accommodation to participate fully and fairly in this meeting, please phone (860) 509-7293

Phone: (860) 509-7299 • Fax: (860) 509-7295 • VP: (860) 899-1611

410 Capitol Avenue, P.O. Box 340308

Hartford, Connecticut 06134-0308

www.ct.gov/dph

Affirmative Action/Equal Opportunity Employee

To summarize, CT DPH seeks your assistance with:

1. Reminding parents that there is no safe blood lead level.
2. Reminding parents that it is the law to have their child tested.
3. Ensuring medical re-testing according to established timelines when a child is identified as having a blood lead level at or above the new 'reference value.'
4. Providing lead poisoning prevention educational information during well child visits.

Primary prevention is paramount in our collective efforts to reduce and eliminate childhood lead poisoning and clinicians are essential to this effort. Your collaboration on this effort is critical to the health of your patients.

Please feel free to contact the CT DPH Lead and Healthy Homes Program at 860-509-7299 if you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to read "Jewel Mullen", with a long horizontal flourish extending to the right.

Jewel Mullen, MD, MPH, MPA
Commissioner

¹The reference value is based on the 97.5th percentile of the blood lead level distribution in children 1-5 years of age in the U.S. Based upon current data the reference value blood lead level is 5µg/dL.

Appendix F

Connecticut Department of Public Health Requirement and Guidance for Childhood Lead Screening by Health Care Professionals in Connecticut



www.ct.gov/dph

Requirements and Guidance for Childhood Lead Screening by Health Care Professionals in Connecticut Lead Poisoning Prevention and Control Program

Revised April 2013

A. Universal Blood Lead Testing is Mandated

Test children:

- Between 9 months and 36 months of age, each year for elevated blood lead levels
 - Most providers test at 12 months and 24 months of age
- Between 25-72 months of age, if not previously been tested, regardless of risk
- < 72 months of age, with developmental delays (especially if associated with pica)

B. Diagnostic Testing and Follow-up

If result of screening test (µg/dl) is	Perform Venous Blood test within:
5-19	3 months
20-44	1 month-1 week*
45-59	48 hours
60-69	24 hours
≥ 70	Immediately

*The higher the result on the capillary test, the more urgent the need for venous testing.

Blood Lead Level (µg/dl)	Early follow-up (1 st 2-4 tests after identification) test within:	Late follow-up (after BLL begins to decline) test within:
5-14	3 months ^b	6 - 9 months
15-19	1 - 3 months ^b	3 - 6 months
20-24	1 - 3 months ^b	1 - 3 months
25-44	2 weeks - 1 month	1 month
> 45	As soon as possible	Chelation and follow-up

^a Seasonal variations of BLLs exists and may be more apparent in colder climates. Greater exposure in the summer months may necessitate more frequent follow ups.
^b Some case managers or PCPs may choose to repeat blood lead tests on all new patients within a month to ensure that their BLL is not rising more quickly than anticipated.

- If a capillary blood test is elevated (equal to or greater than 5µg/dL), confirm with a diagnostic (venous) blood lead test.
- Children with an elevated diagnostic blood lead test require additional follow-up blood testing at appropriate intervals.
- Children should be tested according to schedule above until BLL is below the reference value of <5µg/dl.
- Providers can contact one of Connecticut’s Regional Lead Treatment Centers for guidance and assistance with clinical management of a lead poisoned child (see below).

Consultation and supportive services are available by contacting:
 Hartford Regional Lead Treatment Center, (860-714-5184)
 Yale-New Haven Regional Lead Treatment Center, (203-764-9106)

For more information contact:
 State of CT Department of Public Health Lead Poisoning Prevention and Control Program
 (860-509-7299)

C. Provide Anticipatory Guidance to Families

- Provide educational information about lead poisoning
- Written materials, along with verbal education, should be provided in the family's primary language (at an appropriate reading level)
- Resources available at www.ct.gov/dph/lead

D. Risk Assessment

- In addition to testing children at the recommended time intervals, at each well-child visit, health care providers shall evaluate children 6 months to 72 months of age for risk of lead exposure using the following risk assessment questions.

Risk Assessment Questions

1. Does your child live in or regularly visit a house built before 1978?
2. Does your child have a brother or sister, housemate, or playmate being followed or treated for lead poisoning?
3. Does your child frequently come in contact with an adult whose job or hobby involves exposure to lead (e.g., construction, welding, automotive repair shop, other trades, stained glass making; using lead solder, artist paints or ceramic glazes; etc.)?
4. Has your child been exposed to any imported products (spices, foods/vitamins, ethnic home remedies, or ethnic cosmetics)?
 - Some examples include: azarcon (also known as rueda, Maria Luisa, alarcon, liga); albayalde; greta; pay-loo-ah; ghasard; bala goli; kandu; kohl; litargirio; bebetina; chyawan prash.

Ask any additional questions that may be specific to situations that exist in a particular community (e.g. operating or abandoned industrial sources; waste disposal sites; drinking water; has your child ever lived outside the U.S.; does your family use pottery for cooking, eating or drinking; etc.?).

If the answer to any of the above questions is YES or UNKNOWN, then the child is considered to be at risk and should be tested.

NOTE: Blood lead testing shall also be considered for any child regardless of age, with:

- Unexplained seizures, neurologic symptoms, hyperactivity, behavior disorders, growth failure, abdominal pain, or other symptoms consistent with lead poisoning or associated with lead exposure;
- Recent history of ingesting, or an atypical behavior pattern of inserting, any foreign object (even if the foreign object is unleaded) into a body orifice.

Appendix G

Connecticut Department of Public Health Lead Educational Handouts



Lead Poisoning Prevention

Where is Lead Found?

- **Paint:** Lead can be found in paint that was made before 1978. This paint can be on any painted surface in your home, like doors, windows, and porches.
 - **Dust:** Lead dust in the home is comes from lead painted surfaces that are chipping and peeling. Sanding and scraping old paint when repainting or remodeling can also cause a lead dust problem.
 - **Soil:** Old paint that has fallen off the outside of your house onto the ground may have left lead in the soil.
 - Lead can also be found in ceramic dishes, crystal, food cans from outside the U.S., water pipes, solder and fittings, and some ethnic cosmetics and home remedies.
 - Some jobs and hobbies can expose children and adults to lead. Some examples are painters, house remodelers, plumbers, mechanics, bridge workers, making jewelry, ceramic/pottery or stained glass, and going to indoor firing ranges.
-

Is Your Child At Risk For Lead Poisoning?

If you answer yes to any of these questions you may want to have your child tested, even if your child is older.

- Does your child live in or often visit a building built before 1960?
 - Does your child live in or often visit a building built before 1978 that is being or was just repaired or remodeled?
 - Does your child live in or often visit a building that has peeling or chipping paint?
 - Does your child live with an adult or often visit an adult whose job or hobby exposes them to lead?
 - Does your family eat or drink from dishes made outside the U.S.?
 - Does your family use home remedies?
-

How does a child get lead poisoned?

- Lead poisoning usually happens when children ingest (eat) dust that has lead in it. Children may also eat chips of lead paint or soil that has lead in it.
-

What Does Lead Do to the Body?

- No amount of lead in the body is safe. The damage lead can cause is forever! Lead can damage the brain. It can cause growth problems, hearing loss, and learning problems.
 - Many children do not show signs of lead poisoning. Some signs of high levels of lead poisoning are the same as other childhood illnesses, like the common cold or teething.
-

What Does Lead Do to the Body? (continued)

- If a pregnant woman is around lead, she and her unborn child may become lead poisoned. Lead can cause lasting damage to the mother and her baby.

How Can You Reduce The Risk?

Replace, fix or manage all lead hazards in a lead safe way.

Steps you can take to prevent children from being lead poisoned:

- Keep children and pregnant women away from all lead hazards.
- Clean up lead dust and paint chips by wet wiping window sills and window wells or wet mopping floors. Do NOT dry sweep or vacuum, this will spread the lead dust.
- Block places with peeling or chipping paint. Do not use windows that have chipping paint.
- Move your child's bedroom or play area to a room that has no peeling or chipping paint.
- Place washable mats inside and outside entry doors.
- Have people remove their shoes before coming in the home.
- Do not let your child (or pet) play in dirt.
- Wash and dry your child's hands, toys and pacifiers often. Wash and dry your child's hands before playing, eating, and bedtime.
- Use cold water from the tap for drinking, cooking and making formula. Let water run for 1-2 minutes before using.
- Give your child healthy meals and snacks to eat. An empty stomach takes in lead faster than a full stomach.

Steps adults can take to help prevent themselves or children from becoming lead poisoned from their job or hobby:

- Don't eat, drink or smoke in your work/hobby area.
- Wash your hands and face before eating, smoking or drinking.
- Wear protective clothing (such as disposable gloves, hat, and shoe covers) when you work with lead. Use a NIOSH-approved respirator.
- Shower, wash your hair, and change into clean clothes and shoes before you leave the work area. Leaving dust on your clothes can contaminate your home and car.
- Put your work clothes and shoes in sealed plastic bags.
- Wash work clothes in a different load than the family's laundry.

Does your child need to be tested for lead poisoning?

- Yes, all children, at about ages one and two, must be tested for lead poisoning...it's the law!
- Blood tests will tell how much lead is in your child's blood at the time of the test. If the level is high, your child will need more testing.
- If your child is at risk at other ages, have your child tested at those times too.

Connecticut Lead and Healthy Homes Program

(860) 509-7299

www.ct.gov/dph/lead

www.ct.gov/dph/healthyhomes





CT DPH LEAD & HEALTHY HOMES PROGRAM

FACT SHEET

Eating Right Helps Fight Lead Poisoning

Lead tricks the body into thinking it is iron, calcium or zinc. Eating healthy can help decrease the lead from staying in the body.

Don't let your child go through the day on an empty stomach!

Five Basic Food Groups

- Breads, cereals and grains
- Vegetables
- Fruit
- Milk and milk products
- Meat, chicken, fish, nuts, and beans



Foods Rich in Calcium

- Milk
- Yogurt
- Cheese (*for snacks, in cooking such as macaroni and cheese, pizza, tortillas, vegetables*)
- Foods made of milk (*pudding, soup, ice cream, custard*)
- Sardines or canned salmon (*with bones*)
- Green vegetables (*kale, collard greens, broccoli*)



Foods Rich in Zinc

- Chicken or turkey
- Lean meat
- Fish
- Milk and cheese
- Clams, oysters, mussels, crab
- Dried beans and lentils
- Eggs



Foods Rich in Iron

- Lean red meat, chicken, turkey and fish
- Iron-fortified hot and cold cereals
- Clams, oysters or mussels (*use canned to make soup or sauce for pasta*)
- Dark green leafy vegetables
- Dried beans, split peas, and other beans (*pinto, red, navy, kidney, garbanzo*)
- Eggs
- Dried fruit



The iron in vegetables, grains, beans, nuts and eggs may be made more usable to the body when you eat a food high in Vitamin C at the same meal. Oranges, grapefruit, strawberries, cantaloupe, green peppers, cauliflower, broccoli and potatoes are some foods high in Vitamin C.

Healthy Tips:

- Don't fry foods. Bake or broil them.
 - Try not to eat high fat foods. When you do eat them, eat small portions.
 - Vitamin C helps your body absorb iron.
 - Children under the age of 2 should have whole milk after they no longer drink formula or breast milk. Most children 2 and older can have lower fat milk. Children with milk allergies can have tofu, leafy green vegetables, sardines, or canned salmon for their calcium needs.
 - Younger children need smaller servings than older children or adults. More active people need larger numbers of servings from each of the 5 food groups.
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Prevención de envenenamiento por plomo

¿Dónde se encuentra el plomo?

- **Pinturas:** es posible hallar plomo en las pinturas fabricadas antes de 1978. Estas pinturas pueden encontrarse en cualquier superficie pintada de su hogar, como puertas, ventanas y porches.
- **Polvo:** el polvo con plomo en el hogar proviene de las superficies pintadas con pinturas a base de plomo que se están desprendiendo y descascarando. El lijado y rasqueteo de la pintura vieja cuando se vuelve a pintar o remodelar un lugar también pueden generar un problema con el polvo que contiene plomo.
- **Tierra:** la pintura vieja que se ha desprendido de la parte exterior de la casa sobre el suelo puede haber dejado residuos de plomo en la tierra.
- El plomo también se halla en los platos hechos de cerámica, los cristales, las latas de alimentos de países extranjeros, las cañerías del agua, las soldaduras y accesorios, en ciertos productos cosméticos para pieles de distintos orígenes étnicos y en los remedios caseros.
- Ciertos empleos y hobbies pueden exponer a los niños y adultos al plomo. Entre los ejemplos se encuentran los pintores, los remodeladores, los plomeros, los mecánicos, las personas que trabajan en puentes, en la fabricación de joyas, cerámicas, alfarería o vitrales y quienes ingresan a polígonos de tiro bajo techo.

¿Su hijo corre riesgo de envenenarse con plomo?

Si responde afirmativamente a cualquiera de las siguientes preguntas, tal vez desee someter a su hijo a un análisis, aunque ya sea mayor.

- ¿Su hijo vive o visita con frecuencia un edificio construido antes de 1960?
- ¿Su hijo vive o visita con frecuencia un edificio construido antes de 1978 que está en proceso de reparación o remodelación o que ha sido reparado o remodelado recientemente?
- ¿Su hijo vive o visita con frecuencia un edificio cuya pintura se está desprendiendo o descascarando?
- ¿Su hijo vive con un adulto o visita con frecuencia a un adulto cuyo trabajo o hobby lo expone al plomo?
- ¿Su familia come o bebe utilizando platos o vasos fabricados fuera de los EE. UU.?
- ¿Su familia utiliza remedios caseros?

¿Cómo se envenena por plomo un niño?

- El envenenamiento por plomo suele ocurrir cuando los niños ingieren polvo que contiene plomo. Los niños también pueden comerse restos de pintura o tierra con plomo.

¿Qué provoca el plomo en el cuerpo?

- Ninguna cantidad de plomo en el cuerpo es segura. ¡El daño provocado por el plomo es para siempre! El plomo puede dañar el cerebro. Puede causar problemas de crecimiento, pérdida de audición y trastornos de aprendizaje.
- Muchos niños no exhiben signos de envenenamiento por plomo. Algunos signos de niveles altos de envenenamiento por plomo son los mismos que en otras afecciones infantiles, como el resfriado común o la dentición.

¿Qué provoca el plomo en el cuerpo? (cont.)

- Si una mujer embarazada se encuentra en un ambiente donde hay plomo, ella y el bebé por nacer pueden envenenarse por plomo. El plomo puede causar un daño prolongado a la madre y al bebé.

¿Cómo se puede reducir el riesgo?

Reemplace, arregle o gestione todos los peligros relacionados con el plomo en forma segura.

Pasos a seguir para evitar que los niños se envenenen por plomo:

- Mantener a los niños y a las mujeres embarazadas alejadas de todo peligro relacionado con el plomo.
- Limpiar el polvo con plomo y la pintura desprendida en los alféizares y huecos de las ventanas con un paño húmedo o limpiar los pisos con agua. NO limpiar en seco ni usar una aspiradora, ya que esto puede esparcir el polvo que contiene plomo.
- Bloquear los lugares donde hay pintura desprendida o descascarada. No usar ventanas con pintura desprendida.
- Trasladar la habitación o el área de juegos de los niños a un espacio donde no haya pintura desprendida o descascarada.
- Colocar felpudos lavables dentro y fuera de las puertas de entrada.
- Hacer que las personas se quiten los zapatos antes de ingresar a la casa.
- No permitir que los niños (o mascotas) jueguen con tierra.
- Lavar y secar las manos, los juguetes y chupetes de los niños a menudo. Lavar y secar las manos de los niños antes de jugar, de comer y al acostarse.
- Usar agua fría de la canilla para beber, cocinar y preparar la leche de fórmula. Dejar correr el agua entre 1 y 2 minutos antes de usarla.
- Ofrecer a los niños comidas y bocadillos sanos. Si una persona tiene el estómago vacío, el plomo se absorbe con más rapidez que con el estómago lleno.

Pasos que los adultos pueden seguir para ayudar a evitar que ellos o niños se envenenen por plomo debido a su trabajo o hobby:

- No comer, beber ni fumar en su lugar de trabajo o hobby.
- Lavarse las manos y el rostro antes de comer, fumar o beber.
- Usar vestimenta de protección (como guantes descartables, gorra y fundas para zapatos) al trabajar con plomo. Usar un espirador aprobado por el Instituto Nacional de Salud y Seguridad Ocupacional (NIOSH).
- Ducharse, lavarse el cabello y colocarse ropa y zapatos limpios antes de dejar el área de trabajo. Si queda polvo en la vestimenta, puede contaminar su casa y automóvil.
- Colocar la ropa y los zapatos de trabajo en bolsas de plástico selladas.
- Lavar la ropa de trabajo en una carga separada de la ropa sucia de la familia.

¿Es necesario someter su hijo a la prueba para detectar envenenamiento por plomo?

- Sí, todos los niños que tengan entre 1 y 2 años de edad deben someterse a la prueba de detección de envenenamiento por plomo. ¡Es la ley!
- Los análisis de sangre indicarán la cantidad de plomo en la sangre de su hijo al momento del análisis. Si el nivel es alto, su hijo necesitará pruebas adicionales.
- Si su hijo está en riesgo en otras edades, también debe someterlo a los análisis en esos momentos.

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CT DPH LEAD & HEALTHY HOMES PROGRAM

HOJA DE DATO

Comer Saludable Ayuda Prevenir El Envenenamiento De Plomo

El plomo engaña el cuerpo haciéndole creer que es hierro, calcio o cinc.
Comer saludable para que el cuerpo absorbe menos plomo.

¡No deje que su niño esté con el estómago vacío!

Cinco Grupos Básicos de Alimentos

- Pan, cereal y granos
- Verduras
- Frutas
- Leche y productos lácteos
- Carne, pollo, pescado, nueces y frijoles o lentejas



Alimentos Ricos en Calcio

- Leche (al menos 2 pero no más de 3 tazas al día)
- Yogur
- Queso (para entrecomidas, para cocinar fideos, pizza, tortillas, verduras)
- Comidas hechas con leche (budín, sopa, helado, natilla)
- Sardinas o salmon en lata (con espinas)
- Verduras verdes (col, col verde, broccoli)



Alimentos Ricos en Cinc

- Pollo o pavo
- Carne sin grasa
- Pescado
- Leche y queso
- Almejas, ostras, mejillones y cangrejo
- Frijoles y lentejas
- Huevos



Alimentos Ricos en Hierro

- Carne roja sin grasa, pollo, pavo y pescado
- Cereal frío y caliente fortificado con hierro
- Almejas, ostras y mejillones (en lata para sopa o salsa para pasta)
- Verduras de hoja verde oscuro
- Frijoles, garbanzos o lentejas (pintos, rojos, azules, morados, garbanzo)
- Huevos
- Frutas secas



El hierro que contienen las verduras, los granos, los frijoles, las nueces y los huevos puede ser mejor aprovechado por el cuerpo si se come con un alimento alto en contenido de Vitamina C en la misma comida. Las naranjas, las toronjas, las fresas, los melones, los pimientos verdes, la coliflor, el broccoli y las papas son alimentos altos en contenido de Vitamina C.

Healthy Tips:

- No fría alimentos. Hornee o áselos.
 - Trate de no comer alimentos con mucha grasa. Cuando coma ellos, coma pequeñas porciones.
 - La vitamina C ayuda su cuerpo absorbe hierro.
 - Los niños menores de 2 años deben tomar leche sin desnatar después de dejar la fórmula o el pecho. La mayoría de los niños de 2 años o mayores pueden tomar leche desnatada. Los niños con alergia a la leche pueden comer tofu, verduras de hoja verde y sardinas o salmón en lata para satisfacer sus necesidades de calcio.
 - Los niños pequeños necesitan porciones más pequeñas que los niños grandes o los *adultos*, y *las personas más activas necesitan porciones más grandes de cada uno de los 5 grupos de alimentos.*
-

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