NICHD Research Program in Reading Development, Reading Disorders, and Reading Instruction

Workshop Summary and Map

WORKSHOP ORGANIZING SPONSOR:

National Institute of Child Health and Human Development, National Institutes of Health
U.S. Department of Health and Human Services

The statements, conclusions, and recommendations contained in this document reflect both individual and collective opinions of the symposium participants and are not intended to represent the official position of the U.S. Department of Health and Human Services, or the National Institutes of Health.

THE NICHD RESEARCH PROGRAM IN READING DEVELOPMENT, READING DISORDERS, AND READING INSTRUCTION

INITIATED: 1965

G. Reid Lyon, PhD
National Institute of Child Health and Human Development, NIH

Reading achievement in the United States continues to be stagnant

- 37% of fourth graders read below "Basic" level and much higher in minority groups
- Over 60% of African-American and Latino children; over 70% in some urban school districts

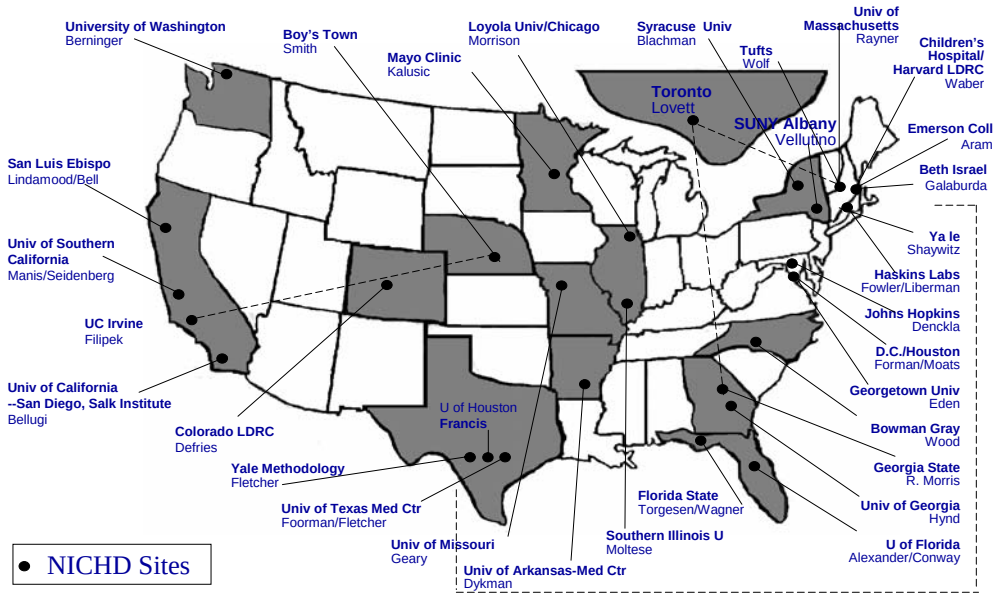
RESEARCH QUESTIONS

- How do children learn to read?
- Why do some children have difficulties learning to read?
- How can we prevent reading difficulties?
- How can we remediate reading difficulties?

PARTICIPANTS

- **Children and Adults Studied: 42,062**
- **Good Readers (50TH %ile and above): 21,680**
- **Struggling Readers (< 25TH %ile): 20,382**

NICHD Reading Research Program



EUROPEAN AND ASIAN SITES

- China
- England
- Israel
- Russia
- Sweden
- Turkey

HOW DO CHILDREN LEARN TO READ

- Substantial oral language interactions from birth onward.
- Extensive literacy interactions from birth onward.
- Using verbal interaction, language play, and oral reading to highlight the structure of the language.
- ALL NECESSARY BUT NOT SUFFICIENT

HOW DO CHILDREN LEARN TO READ

- They have developed an understanding that words that are spoken can be segmented into constituent abstract sounds (PHONEMES).
- PHONEMIC AWARENESS

HOW DO CHILDREN LEARN TO READ

- **The development of phonemic awareness (NECESSARY BUT NOT SUFFICIENT)**
- **Why can this be difficult for some children?**
  - **Spoken language is seamless**
  - **Co-articulation**
  - **Speaking and listening do not require explicit knowledge of speech segments**

HOW DO CHILDREN LEARN TO READ

- They have learned that print represents the sounds of speech.
  - The alphabetic principle

(NECESSARY BUT NOT SUFFICIENT)

- They have learned to connect letters and letter patterns to the sounds of speech.
  - Decoding and word recognition skills

(NESESSARY BUT NOT SUFFICIENT)

HOW DO CHILDREN LEARN TO READ

- They have learned how to apply decoding and word recognition skills accurately and rapidly when reading words and text.
- They have learned how to use context to confirm accurate decoding and pronunciation of unknown words.
- THESE ARE NECESSARY BUT NOT SUFFICIENT FOR LEARNING TO READ

HOW DO CHILDREN LEARN TO READ

- Have learned strategies to maximize their reading comprehension.
  - Can apply decoding and word recognition skills accurately and fluently.
  - Have developed adequate background knowledge and vocabulary to ensure connections between what is known.
  - Can actively employ language form and function (e.g. semantics, syntax, voice) to enhance comprehension.
  - Can actively monitor their comprehension

HOW DO CHILDREN LEARN TO READ

- Good Comprehenders...
  - Relate new information to existing knowledge
  - Have well developed vocabularies
  - Can summarize, predict, and clarify
  - Use questioning strategies to guide
  - Comprehension

NICHD EARLY INTERVENTION STUDIES

- Scientific and Educational Goal
- To determine for which children which instructional approaches and combinations of approaches are most beneficial at particular stages of reading development
  - Children participating: 3,600
  - Teachers participating: 1,012
  - Schools Participating: 266
  - Classrooms: 985
  - States (including DC): 8

NICHD INTERVENTION STUDIES

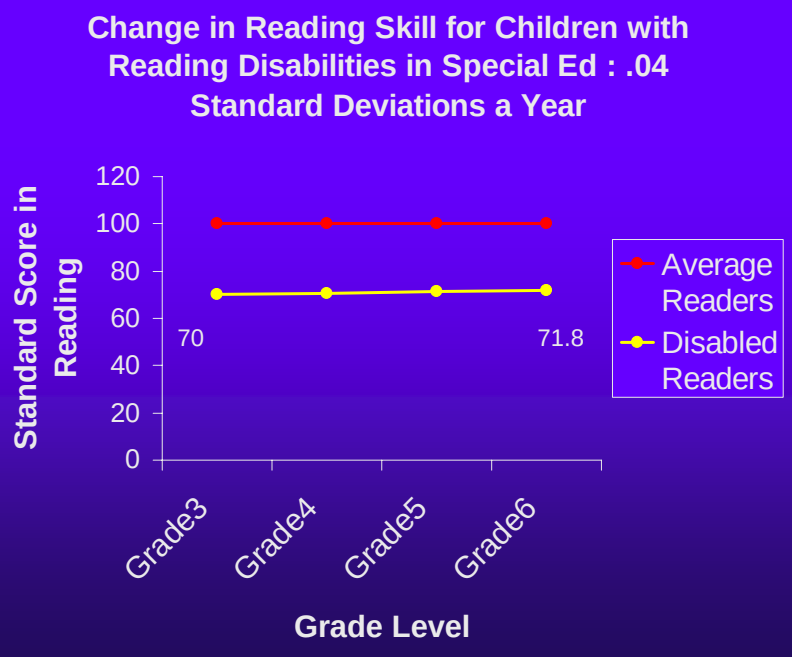
- Methodological characteristics
  - Theoretically based
  - Hypothesis driven
  - Samples defined to permit independent replication
  - Instruction defined to permit independent replication

NICHD INTERVENTION STUDIES

- Methodological Characteristics
  - All studies involve longitudinal designs to determine the effects of different interventions on language and reading growth over time.
  - Studies designed to assess:
    - Different instructional components
    - Units of analysis
    - Degree of explicitness
    - Program Completeness

Special Education Does Not Close the Gap

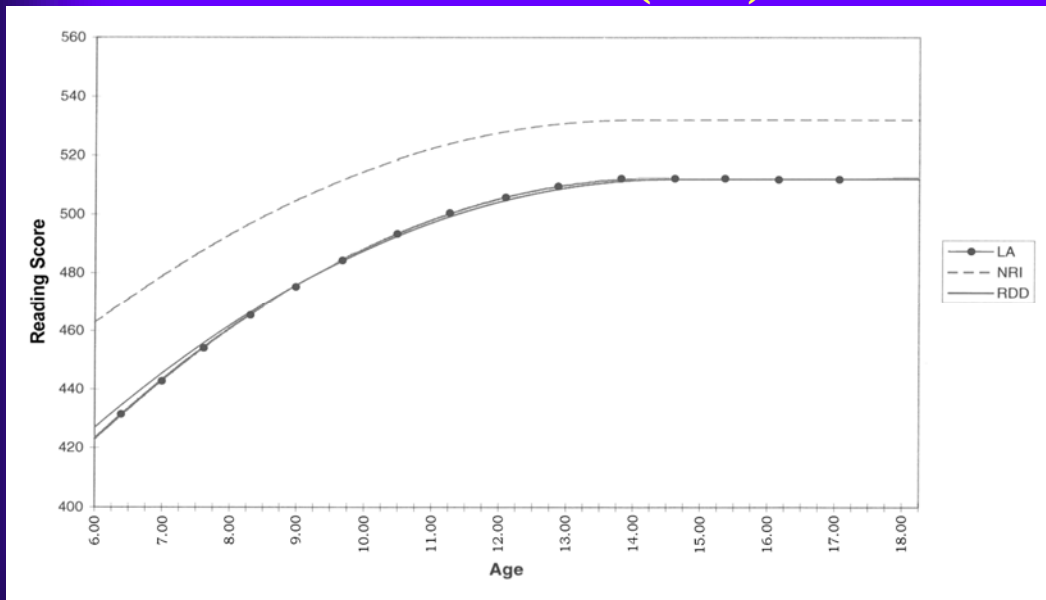
- Group sizes too large for pull out programs
- Inclusion prevents effective practices for children with LD
- Models of service delivery demonstrably ineffective for children with LD in reading
- Occurs Too Late!!



Special Education Does Not Close the Gap

- Teachers not adequately prepared
- Identification based on failure
- System oriented to procedural compliance, not services and outcomes
- Wait to Fail model that sometimes stabilizes but rarely remediates!!

Francis et al. (1996)



Early Intervention is Possible

- **Risk characteristics present in Kindergarten and G1**
- **Letter sound knowledge, phonological awareness, oral language development**
- **Assess all children and INTERVENE- first in the classroom and then through supplemental instruction**

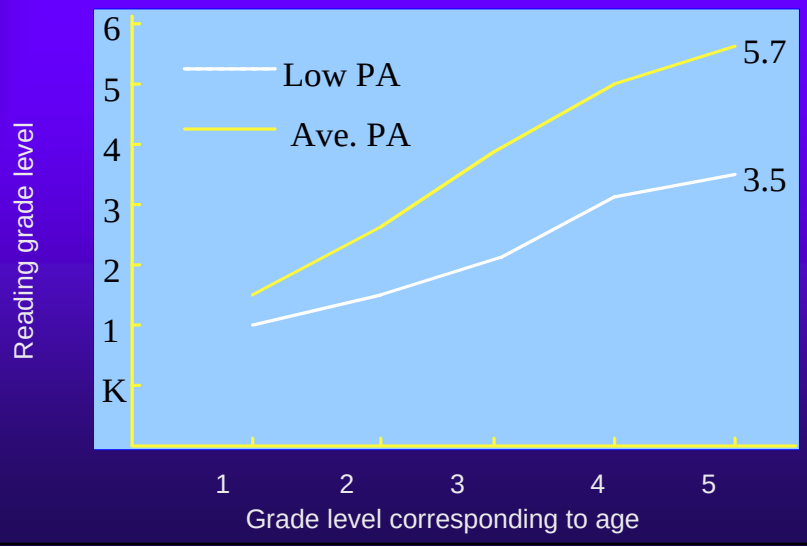
Importance of Early Assessment and Intervention for Reading Problems

- Reading problems identified in Grade 3 and beyond require considerable intervention. Children do NOT simply outgrow reading problems.
- 74% of children identified as disabled in Grade 3 remained disabled in 9th grade (Francis et al., 1996)

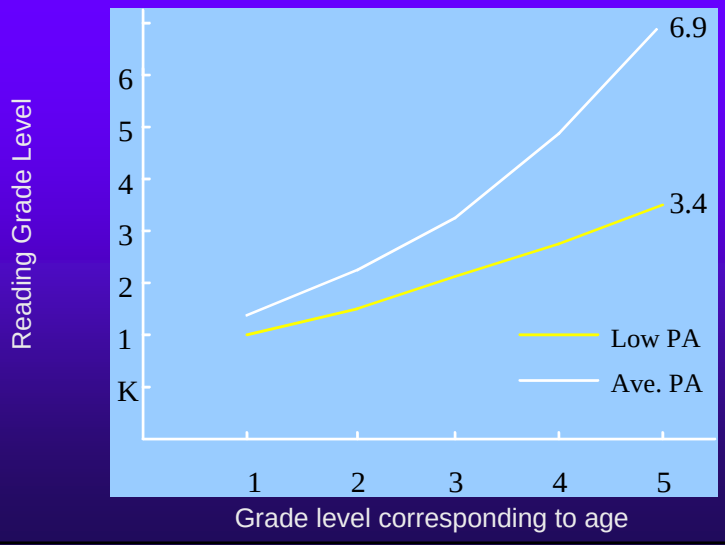
Importance of Early Assessment and Intervention for Reading Problems

- Presence of risk characteristics are apparent in K and G1.
- 88% of students who were poor readers in G4; 87% of students who were good readers in G1 were also good readers in G4 (Juel, 1988).
- Stability in reading status from G1 to G5, this reading status was predictable based on K performance (Torgesen, 1997).

Growth in word reading ability of children who begin first grade in the bottom 20% in Phoneme Awareness
(Wagner, Torgesen, Rashotte, et al., 1997)



Growth in reading comprehension of children who begin first grade in the bottom 20% in Phoneme Awareness
(Wagner, Torgesen, Rashotte, et al., 1997)



Early Intervention is Clearly Effective

- Torgesen (1997) identified children in K based on poor phonological awareness. By G2, 1:1 tutoring brought 75% to grade level reading.
- Vellutino et al. (1996) identified middle SES children with very low word recognition skills at the beginning of G1. After 1 semester of 1:1 tutoring, 70% were on grade level.

Early Intervention is Clearly Effective

- Foorman et al. (1998): Classroom level reading intervention that provided explicit instruction in phonological awareness and the alphabetic principle as part of a balanced approach to reading brought G1-G2 students receiving Title 1 services to national averages relative to less explicit, inductive approaches.

A Widely Proposed Model

If progress is inadequate, move to next level.

Level 1: Primary Intervention

Enhanced general education classroom instruction.

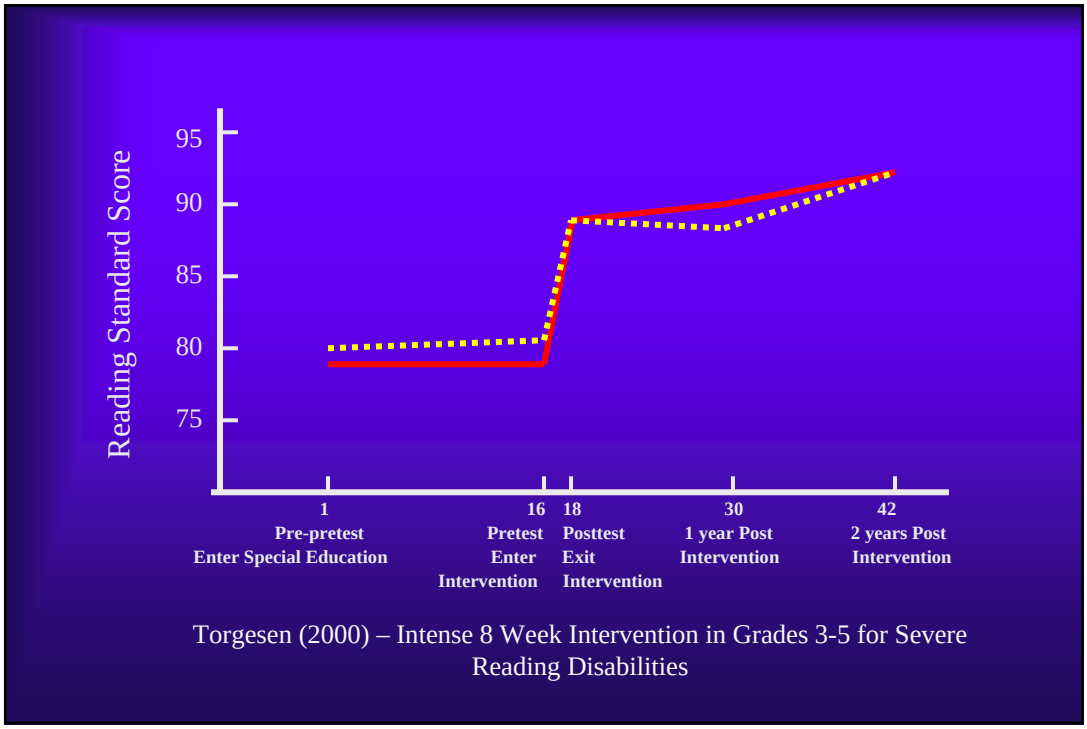
Level 2: Secondary Intervention

Child receives more intense intervention in general education, presumably in small groups.

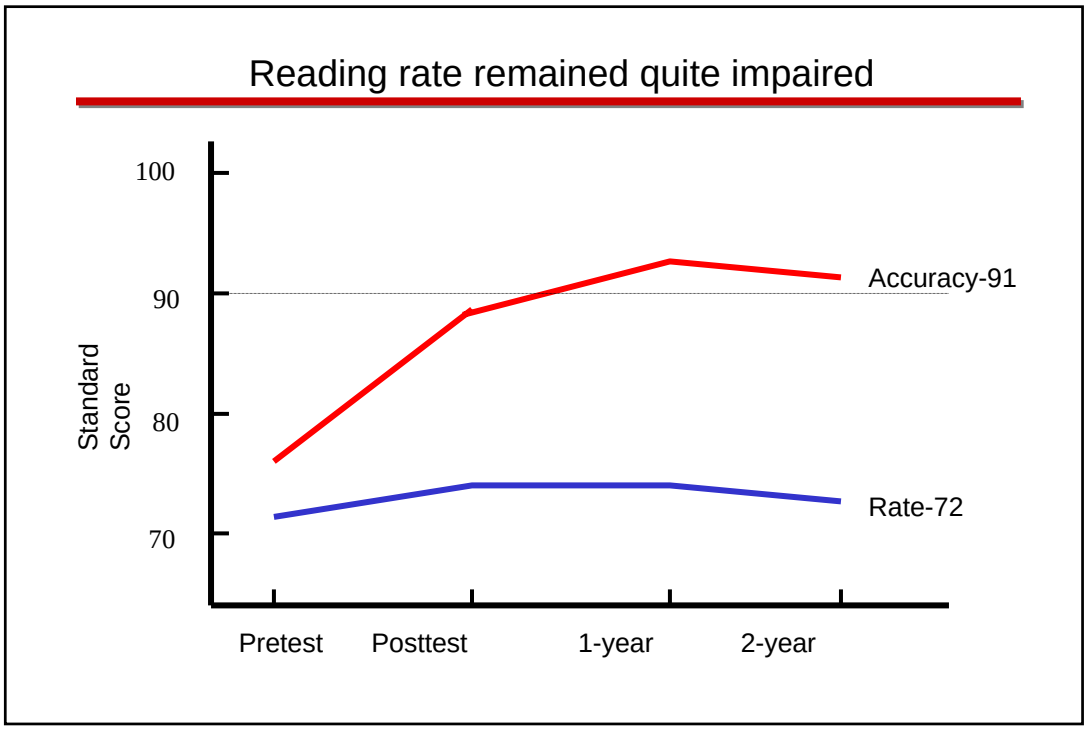
Level 3: Tertiary

Child placed in special education.

Intervention increases in intensity and duration.



Torgesen (2000) – Intense 8 Week Intervention in Grades 3-5 for Severe Reading Disabilities



The Interventions

- **Enhanced Classroom Instruction**
- **All children identified as at-risk for principal, teachers, and parents**
- **Progress monitored with feedback to principal, teachers, and parents**
- **Professional development of classroom teachers in strategies for accommodating academic diversity and linking assessment to instructional planning for struggling readers**

The Core Sample

Children – sampled across 2 years (2001- 2002)

- 300 At-Risk Readers - assigned randomly to intervention.
- 100 Low Risk Readers

Teachers

- 6 Intervention (3 Proactive & 3 Responsive)
- 30 General Education 1st-grade Teachers

Schools

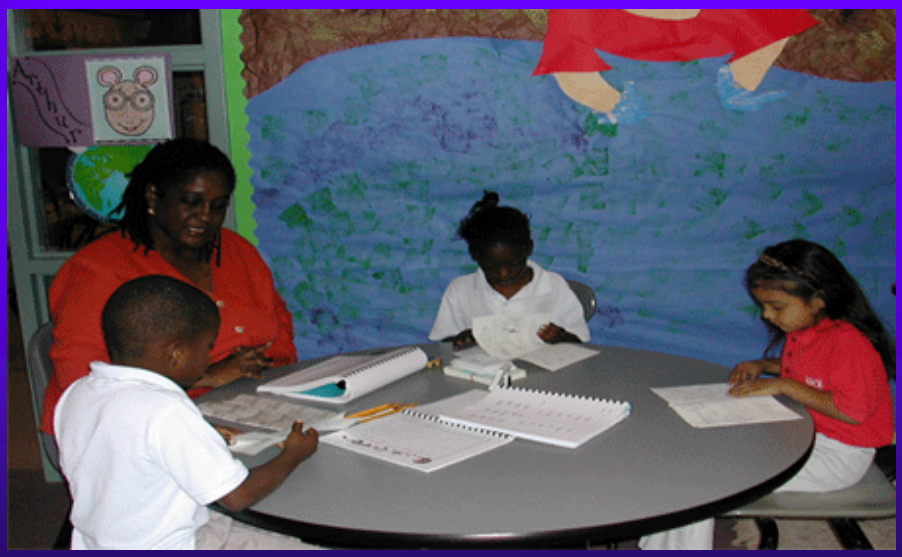
- 6 non-Title 1 elementary schools in a large urban school district

Comparison of Two Interventions

- **Proactive and Responsive**
- **40 minutes, 5 days per week, all school year (30 weeks)**
- **1:3 teacher-student ratio**
- **Taught by certified teachers**
- **Teachers are school employees, but trained and supervised by researchers**
- **Provided in addition to enhanced classroom instruction**

Proactive Intervention

- Explicit instruction in synthetic phonics, with emphasis on fluency.
- Integrates decoding, fluency, and comprehension strategies.
- 100% decodable text
- Carefully constructed scope and sequence designed to prevent possible confusions.
- Every activity taught to 100% mastery everyday.

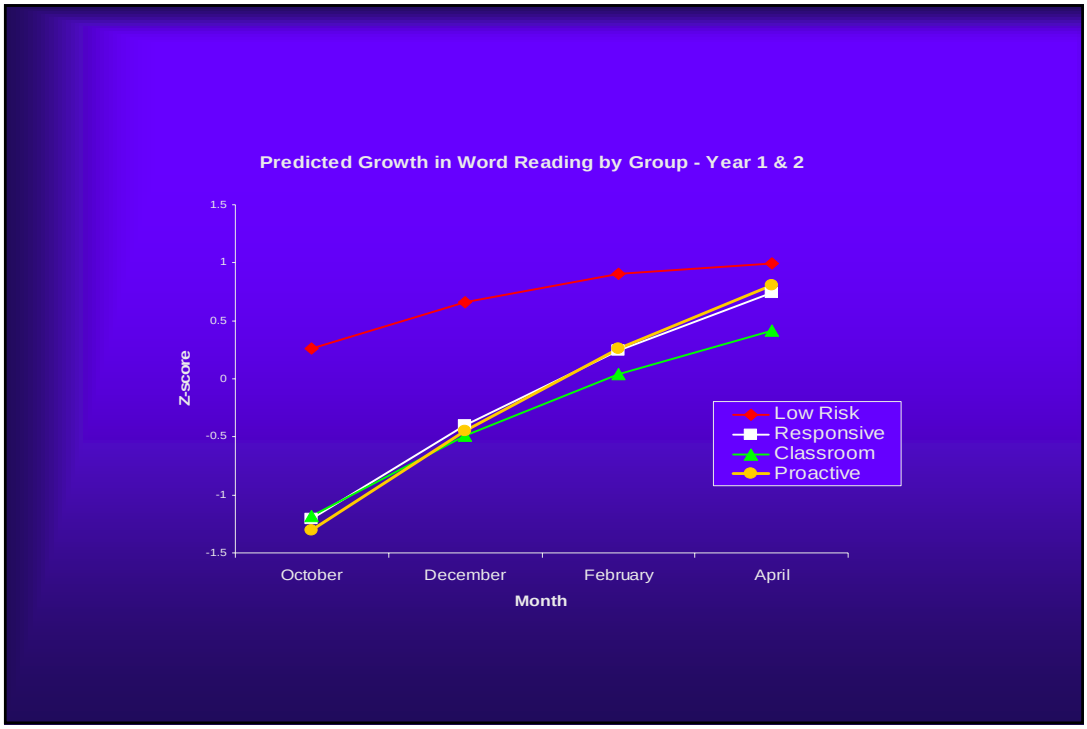


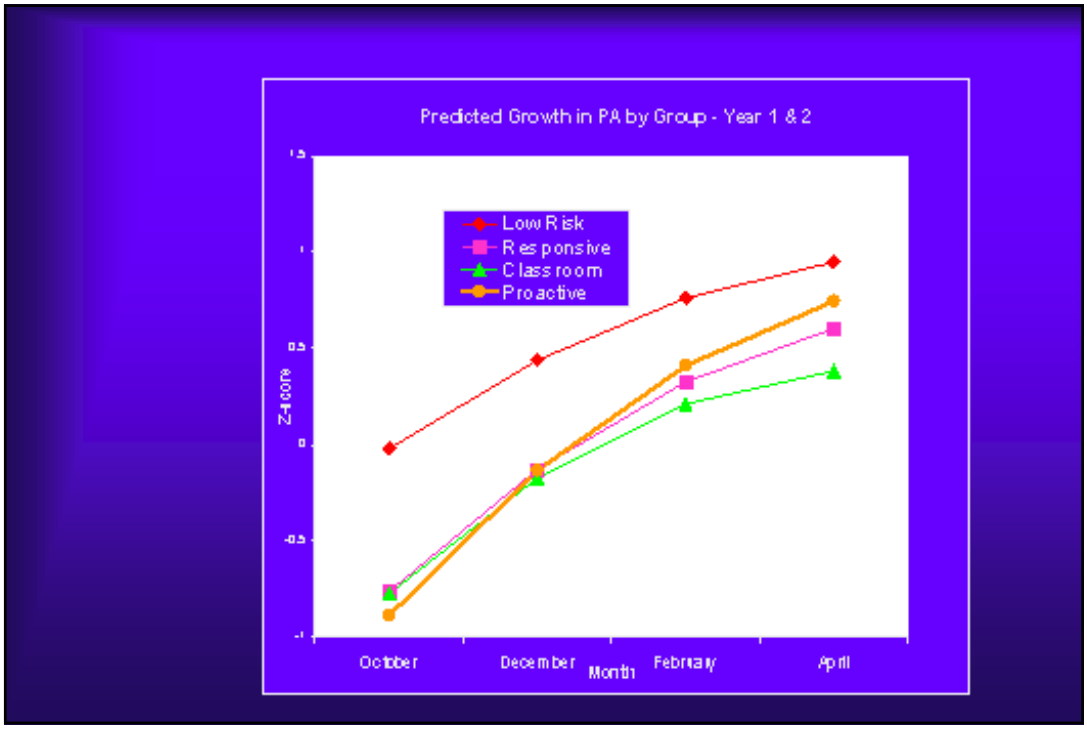
Responsive Intervention

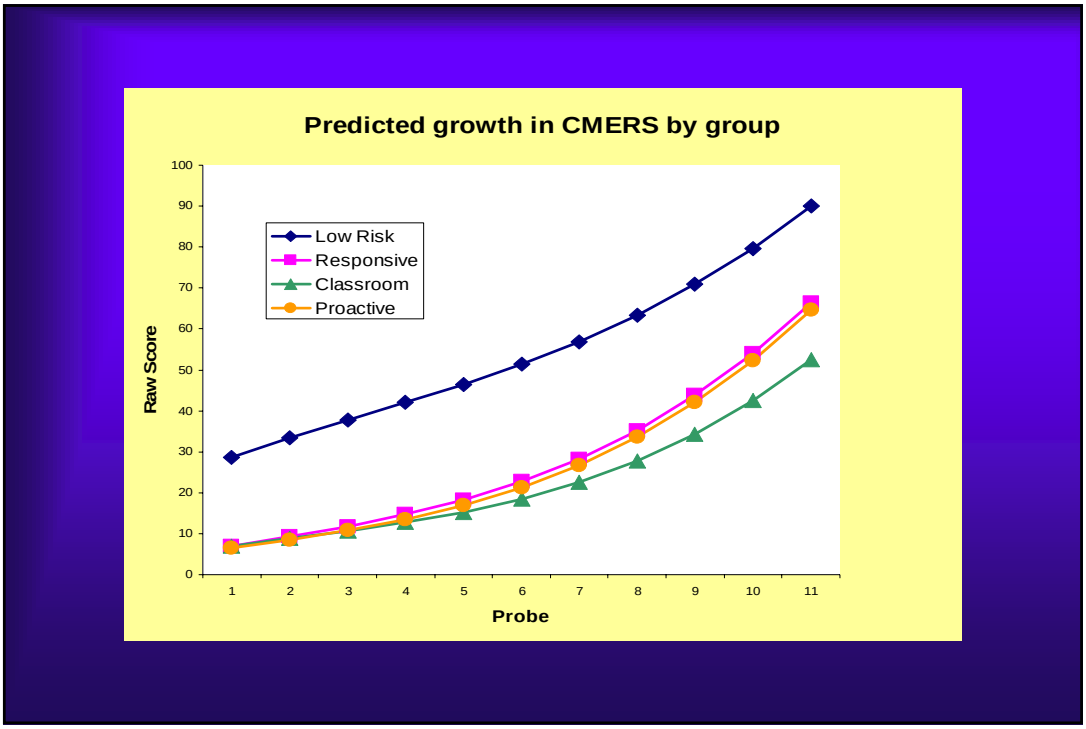
- Explicit instruction in synthetic phonics and in analogy phonics
- Teaches decoding, using the alphabetic principle, fluency, and comprehension strategies in the context of reading and writing
- No pre-determined scope and sequence
- Teachers respond to student needs as they are observed.
- Leveled text not phonetically decodable

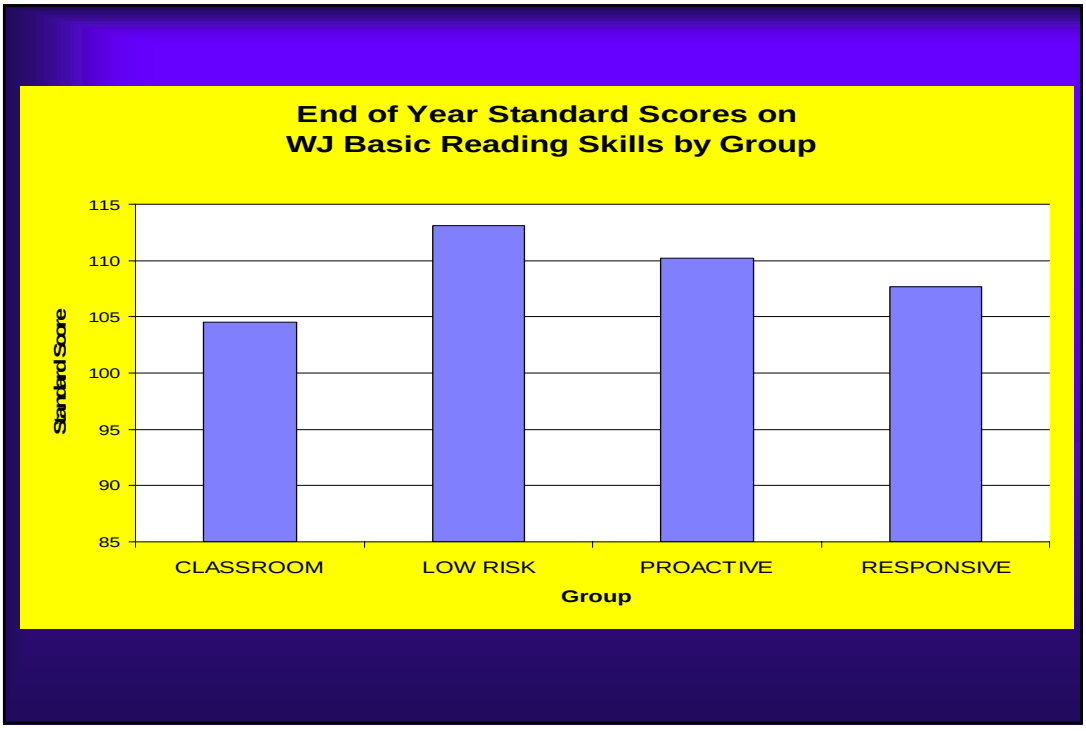
A Comparison Between Responsive Reading and Reading Recovery

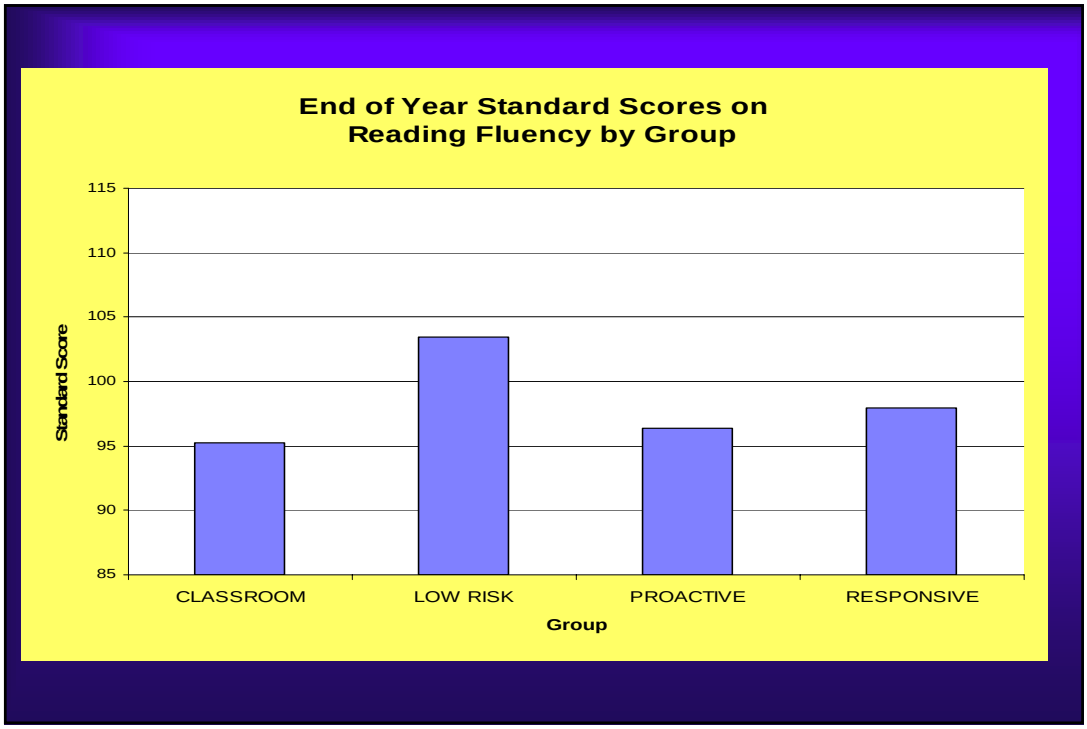
Responsive Reading	Reading Recovery
♦ 1:3 teacher-student ratio (18 students per day)	♦ 1:1 teacher-student ratio (4 students per half day)
♦ Daily 40-minute lessons	♦ Daily 30-minute lessons
♦ School year (30 weeks)	♦ 20 weeks
♦ Letter and word work 10-12 minutes per day	♦ Letter and word work 2-3 minutes per day (optional)
♦ One word identification strategy	♦ Many word identification strategies
♦ Children taught to sound out words	♦ Children taught to use context and pictures to help identify words

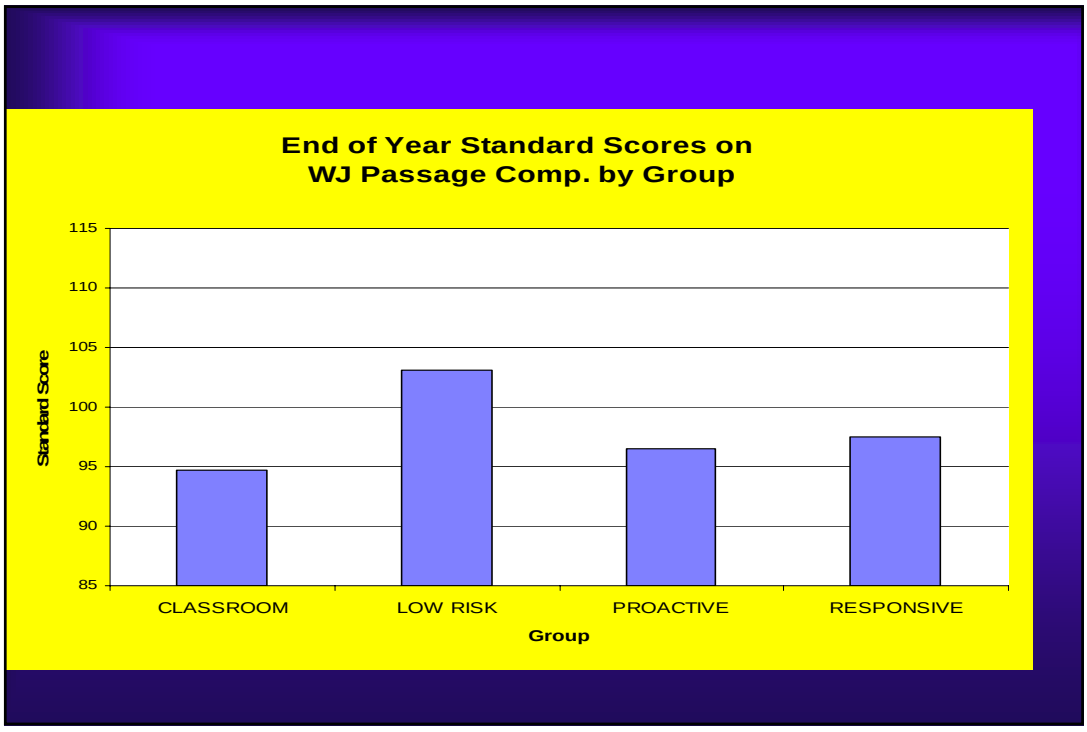

Predicted Growth in Word Reading by Group - Year 1 & 2
Z-score
1.5
1
0.5
0
-0.5
-1
-1.5
October
December
February
April
Month
Low Risk
Responsive
Classroom
Proactive


Predicted Growth in PA by Group - Year 1 & 2
Z-score
October
December
February
April
Month
Low Risk
Responsive
Classroom
Proactive


Predicted growth in CMERS by group
Raw Score
Probe
Low Risk
Responsive
Classroom
Proactive
0
10
20
30
40
50
60
70
80
90
100
1
2
3
4
5
6
7
8
9
10
11


End of Year Standard Scores on
WJ Basic Reading Skills by Group
Standard Score
Group
85
90
95
100
105
110
115
CLASSROOM
LOW RISK
PROACTIVE
RESPONSIVE


End of Year Standard Scores on
Reading Fluency by Group
115
110
105
100
95
90
85
Standard Score
CLASSROOM
LOW RISK
PROACTIVE
RESPONSIVE
Group


End of Year Standard Scores on
WJ Passage Comp. by Group
115
110
105
100
95
90
85
Standard Score
CLASSROOM
LOW RISK
PROACTIVE
RESPONSIVE
Group

What percentage of children don't respond adequately to quality intervention?

Primary only: 14/90 = 16% (3% of school population)

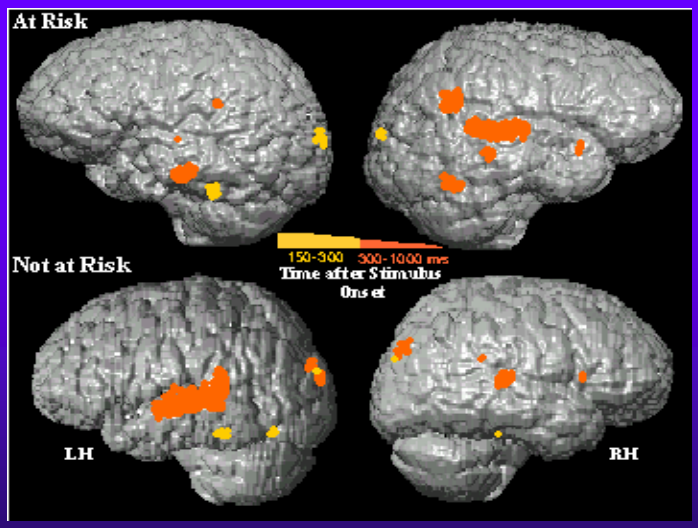
Primary + Secondary:

- **Proactive: 1/82 = < 1% (< .2% of school population)**
- **Responsive: 7/83 = 8% (<1.5% of school population)**

(Woodcock Basic Reading < 30th percentile)

Kindergarten

S#1



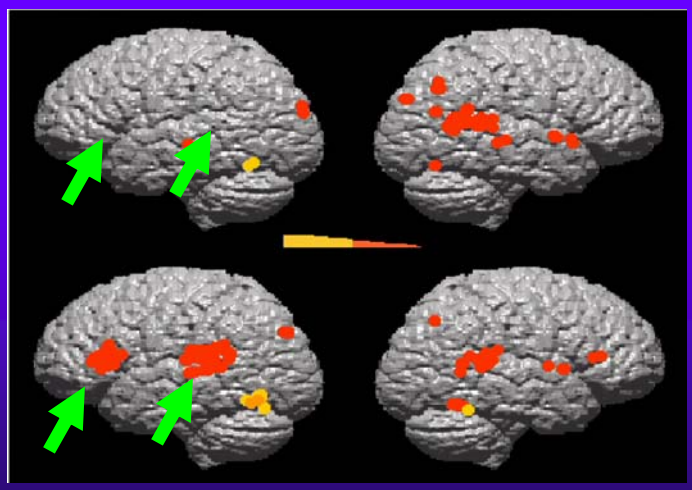
S#31

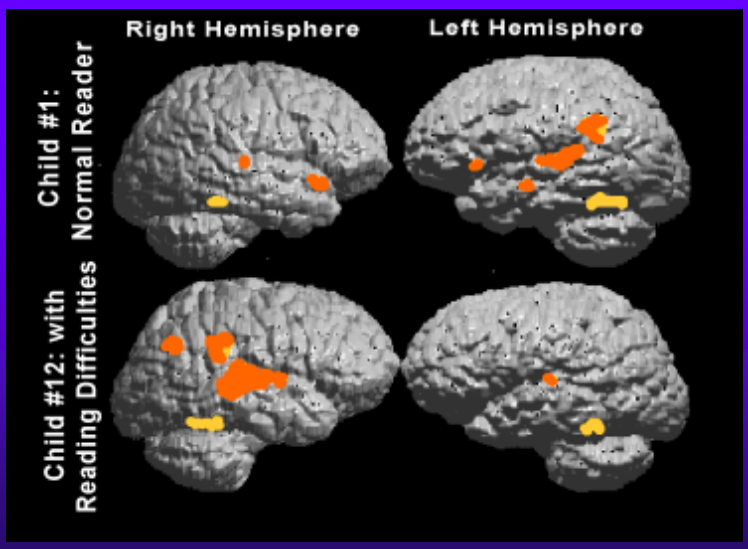
At Risk Reader

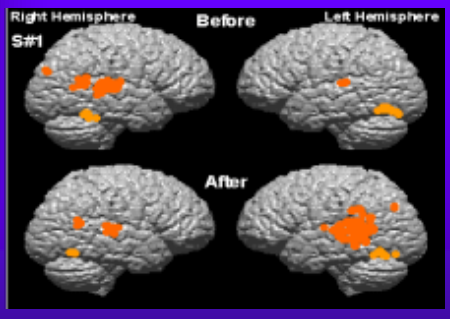
Left Right

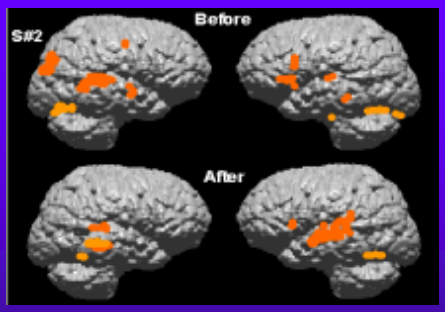
Kindergarten

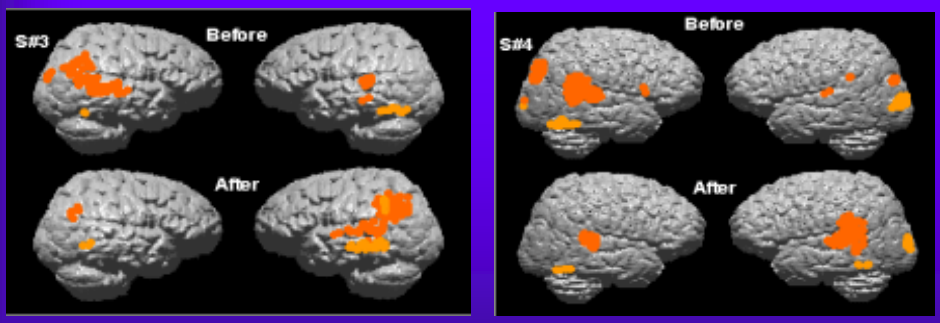
First Grade




Right Hemisphere
Left Hemisphere
Child #1: Normal Reader
Child #12: with Reading Difficulties


Right Hemisphere
S#1
Before
Left Hemisphere
After


S#2
Before
After



Conclusions

- Development of reading skills dependent on establishment of LH neural network
- Network can be established through instruction, but is interplay of brain and experience
- “We are all born dyslexic- the difference among us is that of us are easy to cure and others more difficult” A.M. Liberman, 1996

Conclusions

- Primary and secondary level interventions appear effective in teaching at- risk children to read
- Affect a broad range of reading domains- word recognition, fluency, comprehension
- Pullout approaches comparably effective- both comprehensive, well- integrated with explicit phonics component: consistent with recent consensus reports

Early Intervention Reduces the At- Risk Population

- Primary alone: 5- 7%
- Secondary alone: 2- 6%
- Primary and Secondary: .01% to < 2%

Conclusions

- Three tier model has great promise for preventing most common cause of identification for special education
- Promotes joint responsibility of general education and special education for all children
- No child should be placed in special education without documentation of failure to respond adequately to scientifically- based instruction

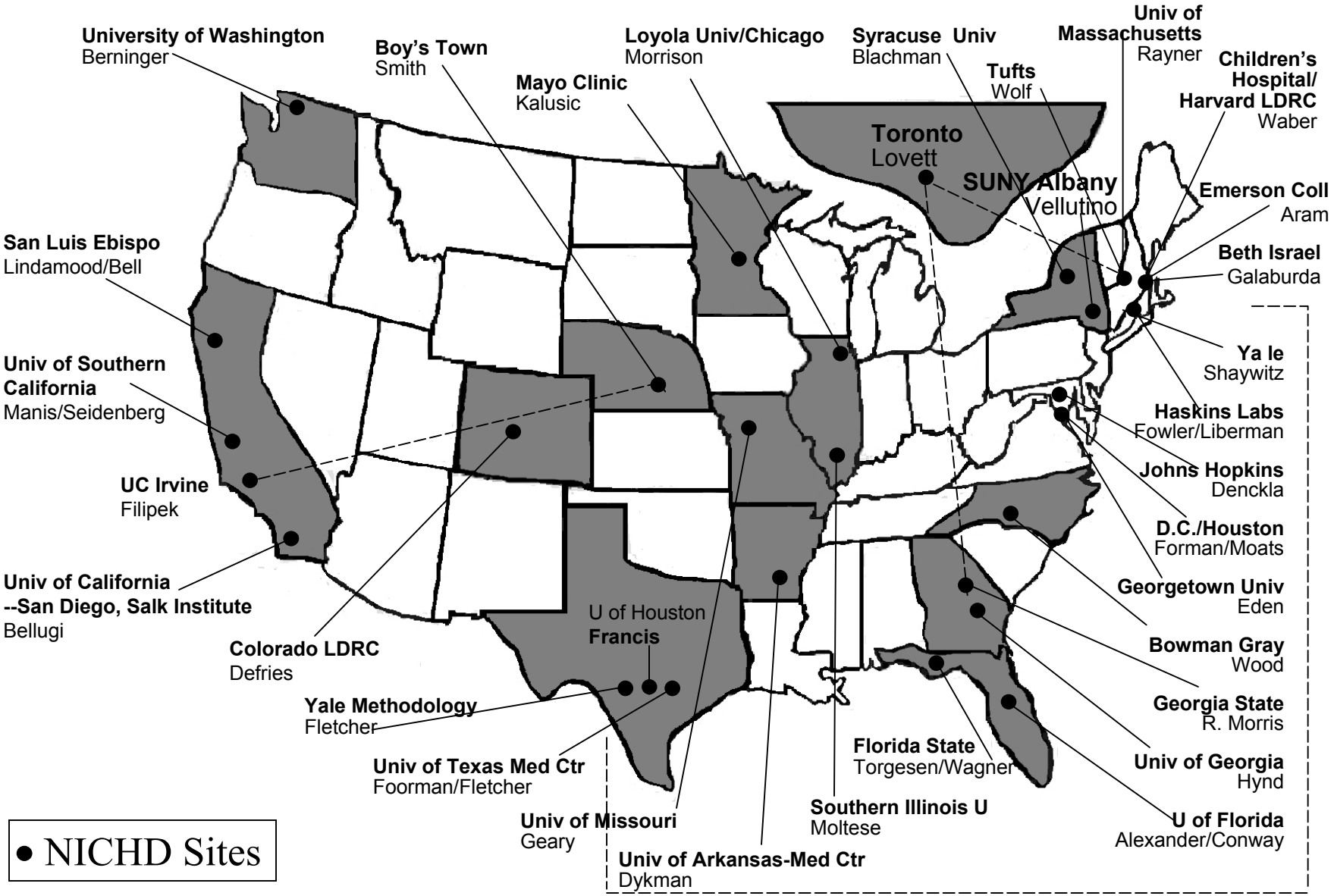
Conclusions

- Scaling up this model will require a significant investment in research
- Many variables interact to produce outcomes: child, classroom (teacher), school, community: *For whom and how long???*
- Adequate measurement and good tools are essential, along with strong designs and large samples

Newer Federal Initiatives have Great Promise

- Reading Excellence Act
- No Child Left Behind
- Reading First
- Early Reading First

NICHD Reading Research Program



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