



**A Promising RTI Tier 2  
Early Literacy Intervention:**  
Results from Cluster Randomized  
Controlled Studies and Longitudinal  
Follow-Up

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Ph.D.

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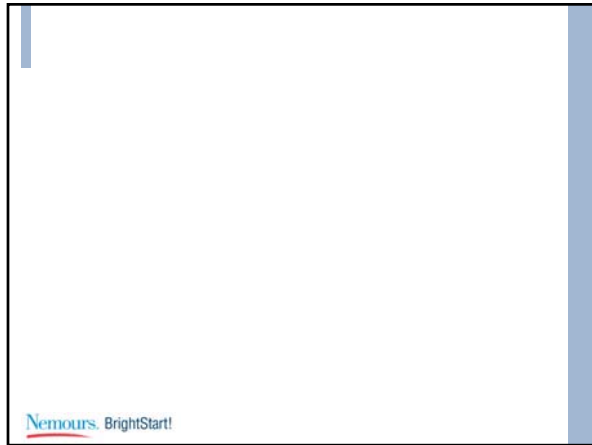
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**About Nemours**

- An operating foundation that provides an integrated child health system in the Delaware Valley and Florida.
- Dedicated to advancing higher standards in children's health and to doing whatever it takes to prevent and treat even the most disabling childhood conditions.
- Identified literacy as a major child health issue.



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### Nemours Foundation

- Established through the will and trust of Alfred I. duPont in 1936, Nemours is one of the largest foundations in the country devoted to children's health
- Owns and operates children's hospitals and clinics throughout the DE and FL regions including the A.I. duPont Hospital for Children in Wilmington and Nemours Children's Hospital - Orlando
- Underwrites over \$100 million each year in unreimbursed medical care, research, and outreach

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### Why Is Literacy a Child Health Issue?

- Reading ability is the strongest individual predictor of adult health status.
- Problems with reading affect many aspects of a child's development: cognitive, academic, emotional, behavioral and social.
- Parents often seek out advice from pediatricians regarding their child's reading problems
- It is often related to many other child health issues (vision, hearing, developmental milestones, school absence, medical conditions, etc.)

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### About Nemours BrightStart!

- Develop screening and educational intervention programs for young children at risk for reading failure
- Provided screening and intervention services for the past 7 years in over 120 childcare sites in Jacksonville, FL and in other FL counties and DE
- Work “in the trenches” with thousands of young children in urban, multi-lingual communities, suburban communities, and rural communities



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### Nemours BrightStart!: What We Do

- Help parents, teachers, health care providers, community leaders, and policy makers understand key concepts and actions that will promote reading success for all
- Conduct translational research to measure our impact and contribute scientific knowledge to reading development field



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### About Nemours BrightStart!

- Transform materials and provide professional development so teachers can integrate our approach into their own classrooms



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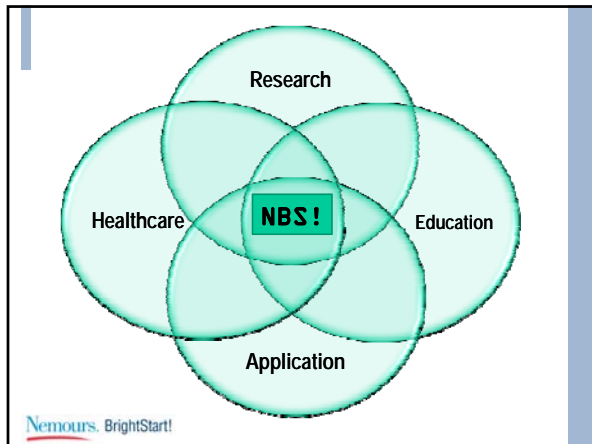
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**Best Practices for Early Identification of At-Risk Young Learners**

- Believe in the full potential of every child
- Take responsibility for doing all that we can
- Screen ALL young children
- Use evidence-based tools and strategies
- Teach critical skills explicitly
- Teach small groups

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**Best Practices for Early Identification of At-Risk Young Learners**

- Demonstrate high levels of responsiveness, consistency and warmth toward all students
- Assess the impact of your program
- Make data-driven educational decisions
- Communicate throughout with parents
- Reflect on lessons learned and ways to continuously improve

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## Nemours BrightStart!'s Pre-K Screening and Educational Intervention Approach

- Screen all 4 – 5 year old children in participating sites in the fall of pre-K year (Get Ready To Read screener)
- Provide small-group intensive instruction to children identified as “at-risk” for reading failure, based on screening results
  - 2x/week or more
  - Small groups (no more than 4 children)
  - 15-40 minute lessons
  - On site at child care centers and preschools
  - 10 to 20 weeks of instruction
- Rescreen after completing intervention, to measure progress

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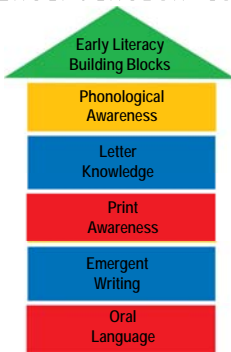
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## Intervention Components



### How We Teach It:

- Fun!
- Developmentally Appropriate
- Explicit
- Multi-sensory
- Systematic
- Standardized
- Small group

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## Overall Results, 2005 - 2012

- Over 13,000 pre-kindergarteners screened
- Over 3,300 received Nemours BrightStart! intervention
- Two-thirds or more moved to the age-appropriate range in reading readiness skills after intervention
- Using GRTR-R, able to calculate standard scores, which show the at-risk children move from significantly below average at pre-test to solid average range at post-test

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70% or more achieve post-test standard score > 90

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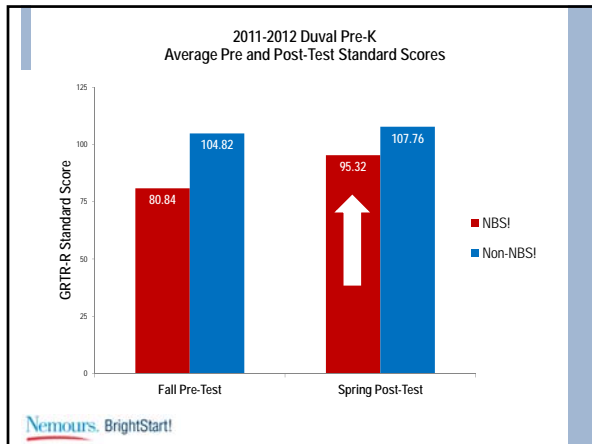
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**4 Years of Cluster Randomized Studies**

- Funded by Nemours
- Designed to contribute to science, inform public policy, AND provide a useful service to at-risk children
- Took place in natural environment of preschools and childcare centers
- No at-risk child was excluded from intervention or from our data analyses

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**General Experimental Design**

- Used Immediate (Fall) versus Delayed (Spring) treatment group design
- Randomly assigned childcare sites to treatment group, matched by zip code and percent of children receiving financial subsidy
- Key comparison was change from T1 to T2 – did treatment groups differ significantly at T2?

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### General Experimental Design

	Time 1	2.5 months	Time 2	2.5 months	Time 3
Immediate	Assessment	Intervention	Assessment	None	Assessment
Delayed	Assessment	None	Assessment	Intervention	Assessment

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### General Analytic Strategies

- Used HLM to test overall treatment effects
- Two-level model (children nested within centers)
- “Intent to treat” model employed
- Effect sizes computed using Cohen’s *d*

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### Method: Sample Year 1

- Screened 744 pre-kindergarteners
- 220 scored < 10 on *Get Ready To Read* screener and were assigned to intervention
- No differences in childcare quality, age, gender, ethnicity, or pretest scores on any measure between Immediate and Delayed treatment groups

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### Method: Dependent Variables

- Get Ready To Read
- Get It, Got It, Go! – Picture Naming, Rhyming and Alliteration subtests
- Bailet, L. L., Repper, K. K., Piasta, S. B., & Murphy, S. P. (2009). Emergent literacy intervention for prekindergarteners at risk for reading failure. *Journal of Learning Disabilities, 42*, 336-255.

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### Results Year One

- Immediate group showed statistically significant gains in Alliteration and Rhyming compared with the Delayed group
- No significant differences on GRTR or Picture Naming
- Significant “dosage” effects on all four DV’s
- Delayed group “caught up” by spring rescreening

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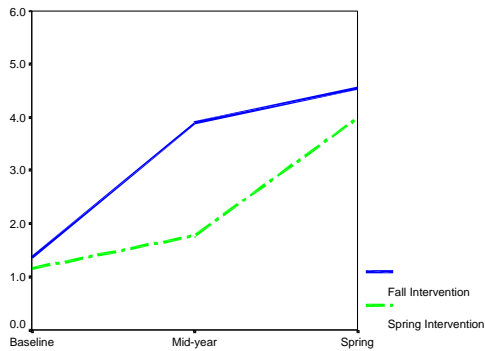
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Mean Rhyming Scores over Time



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**Conclusions: Year 1**

- Study gives evidence that the intervention has a significant favorable impact on selected emergent reading skills, particularly aspects of phonological awareness
- Documentation of a significant dosage effect across all four DV's is particularly noteworthy
- Apparent lack of significant "time of year" effect for intervention encouraging

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**Limitations: Year 1**

- Small number of sites, reducing statistical power
- Floor effects on Rhyming and Alliteration measures
- Newly developed intervention curriculum, thus no prior history with which to augment results interpretation

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**Intervention Changes: Year 2**

- Several new teachers hired
- Same general lesson structure and skill focus
- Increased number of alphabet letters presented across the lessons
- Increased number of lessons with an emergent writing component
- Increased number of letters sent home to parents
- Decreased onset-rime and increased rhyming activities

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### Analytic Approach

- Same general approach (Immediate and Delayed groups; intent to treat model; HLM analyses)
- A new wrinkle: “split” and “non-split” sites
- Required separate HLM analyses for each site type, then merged using a meta-analytic method
- Dropped GRTR cut-off one point to <9
- Switched to TOPEL (Print Knowledge, Phonological Vocab., Phonological Awareness)

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	# Sites	# Screened	# Qualified	Dep. Variables	Effect Size
Year 1	38	744	220 (29%)	GRTR	NS
				GGG PN	NS
				GGG RH	0.35
				GGG AL	0.44
Year 2	72	2004	349 (17%)	GRTR	0.29
				TOPEL PK	0.54
				TOPEL DV	NS
				TOPEL PA	NS
Year 3	102	2177	429 (15%)	GRTR	0.25
				TOPEL PK	NS
				TOPEL BL	0.41
				ALL RH	0.24
Year 4	104	2079	415 (20%)	GRTR	0.21
				TOPEL PK	0.24
				TOPEL BL	NS
				TOPEL EL	0.26
				ALL RH	0.33

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### Conclusions: Year 2

- Further evidence that Nemours BrightStart! intervention increases at-risk pre-kindergarteners’ emergent literacy skills, especially in print knowledge
- Not effective in improving phonological awareness skills, as measured by the TOPEL
- Same GRTR raw score outcome even though the at-risk students were lower functioning at baseline than in Year 1
- Demonstrated an accelerated learning pace for at-risk children through intervention

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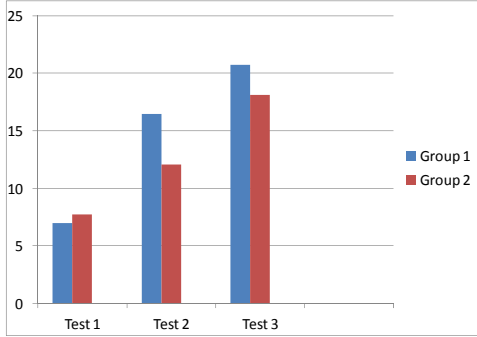
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### Year 2: TOPEL Print Knowledge Results



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### Limitations: Year 2

- Did not include a measure of rhyming
- Curriculum was disappointing in terms of measured growth of phonological awareness skills
- Both problems were addressed for Year 3
- Baillet, L. L., Repper, K. K., Murphy, S. P., Piasta, S. B., & Zettler-Greeley, C. (2011). Emergent literacy intervention for prekindergarteners at risk for reading failure: Years 2 and 3 of a multiyear study. *Journal of Learning Disabilities* published online June 17, 2011, DOI: 10.1177/0022219411407925

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### Method: Year 3

- Same general experimental design, screening and intervention approach
- Larger number of sites (n = 102) and children (n = 429)
- Kept cut-off score on GRTR the same (<9)
- Deleted TOPEL Definitional Vocabulary subtest
- Added the Rhyme Knowledge subtest from the Assessment of Language and Literacy (ALL)

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**Intervention Changes: Year 3**

- Same general lesson structure and skill focus
- Several new teachers hired
- Increased focus on segmenting and blending syllables
- Increased explicit multi-sensory instruction
- Parent letters sent home for every lesson

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**Results: Year 3**

**Significant impact of intervention on:**  
 Get Ready to Read  
 ALL-Rhyming

**Approaching significance:**  
 TOPEL Phonological Awareness ( $p < .08$ )  
 Ad Hoc analysis showed significant gains in Blending (ES = .41) but not Elision

Bailet, L. L., Repper, K. K., Murphy, S. P., Piasta, S. B., & Zettler-Greeley, C. (2011). Emergent literacy intervention for prekindergarteners at risk for reading failure: Years 2 and 3 of a multiyear study. *Journal of Learning Disabilities* published online June 17, 2011. DOI: 10.1177/00222194114079

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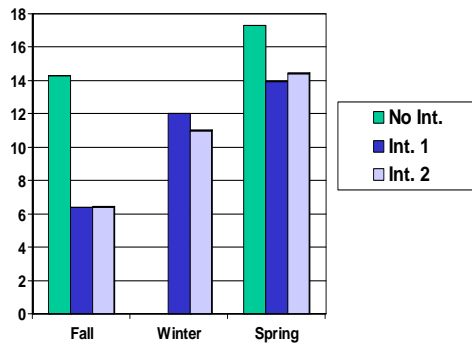
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### GRTR Scores for Year 3



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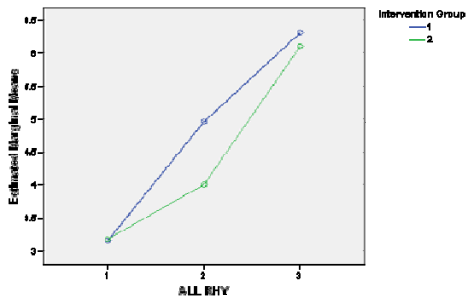
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### Rhyme Knowledge Results Year 3

Estimated Marginal Means of MEASURE\_1



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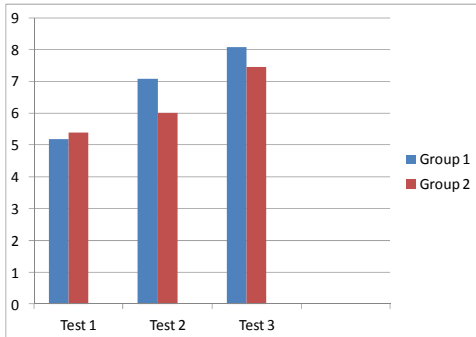
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### Year 3: T0PEL Blending Cluster



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### Year 4 Intervention Changes

- Strengthened explicit and multisensory strategies for syllable segmenting, blending and deletion, and for letter name/letter sound activities
- Introduced explicit instructions for read-aloud component, including before, during and after reading

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### Results: Year 4

- Significant impact of intervention on 4/5 dependent variables:
  - GRTR
  - TOPEL Print Knowledge
  - TOPEL Elision
  - ALL Rhyme
- No significant effect on TOPEL Blending

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### Conclusions From Across Studies

- BrightStart! intervention has a positive impact on several key early literacy skills.
- Using data to inform curriculum changes has enhanced outcomes.
- There does not appear to be a major time of year effect for intervention
- Children at all risk levels benefit substantially
- More work to be done on specific ways to enhance phonological awareness at this young age and also to address the issue of non-response to treatment (perhaps a layered approach to intervention)

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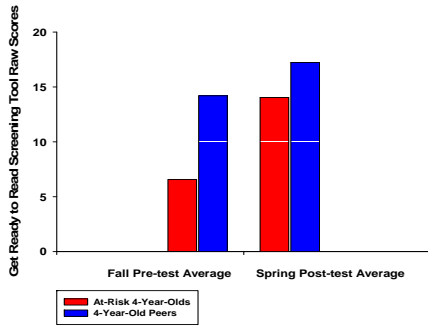
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### Closing the Reading Readiness Achievement Gap, 2005-2010

2005-2010 School Years



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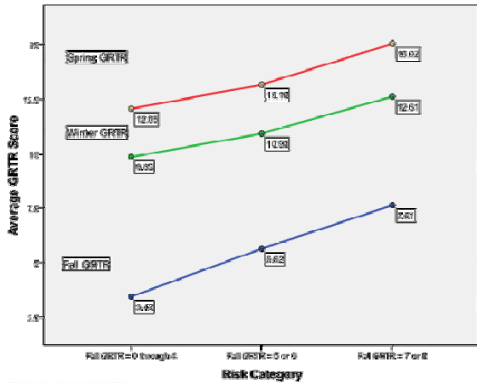
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### 2007-08 School Year: Intervention Children



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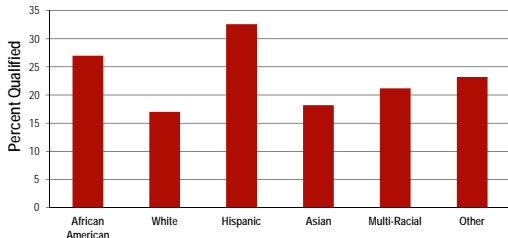
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### Race/Ethnicity for Children who Qualified for Intervention



- ANCOVA conducted on the full sample indicated no significant main effect at post test
- ANCOVA results indicated significant differences in pretest GRTR scores among the examined ethnicities,  $F(5, 9694) = 31.72, p < .01$
- Hispanic, African American, and Multi-racial children qualified at the highest rates

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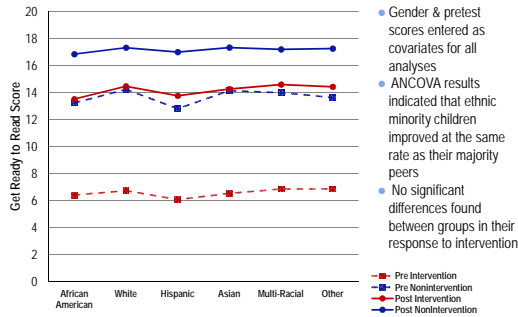
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### Response to Intervention by Race/Ethnicity



- Gender & pretest scores entered as covariates for all analyses
- ANCOVA results indicated that ethnic minority children improved at the same rate as their majority peers
- No significant differences found between groups in their response to intervention

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### Are Results Sustained Over Time?

- Database of nearly 6,000 Nemours BrightStart! participants who are being followed through 3rd grade to monitor reading outcomes
- Growth curve analysis for the first cohort (200 children) shows that intervention children are THE SAME as non-intervention children in ALL reading skills assessed through 3rd grade; larger cohort analyses coming soon
- (See longitudinal analyses poster)

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### Additional Research Questions

- What combination of factors best predicts likelihood of response to intervention (initial test score, in combination with income, gender, ethnicity, family home factors, etc.)
- From those analyses, can we develop a tiered level of intervention for the pre-K year that helps the right children at the right time, in the most cost-effective way?
- Is it more cost-effective to simply use baseline score for the first round of intervention, and follow up more intensively with non-responders?

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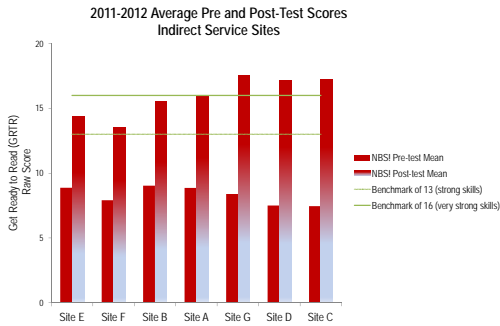
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### Indirect Service Outcomes, 2011-2012



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### Program Evaluation Results in an Urban School District, 2011-12 School Year

- Average number of lessons completed = 12.7 (6.2)
- Implementation fidelity ratings were “high” for 43%, “low” for 57%
- 19% of teachers had groups > 4 students
- After controlling for students’ initial GRTR scores, neither dosage nor fidelity rating was significantly related to child outcomes

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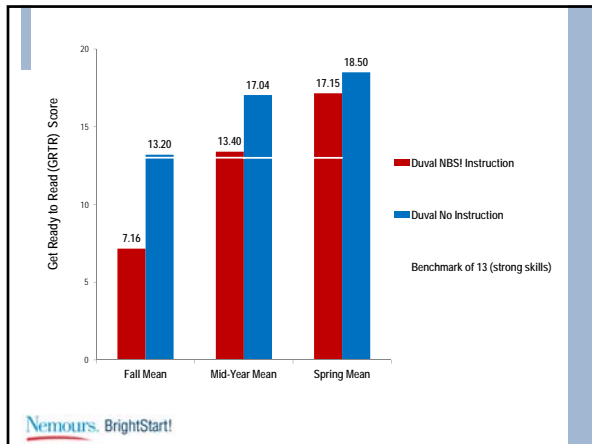
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**Orange County ELC Collaboration 2011-2012**

- 346 children screened across 14 child care centers – ALL were “low performing providers” per State of Florida Office of Early Learning
- 66% of children qualified for instruction
- Diverse group of 170 children received Nemours BrightStart! differentiated instruction: 49% African- American, 41% Hispanic, 8% Caucasian, 2% Multi-racial/Other

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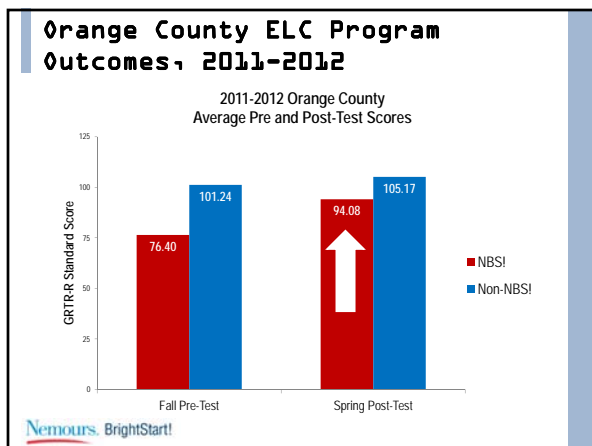
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### Ongoing and Upcoming Research

- More longitudinal data analyses
- More sophisticated analyses of intervention impact by ethnicity in relation to multiple other variables (*gender, age, maternal education, family income, language status, etc.*)
- Pilot results for Level 2 curriculum
- Progress monitoring tool results, Levels 1 and 2

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### Ongoing and Upcoming Research

- Relationships between TV time, # books in home, demographics and risk for reading readiness
- Psychometric properties of a parent-completed reading readiness skills checklist, and relationships with teacher-administered GRTR and intervention status
- Parent engagement randomized study

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### Family and Home Environment Factors Affecting Literacy Outcomes

- From Nemours BrightStart! research –
  - Children who scored “at risk” on GRTR averaged 152 minutes/weekday of TV, versus 127 minutes/weekday for non-at-risk children – statistically significant but mediated by family income and parent education level.
  - Same results for intervention “responders” (average of 139 minutes/weekday of TV, versus “non-responders” (average of 162 minutes/weekday of TV)

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### Family and Home Environment Factors Affecting Literacy Outcomes

- From Nemours BrightStart! research –
  - Children scoring “at risk” on GRTR averaged 55.3 books at home, versus non-at-risk children, who averaged 75.9 books at home
  - This was statistically significant regardless of family income and parent education levels
  - Same results for intervention “responders,” who averaged 76.8 books at home, versus “non-responders,” who averaged 56.2 books at home.



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### Family and Home Environment Factors Affecting Literacy Outcomes

- # of books at home significantly predicted fall GRTR scores over and above child age, maternal education, and family income



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# Thank you!



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