



UNIVERSITY OF
LEICESTER

Improving educational outcomes for children born preterm: A new approach to intervention

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Professor of Child Development

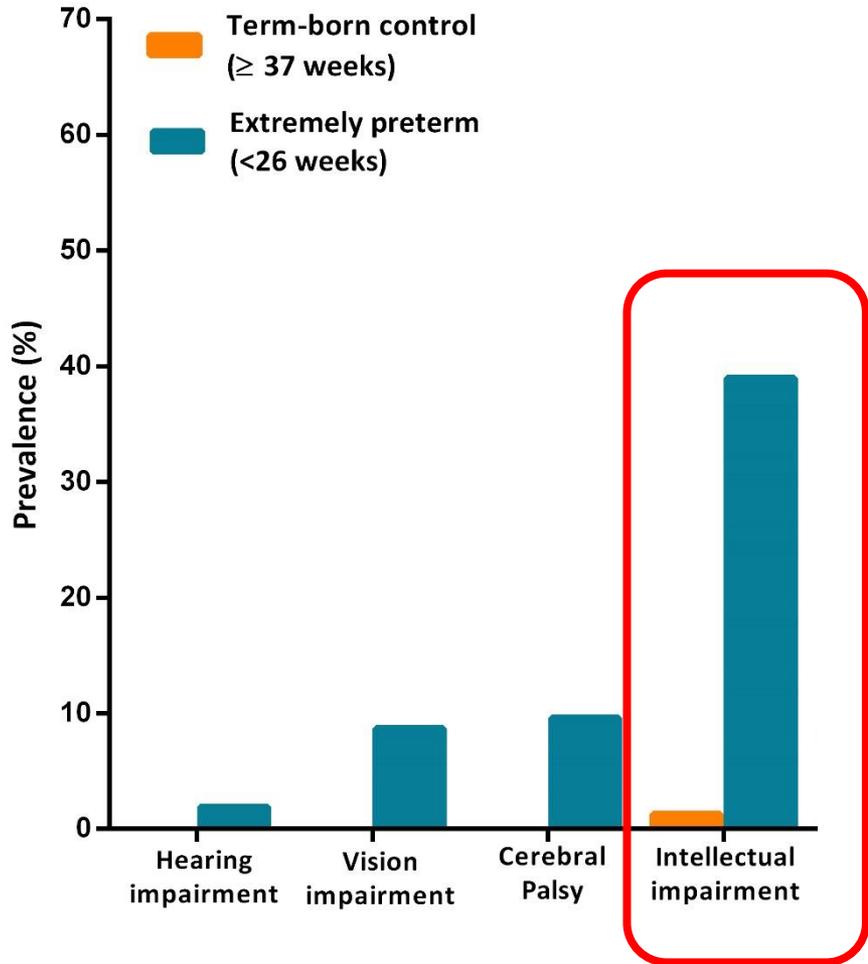


Overview

- The preterm phenotype
- Impact on educational outcomes
- How can we improve outcomes at school?
- Towards a new approach . . .



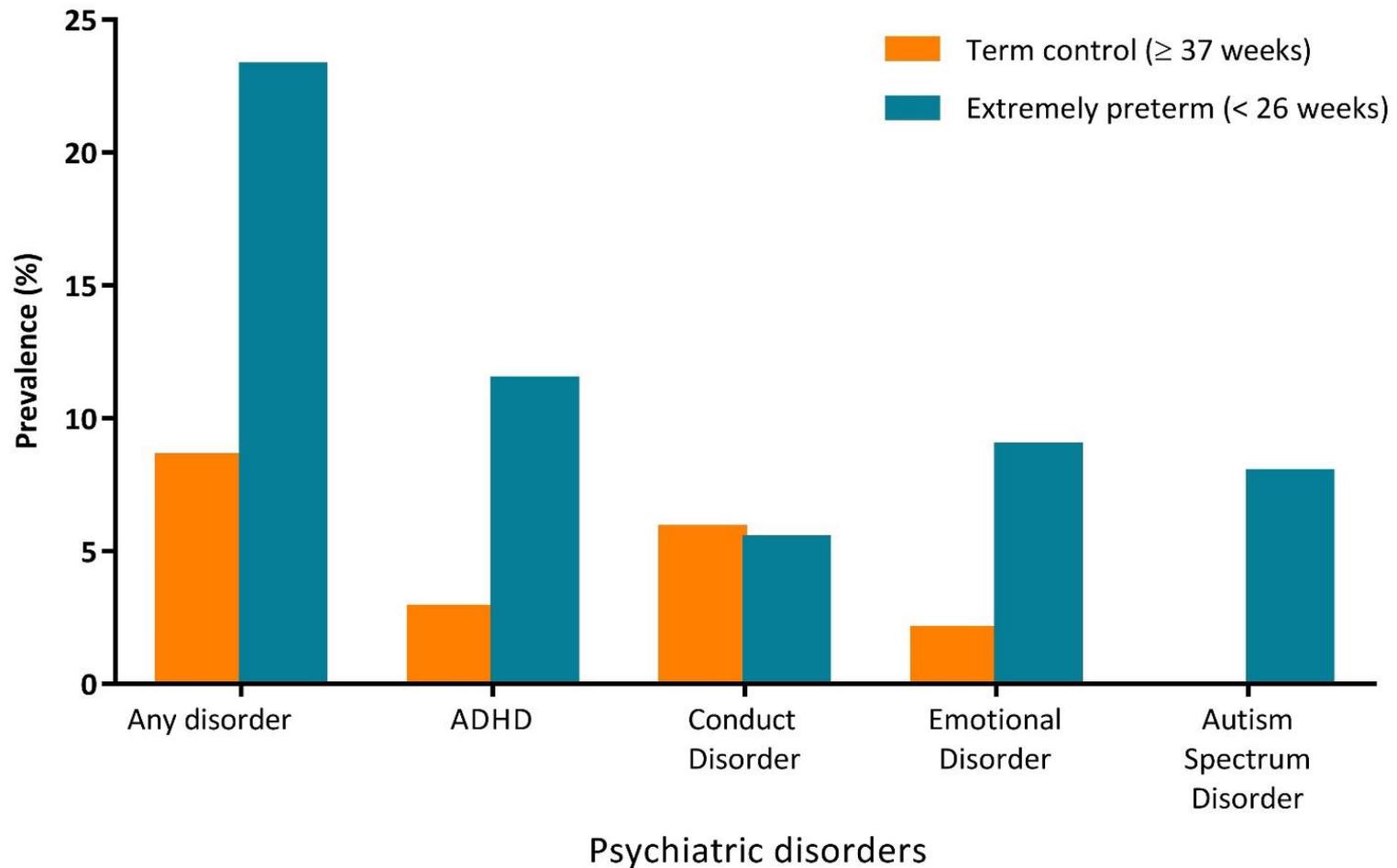
Neurodevelopmental outcomes



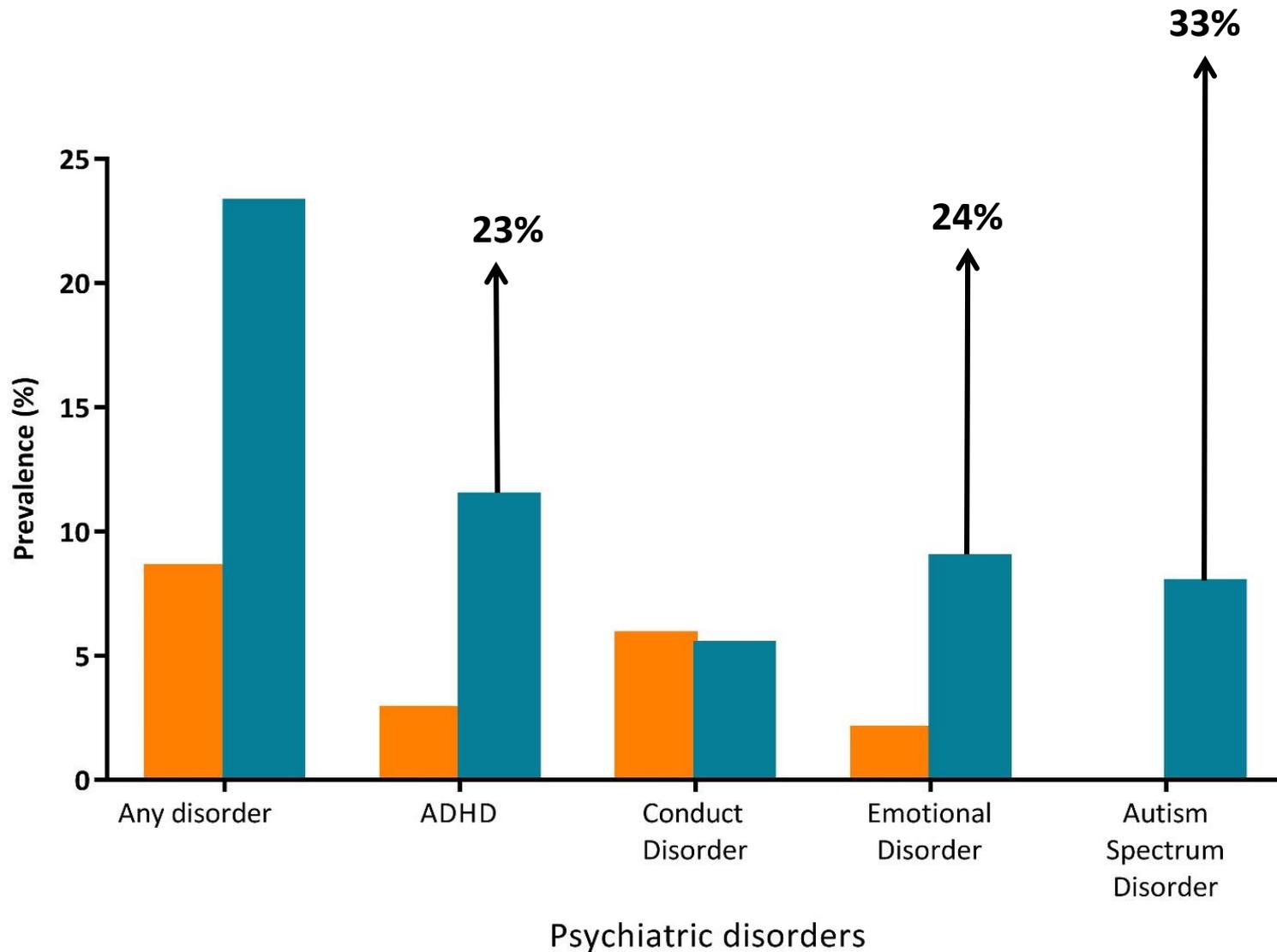
Cognitive difficulties:

- Difficulties problem solving
- Poor simultaneous processing
- Poor working memory
- Poor visuospatial skills
- Poor fine motor skills
- Slow processing speed
- Difficulties planning & organising (executive function)

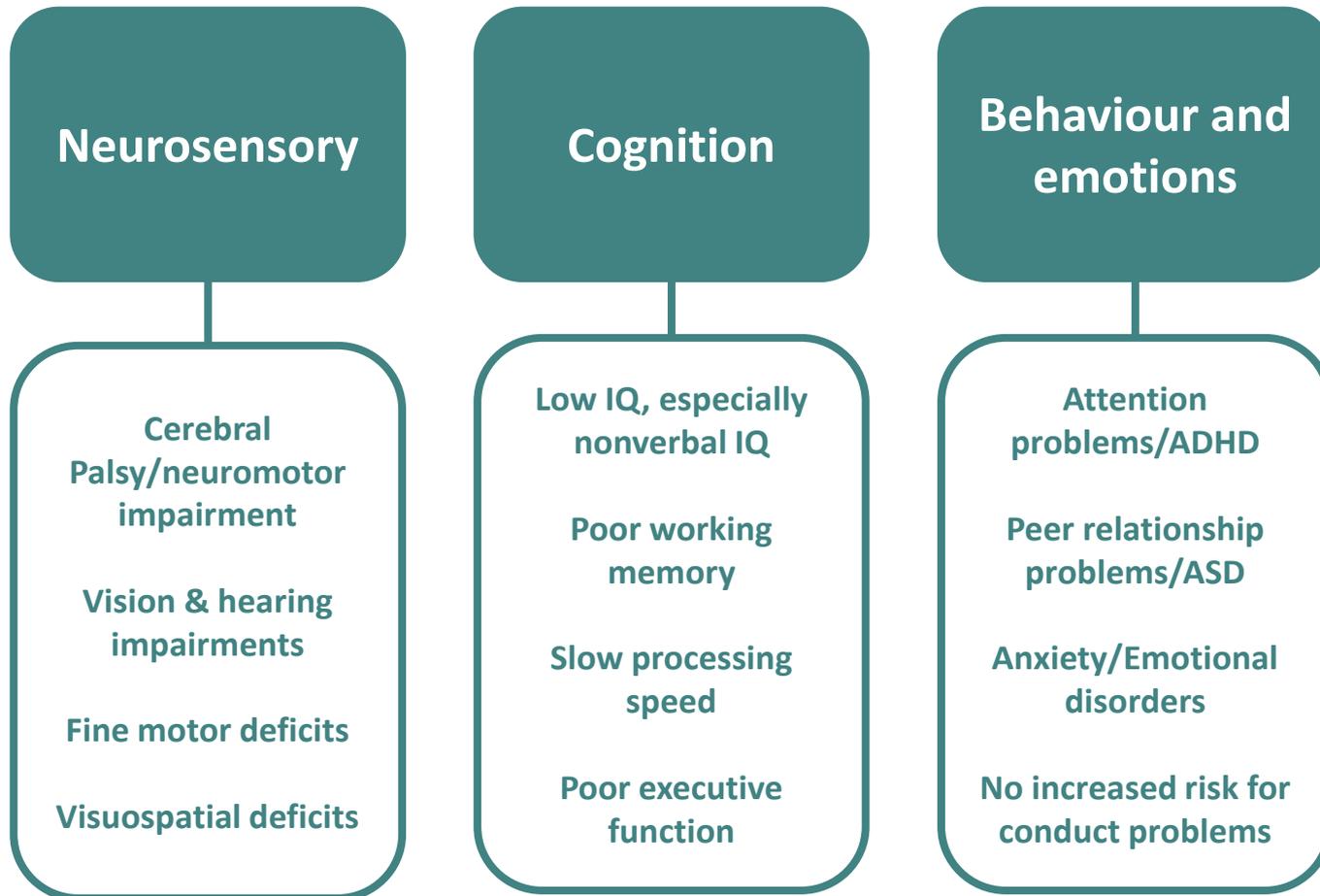
Psychiatric disorders



Attention, social & emotional problems



The preterm phenotype



Special educational needs

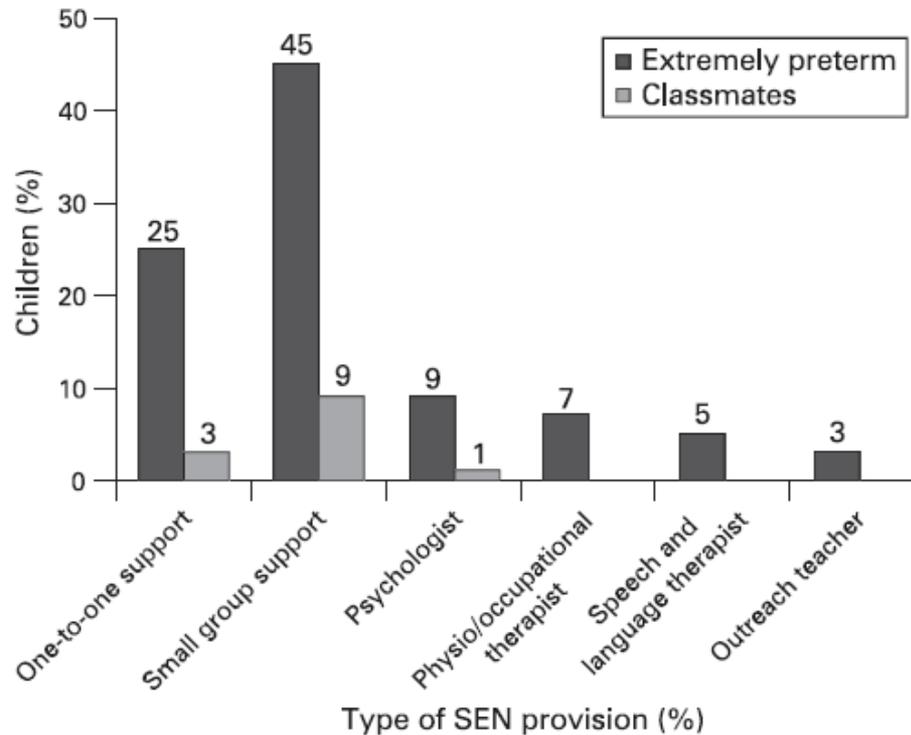
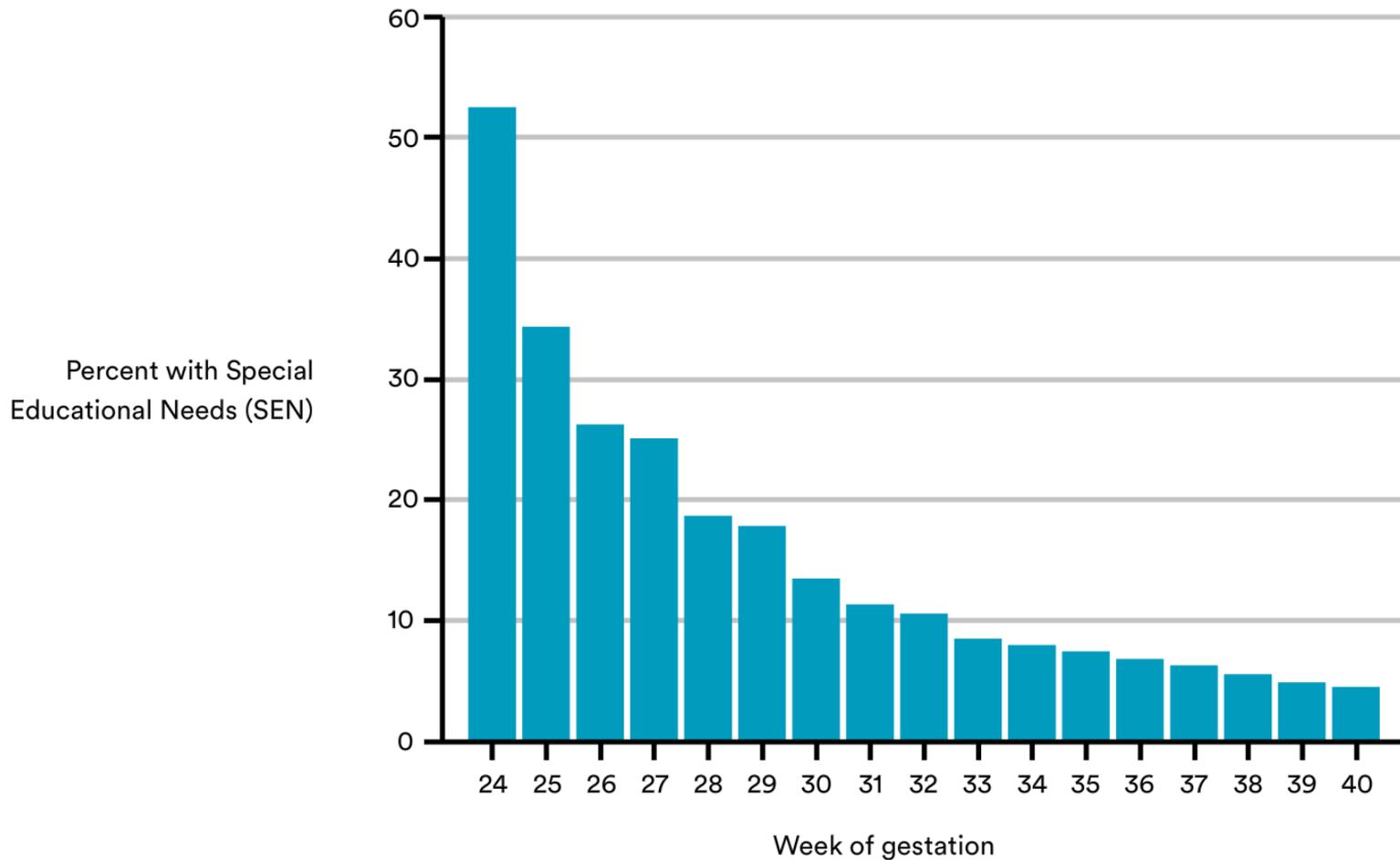
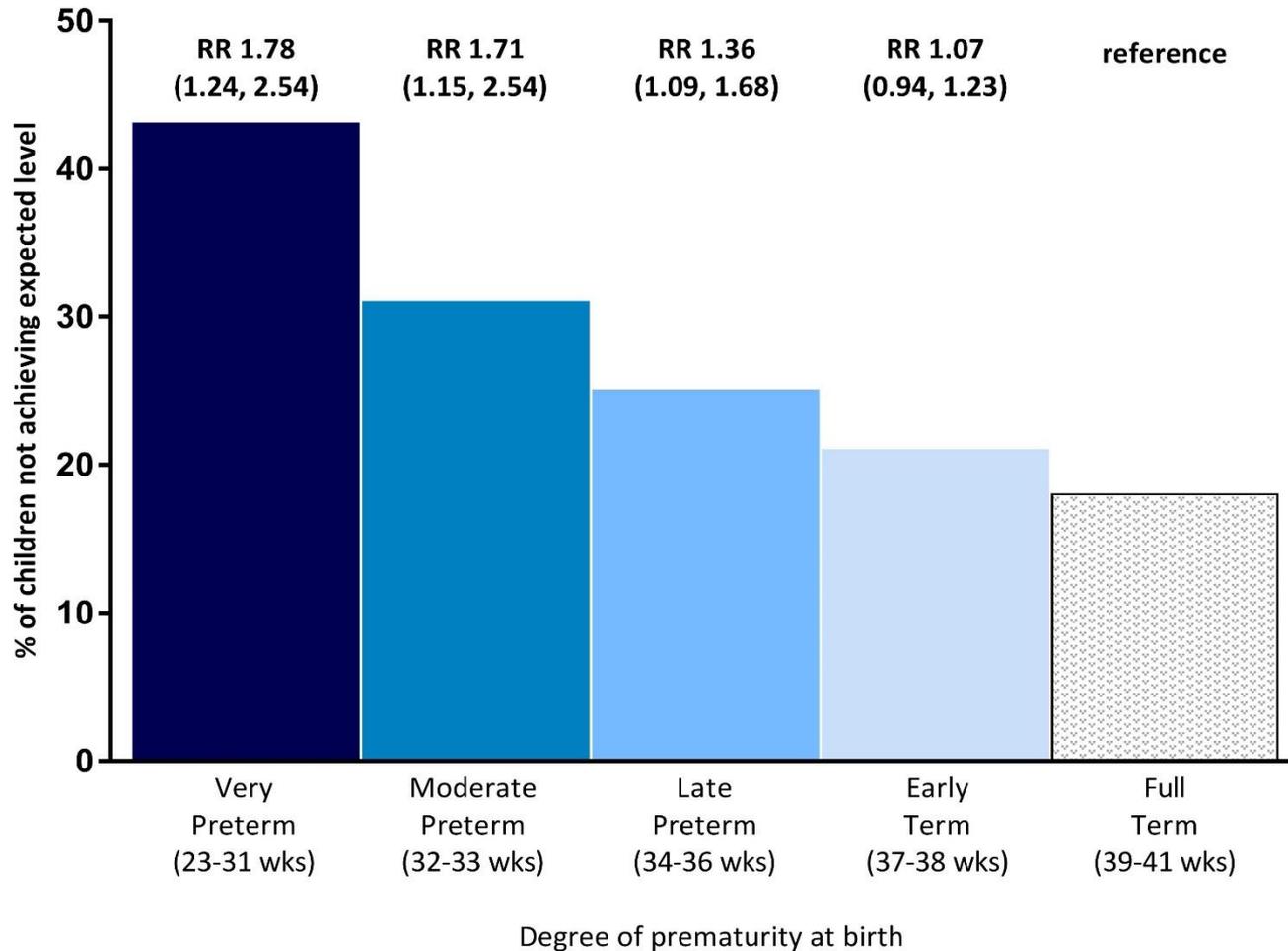


Figure 1 Type of special educational needs (SEN) resource utilised by extremely preterm children and classmates in mainstream schools at 11 years of age.

Special educational needs

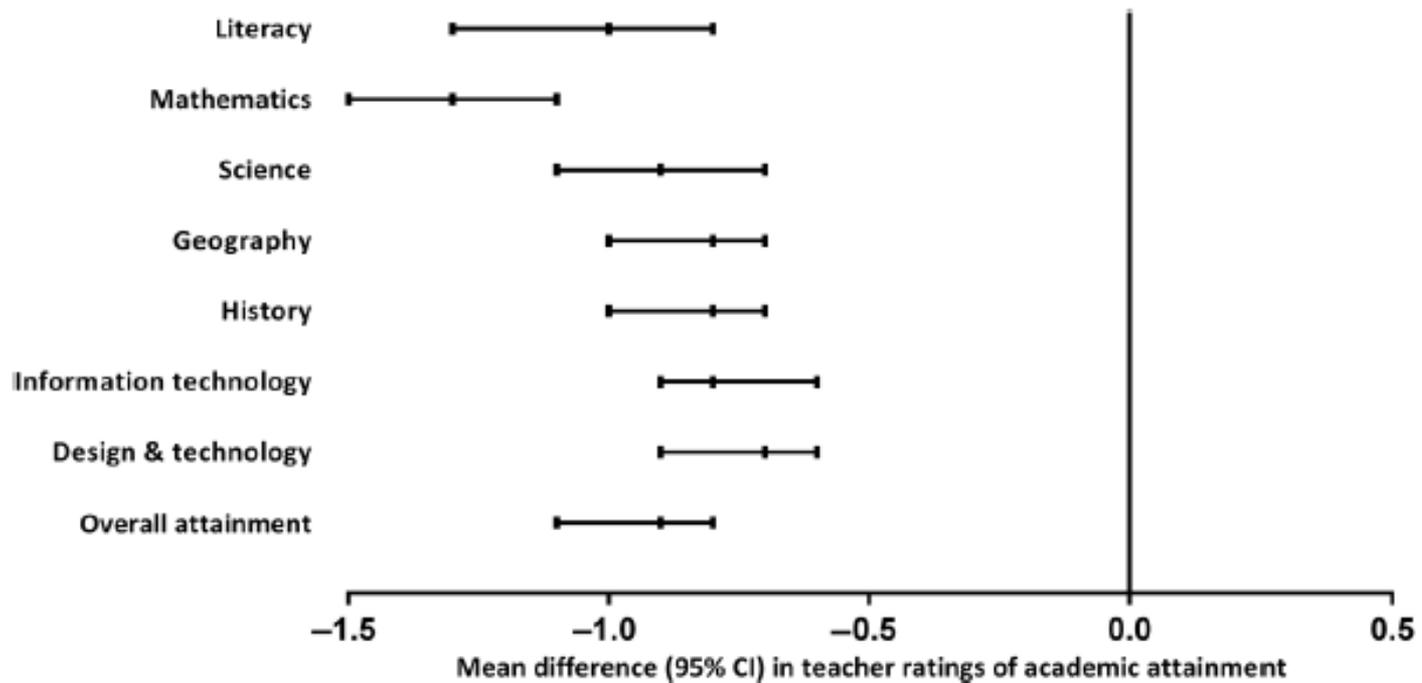


Academic attainment (age 7)



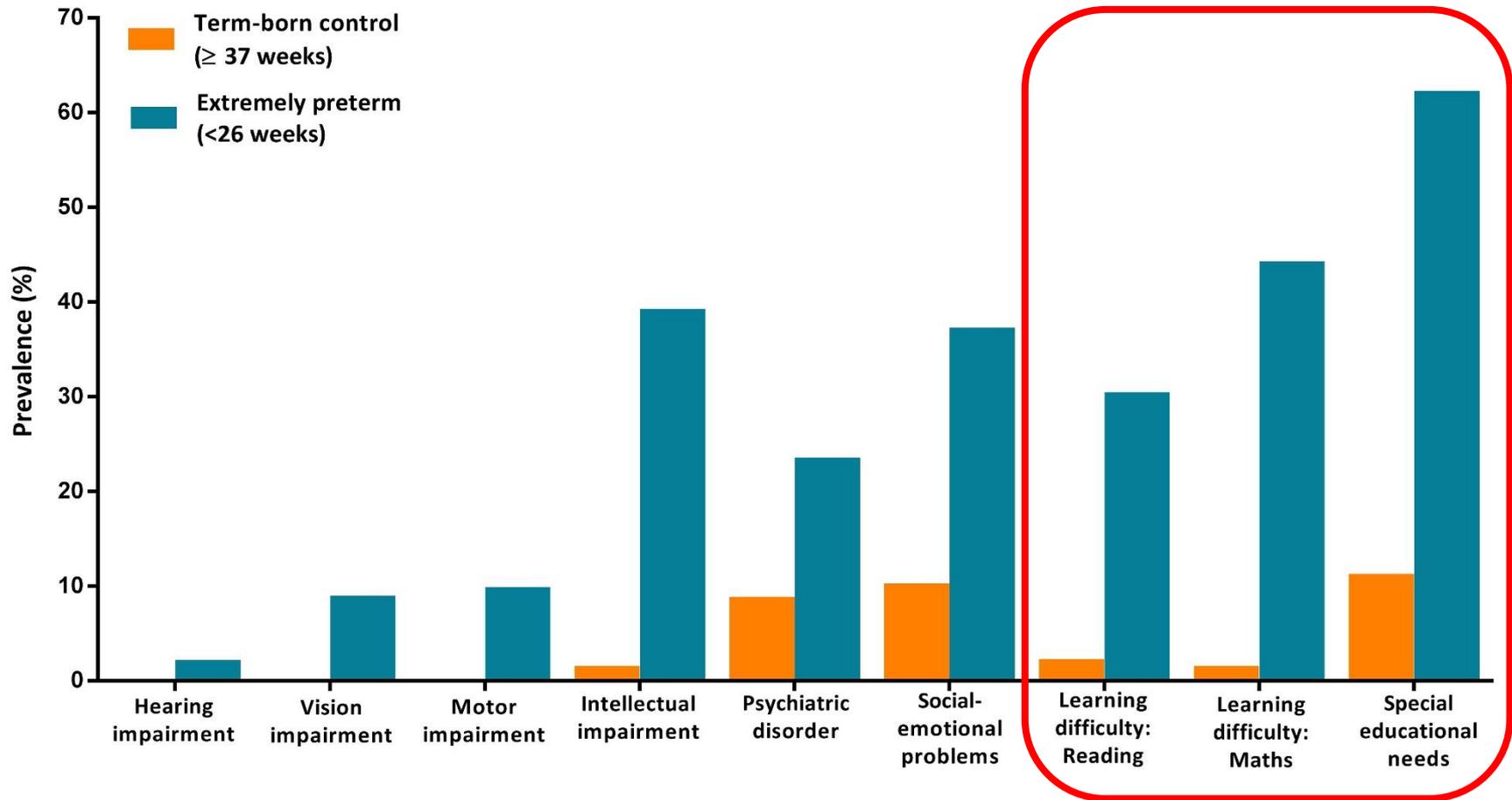
Risk Ratios (RR) adjusted for sex, age in school year, parity, multiple birth, mother's age, marital status & education, social class, smoking during pregnancy.

Academic attainment (age 11)



Mean difference (95% CI) in teacher ratings of academic attainment for extremely preterm children compared with term-born controls

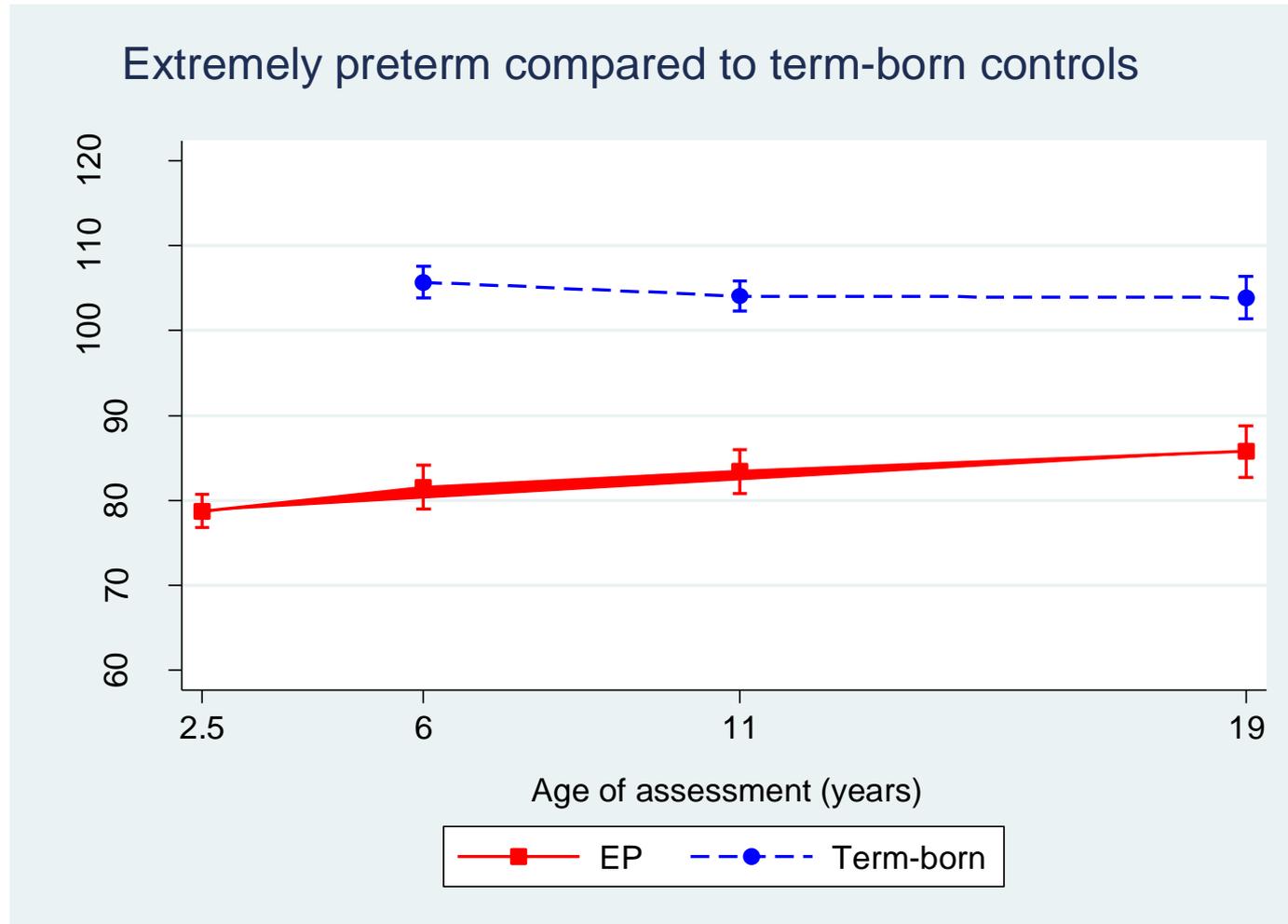
Putting it all together



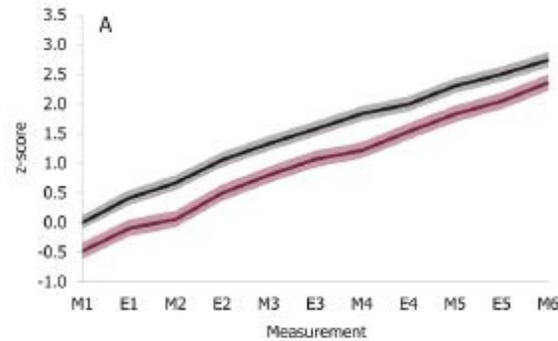
**How can we improve educational
outcomes for children born preterm?**



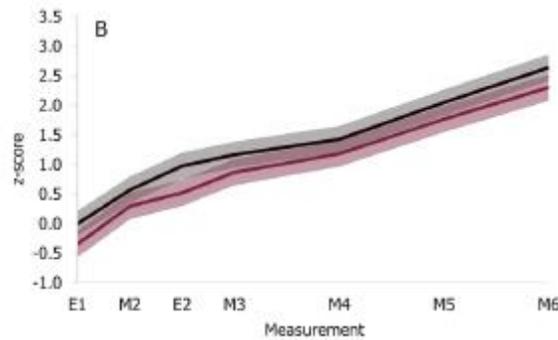
Do nothing?



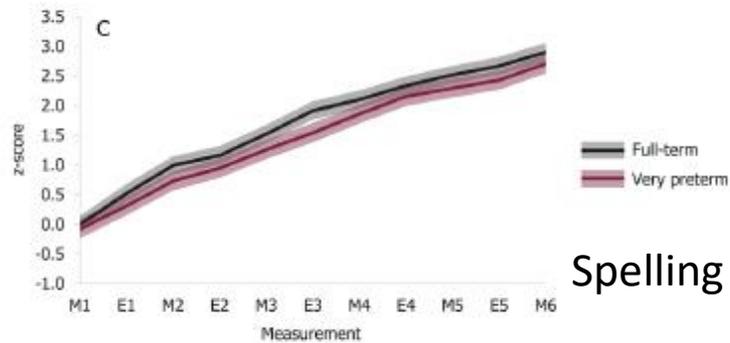
Do nothing?



Arithmetic



Reading comprehension



Spelling

Do nothing?

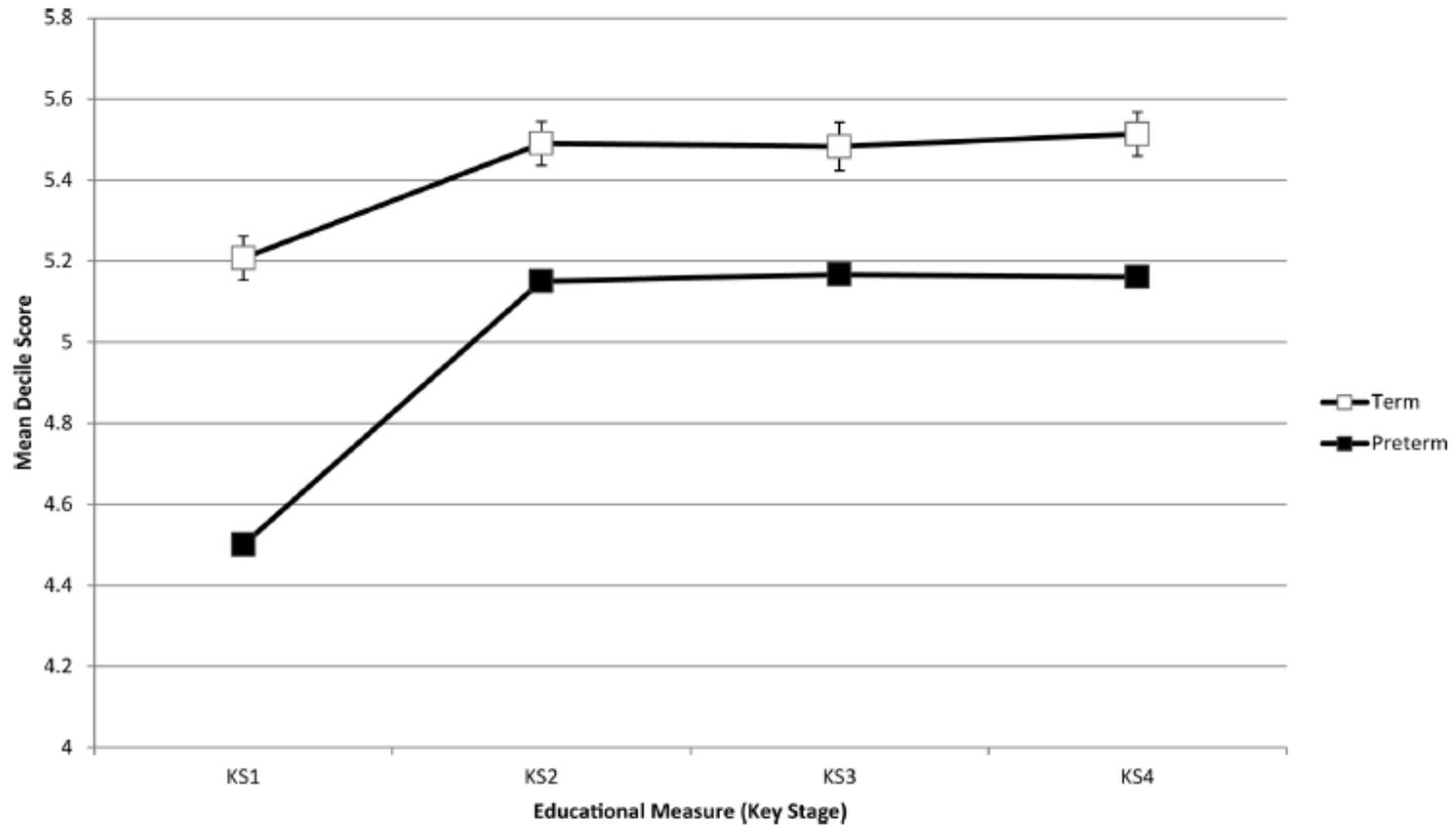
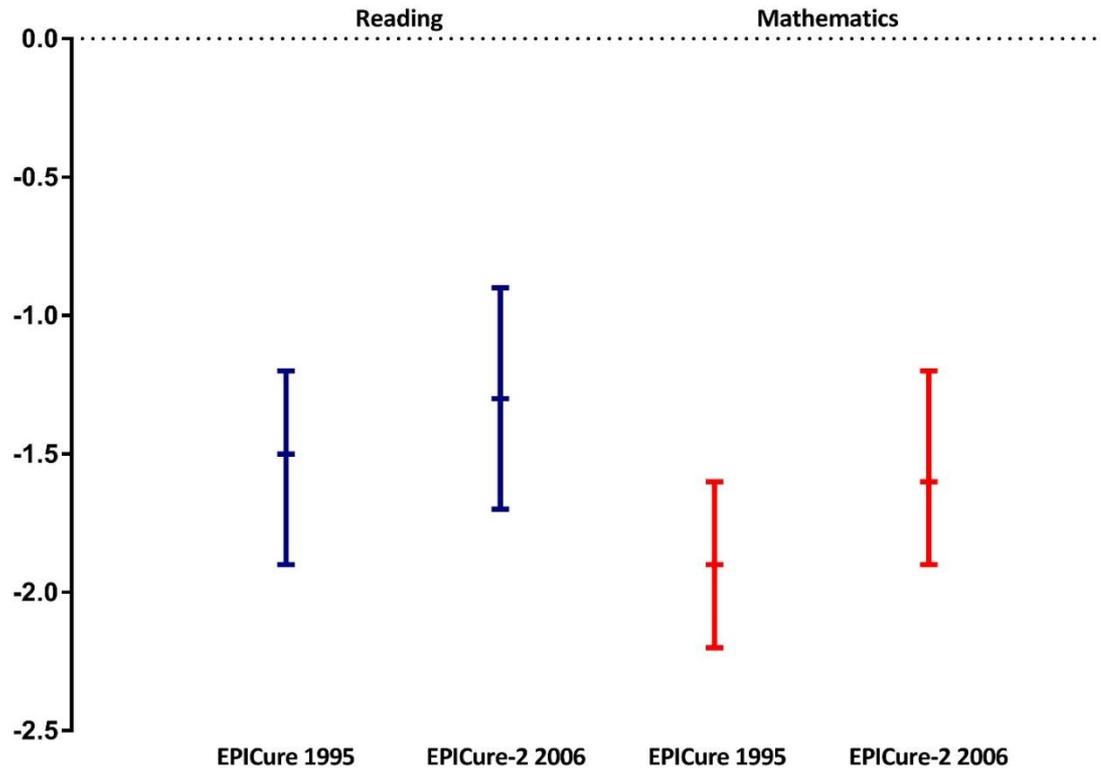


Figure 1 Summary measures of Key Stage scores at each time point, split by gestational age groups.



Improve neonatal care?



Adjusted mean difference (95% CI) in WIAT-II z-scores for extremely preterm children vs. controls

Mean deficit (95% CI) in z-scores in EP children vs. controls in 1995 vs. 2006

adjusted for sex, gestational age, birthweight z-score, multiple birth, maternal age & SES:

Reading: -0.2 (95% CI -0.6 to 0.3); Mathematics: -0.3 (-0.7 to 0.1)

Improve neonatal care?

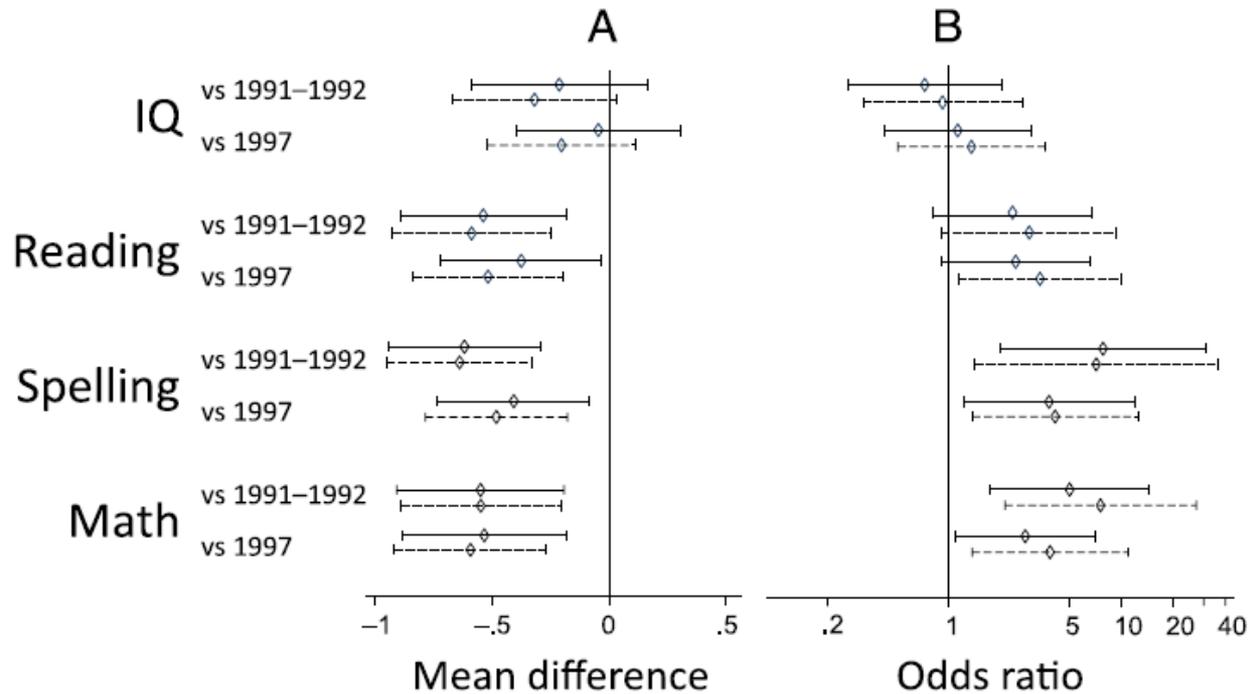


FIGURE 1

Differences on standardized cognitive and academic scores comparing 2005 cohort with both earlier eras. A, Continuous scores. B, Dichotomous scores <-2 SD vs ≥ -2 SD. Solid line is adjusted for age at assessment, age of mother, and sociodemographic variables; dashed line is adjusted for age at assessment, age of mother, sociodemographic variables, and perinatal variables.



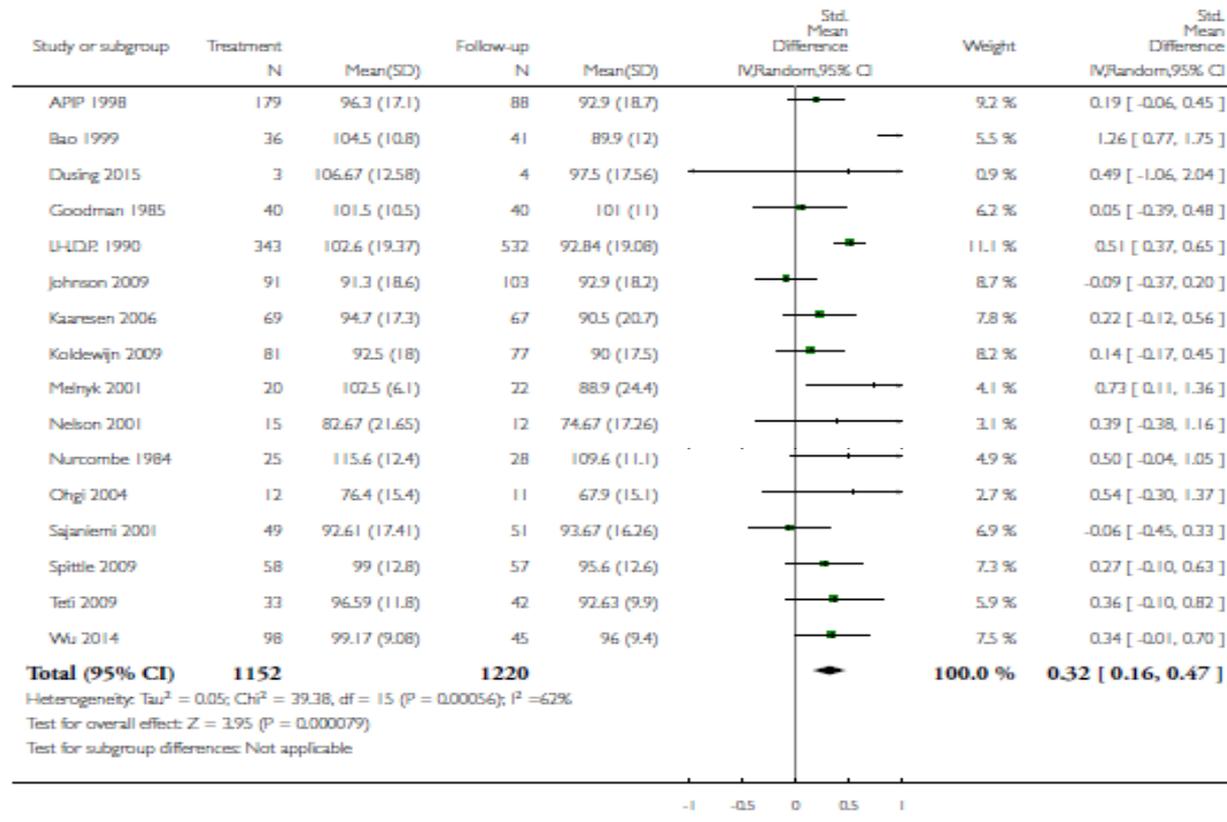
Early intervention?

Analysis 1.1. Comparison 1 Early developmental intervention versus standard follow-up (all studies), Outcome 1 Cognitive outcome at infancy - DQ (Bayley and Griffiths).

Review: Early developmental intervention programmes provided post hospital discharge to prevent motor and cognitive impairment in preterm infants

Comparison: 1 Early developmental intervention versus standard follow-up (all studies)

Outcome: 1 Cognitive outcome at infancy - DQ (Bayley and Griffiths)



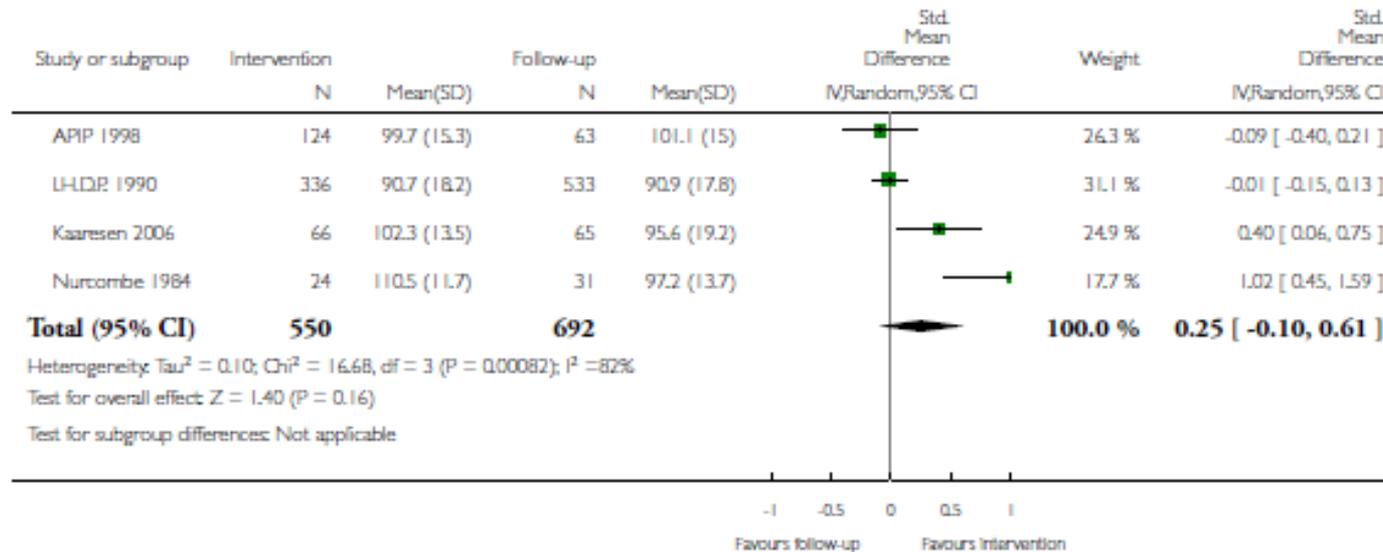
Early intervention?

Analysis 1.3. Comparison 1 Early developmental intervention versus standard follow-up (all studies), Outcome 3 Cognitive outcome at school age - IQ (WISC, Kaufmann).

Review: Early developmental intervention programmes post-hospital discharge to prevent motor and cognitive impairments in preterm infants

Comparison: 1 Early developmental intervention versus standard follow-up (all studies)

Outcome: 3 Cognitive outcome at school age - IQ (WISC, Kaufmann)



Early intervention?

DEVELOPMENTAL MEDICINE & CHILD NEUROLOGY

COMMENTARY

Timing and content of interventions to enhance cognitive performance of very-low-birthweight children

Previous research has indicated that interventions in infancy may have short-term but not positive long-term effects on cognitive or academic performance.² It is not surprising that interventions in the first few months of life may not be enough to solve the complex issue of cognitive deficits in preterm children at school age. This highlights the need for intervention at around school age



Working memory training?

Conclusions:

We currently do not recommend administration of Cogmed for early school-aged children born extremely preterm/extremely low birth weight to improve academic functioning.

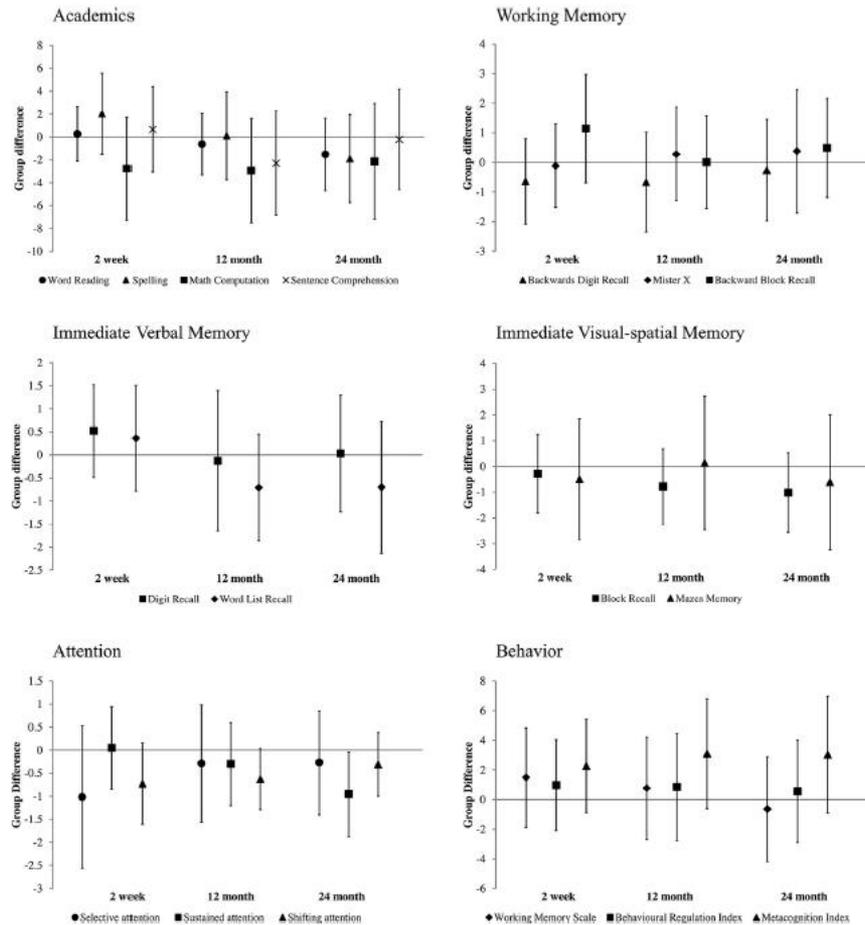


Figure 2. Treatment group differences in academics, working memory, immediate verbal memory, immediate visual-spatial memory, attention, and behavior at 2 weeks, 12 months, and 24 months post-training. Point estimates reflect regression coefficients from mixed-effect models where a group difference >0 reflects a higher score in the Cogmed group, and a group difference <0 reflects a lower score in the Cogmed group. Vertical error bars represent 95% CIs.



Research priorities

Open access

Original research

BMJ Open Joint production of research priorities to improve the lives of those with childhood onset conditions that impair learning: the James Lind Alliance Priority Setting Partnership for 'learning difficulties'

Ai Keow Lim ,¹ Sinead Rhodes,¹ Katherine Cowan,² Anne O'Hare¹

Research priorities

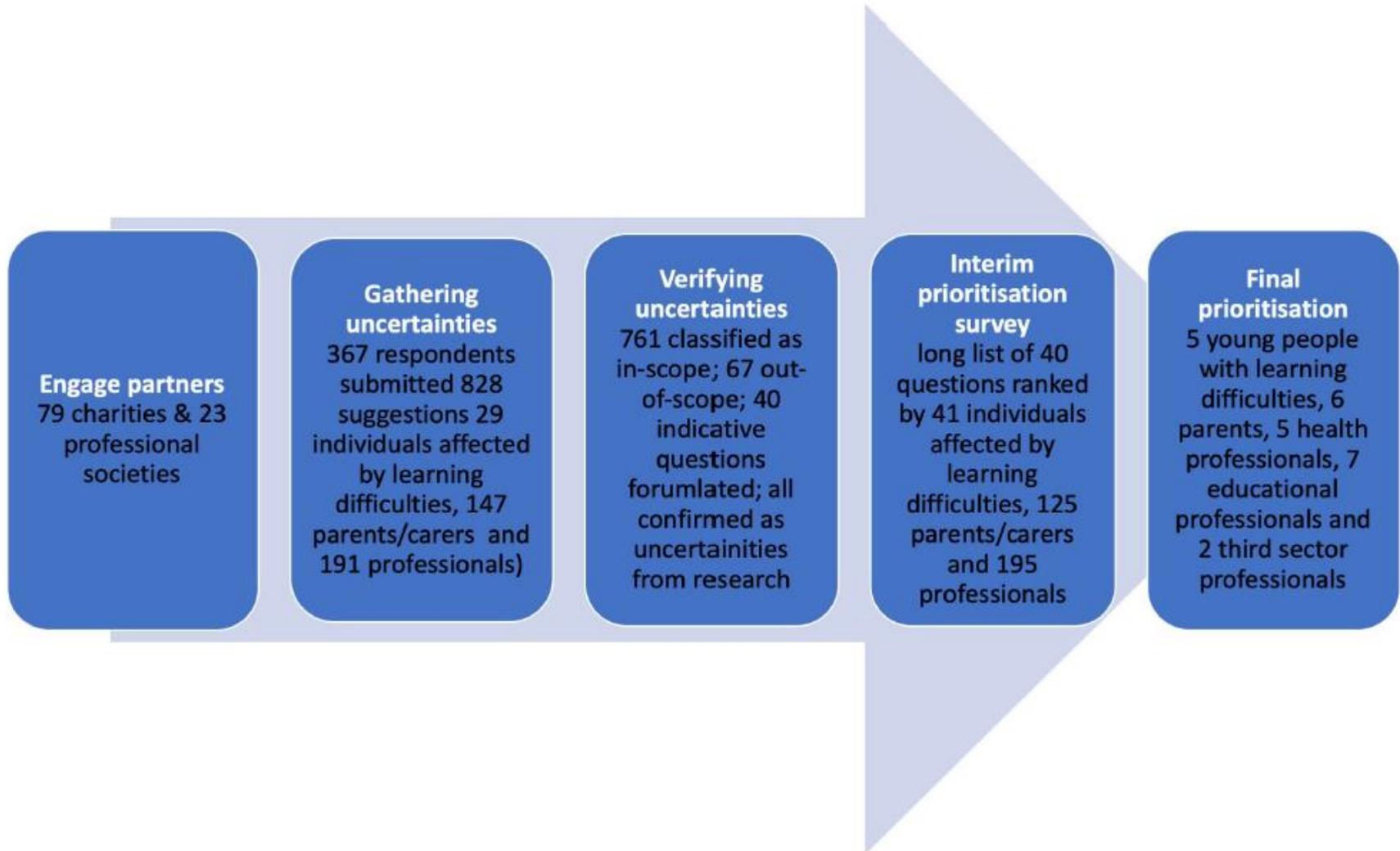


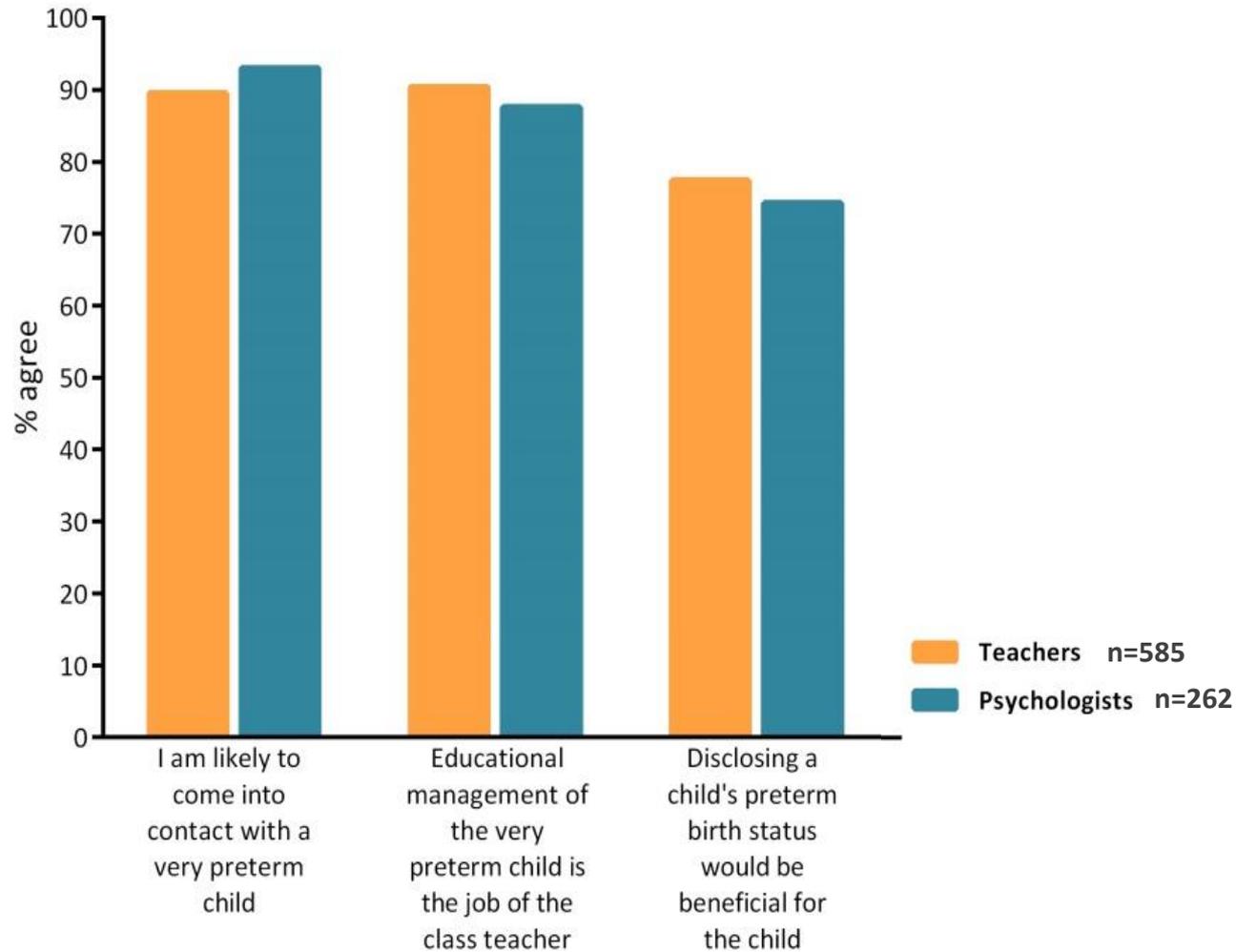
Figure 1 Flow chart showing the process and numbers of participants and research suggestions and questions at each stage.

Top research priority

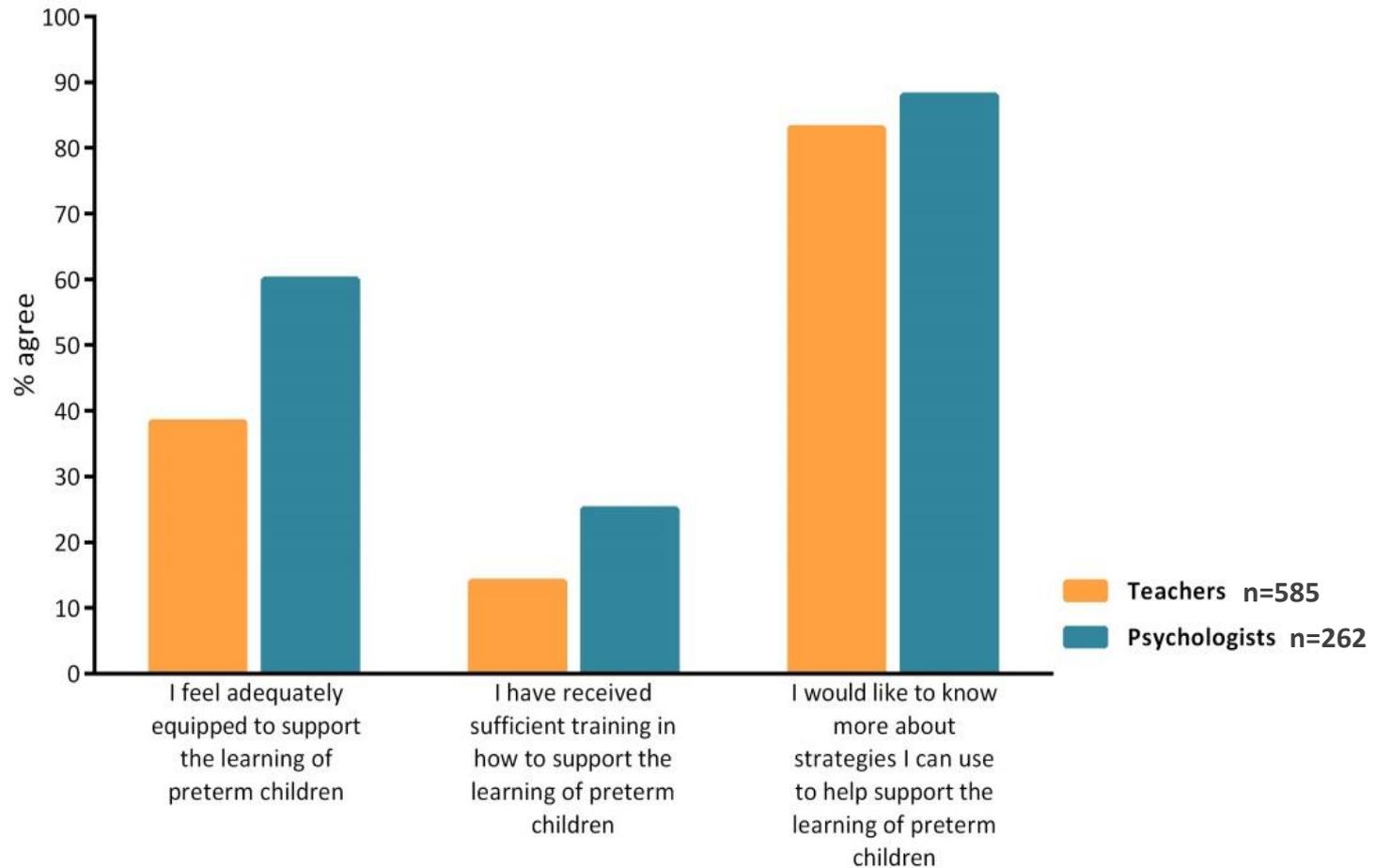
Table 3 Top 10 research questions agreed as shared priorities

- (1) What knowledge, skills and training do educational professionals need to identify the early signs of learning difficulties and provide optimal support for children and young people affected to help them achieve the best possible outcomes?
- (2) What is the best educational and community environment for children and young people with learning difficulties?
- (3) How can multiple types of professionals work together with parents and carers to improve identification, diagnosis, interventions and treatments and achieve the best outcomes for children and young people with learning difficulties?
- (4) Which early interventions are effective for children and young people with learning difficulties, at what ages and stages are they best introduced and what are the long-term outcomes?
- (5) What knowledge, skills and training do health, social work and 'third sector' (eg, charities and support services) professionals need to understand the best support to give children and young people with learning difficulties and their families/carers?
- (6) How can parents, carers, brothers and sisters and extended families of children and young people with learning difficulties, be best supported to achieve their best quality of life before, during and after the diagnosis or identification in home, school and community contexts?
- (7) How can we best identify early features, symptoms and signs of learning difficulties among children, young people and their families/carers?
- (8) What is the best way to assess learning difficulties in children and young people?
- (9) Which strategies are effective in preventing stigma and bullying towards children and young people with learning difficulties?
- (10) Which strategies are effective in helping children and young people with learning difficulties live independent lives, including during times of transition?

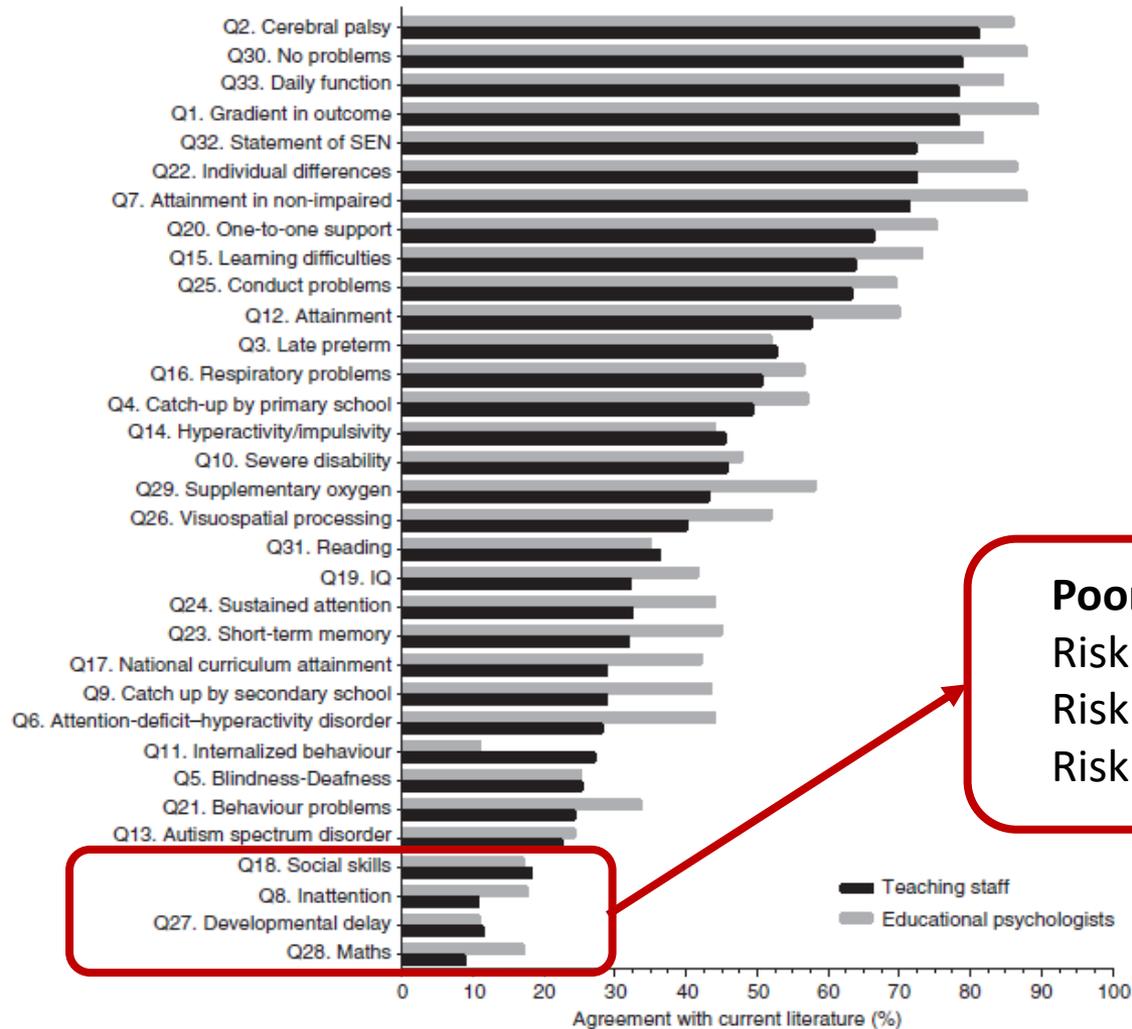
Education professionals' knowledge of preterm birth



Education professionals' knowledge of preterm birth



Education professionals' knowledge of preterm birth



Poorest knowledge:
 Risk for poor social skills
 Risk for inattention
 Risk for maths difficulties

Q18. Social skills
 Q8. Inattention
 Q27. Developmental delay
 Q28. Maths

Teaching staff
 Educational psychologists

Agreement with current literature (%)

[Source: Johnson et al. *Dev Med Child Neurol*, 2015]

A different kind of difficulties

SSAT | inquire
inspire
innovate
impact

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How to use the resources

Promising CLDD approaches

Professional development

Links

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Complex learning difficulties and disabilities research project

Developing meaningful pathways to personalised learning



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Welcome

Welcome to SSAT (The Schools Network) Ltd Complex Learning Difficulties and Disabilities (CLDD) research project website.

The Department for Education identified through feedback from schools that educators needed a new teaching and learning framework to meet the needs of children and young people with Complex Learning Difficulties and Disabilities (CLDD). SSAT was commissioned to develop resources to support schools in educating these children.

Further details about the project can be found on the 'Project information' page, reached by clicking on the named button to the left. To access the three tools which make up the Engagement for learning resource framework, please click on the 'Project resources' button or the photo buttons below.

This project is supported by the
**Department for
Education**

This new generation of children and young people includes some . . . who survived extreme prematurity . . . These children have complex learning difficulties and disabilities. They learn and respond differently to previous generations of children with profound and multiple or severe learning difficulties.

Training for staff to recognise the possible learning disabilities and difficulties associated with extremely preterm birth.

PRISM e-learning resource for education professionals

- For education professionals
- 5 short sections
- ~ 1 hour of learning
- Control own pace of learning
- Interactive multimedia content
- Case studies & animations
- Figures and graphs narrated
- Provides strategies to support children in the classroom



Preterm Birth Information for Education Professionals

Welcome to the Preterm Birth Information for Education Professionals home page. These five learning resources have been developed to improve your knowledge and confidence in supporting prematurely born children in the classroom.

Please navigate through the resources by selecting each image below.



1. What is preterm birth? [\[opens in new window\]](#)

Learning outcomes:

- To define preterm birth
- To understand that the more preterm a baby is born, the greater the risk of developmental problems later in life



2. Educational outcomes following preterm birth [\[opens in new window\]](#)

Learning outcomes:

- To understand that children born preterm are at risk of special educational needs and poor academic attainment
- To identify which school subjects children born preterm are most likely to struggle with



3. Cognitive and motor development following preterm birth [\[opens in new window\]](#)

Learning outcomes:

- To understand that children born preterm may have difficulties with IQ, processing speed, working memory, and hand-eye coordination
- To understand how these difficulties may impact on learning



4. Behavioural, social and emotional outcomes following preterm birth [\[opens in new window\]](#)

Learning outcomes:

- To understand that children born preterm may be withdrawn, anxious, and inattentive, and have difficulties developing relationships with their peers
- To understand that children born preterm don't tend to be disruptive so their needs may be overlooked in the classroom



5. How can education professionals support preterm children? [\[opens in new window\]](#)

Learning outcomes:

- To understand what kind of strategies might be helpful for supporting children born preterm
- To understand that preterm birth is a risk factor and an individual assessment is always necessary to provide appropriate support

Co-designed with stakeholders



Practical strategies for use in the classroom

- Strategies for providing support for children with:
 - Inattention
 - Poor working memory
 - Slow processing speed
 - Poor visuo-spatial processing
 - Social & emotional problems
 - Mathematics difficulties

4. How you can help

The screenshot shows a digital interface for selecting strategies to support children with inattention. It features a list of 13 strategies, each with a checkbox. At the bottom, there is a text input field for comments and two buttons: 'Save your selections' and 'Help'. On the right side, there is a vertical navigation bar with colored tabs for different categories: Inattention (blue), Working memory (green), Processing speed (orange), Hand-eye coordination (yellow), Social & emotional wellbeing (purple), and Maths (dark blue).

Supporting children with inattention

Select the strategies below that you would like to save and print later

- Everyone finds it easier to concentrate when they are enjoying an activity. Use the child's own interests where you can, and try to introduce new ideas using an engaging context.
- It is not always helpful to have an inattentive child working on their own. Look for opportunities to use oral and practical work with a partner. This helps build social and friendship links, too.
- Encourage the child to focus on one task at a time. For example, some children may find it helpful to fold under the part of a worksheet that isn't being worked on yet.
- When children experience difficulties with starting work, give small targets for them to work to. For example, "Write two sentences on chemical reactions and show them to me." Using writing frames to provide a structure or other forms of scaffolding can also be helpful.
- Break assignments into chunks and set short-term deadlines for the completion of each task.
- Work with the child to agree a subtle cue to remind them to stay on task, such as a touch on the shoulder. Avoid calling out the child's name – it can be distracting!
- Try prompting the child to make sure they have understood instructions and to keep them focussed on a task. For example you could ask, "What have you got to do first?" or "Can you talk me through what you are going to do?" This can give you the chance to help spot things that they may have missed.
- Agree with the child a plan for completing tasks. Review this together regularly and encourage the child to evaluate its efficacy himself/herself.
- Try to minimise distractions as much as possible. For example, try to put busy classroom displays on a wall where they are not visible to the inattentive child.
- Provide opportunities for sensory breaks by involving the child in classroom management tasks, for example, helping to distribute or collect books.
- Work together! Ask the child what they find distracting and try to reduce these distractions where possible.

Enter any thoughts you have on this section.

Inattention comments

[Save your selections](#) [Help](#)

Navigation bar: Inattention, Working memory, Processing speed, Hand-eye coordination, Social & emotional wellbeing, Maths

Evaluation study

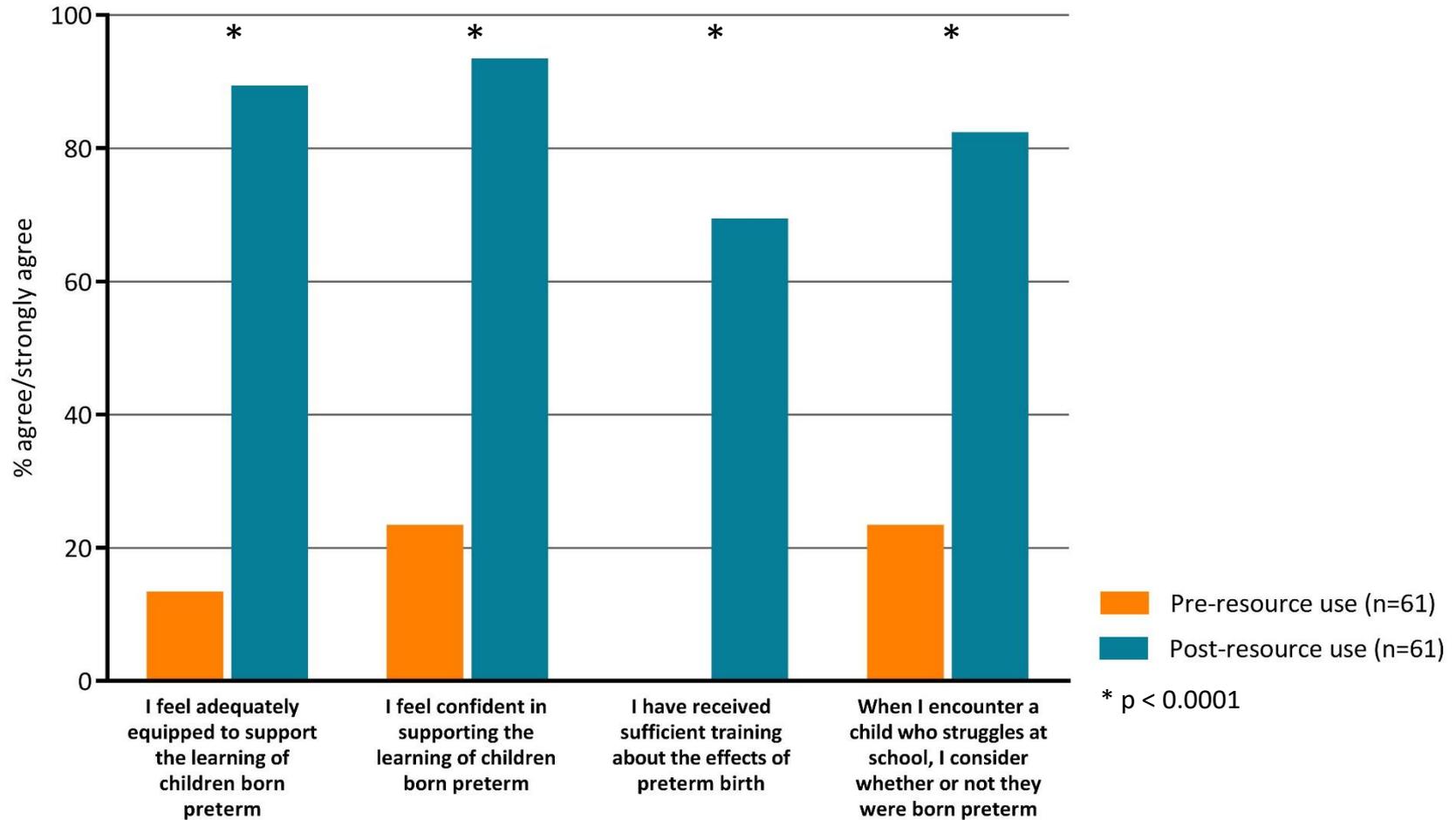
- 61 teachers from primary schools in England
- 1 month access to the resource
- Before and after using the resource:
 - Assessed knowledge of outcomes following preterm birth
 - Assessed confidence in supporting preterm children

Evaluation study

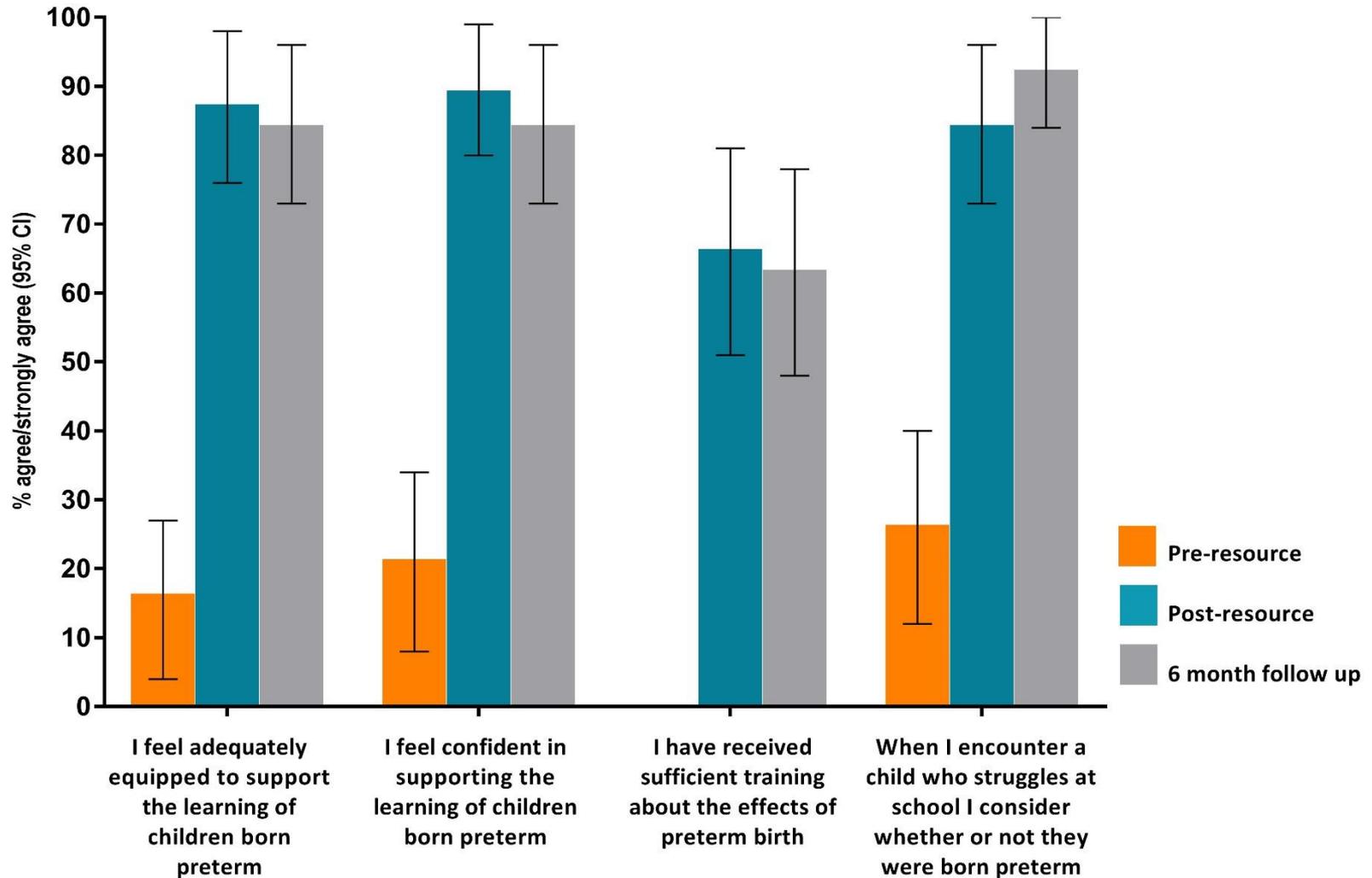
- Preterm Birth Knowledge Scale: mean score
 - Pre-resource use: 13 (SD 6.2); range 0-25
 - Post-resource use: 28 (SD 3.5); range 18-33; $p < 0.001$
- Greatest increase in knowledge

Item	% accuracy pre resource	% accuracy post resource	% difference in accuracy
Risk for mathematics difficulties	7%	100%	93%
Risk for poor social skills	15%	95%	79%
Risk for inattention	15%	89%	74%
Risk for poor visuospatial skills	26%	100%	74%

Evaluation study



6 month follow up



Changing practice – 6 month follow up

- 90% changed their thinking; 61% changed the way they work

Thinking and planning extra scaffolding to activities

We now routinely collect information from parents of new children starting at school about when the child was born

More aware of the way I deliver maths lessons, making them more practical

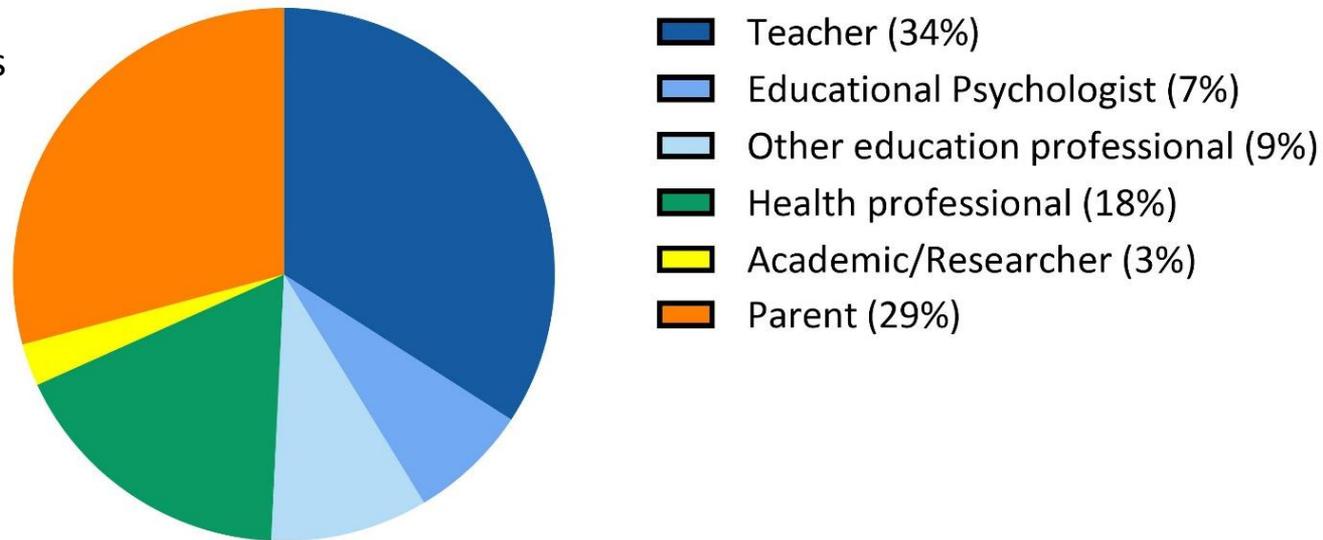
Making sure that the very basics have been fully embedded with these children and realizing that this has to be done first, before other learning will take place

Give more time to explaining, instructing and supporting these children

Available online: www.pretermbirth.info

- **6,883 users in 53 countries in 10 months**

- Structural/organisational change
- Staff training in schools
- Teacher training programmes
- Support staff in higher education
- Educational psychology training
- Clinical recommendation
- Allied health professionals



Total = 2922

Empowering parents

My son was very preterm but because he has no behavioural issues, we have had real difficulties getting his differences acknowledged and understood by his teachers. This site is really excellent in getting the issues across to busy teachers who cannot be experts in everything but do need to know how to help these precious children.

Thank you so much. This is amazing, and I can't wait to share it with my son's teachers. They really need it.

I've felt FOREVER that I wanted a resource like this for the teachers of my Former Micro Preemie Daughter.. Thank you so much!!!"

As a parent of premature children I would like all teachers and people involved in their lives to read this. It rings true

I have shared the teacher resource from the Prism study so often: it has enabled parents and teachers, and young adults to advocate for themselves using verified information for the first time. This is hugely empowering for both the parent and child





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Thank you

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[@SamJPsych](https://twitter.com/SamJPsych)

