An integrated transdisciplinary approach to early intervention

www.eismart.co.uk

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A better start for high - risk infants

Who we are:

We are a small organisation of passionate clinicians, academics and parents who are working together with the sole aim of improving neurodevelopmental outcomes for premature and term infants at risk of developmental difficulties.

EiSMART is a non-profit organisation, with teams focused on research and development, education, and representing EiSMART nationally

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Our vision:

Our vision is to lead and transform the face of early intervention for babies and their parents.

We would like our approach to be available to all babies who are at risk of developmental delay, cerebral palsy and other difficulties as a result of being disadvantaged by preterm birth or perinatal brain injury.

The Ei SMART approach promotes early intervention with the best possible evidence base – early is vitally important to capture brain plasticity.

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Our message to babies:

EiSMART wants to give you the best start in life – to feel joy in touch and successfully interpret the world around you (S);

to move and explore in a secure and supportive space (M);

to learn how to sleep deeply, grow strong, communicate, eat, play and have fun and to feel infinitely connected (A)

as you are embraced with skill and confidence by your family (R),

and are supported in all of this as we work together (T).

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Our message to parents:

We promise to always start with what your baby can do; we will give you hope; we will call you by your name; we will balance fun with challenging when helping your baby achieve their next goal because we know that babies learn best when they are relaxed and happy.

We will embrace you as the expert on your baby and we will work with you in partnership, enjoying and taking pride in your baby's developmental journey.

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Our message to therapists:

We are committed to supporting the professional development of neurodevelopmental occupational therapists, physiotherapists and speech and language therapists.

We are working closely with others in this field – doctors, psychologists, researchers and families, for the advancement of knowledge, skills and practice in early intervention to improve neurodevelopmental outcomes for our tiniest patients.

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Our message to doctors and nurses:

Work in progress ……!!

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What have we been doing?

DEVELOPMENTAL MEDICINE & CHILD NEUROLOGY REVIEW

Early intervention programmes for infants at high risk of atypical neurodevelopmental outcome

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ABBREVIATIONS

COPCA	Coping with and caring for infants with special needs
EI SMART	Early intervention: sensorimotor development, attention and regulation, relationships, and therapist support
NICU	Neonatal intensive care unit

The purpose of this review is to present a new framework, EI SMART (early intervention: sensorimotor development, attention and regulation, relationships, and therapist support) for identifying key components that could contribute to more effective interventions for infants at high risk of atypical neurodevelopmental outcome. We present a clinical consensus of current challenges and themes in early intervention, based on multidisciplinary group discussions, including parents of high-risk infants, supported by a literature review. Components to include in early intervention programmes are: (1) promotion of self-initiated, developmentally appropriate motor activity; (2) supporting infant self-regulation and the development of positive parent–infant relationships; and (3) promotion of early communication skills, parent coaching, responsive parenting, and supporting parental mental well-being. Such multimodal programmes may need to be evaluated as a package.

Improvements in neonatal intensive care have been associated with increased survival of very low birthweight and infants born preterm; however, morbidity remains high. There is an increased risk of cognitive and/or behavioural impairments, speech and language delay, and sensorimotor deficits, including cerebral palsy (CP). This greatly increases the emotional and financial burdens on families, society, and health care systems.

Multiple factors have an impact on cognitive, behavioural, language, and sensorimotor outcomes in infants born preterm. Periventricular leukomalacia, grades 3 to 4 intraventricular haemorrhage, and bronchopulmonary dysplasia are associated with a high risk of CP.[1] There are also justifiable concerns about the impact of environmental factors in the neonatal intensive care unit (NICU) on infants born preterm, including noise, bright lights, medical equipment, and altered social interactions.[2] Loud noises and bright lights have short-term negative effects on weight gain and cardiorespiratory parameters; these factors influence developmental outcomes.[2] Isolation in an incubator and skin-to-skin caregiver contact are very different sensory experiences that affect cardiorespiratory parameters and sleep organization. Non-medical factors including social demographics, parental education, parenting style, parental mental health, family structure, family functioning, and the home environment, are also associated with developmental outcomes.[3] In a longitudinal study,[3] the effects of biological and psychosocial risk factors on cognitive and socio-emotional functioning outcomes aged 2 years were additive.

The birth of an infant requiring NICU admission represents a life-changing crisis for parents, which could have an impact on parenting ability and their sense of self-worth.[4] A high-risk pregnancy and/or preterm delivery may cause stress due to feelings of grief and guilt.[5] Around one-quarter of parents of infants born very preterm (especially mothers) report mental health problems over 2 years after the birth.[6] This may jeopardize parent–infant relationships that may affect subsequent child development. Treyvaud et al.[1] demonstrated a strong, positive association between parent–child synchrony and child cognitive development and social-emotional competence at 2 years' corrected age.

Existing developmentally supportive care interventions in the NICU include the Newborn Individualized Developmental Care and Assessment Program, Family Nurture Intervention, Family Integrated Care, and the Mother Infant Transaction Programme (Table SI, online supporting information). These interventions are underpinned by an ethos of individually tailored collaborative care,

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High risk infants:

Infants disadvantaged by

Biological (preterm birth, perinatal brain injury)

and/or

environmental (socio-economic class, parenting)

risk factors

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A new approach was needed

- To shift the focus towards the holistic needs of the infant and family,
- to produce collaborative,
- evidence-based services

common purpose:

- supporting professional development,
- placing parent empowerment and
- education at the centre of early intervention strategies

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Universal concern regarding:

- type,
- frequency
- quality of early intervention on offer to parents of infants at high risk of neurodevelopmental difficulties.
- All too often there is a lack of evidence for the effectiveness of some of the interventions implemented

"largest effect in interventions that include:
-child initiated movement, task specific training and included elements of environmental enrichment"

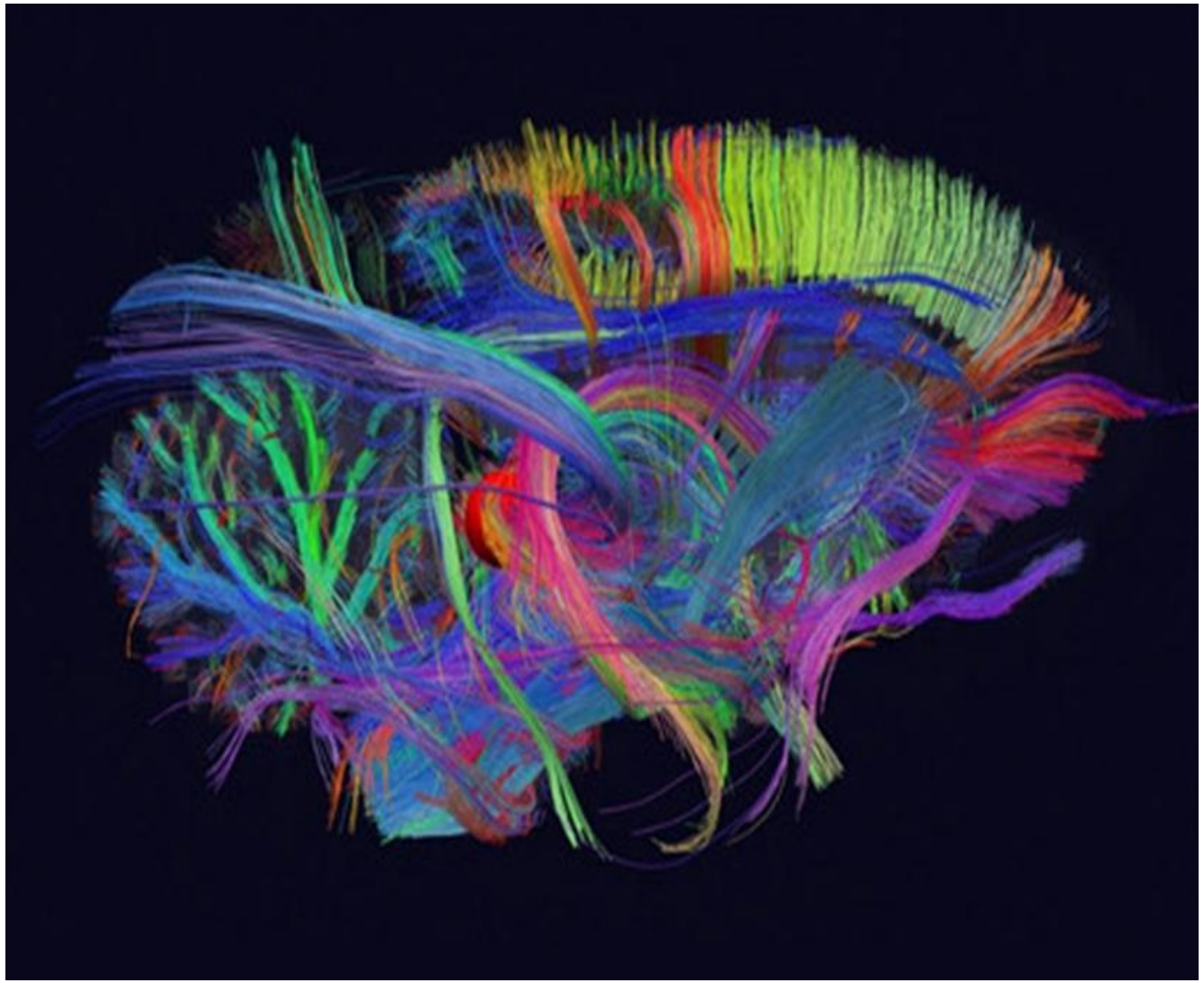
*"**dosing** may be critical and **multifaceted** interventions may offer best opportunities for child and family"*

Morgan C et al (2016)
Effectiveness of motor interventions in infants with cerebral palsy: a systematic review
Dev Med Child Neurol. 58(9):900-9.

Hadders-Algra M et al (2017)
Effect of early intervention in infants at very high risk of cerebral palsy: as systematic review
Dev Med Child Neurol 59 (3) 246-258

evidence

Experience shapes brain development....



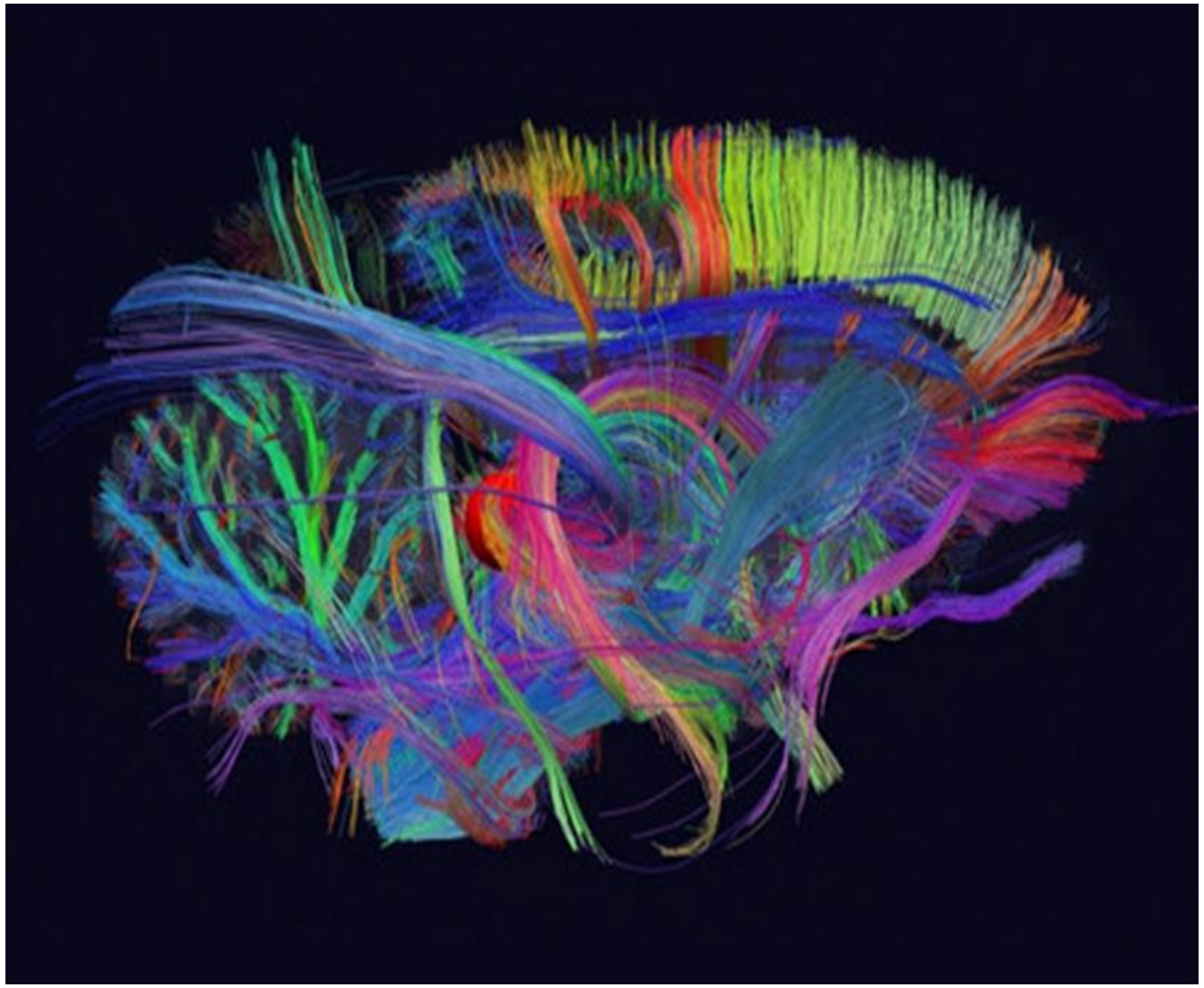
→ *'What fires together wires together'* (Donald Hebb) – neural basis of learning

Potential for early experiences to positively influence brain development

.. Learning takes place best in an action–reaction situation

Child actively explores the environment or participates actively

Critical periods of brain development



- Developmental plasticity
- Post-lesional plasticity
- Critical periods
- Neonatal stroke as example

If we intervene early, can we mitigate most effectively against the effects of early brain injury and improve outcomes?

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We found no single approach

built around a central strategy of -

- parental inclusion
- education
- empowerment beyond the NICU

to maximize the effectiveness of early intervention for the infant.

We recognised that many parents may not know what to expect from service providers.

There was widespread agreement that a multidisciplinary approach is best for children with CP

Current approach is too fragmented

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Our literature review revealed:

- The ideal early intervention has yet to be found
- We need more information about what works for whom and why
- Common themes and active ingredients that may be crucial to sustained change
- We identified key components that could contribute to more effective interventions for infants at high risk of atypical neurodevelopmental outcome.

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Evidence for effective interventions

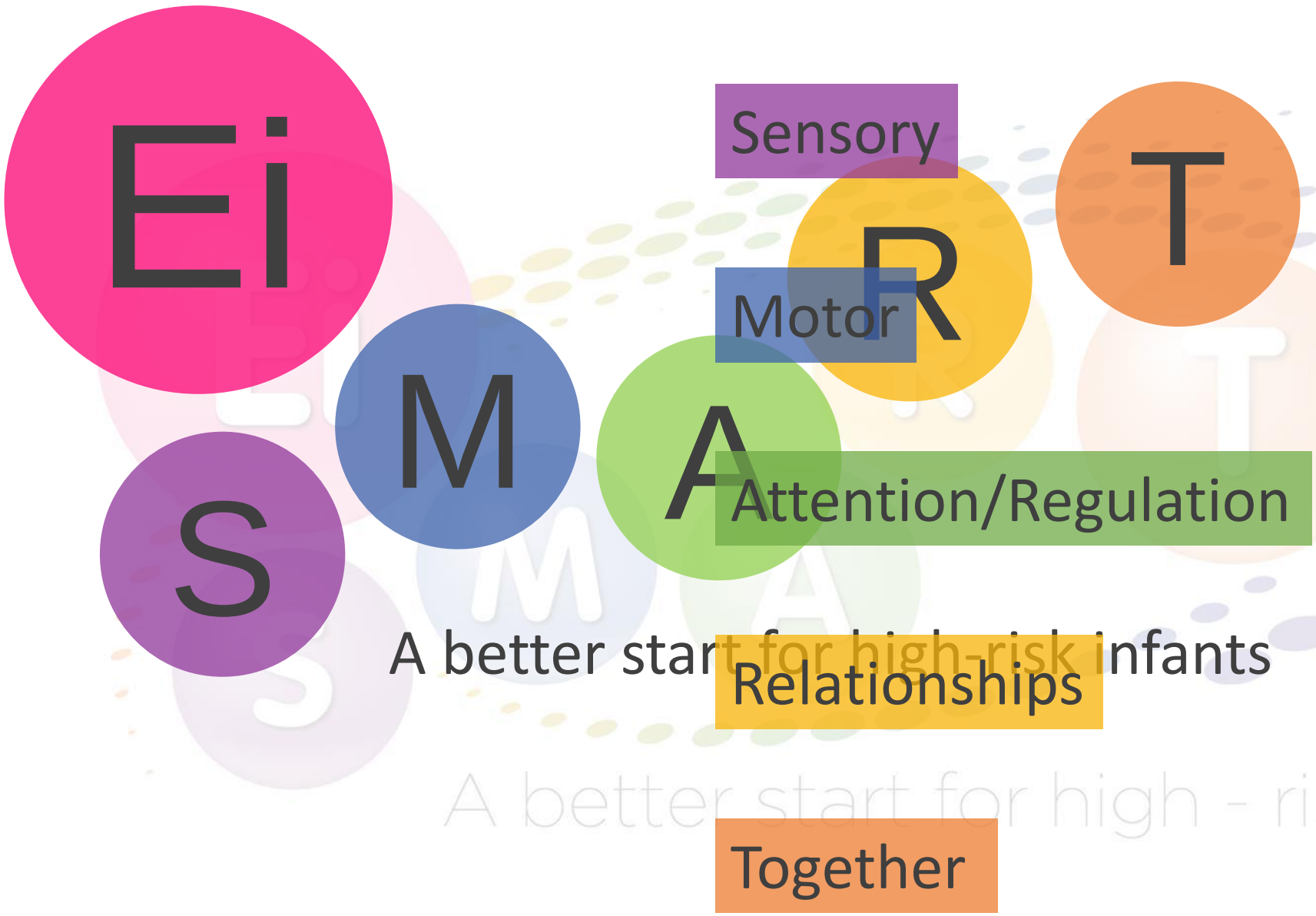
We made the case for including the following components in early intervention programmes:

(1) promotion of self-initiated, developmentally appropriate motor activity;

(2) supporting infant self-regulation and the development of positive parent–infant relationships;

(3) promotion of early communication skills, parent coaching, responsive parenting, and supporting parental mental well-being.

By articulating the components Ei SMART enables therapists to support their consideration of the interplay of these elements and how they may impact an infant's development and the parent-infant relationship, which will underpin the planning and delivery of their specific therapeutic intervention.



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It is a multi-disciplinary, evidence-based approach to optimise cognitive, motor and relational development in premature and sick babies

Sensory

Motor, sensory and cognitive development are all strongly interrelated

(Hadders-Algra M. 2016)

Huge sensory challenges in the form of prolonged and excessive exposure to auditory, visual and tactile stimulation during a period of critical brain development (Graven and Brown 2008)

There is a mismatch between intensity of sensory input and the maturation of the infant's sensory system.

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Emphasis of intervention for sensory development:

- Interpret the impact of the sensory world on the infant
- Provide the appropriate sensory environment
- -to help with infant's self-regulation to promote social interaction and attachment
- - that keeps the infant engaged but not over stimulated.
- Help parents and carers interpret the
- impact of sensation on their infants

Motor

Dynamic Systems Theory

(Thelen 1995)

Complexity & Variability seen in typical motor development,

→

Neuronal Group Selection Theory *(Edelman 1989)*

Heinz Prechtl and many other researchers

Qualitative assessment of spontaneous General Movements

Age appropriate motor repertoire

Movement quality and relationship with brain MRI and later motor AND cognitive ability

Prechtl 1997; Einspieler et al 2004; Heineman K et al 2008; Spittle A et al 2008, 2009 & 2010

Attention / Regulation

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Attention / Regulation

- Self-regulation involves different domains – regulation of one domain affects other areas of development
- Self-regulation skills develop gradually, important to have developmentally appropriate expectations of infant behaviour
- Important to identify and intervene with infants who need extra help
- Research shows that EI that targets the development of social and attention skills/abilities in the first year reduced risk of attention and FM difficulties at school age (Spittle 2015)

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Attention / Regulation

- Regulatory challenges are heightened for preterm infants and especially those at high risk CP who may also have unreliable motor responses.
- Difficulties with behavioural state regulation and organisation
- Eg irritability, crying, difficulties with consolability, feeding and sleeping

Brazelton and colleagues:

Understanding Infant behavioural cues

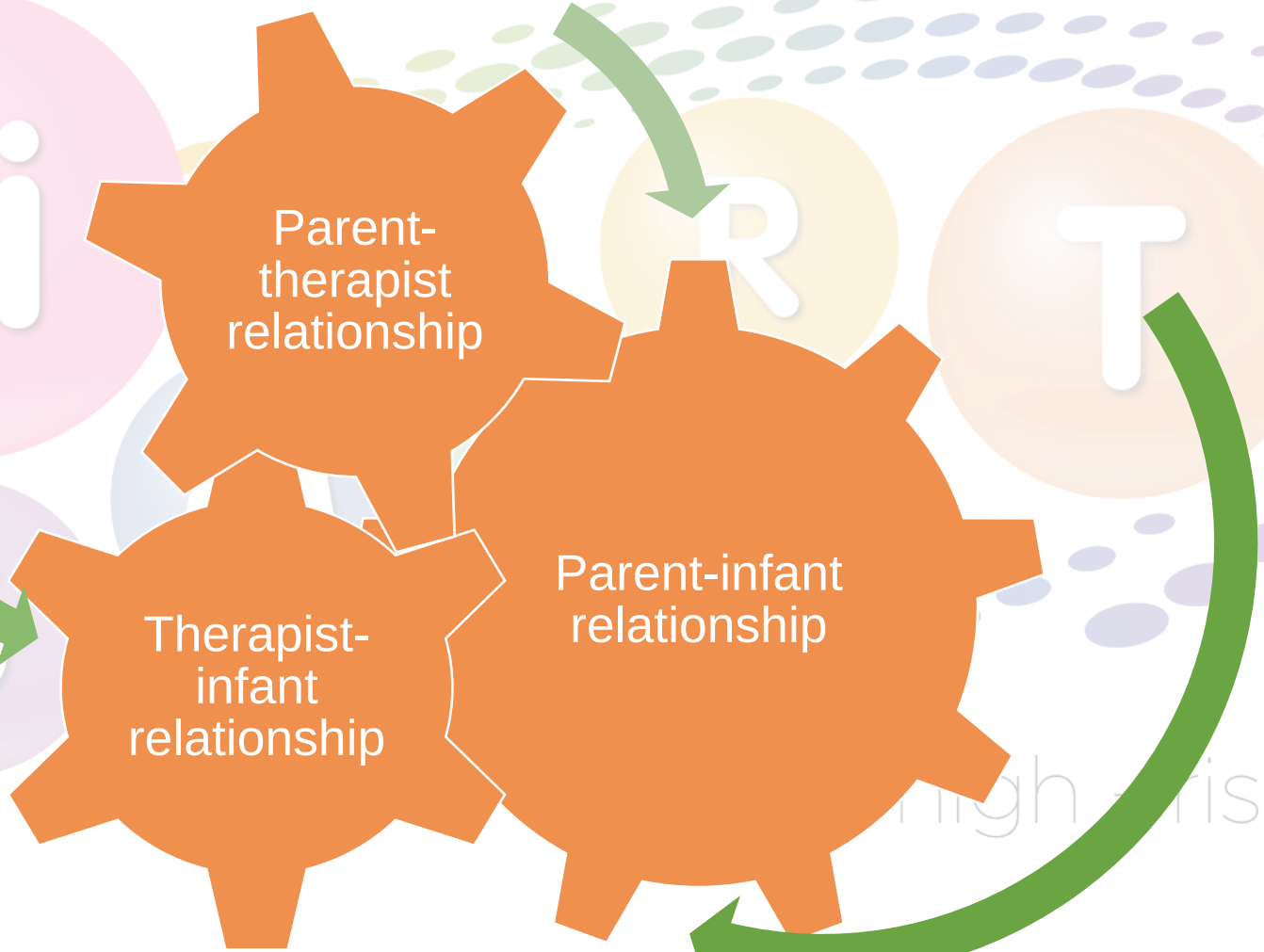
Positive and sensitive parental awareness and responsiveness to infant's cues

Support for the infants self-regulatory competence to reduce parental and infant stress

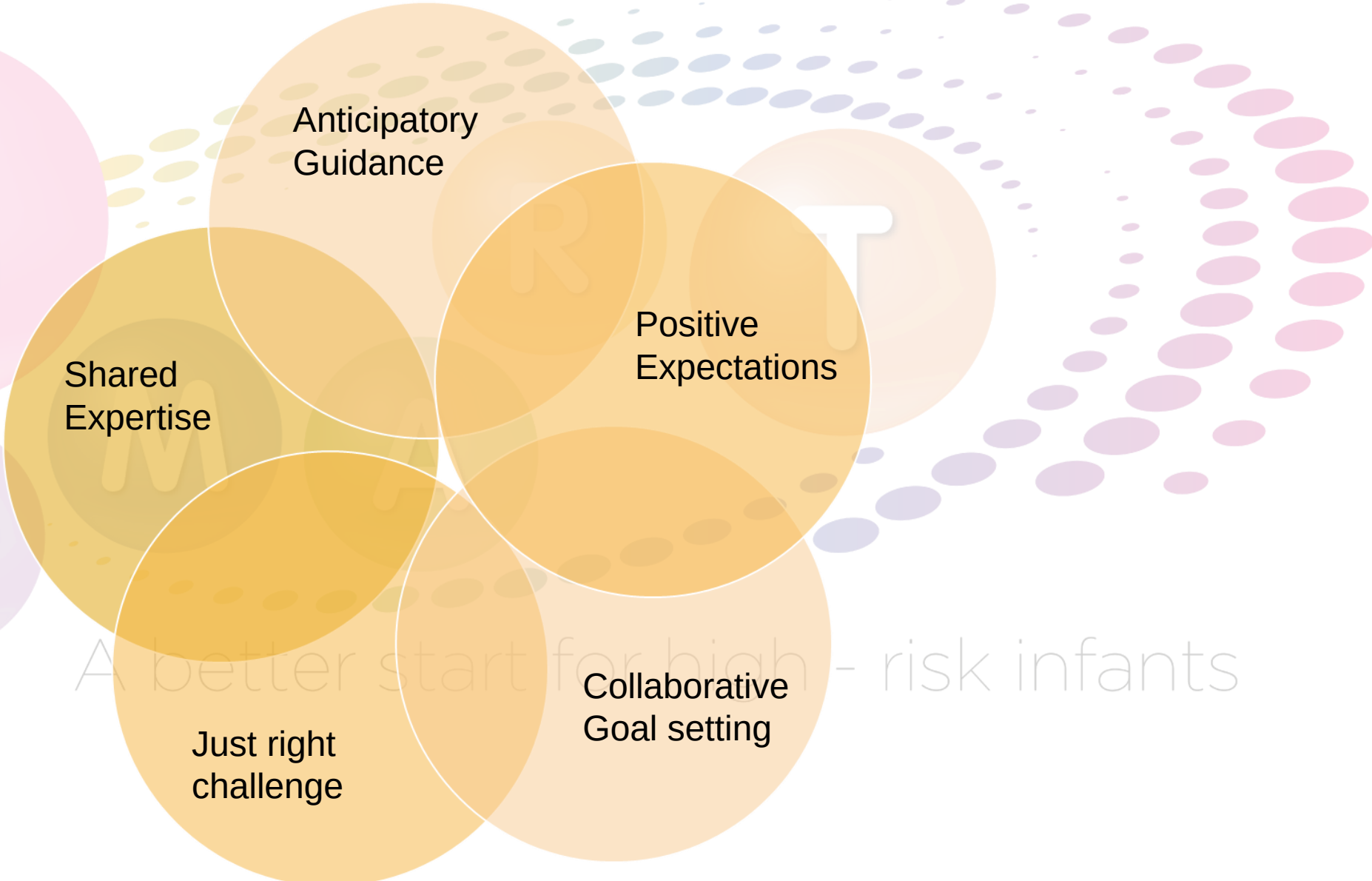
Brazelton TB & Nugent JK (2011); Hawthorne J (2005)

Relationships

Relationships integral to early intervention:



Parent-therapist relationship



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Support parent-infant relationship by:

- Promoting attunement, attachment and a reliable and responsive parent-infant relationship
- Reducing infant stress and supporting self-regulation
- Illuminate the infant's capabilities and efforts to form a relationship with their primary caregivers
- Validate parent's skills in reading their infant's communicative efforts and responses.

Ei SMART 6 core principles:

- **Co-production with parents using a biopsychosocial model (considering biological, psychological and socio-environmental factors)**
- **Supporting a consistent and responsive parent-infant relationship**
- **Minimising infant stress and recognising and supporting the infant's self-regulatory behaviours**
- **Scaffolding the infant's next developmental steps in cognitive, motor, sensory and communication to stimulate and elicit active participation**
- **Challenging the infant with a wide variety of self-initiated, self produced motor activities in a variety of positions**
- **Promoting parent well-being**

Ei SMART

SMART
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Not everything that can be counted counts; and not everything that counts can be counted.'

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William Bruce Cameron 1963

A better start for babies

Sensory | Motor | Attention/Regulation | Relationships | Therapy

Helping my baby learn through play: 0 to 3 months old

TOUCHING, MOVING, SMELLING, TASTING, HEARING AND SEEING
Your Baby is learning really fast. They need your help and guidance.

Play idea	How does it help my baby?
Interacting with Faces 	**Helping my baby learn through interacting** • Expensive toys are not needed. Your face is the best toy for your baby! • Your baby loves looking at, exploring and touching your face. • Your baby loves hearing your voice and it helps your baby develop language. • Pause when talking to your baby and wait for your baby to respond and take a turn. This is the beginning of a conversation!
Interesting things to look at  	**Helping my baby learn through play: 0 to 3 months old.** • Young babies like interesting things to look at and contrasting patterns. • It helps visual attention and learning skills. • Pictures should be about 30cm from your baby's face • Note: ensure pictures are not too close to your baby's face and use them only a few minutes at a time when your baby is looking and interested.
Play Mat 	**Helping my baby learn through using their hands** • It promotes reaching and grasping • When your baby holds a toy, it draws attention to your baby's hands • It stimulates using hands to bring an object to mouth • Toys that make a gentle noise like rattles help your baby begin to develop an understanding of cause and effect
Rattles and Teethers  	**Helping my baby learn through using their hands** • It promotes reaching and grasping • When your baby holds a toy, it draws attention to your baby's hands • It stimulates using hands to bring an object to mouth • Toys that make a gentle noise like rattles help your baby begin to develop an understanding of cause and effect

مساعدة طفلي على التعلّم من خلال اللعب: من عمر 0 إلى 3 أشهر

اللمس،الحركة،الشّم،الذوق،السمع والنظر
إن طفلك يتعلّم بسرعة و هو بحاجة لمساعدتك وتوجيهك

أفكار للعب	كيف يساعد اللعب طفلي؟
التفاعل مع الوجوه 	**أساعد طفلي على التعلّم من خلال التفاعل.** • أن طفلك هو ليس بحاجة لألعاب باهظة الثمن.أفضل لعبة لطفلك هي النظر الى وجهه! • يحبّ طفلك النظر إلى وجهك وإستكشافه ولمسه. • يحبّ طفلك سماع صوتك و هذا يساعده على تنمية لغته • عند التحدّث مع طفلك توقّف(ي) وانتظر(ي) حتى يتفاعل معك. أن هذه الطريقة هي بداية جيّدة للمحاكاة!
أشياء مثيرة للاهتمام للنظر  	**أساعد طفلي على التعلّم من خلال النظر.** •يحبّ الطفل النظر الى الصور المثيرة لإهتمامه التي هي متناقضة الألوان (الأبيض/ الأسود) •النظر الى هذه الصور يساعد الطفل على تطوير إهتماماته البصرية ومهارات التعلم. •يحبّذ وضع هذه الصور على بعد حوالي 30 سم من وجه طفلك **ملاحظة:** تأكد(ي) من أن طفلك ينظر الى هذه الصور عندما يكون يقظاً و هادئاً. ومن المستحسن أن تكون هذه الصور ليست قريبة جداً من الوجه و يفضّل النظر اليها لبضع دقائق من الوقت.
سجادة اللعب 	**أساعد طفلي على التعلّم من خلال الإستكشاف.** •يعزز الإستكشاف مدّ اليدين و الإمساك بالأشياء وتحفيز النظر •الإستكشاف يساعد الطفل على التعلّم الى تقريب اليدين من بعض و رفع ساقيه عالياً لركل الأشياء المتدلية من سجادة اللعب •غيّر(ي) وضعية الأشياء المتدلية من سجادة اللعب لتعزيز الإستكشاف والإهتمام البصري.
الخشخيشات والعضّاضات 	**أساعد طفلي على التعلّم من خلال إستخدام يديه** • أستخدام اليدين يعزز المدّ و الأمساك • أمساك لعبة/خشخيشة تلفت انتباه طفلك

讓寶寶有更好的開始

感官 | 體能 | 專注及調節 | 建立關係 | 治療

在遊戲中讓嬰兒學習：0 至 3 個月大

觸覺、運動、嗅覺、味覺、聽覺和視覺
寶寶學習得很快。他們需要你的協助和指引。

遊戲意念	對寶寶有何幫助？
面對面的接觸及交流 	***透過母嬰之間接觸及交流學習*** • 不需要昂貴的玩具，你的面容和親切的笑容便是最好的 • 你的寶寶喜愛觀察、探索及觸摸你的臉 • 他喜歡聽你的聲音，這有助寶寶的語言發展 • 跟寶寶說話時要有停頓，並耐心留意他的反應，然後再輪流作出反應。這就是寶寶學習對話的第一步
觀看有趣味的物件 	***透過觀察學習*** • 寶寶喜歡凝視黑、白強烈對比的圖案數分鐘。接近三個月大，寶寶較喜歡明亮及顏色鮮明的圖案 • 加強視覺專注和學習技巧 • 對於初生嬰兒，圖畫應該放在他們面前約三十厘米 (哺乳的距離) 註： 不要把圖畫放得太近寶寶的臉，並留意只是寶寶有興趣看著的數分鐘時用
遊戲氈 	***透過探索學習*** • 遊戲氈可以給予豐富的視覺刺激，並鼓勵寶寶抓握及伸手觸摸物件 • 鼓勵寶寶把雙手向身體中心合攏 • 可刺激嬰兒提起雙腿踢玩具 • 改變玩具擺放的位置可以促進寶寶的探索及視覺興趣
搖鼓及牙膠	***透過雙手學習*** • 這些玩具能促進寶寶伸手及抓握的技巧

Η καλύτερη αρχή για τα μωρά

Πρώιμη Παρέμβαση

S M A R T

Sensory Αισθήσεις | Motor Κίνηση | Attention/Regulation Προσοχή/ Ρύθμιση | Relationships Σχέσεις | Therapy Θεραπεία

Πώς να βοηθήσετε το μωρό σας να μάθει παίζοντας: από 3 έως 6 μηνών.

ΠΡΟΣΕΓΓΙΣΗ, ΑΡΠΑΓΜΑ ΚΑΙ ΑΛΛΗΛΕΠΙΔΡΑΣΗ

Ιδέα παιχνιδιού	Πώς βοηθάει το μωρό μου;
Καθρέφτης 	***Πώς να βοηθήσετε το μωρό σας να εξελιχθεί χρησιμοποιώντας την όραση*** • Οπτική προσοχή και αναγνώριση. • Εξερεύνηση. • Μαθαίνει να εστιάζει και να ακολουθεί εικόνες.
Κρεμαστά  **Αισθητηριακές μπάλες**  **Τουβλάκια** 	***Πώς να βοηθήσετε το μωρό σας να εξελιχθεί μέσω της εξερεύνησης*** • Προσέγγιση, άρπαγμα, κράτημα και απελευθέρωση. • Μεταφορά αντικειμένων από το ένα χέρι στο άλλο. • Αίσθηση διαφορετικών υφών. • Να φέρει αντικείμενα στο στόμα.
Μαλακά υφασμάτινα βιβλία με απλές εικόνες	***Πώς να βοηθήσετε το μωρό σας να εξελιχθεί μέσω της χρήσης των αισθήσεων***

Early Intervention

A better start for babies

Sensory | Motor | Attention/Regulation | Relationships | Therapy

Aiutare il mio bambino ad imparare attraverso il gioco: 9-12 mesi.

ESPLORARE, INTERAGIRE E IMITARE

Idee di gioco	Come aiutano il mio bambino?
Giocare con gli oggetti della casa  Giocare con le scatole e la carta 	***Aiuta il mio bambino ad imparare attraverso l'esplorazione di oggetti di uso quotidiano*** • Sviluppare il gioco del "fare finta" • Imitare i genitori e i fratelli • Utilizzare due mani insieme per esplorare gli oggetti di diversa forma e dimensione • Risolvere problemi che possono emergere durante il gioco

Cubi da costruzione e torre impilabile di tazze  Formine ad incastro  Puzzle ad incastro  Rampa con palline 	***Aiuta il mio bambino ad utilizzare le sue mani per imparare***
	• Utilizzare due mani
	• Lavorare sull'afferrare e il lasciare gli oggetti
	• Attaccare e staccare gli oggetti
	• Capire le forme
	• Capire nuovi concetti
	  ○ Costruire e mettere le cose una sopra all'altra
	  ○ Mettere le cose dentro un contenitore
	  ○ Capire come le cose stanno insieme

Giochi pop-up 	***Aiuta il mio bambino ad imparare facendo*** • Schiacciare, girare, chiudere • Inserire le dita nei buchi • Iniziare a comprendere causa-effetto
Libri	***Aiuta il mio bambino a costruire il proprio linguaggio*** • Indicare con il dito indice

A better start for babies

EiSMART Masterclass and Workshop

Born too soon, too sick. Start SMART.

Attend the EiSMART Masterclass (Early Intervention, Sensory, Motor, Attention/regulation and Relationships Together) and learn what the latest evidence tells us about early intervention – what works and how to optimise developmental outcomes for premature and sick babies.

What is EiSMART?

EiSMART supports therapist, clinician and family access to early intervention solutions for babies with developmental concerns. It is a multi-disciplinary, evidence-based approach to optimise cognitive, motor and relational development in premature and sick babies.

Study day 3rd Dec booking now

How can I learn more about EiSMART?

EiSMART is hosting a virtual Masterclass and Workshop for therapists, parents and clinicians seeking to maximise the potential of babies with neurodevelopmental concerns. The expert-led Masterclass will introduce the case for, and principles behind, the five-fold EiSMART approach. The Workshop will be an opportunity to share and discuss the practical application of the EiSMART approach.

The Masterclass and Workshop sessions will be led by some of the UK's experts in early intervention for babies and young children with developmental concerns, and include parents that practice early intervention therapies.

Date: Thursday 5th November
Time: 9:00am – 10:30am Masterclass; 11:00am-4:15pm Workshop
Tickets: Masterclass £25; Masterclass and Workshop £50
Agenda: Detailed online at http://training.ucheducationcentre.org/home/viewcourse/493/

This event is run by the University College Hospital London (UCLH) Education Centre.

The Workshop is limited to 50 places, so early registration is advisable: sign up here.

Is this the right event for me?

Are you a professional involved in the care of babies in neonatal units and /or their long-term management and follow-up? You may be a physiotherapist, occupational therapist, or speech and language therapist. You may be a paediatrician; neonatologist, neonatal nurse or GP. Learn about the evidence base for early intervention; the impact of family-centred care; and incorporating EiSMART into your practice.

Are you a parent of a premature or sick baby that has neurodevelopmental concerns? You are integral to the EiSMART approach, and a partner to the whole multidisciplinary team in your baby's developmental journey. Learn about the approach guiding early intervention for your baby, and practical resources to support your baby's development.

Email Malorie.bantala-nzewo@nhs.net for more information.

Sign me up!

EiSMART Masterclass and Workshop

A better start for high - risk infants

Thank you BANNFU for your support and this opportunity

from the Ei SMART team