Long-term Executive Assessment and Resilience in extremely premature-born Neonates (LEARN)

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(1) investigate alterations in executive functioning in extremely preterm-born adolescents in the Netherlands relative to term-born controls, (2) assess the neurobiological basis of individual variability in executive functioning following preterm...

Ethical review	Approved WMO
Status	Pending
Health condition type	Structural brain disorders
Study type	Observational non invasive

Summary

ID

NL-OMON57161

Source
ToetsingOnline

Brief title
LEARN

Condition

- Structural brain disorders

Synonym
Prematurity, preterm birth

Research involving
Human

Sponsors and support

Primary sponsor: Universitair Medisch Centrum Utrecht
Source(s) of monetary or material Support: Ministerie van OC&W

Intervention

Keyword: extreme preterm, longterm outcome, neurocognitive, resilience

Outcome measures

Primary outcome

The main endpoints of the study are the CANTAB scores of executive functioning (memory, attention, processing speed, cognitive flexibility, emotion recognition, inhibition, visual and social processing) in the population of exteme preterms at adolescent age.

Secondary outcome

- Quantative MRI analysis including structural, resting state functional (fMRI), diffusion imaging (DTI).

- possible predictors for CANTAB scores at this age, including parental education, TEA MRI, earlier developmental scores, gender, and early-life stress (e.g.,prenatal data and stress during NICU stay).)

- possible predictors for abnormal MRI scores at this age, including parental education, TEA MRI, earlier developmental scores, gender, and early-life stress (e.g.,prenatal data and stress during NICU stay).)

- By post-hoc grouping of the variables into mixed effect models we hope to identify multidimensional resilient and vulnerable groups within our population , we will use variables in categories:

* Clinical factors: For example, the number of days the patient required ventilation during their stay in the NICU, and the results of executive function tests.

* Environmental factors: The socio-economic status (SES) of the parents.

* Social factors: The educational level of the parents, and the CANTAB test for

emotion recognition.

* Biological factors: Such as the structure of the brain in earlier MRI scans,

as well as sex differences that may play a role in the development of

resilience and vulnerability.

Study description

Background summary

Prematurity imposes a significant global health burden, affecting approximately 11% of all births worldwide and remains a leading cause of infant morbidity and mortality . Long-term neurodevelopmental delays are prevalent among those born extremely premature, with preterm children being more likely to develop behavioural, attention, hyperactivity-impulsivity, and social-communication difficulties than term-born children. Furthermore, structural alterations in the brain, including reductions in various brain regions, are commonly observed. Despite advancements in medical care leading to increased survival rates, neurobehavioral outcomes among preterm infants have remained largely unchanged or worsened over the past years, underscoring the need for a deeper understanding of neurodevelopment in these neonates. Furthermore, it remains a challenge to predict which infants are at risk or resilient for developing maladaptive neurodevelopmental outcomes. Literature has shown that executive functioning is essential in resilience and predicts neurocognitive functioning better than IQ for example. Currently, follow-up programmes are designed until the age of 8 years in the Netherlands [NVK], potentially leaving a knowledge gap in neurocognitive functioning of older, extreme premature survivors in the Netherlands. Especially since, we know that neurodevelopmental, social, and emotional problems persist into adulthood and we know that adolescence poses challenges in neurocognition.

Primarily, we focus on comparing executive functions between preterm and full-term children, where cognitive performance is assessed without considering the experienced stress.

The secondary outcome measure specifically focuses on the multidimensional aspects of resilience and vulnerability. Through multidimensional constructs, including biological, social, environmental, and clinical factors, we highlight variations in functioning. Neurocognitive outcomes, as clinical factors, contribute to the formation of either a resilient or vulnerable profile. These

neurocognitive performances can, for example, help predict how well children cope with challenges related to premature birth.

Study objective

(1) investigate alterations in executive functioning in extremely preterm-born adolescents in the Netherlands relative to term-born controls,
(2) assess the neurobiological basis of individual variability in executive functioning following preterm birth,
(3) identify possible predictive factors for atypical executive functioning
(4) classify distinct behavioural, clinical, and environmental patterns of resilience and vulnerability following preterm birth.

Study design

The study design is a prospective observational study, primarily cross-sectional in nature, but with longitudinal data analysis as well. The study is built up from two parts: an online executive assessment and a cerebral MRI scan.

Study burden and risks

The study focuses on adolescents born extremely premature to understand long-term executive functioning and brain networks, with minimal risks and burdens. This study involves assessments of executive function conducted in a safe home environment using an online test-battery, and a 30-minute cerebral MRI without sedation or intravenous contrast. This age group is specifically chosen as executive functioning challenges become more pronounced in adolescence, providing a comprehensive understanding of the long-term impacts of extreme prematurity on cognitive development. Furthermore, this age group offers insight into adolescents born since the guideline of 2010, which permits treatment from 24 weeks gestational age. There are no direct benefits to participants, but findings could contribute to the understanding of neurobehavioral outcomes for extremely preterm infants and improve personalized care programs in the Netherlands.

Contacts

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Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age
Adolescents (12-15 years)
Adolescents (16-17 years)

Inclusion criteria

Gestational age <28 weeks
Born between January 2009 and December 2012

Exclusion criteria

Major chromosomal and/or congenital anomalies
Ferromagnetic implants
Claustrophobia
Parents who refuse to be informed about unexpected clinically relevant information

Study design

Design

Study type: Observational non invasive

Masking:	Open (masking not used)
Control:	Uncontrolled
Primary purpose:	Basic science

Recruitment

NL

Recruitment status:	Pending
Start date (anticipated):	02-09-2024
Enrollment:	250
Type:	Anticipated

Ethics review

Approved WMO

Date:	22-10-2024
Application type:	First submission
Review commission:	METC NedMec

Study registrations

Followed up by the following (possibly more current) registration

No registrations found.

Other (possibly less up-to-date) registrations in this register

No registrations found.

In other registers

Register	ID
CCMO	NL87035.041.24