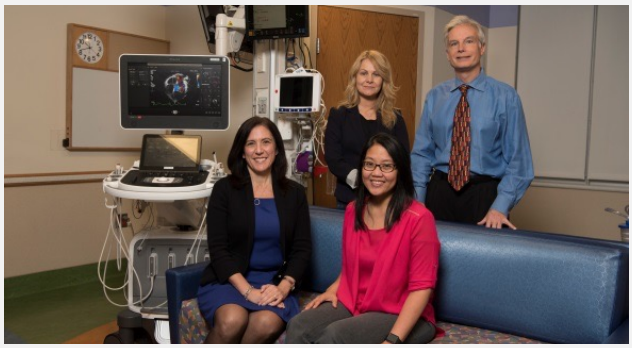
December 2017 Volume 2 Issue 4

Director's Message For the New Year:

Catherine Limperopoulos, PhD
Director

I want to take this opportunity to thank everyone for all their hard work and dedication throughout the year. Our success is built on the efforts of our team and in this past year, we have enjoyed many successes as we continue to expand our Program's reach. It's been a year filled with both challenges and victories. How reassuring it's been to know that we can count on each other. I appreciate each and every one of you for your valuable contributions to our mission. Working with you this past year has been a pleasure and I'm so proud to be on your team. I look forward to a successful 2018!

Children's National Banner Year For Innovation 2017



Pictured: Drs. De Asis-Cruz, Donofrio, Vezina and Limperopoulos. NeuroImage: Clinical

Innovative Research Studies

Intermittent Hypoxia And Caffeine In Infants Born Preterm

(Recently funded by National Institutes of Child Health & Human Development)

What is the study about?

Most preterm infants experience frequent, yet routinely undetected episodes of intermittent hypoxia (IH), which can potentially increase their already considerable potential burden of neurologic injury. In infants born preterm, caffeine might be neuroprotective through two major mechanisms: **1)** reducing incidence and severity of IH due to its respiratory stimulatory effects and **2)** reducing pre-and immature oligodendrocyte injury. The central goal of this multisite study led by Dr. Carl Hunt is to assess whether persisting intermittent hypoxia (IH) in infants born preterm is associated with injury. Injury will be assessed in 4 domains: **1)** inflammatory (biochemical) **2)** structural (MRI) **3)** microstructural (MRI) and **4)** metabolic (MRI). The study will confirm persisting IH to 42 weeks PMA, the effects of persisting IH on adverse changes in biochemical, structural, functional and physiological biomarkers of injury and determine whether extended caffeine treatment attenuates these effects.

At higher doses caffeine can improve motor and cognitive Neurodevelopmental outcome in premature infants. This study has the potential to have a major impact on clinical practice, both in how clinicians assess and interpret IH and in the duration of pharmacological treatment with caffeine.

Featured Press

Blood flow altered in brains of preterm newborns v. full-term infants

Study finds altered blood flow in brains of preterm newborns

MR detects neurological impairments in newborns with CHD before surgery

Newborns with CHD show signs of brain impairment even before cardiac surgery

Welcome New Team Members!

Dhinesvikram Krishnamurthy
Software Engineer

Chantel Snyder
Clinical Research Nurse Coordinator

Jessica Quistorff
Clinical Research Program Lead

Congratulations and Welcome to: Wesley Zun's newest addition, baby Eugene.

Kudos to our Team's Promotions

Kudos to **Josepheen Cruz:** Staff Scientist III.

Congratulations to **Kushal Kapse**: R&D Staff Engineer III.

Kudos to **Manouchka Jean-Gilles:** Academic Program Analyst.

Children's National Race for Every Child Update

Research Presentations

Emerging Metabolic Trajectories in the Developing Fetal Brain. ISMRM (Submitted)

Comparison of 1.5T and 3T MRI for 3D quantitative susceptibility and T2* mapping of the human placenta. ISMRM (Submitted)

Free-breathing 3D quantitative susceptibility and T2* mapping of the human placenta: Initial experience in healthy pregnancies. ISMRM (Submitted)

Placental perfusion imaging using velocity-selective arterial spin labeling. ISMRM (Submitted)

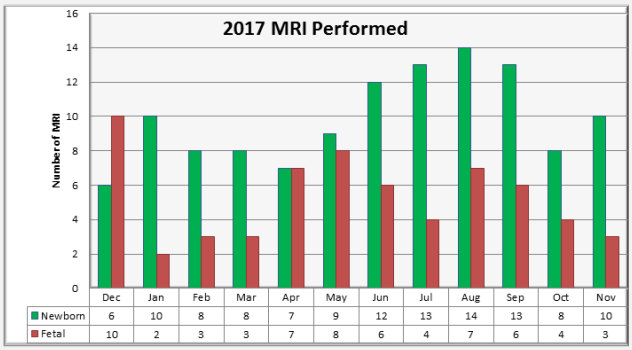
Diffusion weighted imaging of the placenta in gestational diabetes: A feasibility study. ISMRM (Accepted)

Hyperoxic R2* changes in the placenta and brain in fetuses with Congenital Heart Disease. ISMRM (Accepted)

Accelerated placental maturation in growth-restricted fetuses using in vivo textural analyses. ISMRM (Accepted)

Placental diffusion and perfusion in healthy and growth-restricted fetuses using IVIM. ISMRM (Accepted)

2017 Study Updates



	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Newborn	6	10	8	8	7	9	12	13	14	13	8	10
Fetal	10	2	3	3	7	8	6	4	7	6	4	3

Published Articles

Non-invasive placental perfusion imaging in pregnancies complicated by fetal heart disease using velocity-selective arterial spin labeled MRI. *Nature Scientific Report*s. (In Press)

Inter-slice motion correction using spatiotemporal interpolation for functional magnetic resonance imaging of the moving fetus. *bioRxiv.* 2017 Oct 17.

In vivo placental MRI shape and textural features predict fetal growth restriction and postnatal outcome. *Journal of Magnetic Resonance Imaging*. 2017 Jul 22.

Aberrant brain functional connectivity in newborns with congenital heart disease before cardiac surgery. *Neuroimaging Clinic. 17* (2018) *31-42.*

Altered cerebral perfusion in preterm Infants compared to full-term infants. *Journal of Pediatrics.* 2017 Nov 30. pii: S0022-3476(17)31338-0.

Book Chapters: Limperopoulos C. et al. "Cerebellar hemorrhage" and "Cerebellar development" In: Joseph J. Volpe, Terrie Inder et al. Eds. Volpe's Neurology of the Newborn. 6th Edition. Elsevier (November 2017).

Upcoming Events

5th Giessen Symposium of Prenatal Medicine & Therapy , Jan 18-20, 2018 Germany

ISMRM Workshop on MRI of the Placenta, Feb 4-6, 2018 Atlanta, GA

Medela International Symposium on Breastfeeding & Lactation March 22-23, 2018 Paris, France