

**Relationship between renal volume, prematurity, birth weight  
and retinal microvasculature**

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## **Statement of Originality**

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text. I give consent to this copy of my thesis, when deposited in the University Library, being made available for loan and photocopying subject to the provisions of the Copyright Act 1968.

## **Acknowledgement of Authorship**

I hereby certify that this thesis is submitted in the form of a series of published papers of which I am a joint author. I have included as part of the thesis a written statement from each co-author; and endorsed by the Faculty Assistant Dean (Research Training), attesting to my contribution to the joint publications.

.....  
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*“Try not. Do or do not. There is no try”*

Jedi Master Yoda

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### **Review articles**

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Kandasamy Y, Smith R, Wright IMR. Measuring Cystatin C to Determine Renal Function in Neonates. *Pediatric Critical Care Medicine* 2013;14(3):318-22

Kandasamy Y, Smith R, Wright IMR, Hartley L. Pain relief for premature babies during ophthalmology assessment. *Journal of the American Association for Pediatric Ophthalmology and Strabismus (JAAPOS)*. 2011; 15(3):276-80.

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## **Abstract**

This thesis consists of a collection of articles arising from a research project carried out as a requirement of a higher research degree at the University of Newcastle. This research project was carried out in a tertiary perinatal centre in North Queensland, Australia. The study cohort consists of three groups – normal and low-birth-weight term infants, and premature infants. In this study, the relationship between renal volume, birth weight and retinal microvasculature was investigated in a cohort of low-birth-weight term babies. This study also investigated the relationship between prematurity and extra-uterine renal growth and renal function. For the purpose of assessment of renal function Cystatin C was used, which is a relatively new marker of renal function in infants. Retinal imaging technique and technology used in this study are similar to those used in detecting Retinopathy of prematurity. However, the analysis of retinal microvasculature was limited to term infants. The literature review for this manuscript is presented as a series of published review articles. The results are presented in the format of original research manuscripts, which have been published in peer-reviewed journals. From this study we were able to demonstrate that low birth weight and prematurity result in different yet important changes to the developing kidney. We also demonstrated that while eyes, kidneys and blood vessels are distinct organs, they share common features in low-birth-weight term infants.