

How Many Cs in NICU?

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Certificate of Original Authorship

I certify that the work in this thesis has not previously been submitted for a degree nor has it been submitted as part of requirements for a degree except as fully acknowledged within the text.

I also certify that the thesis has been written by me. Any help that I have received in my research work and the preparation of the thesis itself has been acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

Lynn Sinclair

10 September 2013

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List of Abbreviations

ACT	Australian Capital Territory
AIHW	Australian Institute of Health and Welfare
ANZNN	Australia and New Zealand Neonatal Network
AQP	Aquaporin
CLD	Chronic lung disease
CNC	Clinical nurse consultant
CNRG	Cochrane Neonatal Review Group
CONSORT	Consolidated Standards of Reporting Trials
CP	Cerebral palsy
CPG	Clinical practice guidelines
CRCT	Cluster randomised controlled trial
CRIB	Clinical Risk Index for Babies
CTC	Clinical Trials Centre
DOI	Diffusion of Innovations
DSMC	Data and Safety Monitoring Committee
EBM	Evidence-based medicine
EBP	Evidence-based practice
ECW	Extracellular water
EoC	Essentials of Care
fMRI	functional magnetic resonance imaging
HIPI	Humidity in Incubators for Preterm Infants
HREC	Human research ethics committee
ICC	Intraclass correlation coefficients
ID	Identification
IVH	Intraventricular haemorrhage
MRN	Medical record numbers
NEC	Necrotising enterocolitis
NHMRC	National Health and Medical Research Council
NICU	Neonatal intensive care unit
NICUS	Neonatal Intensive Care Units
NSW	New South Wales

PARiHS	Promoting Action on Research Implementation in Health Services
PDA	Patent ductus arteriosus
PET	Positron emission tomography
PICO	Patients, intervention, comparator and outcomes
PSANZ	Perinatal Society of Australia and New Zealand
PSN	Pregnancy and Newborn Services Network
PVL	Periventricular leukomalacia
qEEG	quantitative electroencephalography
QUOROM	Quality of Reporting of Meta-Analyses
RCT	Randomised controlled trial
SAE	Serious adverse event
SCAN	Social cognitive affective neuroscience
SCARF	Status, certainty, autonomy, relatedness, fairness
SCARF-SA	SCARF-Self-Assessment
SNAPPE-II	Score for Neonatal Acute Physiology—Perinatal Extension
SPIRIT	Standard Protocol Items: Recommendations for Interventional Trials
TEWL	Transepidermal water loss
TGA	Therapeutic Goods and Administration
TMC	Trial management committee
TMS	Transcranial magnetic stimulation

Abstract

Neonatal clinicians are challenged to ensure practice is evidence based and health outcomes are positive, which necessitates ongoing innovation and change. In the neonatal intensive care unit (NICU), assessment of the effectiveness of both new and existing interventions is required to reduce the burden of illness for extremely preterm infants and their families. The initial focus of the doctoral work outlined within this thesis was the investigation of the use of incubator humidity in the care of premature infants. My original doctoral plan was to undertake a randomised controlled trial in order to produce robust evidence to guide clinicians in humidity use and reduce the existing variability in practice. The doctoral work evolved to include a review of the broad literature that examines the physiological and historical context of humidification practices; a systematic review of randomised controlled trials that identifies a lack of research evidence to direct practice; a survey of humidification practices in NICUs across Australia and New Zealand that highlights the extent of the diversity in day-to-day practices; a single centre audit that was unable to detect any patterns between incubator humidity and neonatal health outcomes, but did reveal diversity in practice; and, the development of a protocol for the randomised controlled trial required to test the effect of different levels and duration of humidity and its effect on clinically important outcomes. The final chapters build on these findings and explore the kind of workplace cultures that are required to maximise the generation of meaningful evidence and the likelihood that clinicians would use this evidence to inform practice. The final chapter also explores the potential of contemporary social, cognitive, affective neuroscience for providing causal explanations for interventions such as transformational practice development (tPD) as well as providing pointers to additional strategies for creating more positive workplaces for clinicians and families.