

Supplementary Table 1 – Members of multi-disciplinary advisory panel for study project

Name	Academic/clinical role	Institution
Professor Jennifer J Kurinczuk	Professor Of Perinatal Epidemiology & Director	National Perinatal Epidemiology Unit (NPEU), University of Oxford
Dr Jonathan Cusack	Consultant Neonatologist	University Hospitals of Leicester
Dr Patrick Davies	Consultant in Paediatric Intensive Care, Honorary Assistant Professor of Paediatrics	Nottingham University Hospitals, University of Nottingham
Dr Cheryl Battersby	Clinical Senior Lecturer, Honorary Consultant Neonatologist	Neonatal Data Analysis Unit - Imperial College London, Chelsea and Westminster NHS Foundation Trust
Dr Peter Davis	Consultant Paediatric Intensivist	Bristol Royal Hospital for Children, University Hospitals Bristol and Weston NHS Foundation Trust
Dr Nicola Mackintosh	Associate Professor in Social Science applied to Health	Department of Population Health Sciences, University of Leicester
Dr Joseph C Manning MBE	HEE NIHR ICA Clinical Lecturer, Clinical Associate Professor in CYP & Families Nursing Charge Nurse, Paediatric CCOT, Associate Professor and Deputy Director - Centre for Children & Young People's Health Research	Nottingham Children's Hospital and Neonatology, Nottingham University Hospitals NHS Trust, School of Health Sciences, University of Nottingham
Professor Chris Gale	Professor of Neonatal Medicine, Honorary Consultant Neonatologist	Faculty of Medicine, School of Public Health, Imperial College London

Supplementary Table 2 - Logistic regression analysis for unplanned PICU admission for children discharged home from neonatal care, using gestation as grouped categorical variable (n=40,290)

		Adjusted odds ratio (95% confidence interval)	p
Gestation at birth (weeks)	<25	Reference	-
	25-27	0.73 (0.61 to 0.87)	<0.001
	28-31	0.53 (0.44 to 0.64)	<0.001
Sex	Male	Reference	-
	Female	0.80 (0.72 to 0.87)	0.096
Small for gestational age	Present	1.15 (0.98 to 1.36)	<0.001
BPD	Present	1.47 (1.31 to 1.65)	0.012
Severe NEC	Present	1.42 (1.08 to 1.86)	<0.001
Brain injury	Present	1.45 (1.23 to 1.70)	<0.001

BPD: bronchopulmonary dysplasia requiring oxygen at 36 weeks corrected gestational age

Severe NEC: necrotising enterocolitis requiring surgery

Supplementary Table 3 - Logistic regression analysis for unplanned PICU admission for children discharged home from neonatal care, using gestation as categorical variable (n=40,290)

		Adjusted odds ratio (95% confidence interval)	p
Gestation at birth (weeks)	23	2.31 (1.66 to 3.20)	<0.001
	24	2.29 (1.81 to 2.90)	<0.001
	25	1.96 (1.58 to 2.43)	<0.001
	26	1.80 (1.48 to 2.19)	<0.001
	27	1.31 (1.08 to 1.59)	0.006
	28	1.28 (1.07 to 1.52)	0.006
	29	1.27 (1.08 to 1.50)	0.005
	30	1.17 (1.00 to 1.36)	0.056
	31	Reference	-
	Sex	Male	Reference
	Female	0.79 (0.72 to 0.87)	<0.001
Small for gestational age	Present	1.18 (1.00 to 1.39)	0.051
BPD	Present	1.37 (1.22 to 1.54)	<0.001
Severe NEC	Present	1.37 (1.04 to 1.80)	0.023
Brain injury	Present	1.41 (1.20 to 1.65)	<0.001

BPD: bronchopulmonary dysplasia requiring oxygen at 36 weeks corrected gestational age

Severe NEC: necrotising enterocolitis requiring surgery

Supplementary Table 4 - Logistic regression analysis for unplanned PICU admission for children discharged home from neonatal care, using gestation as grouped categorical variable, after excluding children with any congenital anomaly (n=39,552)

Variables		Adjusted odds ratio (95% confidence interval)	p
Gestation at birth	(weeks)	0.90 (0.87 to 0.92)	<0.001
Sex	Male	Reference	-
	Female	0.78 (0.71 to 0.86)	<0.001
Small for gestational age	Present	1.15 (0.97 to 1.36)	0.112
BPD	Present	1.35 (1.19 to 1.52)	<0.001
Severe NEC	Present	1.39 (1.05 to 1.83)	0.022
Brain injury	Present	1.43 (1.22 to 1.68)	<0.001

BPD: bronchopulmonary dysplasia requiring oxygen at 36 weeks corrected gestational age

Severe NEC: necrotising enterocolitis requiring surgery

Supplementary Table 5 – Tests of model collinearity, predictive ability, and fit, during logistic regression model development

Variables	N	Mean VIF	Variables with highest VIF	AIC	Brier score	Pseudo R ²	C-statistic	HL test (p)	Link test (p)
Primary model: Gestation (weeks, linear), sex, SGA, BPD, NEC, brain injury	40,290	1.19	Gestation 1.52 BPD 1.47 Brain injury 1.07	14,858	0.042	2.1%	0.614	0.205	0.853
Sensitivity analysis: Gestation (weeks, grouped categorical), sex, SGA, BPD, NEC, brain injury	40,290	2.15	Gestation 28-31wk 5.14 Gestation 25-27wk 4.41 BPD 1.38	14,877	0.042	2.0%	0.609	0.488	0.424
Sensitivity analysis: Gestation (weeks, categorical), sex, SGA, BPD, NEC, brain injury	40,290	1.25	BPD 1.48 Gestation 30wk 1.41 Gestation 28wk 1.36	14,864	0.042	2.1%	0.615	0.432	0.533
Sensitivity analysis (exclusion of any congenital anomaly) Gestation (weeks, linear), sex, SGA, BPD, NEC, brain injury	39,552	1.19	Gestation 1.52 BPD 1.47 Brain injury 1.06	14,440	0.042	2.1%	0.614	0.539	0.781

VIF: Variance inflation factor

AIC: Akaike Information Criterion

HL test: Hosmer-Lemeshow test

SGA: Small for gestational age

BPD: Bronchopulmonary dysplasia requiring oxygen at 36 weeks

NEC: Severe necrotising enterocolitis requiring surgery

Supplementary Figure 1 – Predicted percentages of unplanned PICU admission for children discharged from neonatal care by gestational age at birth, comparing unadjusted observed data with model predictions by neonatal morbidity

