King's Research Portal

DOI:

[10.1136/archdischild-2018-315343](https://doi.org/10.1136/archdischild-2018-315343)

Document Version

Peer reviewed version

[Link to publication record in King's Research Portal](#)

Citation for published version (APA):

Hunt, K. A., Dassios, T., Ali, K., & Greenough, A. (2018). Prediction of bronchopulmonary dysplasia development. *Archives of Disease in Childhood Fetal and Neonatal Edition*. <https://doi.org/10.1136/archdischild-2018-315343>

Citing this paper

Please note that where the full-text provided on King's Research Portal is the Author Accepted Manuscript or Post-Print version this may differ from the final Published version. If citing, it is advised that you check and use the publisher's definitive version for pagination, volume/issue, and date of publication details. And where the final published version is provided on the Research Portal, if citing you are again advised to check the publisher's website for any subsequent corrections.

General rights

Copyright and moral rights for the publications made accessible in the Research Portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognize and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the Research Portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the Research Portal

Take down policy

If you believe that this document breaches copyright please contact librarypure@kcl.ac.uk providing details, and we will remove access to the work immediately and investigate your claim.

Prediction of bronchopulmonary dysplasia development

Katie A Hunt^{1,2}, Theodore Dassios^{2,3}, Kamal Ali³, Anne Greenough¹⁻⁴

¹MRC & Asthma UK Centre in Allergic Mechanisms of Asthma, King's College London, London, United Kingdom

²Department of Women and Children's Health, School of Life Course Sciences, Faculty of Life Sciences and Medicine, King's College London, United Kingdom

³Neonatal Intensive Care Centre, King's College Hospital NHS Foundation Trust, London, United Kingdom

⁴NIHR Biomedical Research Centre at Guy's and St Thomas' NHS Foundation Trust and King's College London, United Kingdom

Address for correspondence: Professor Anne Greenough, Neonatal Intensive Care Unit, 4th Floor Golden Jubilee Wing, King's College Hospital, Denmark Hill, London, SE5 9RS, United Kingdom. Tel: 0203 299 3037 Fax: 0203 299 8284

Letter word count: 398 words

Key words: Bronchopulmonary dysplasia; premature

The survival of infants born extremely prematurely is increasing, but the incidence of bronchopulmonary dysplasia (BPD) is not diminishing.[1] Strategies employed to reduce the incidence of BPD have largely been unsuccessful or have an unacceptably high rate of adverse effects.[2] It is, therefore, essential to identify predictors of BPD development and in particular the development of severe BPD so that preventative interventions can be targeted at high risk infants. We tested the hypothesis that a requirement for invasive mechanical ventilation at one week of age would predict development of BPD and severe BPD.

Infants less than 32 weeks of gestational age ventilated at one week of age on the neonatal unit at King's College Hospital NHS Foundation Trust from September 2012 to August 2017 were identified using the Badger Neonatal EPR system (Clevermed, Edinburgh, UK). BPD was diagnosed as oxygen dependency greater than 28 days after birth. BPD severity was categorised according to the support required at 36 weeks post-menstrual age (PMA); those in room air were diagnosed as having mild BPD, those requiring less than 30% oxygen moderate BPD and those requiring positive pressure support or more than 30% oxygen as having severe BPD.

The outcomes of 454 infants were assessed; 22 infants died before 28 days and were excluded from the analysis. Hence, 432 infants were included in the analysis, 228 (53%) developed BPD. Of those who survived, 24% had mild BPD, 29% moderate BPD and 47% severe BPD. Of the 127 ventilated at one week of age, 126 developed BPD. Of those infants who were ventilated at one week, 6% had mild BPD, 27% had moderate BPD and 67% had severe BPD (Figure 1). Comparison of data from 2012-2013 to from 2016-2017 showed no significant change in the incidence of BPD ($p=0.4$) or severe BPD ($p=0.53$).

Requirement for mechanical ventilation at one week of age was 99% sensitive and 67% specific in predicting development of BPD and predicted severe BPD with 63% sensitivity and 92% specificity. Mechanical ventilation at one week gave areas under the receiver

operator characteristic curves for the development of BPD and severe BPD of 0.77 and 0.83 respectively. Use of invasive mechanical ventilation at one week of age as a predictor of the development of BPD, and in particular severe BPD, may facilitate counselling of parents and identifying the most appropriate candidates for future trials of therapeutic interventions to prevent BPD.

ACKNOWLEDGEMENTS

Funding: Dr Hunt was supported by the Charles Wolfson Charitable Trust and Specialised Laboratory Equipment (SLE). The research was supported by the National Institute for Health Research (NIHR) Biomedical Research Centre based at Guy's and St Thomas' NHS Foundation Trust and King's College London. The views expressed are those of the authors and not necessarily those of the NHS, the NIHR or the Department of Health.

Conflict of interest: The authors have no conflict of interest to disclose.

Contributor statement: KAH, TD, KA and AG were all involved in the production of this letter.

The Corresponding Author has the right to grant on behalf of all authors and does grant on behalf of all authors, an exclusive licence (or non-exclusive for government employees) on a worldwide basis to the BMJ Publishing Group Ltd and its Licensees to permit this article to be published in Archives of Disease in Childhood editions and any other BMJ PGL products to exploit all subsidiary rights, as set out in our licence
“<http://adc.bmjjournals.com/ifora/licence.dtl>”.

REFERENCES

1. Costeloe K L, Hennessy Em, Haider , et al. Short term outcomes after extreme preterm birth in England: comparison of two birth cohorts in 1995 and 2006 (the EPICure studies). *BMJ* 2012;**345**:e7976.
2. Laughon MM, Langer JC, Bose CI, et al. Prediction of bronchopulmonary dysplasia by postnatal age in extremely premature infants. *Am J Respir Crit Care Med* 2011;**183**:1715-22

FIGURE LEGEND

Figure 1: Flow diagram of infants included in the study