

Incidence of brain injury in babies estimated for first time using routine NHS data

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New research has estimated that each year five babies in every 1,000 born in England suffer a condition or sign linked to brain injury.

The study, conducted by researchers at the Neonatal Data Analysis Unit at Imperial College London and Chelsea and Westminster Hospital NHS Foundation Trust, analysed data on babies born between 2010 and 2015 to assess the number that may have sustained [brain](#) injury at or soon after birth.

The researchers used routinely recorded NHS data and so were able to measure the incidence rate of brain injury in newborns without any additional workload for doctors or nurses. Ultimately, this research could lead to a better understanding of how to prevent brain injury in preterm and full term babies.

Dr Chris Gale, lead author and Clinical Senior Lecturer in Neonatal Medicine at Imperial College London and Consultant Neonatologist at Chelsea and Westminster Hospital NHS Foundation Trust, said: "Brain injury at or soon after birth is a serious problem, as it can lead to long-term conditions later in life such as cerebral palsy, blindness, deafness and learning deficits. A proportion of these cases could be avoided."

Neena Modi, Professor of Neonatal Medicine at Imperial College London and Head of the Neonatal Data Analysis Unit, said: "Before now UK health services did not have a standard definition of brain injury in babies and there has been no systematic collection of data for this

purpose. With colleagues, and in collaboration with the Department of Health, we have devised a practical way to measure the incidence rate of brain injury in babies."

Published in the journal *Archives of Disease in Childhood*, the research estimated that 3,418 babies suffered conditions linked to brain injury at or soon after birth in 2015, which equates to an overall incidence rate of 5.14 per 1,000 [live births](#). For preterm births (babies born at or less than 37 weeks) the rate was 25.88 per 1,000 live births in 2015, more than seven times greater than the rate for full term births, which was 3.47 per 1,000 live births.

It is often not known whether a baby has suffered brain injury until later in life. Therefore, the new standardised definition of brain injuries in newborn babies, developed by a group of experts convened by the Department of Health, consists of a range of conditions and signs that are known to be related to brain injury. These include seizures or fits, bleeding within the brain, stroke just before or at birth, infections like meningitis, and damage caused by oxygen deprivation.

The research, commissioned by the Department of Health, is the first to present estimates for the number of babies with brain injuries based on a definition that includes multiple conditions in one measure.

It is also the first time this estimate has been made using data gathered routinely during day-to-day clinical care on neonatal units. The use of routine data required no additional work for clinical staff and provides a valuable way to measure the effectiveness of interventions to reduce brain injury.

As part of a drive to make England a safer place to give birth, the Department of Health has set a target of reducing the number of babies that incur brain injury during or soon after birth by 20% by 2020 and to

halve them by 2030. Using these new estimates this equates to lowering the incidence of babies with brain [injury](#) to four per 1,000 live births by 2020 and to 2.5 babies per 1,000 live births by 2030.

Overall, the research found that the most common type of condition that contributed to brain injuries was damage caused by lack of oxygen to the brain, called hypoxic ischaemic encephalopathy; this is seen mainly in full term babies. For preterm babies, the largest contributor to brain injuries is from bleeding into and around the ventricles of the brain, a condition called periventricular haemorrhage.

Dr Gale added: "Being able to measure how common brain injuries are allows health professionals and researchers to focus on reducing these devastating conditions. This includes the consistent use of treatments that reduce the risk of brain injuries in preterm infants, such as steroids and magnesium sulfate given to the mother before [birth](#).

"This measure will also help us to evaluate other interventions, for example, making sure that as many preterm [babies](#) as possible are born at hospitals with advanced neonatal services on site, which we know reduces the risk of [brain injury](#).

"The next step is to use routine data to understand the long-term effects of these conditions on the children and their families."

The research analysed data from the National Neonatal Research Dataset (NNRD), which was established by Professor Modi at Imperial College London and Chelsea and Westminster Hospital NHS Foundation Trust. The NNRD holds routinely recorded clinical data from all English NHS neonatal units from 2012 onwards. The NNRD only holds data on infants admitted for neonatal care and does not contain data on infants who receive care on postnatal or paediatric wards, but instances of infants with brain damage on these wards are rare.

More information: Chris Gale et al, Neonatal brain injuries in England: population-based incidence derived from routinely recorded clinical data held in the National Neonatal Research Database, *Archives of Disease in Childhood - Fetal and Neonatal Edition* (2017). [DOI: 10.1136/archdischild-2017-313707](https://doi.org/10.1136/archdischild-2017-313707)

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