Prof Maria Quigley - Written evidence (PRT0059)

I am a Professor of Statistical Epidemiology based in the National Perinatal Epidemiology Unit at the University of Oxford. I have been conducting research on childhood outcomes following preterm birth since 2009. In particular, I have looked at health and educational outcomes in children born in the UK in the Millennium Cohort Study and in routinely collected hospital admission data. I have provided evidence from some of my own research, and other similar studies.

My evidence addresses the longer term impact of prematurity within the following topic:

Neonatal and longer term care and support

- *Longer-term impacts, care and support for preterm babies and their families*

Introduction

1. Preterm birth is a major contributor to morbidity in childhood, for example, respiratory disease, infections and neurodevelopmental deficits. In general, the risk of health problems increases with prematurity. The UK EPICure studies have documented the health problems that are associated with extreme prematurity, such as birth before 27 weeks [1], where morbidity is the greatest.
2. In recent years, evidence has emerged of increased morbidity in children born moderately preterm (32-33 weeks), late preterm (34-36 weeks) and to a lesser extent in children born early term (37-38 weeks). This is summarised in a recent review [2]. While the risk of morbidity in these groups is much smaller than in the extremely preterm groups, there are many more babies born at 34-38 weeks.

Therefore, a large number of babies born in the UK are potentially vulnerable to the effects of mild to moderate prematurity.

3. There are numerous studies that have looked at the longer term impacts of preterm birth. Here I present some of the evidence of the longer term impacts of prematurity, with a focus on large UK studies that have assessed outcomes across the whole spectrum of gestational age, and have therefore considered different levels of prematurity. This includes studies that have looked at the effect of gestational age in weeks, and those that have grouped gestational age into different levels of prematurity. As there are numerous studies, I will focus on studies conducted in England or elsewhere in the UK for which there is a lot of evidence. I will focus on hospital admission data in childhood, and on educational attainment and special education needs.
4. The evidence I summarise comes from the analysis of routinely collected data such as hospital admissions and school records. It also comes from some of the UK birth cohorts which have been linked to routinely collected data on school records. The main publications based on these data sources are summarised in the table below.

Table. Summary of the large UK studies of the association between gestational age (across the whole gestational age spectrum) and outcomes in childhood

Source	**Country**	**Year of Birth**	**Sample size**	**Outcomes**
Hospital admissions up to age 10 years				
Paranjothy	Wales	1998-	318,613	Emergency

[3]		2008		respiratory hospital admission up to age 5 years
Coathup[4-5]	England (TIGAR)	2005-2006	1,018,136	All hospital admissions up to age 10 years
School attainment and SEN up to end of secondary school				
MacKay[6]	Scotland	1987-2000	407,503	SEN (at age 5-18)
Chan[7] Alterman[8-9]	England MCS	2000-2001	6,031 to 12,081	School attainment at age 7, 11, 16 years; SEN in primary school
Libuy[10]	England	2004-2005	306,717	School attainment in Maths at age 7, 11 years; SEN in primary school
Copper[11]	England BiB	2007-2011	2,386 to 5,560	School attainment at age 7, 11 years

SEN special educational needs TIGAR study https://www.npeu.ox.ac.uk/tigar

MCS Millennium Cohort StudyBiB Born in Bradford study

Hospital admissions in childhood

5. Two large studies conducted in England [4] and Wales [3] have shown that gestational age at birth is strongly associated with an increased number of hospital admissions – the hospital admission rate decreases with each additional week of gestational age.

6. The TIGAR study in England showed that the all-cause hospital admission rate up to age 10 years decreases with each additional week of gestational age [4]. This was particularly so for children born before 28 weeks whose risk was four times higher compared with those born at 40 weeks, but there was even an excess risk in those born at 38 weeks, who are considered 'early term' rather than preterm. The effect of gestational age was stronger in younger than older children, but there was still an effect at age 7-10 years. While the impact of being born just a few weeks early, such as at 37-39 weeks, was relatively small, this group is large, representing 42% of the cohort. Infections were the main driver of excess hospital admissions at all ages. While upper respiratory tract infections were the most common type of infection, lower respiratory tract infections (LRTI) (particularly bronchiolitis, influenza and pneumonia) and invasive bacterial infection were most strongly associated with gestational age [5].

7. A study from Wales showed that the risk of emergency hospital admission for respiratory problems up to age 5 years decreased with every week of gestation [3]. For example, the rate of admission up to age one year ranged from 41.5 per 100 child-years for infants born before 33 weeks to 9.8 per 100 child-years at 40-42 weeks. The effect of gestational age remained up to age 5 years. Even those born at 39 weeks had a 10% higher risk of admission up to age 5 years than those born at 40-42 weeks.

Educational attainment at primary school

8. Gestational age at birth is strongly associated with educational attainment at primary school. For example, for children in the Millennium Cohort Study (MCS), the percentage who achieved the expected level in both English and Mathematics at age 11 assessments (SATS) increased with prematurity: it was 16% in those born at 39-41 weeks, 20% at 37-38 weeks, 20% at 34-36 weeks and 39% for those born before 32 weeks [9]. A similar association was found at age 11 in the Born in Bradford study [11].
9. Another large study in England looked at the association between gestational age in weeks and academic attainment in Mathematics at end of primary school [10]. The percentage of children not achieving the expected level at the end of primary school increased from 7.6% at 41 weeks to 50% at 24 weeks.

Educational attainment at secondary school

10. Fewer studies have looked at educational attainment at the end of secondary school. For children in the MCS, the percentage who had not achieved 5 GCSE passes, including English and Mathematics, increased from 44% at 39-41 weeks, 47% at 37-38 weeks, 48% at 32-33 weeks, up to 60% for those born before 32 weeks [9]. Here, the differences were very small and not statistically significant apart from for those born before 32 weeks. This suggests that the effect of being born just a few weeks early (for example, at 34-38 weeks) had reduced by the time the children had reached the end of secondary school.
11. A similar catch up effect was observed in the ALPAC study which looked at educational trajectories in all preterm (23-36 weeks) compared with term (37-42 weeks) children [12]. Those born preterm had lower scores on their key stage assessments on average than term children at all ages from 7 to 16 years. However, there was evidence

of a catch-up effect particularly during primary school so that by secondary school the effect of prematurity was reduced.

Special Educational Needs (SEN)

12. Children born preterm are more likely to experience special education needs (SEN) by the end of primary school. Two large studies conducted in England [10] and Scotland [6] have shown that gestational age at birth is strongly associated with SEN – the percentage of children with SEN decreases with each additional week of gestational age.
13. In a large study in England, the percentage of children who had SEN during primary school decreased with each additional week of gestational age, for example, 30% at 40 weeks, 35% at 37 weeks, 40% at 34 weeks, and >50% for those born before 32 weeks [10]. Similar results were observed in a large study in Scotland [6]. In the MCS study, where gestational age was grouped, the prevalence of SEN by the end of primary school increased from 10% at 39-41 weeks to 27% for those born before 32 weeks [8]. Prematurity was particularly associated with ADHD and health/physical needs.

References

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