

# TIGAR

## Born too soon – how being born early might affect a child's health and their progress at school

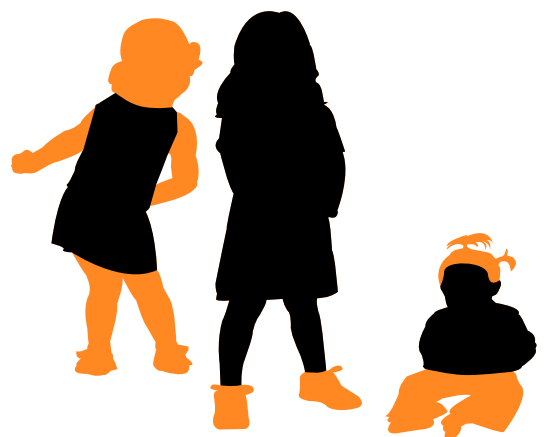
### What do we know about the effect of prematurity?

A typical full term pregnancy lasts about 40 weeks of pregnancy (or 40 weeks gestational age). Babies born before 37 weeks of pregnancy are described as preterm or premature. About 7% of babies are born preterm in the UK. This means that a typical class of 30 school children might include two or three children who were born preterm.

Most preterm babies survive and do very well in the long term, but as a group they:

- Are more likely to have difficulties with their health
- Are more likely to have difficulties with their development
- Are more likely to have special educational needs (SEN)
- May not perform as well in school tests.

While for parents these findings may feel stark, as children grow older the differences begin to narrow a little. Read further and we will explain our results. In these pages you will also find a link to current clinical guidelines to support the monitoring of preterm babies as well as links to the many organisations that provide information and support for families of babies born preterm.



## Results of a large study of children born in the UK

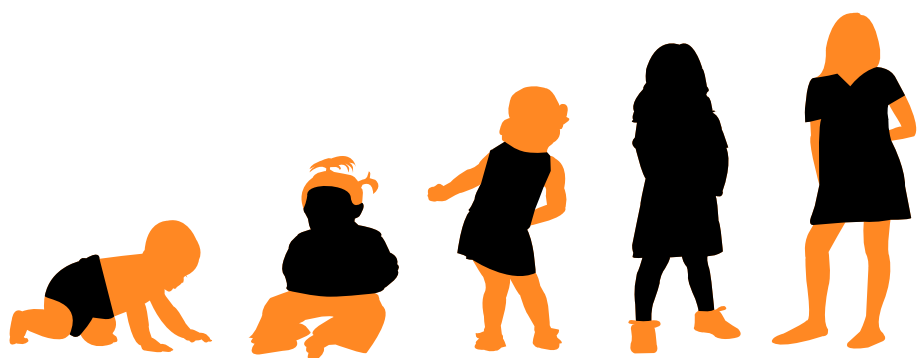
We know a lot about how preterm babies might do in the early weeks and months after birth, but we know less about what happens to these babies as they grow into young children and adolescents. We have recently carried out new research looking at the longer-term effects of being born early. Our findings, together with other information, may help explain how being born early can affect a child's health and their progress at school.

- The TIGAR health study followed a million children who were born in England in 2005 or 2006. It explored whether children born early had more hospital admissions up to age 10 years compared with children born at about 40 weeks of pregnancy.
- The TIGAR school study followed between 7,000 and 12,000 children born in the UK in 2000 or 2001. It compared school 'SATs' results (standardised tests) at age 11 and GCSE results at age 16 in children born early with their classmates who were born at 39-41 weeks of pregnancy. The study also looked at how many children had special educational needs (SEN).

For both studies, our analysis tried to take into account reasons other than prematurity which may have explained the results. As an example, children whose birthday is in the autumn term (September to December) tend to do better in school tests than children whose birthday is in the summer term (May to August). Therefore, we took the child's birth month into account in our analysis. We also took into account other characteristics of the child and their family circumstances, which are known to affect children's health or progress at school.

Often we do not know the underlying reason for a preterm birth. We did not have any information about this in our study, so we did not take this into account in our analysis. **Therefore, our results should be interpreted as reflecting what happened to the children as a group, 'on average'. If you look at two children born at exactly the same number of weeks of pregnancy, they may have very different experiences, especially if they have different reasons for being born preterm.**

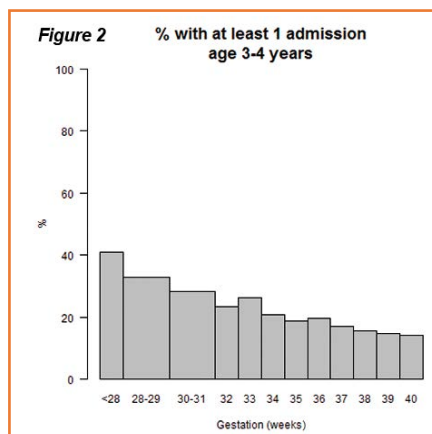
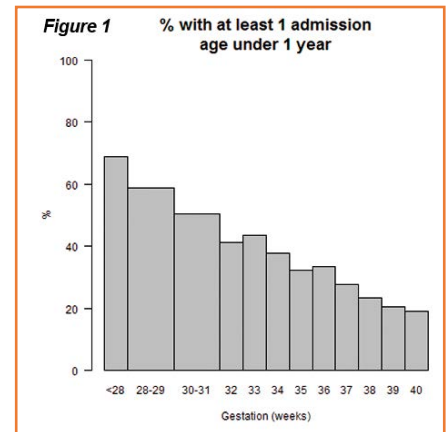
Finally, our results on hospitalisation are for singletons only, rather than twins, triplets and more.



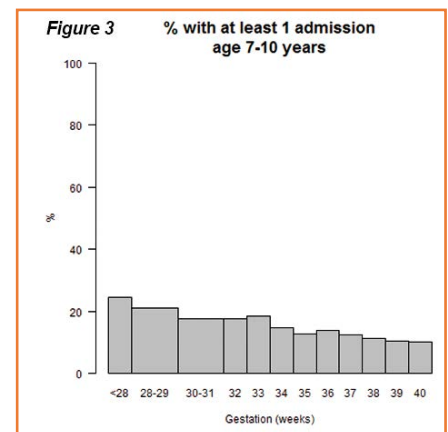
# Key messages about hospital admissions

## How common were hospital admissions?

In children under one year of age, hospital admissions were not unusual. For children born at 40 weeks of pregnancy, 19% had at least one hospital admission. The more preterm the child was born, the more likely they were to have hospital admissions (see Figure 1). For example, 20% of children born at 39 weeks of pregnancy had at least one hospital admission. This figure was 23% in those born at 38 weeks, 28% in those born at 37 weeks, and was highest (at 69%) in children born before 28 weeks of pregnancy.



All children tended to have fewer hospital admissions as they got older, even those born preterm. For example, when the children were aged 3-4 years, 14% of those born at 40 weeks had at least one hospital admission. Again, the more preterm the child was, the more likely they were to have at least one hospital admission (see Figure 2). This figure was highest (at 41%) in children born before 28 weeks.



The same pattern occurred for hospital admissions at age 7-10 years – the more preterm the child was, the more likely they were to have at least one hospital admission (see Figure 3).

## What were the main reasons for hospital admission?

When children were under 5 years, the most common reason for hospital admission was infection. The most common types of infection were in the lung (such as pneumonia), or the nose, throat and sinus (such as colds). In those under one year, an infection of the lung called bronchiolitis was also quite common.

Other common reasons for hospital admission were problems with breathing (such as chronic lung disease or asthma) and problems with feeding or the gut. Another common reason for admission was when the child had an accident or injury.

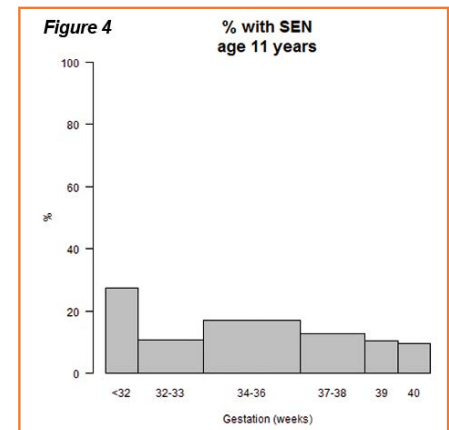
From the age of 5 years, the most common reason for hospital admission was infection. Again these tended to be infections of the lung (such as pneumonia), or the nose, throat and sinus (such as colds). Another common reason for admission was because of an accident or injury. In children born before 32 weeks of pregnancy, another common reason for admission was for conditions such as epilepsy or cerebral palsy.

# Key messages about school results and SEN

## How many children had special educational needs (SEN)?

When children were aged about 11 years, parents were asked whether the school or local education authority had ever told them their child has SEN.

At this age, 10% of the children born at 40 weeks of pregnancy had SEN. The more preterm the child was born, the more likely they were to have SEN (see Figure 4). For example, 13% of children born at 37-38 weeks of pregnancy had SEN. This figure was highest (at 27%) in children born before 32 weeks.

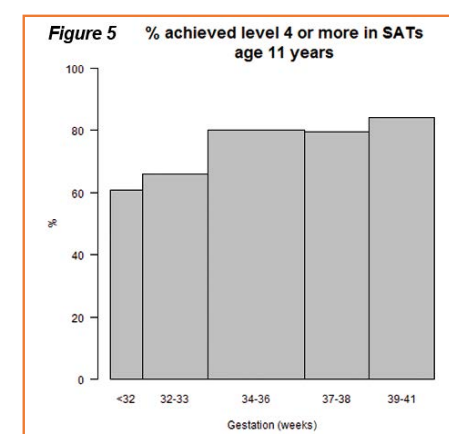


The most common reason for SEN was a learning difficulty such as dyslexia. On average, about 10% of preterm children (born before 37 weeks of pregnancy) had a learning difficulty compared with 6% of children born at 37-41 weeks. Other reasons for SEN included autism, attention-deficit/hyperactivity disorder (ADHD), and health or physical difficulties, but these were much less common.

## How did children do in their SATs?

At the end of primary school, when children are aged about 11 years and in Key Stage 2, those at school in England take standardised tests (SATs), alongside a teacher's assessment of their schoolwork. Children who score above a certain grade are considered as reaching 'the expected standard'. The tests and how they are scored has changed over the years, so it is not helpful to compare the percentage of children who reached the expected standard in different years, especially results from before and after 2016 as there was a big change to SATs in 2016.

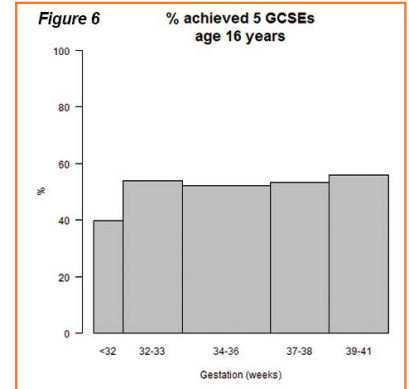
The children in our study did their age 11 SATs in 2012. In this year, 79% of all children in England achieved the expected standard in both English and Mathematics. For the children in our study, this figure was 84% for children born at 39-41 weeks of pregnancy. The more preterm the child was, the less likely they were to achieve the expected level (see Figure 5). For example, 61% of children born before 32 weeks of pregnancy achieved this level.



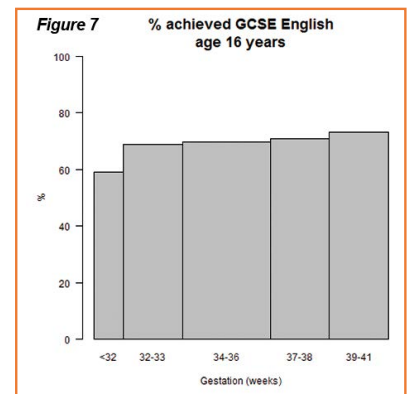
## How did children do in their GCSEs?

At the end of secondary school, when children are about 16 years of age, those at school in the UK (except Scotland) take GCSE examinations. A pass is defined as a grade A\*-C or a grade 9-4. We looked at how many children passed at least 5 GCSEs, including English and Mathematics.

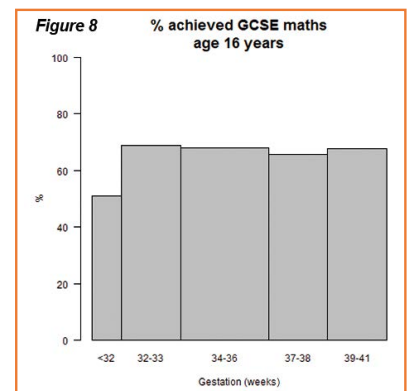
When the children in our study were age 16 years, 56% of the children born at 39-41 weeks of pregnancy achieved 5 GCSE passes (including passes in English and Mathematics). This figure was a bit lower in those born at 32-38 weeks and was lowest (at 40%) in children born before 32 weeks (see Figure 6).



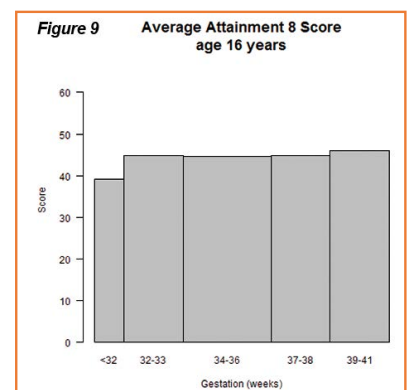
Looking at English GCSE specifically, 73% of the children born at 39-41 weeks of pregnancy achieved a pass. This figure was a bit lower in those born at 32-38 weeks and was lower (at 59%) in children born before 32 weeks (see Figure 7).



For Mathematics GCSE, 67% of the children born at 39-41 weeks of pregnancy achieved a pass. This figure was similar in those born at 32-38 weeks and was lower (at 51%) in children born before 32 weeks (see Figure 8).



We also looked at the children's attainment 8 score which is a combined score based on up to 8 GCSEs (including English and Mathematics). Higher attainment 8 scores are better. The average attainment 8 score was 46 in children born at 39-41 weeks. This figure was similar in those born preterm at 32-38 weeks and was lower (at 39) in children born before 32 weeks of pregnancy (see Figure 9).



# Supporting children born preterm

## For parents:

- From birth to 5 years of age, all families receive regular developmental checks, information and advice about their child from health visitors via the Healthy Child Programme.\*
- Children born preterm may be assessed more often.\*\* Parents should attend any follow-up appointments offered.
- Pre-school children: concerns about child health or development should be discussed with the child's health visitor and/or GP.
- School-aged children: concerns about child development or progress at school should be discussed with the child's teacher and/or GP.
- Try to reduce the risk of infections through hand washing, keeping surfaces clean, throwing away used tissues and avoiding smoking. It's important to make sure children's vaccinations are up to date.

\*[www.e-lfh.org.uk/programmes/healthy-child-programme](http://www.e-lfh.org.uk/programmes/healthy-child-programme)

\*\*NICE recommends that children born before 30 weeks of gestation, or those born at 30-36 weeks of gestation who have additional risk factors for developmental problems, should be monitored and assessed up to 2 years of age by neonatal health professionals, or up to 4 years of age for children born before 28 weeks of gestation [www.nice.org.uk/guidance/ng72/](http://www.nice.org.uk/guidance/ng72/)

## For education and health professionals:

- Children born preterm should be followed up and monitored closely by health professionals.\*
- Education professionals, early years practitioners and school staff can support families by being aware of the potential needs of preterm-born children, especially the very pre-term, and discussing any concerns raised by families.
- Education professionals should receive training about the potential needs of children born preterm.\*\*
- Staff may find it helpful to use the free PRISM e-learning resource\*\* which provides information about how preterm birth affects children's development and learning and how to support preterm born children in school.
- Schools may wish to encourage parents to share details of their child's birth history to enable staff to better support children born preterm.

\*[www.nice.org.uk/guidance/ng72/](http://www.nice.org.uk/guidance/ng72/)

\*\*[www.pretermbirth.info](http://www.pretermbirth.info)

## Further information

For information about preterm birth, including information about common illnesses, developmental milestones and follow-up, and starting school:

BLISS [www.bliss.org.uk/](http://www.bliss.org.uk/)  
The Smallest Things: [www.thesmallestthings.org/](http://www.thesmallestthings.org/)  
Tiny Life: [www.tinylife.org.uk/](http://www.tinylife.org.uk/)

**NICE Developmental follow-up of children and young people born preterm:**

[www.nice.org.uk/guidance/ng72/resources/developmental-followup-of-children-and-young-people-born-preterm-pdf-1837630868677](http://www.nice.org.uk/guidance/ng72/resources/developmental-followup-of-children-and-young-people-born-preterm-pdf-1837630868677)

**BLISS and the NHS website have useful information on some of the conditions mentioned:**

BLISS [www.bliss.org.uk/](http://www.bliss.org.uk/)  
NHS e.g: [www.nhs.uk/conditions/baby/health/colds-coughs-and-ear-infections-in-children/](http://www.nhs.uk/conditions/baby/health/colds-coughs-and-ear-infections-in-children/)  
[www.nhs.uk/conditions/bronchiolitis/](http://www.nhs.uk/conditions/bronchiolitis/)  
[www.nhs.uk/conditions/asthma/](http://www.nhs.uk/conditions/asthma/)  
[www.nhs.uk/conditions/cerebral-palsy/](http://www.nhs.uk/conditions/cerebral-palsy/)  
[www.nhs.uk/conditions/epilepsy/](http://www.nhs.uk/conditions/epilepsy/)

**Special Educational Needs (SEN) and disability:**

IPSEA [www.ipsea.org.uk/](http://www.ipsea.org.uk/)  
SCOPE [www.scope.org.uk/](http://www.scope.org.uk/)

**Preterm birth e-learning resource for parents and teachers (PRISM):**

[www.pretermbirth.info](http://www.pretermbirth.info)

**For more details on the results of the TIGAR study, please see the website:**

[www.npeu.ox.ac.uk/tigar](http://www.npeu.ox.ac.uk/tigar)

Or see the links to the full papers here:

### **Papers on hospital admissions**

Gestational age and hospital admissions during childhood: population based, record linkage study in England (TIGAR study)

[www.bmj.com/content/371/bmj.m4075.long](http://www.bmj.com/content/371/bmj.m4075.long)

Association between gestational age at birth and infection-related hospital admission rates during childhood in England: population-based record linkage study

[journals.plos.org/plosone/article?id=10.1371/journal.pone.0257341](http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0257341)

### **Papers on school results and SEN**

Gestational age at birth and child special educational needs: a UK representative birth cohort study

[www.ncbi.nlm.nih.gov/pmc/articles/PMC7613205/](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC7613205/)

Gestational age at birth and academic attainment in primary and secondary school in England: evidence from a national cohort

[journals.plos.org/plosone/article?id=10.1371/journal.pone.0271952](http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0271952)

### **Paper on data quality and record linkage**

Linkage of maternity hospital episode statistics birth records to birth registration and notification records for births in England 2005-2006: quality assurance of linkage

[bmjopen.bmj.com/content/10/10/e037885.long](http://bmjopen.bmj.com/content/10/10/e037885.long)

# TIGAR

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This document was written by the TIGAR study investigators and the Parent and Public Involvement (PPI) Group.