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Newborn and infant physical examination: quality improvement in the English newborn screening pathway

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INTRODUCTION

The newborn and infant physical examination (NIPE) screening programme screens newborn babies within 72 hours of birth in England for congenital heart disease, congenital cataracts, developmental dysplasia of the hip, and bilateral or unilateral undescended testes. Failsafe of completion of NIPE screening is managed on the national NIPE IT system SMaRT4NIPE (S4N). This is implemented in all 136 of 136 maternity trusts in England (June 2021) and records the end to end screening pathway including outcomes for screen positive babies. Further implementation in children's hospitals is being progressed. Babies are eligible for screening irrespective of their gestational age at birth however babies that are 'too ill' for screening are managed as a mitigation to coverage with an acceptable threshold for the key performance indicator of 95% within 72 hours of age (2019-2020). Feedback from clinicians and monitoring of the completeness of the data recorded on S4N prompted quality improvement work in the NIPE screening pathway.

METHODS

- Analysis of completeness of outcome recording on SMaRT4NIPE (S4N) with monitoring reports shared with screening commissioners and screening quality assurance.
- Professional expert groups to revise clinical guidance, identify refinements in the hip and eye screening pathway and clarify definitions of 'too ill' and 'too young' for screening

SMaRT4NIPE (S4N) LIVE Trusts/ 136	
April 2014	17
March 2015	42
December 2015	84
July 2016	108
February 2017	113
October 2017	117
April 2018	120
September 2018	126
February 2019	127
January 2020	132
April 2020	134
December 2020	135
June 2021	136

Figure 1: Implementation of SMaRT4NIPE by maternity trust in England

RESULTS

In 2018-2019 between 33 and 77 of the120 trusts with S4N did not record outcomes against any of the 5 NIPE standards with less than with 50% data completeness for those that did. Following quality improvement work which included additional training sessions for providers in the use of S4N and production of monitoring reports for screening commissioners, data completeness in Q3 2020-21 improved from 24% (2018-2019) to 90% for eyes, from 36% to 89% for hips DDH, 49% to 89% hip risk factors and from 15% to 78% for testes.

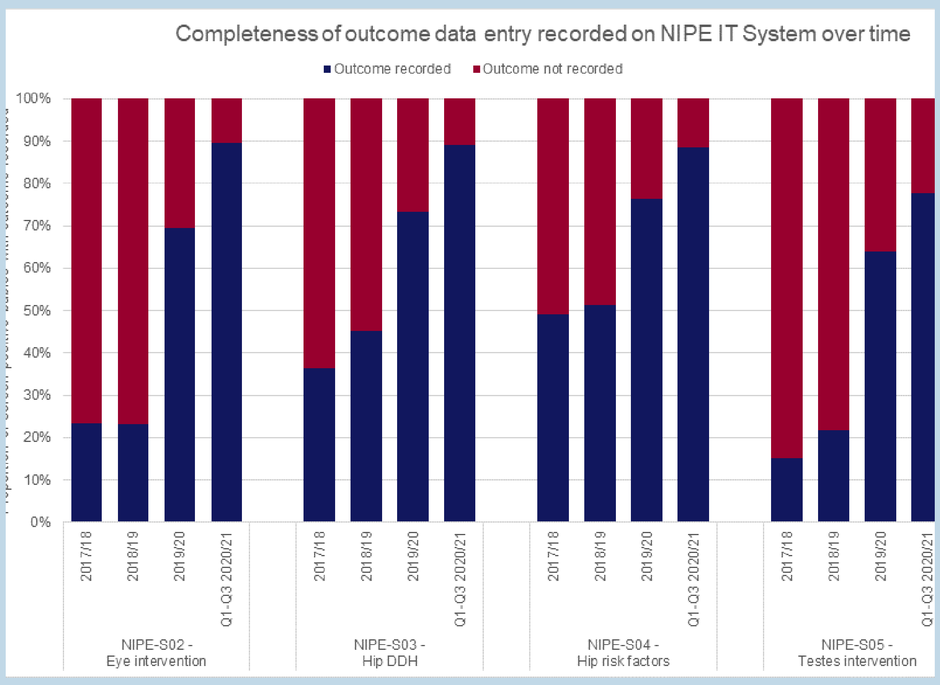

Figure 2. Completeness of outcome data entry recorded on SMaRT4NIPE

Clinical guidance is updated with the inclusion of images of an abnormal red reflex. Pathway changes include change to ophthalmology review within 2 weeks of screen and timeframe for hip ultrasound to between 4 and 6 weeks with specialist review by 6 weeks for all babies (positive clinical examination and hip risk factors). Babies that are aged less than 34^{+0} weeks corrected gestational age are deemed 'too young' for screening with examples of 'too ill' as shown in Figure 2.

- Respiratory support (other than low flow oxygen) including the presence of chest drains for the first 72 hours of life
- Cardiovascular support e.g. inotropes, prostin
- Ventilated baby (until extubated)
- Babies on continuous positive airway pressure (CPAP)
- Intensive phototherapy (double or more, need for immunoglobulin or exchange transfusion)
- Chest drain in place (without additional respiratory support)
- Umbilical or arterial lines in place
- Post operatively until off analgesia
- Unstable hypoglycaemia until off intravenous dextrose
- Where active reorientation of care is to comfort or palliative care is taking place

Figure.3: Examples of 'too ill' for newborn physical examination screening

DISCUSSION

Premature infants admitted to neonatal medical care or other paediatric settings are the babies that most commonly have delayed or missed NIPE screening reported as a screening incident. This can impact on their long term outcome.

The changes to the expected timeframes for babies with NIPE screen positive conditions were clinically driven based on feedback from paediatric orthopaedic and opthalmology experts. Implementation in April 2021 with revised programme standards will be monitored to see if further adjustments are needed.

CONCLUSIONS

- Full implementation of SMaRT4NIPE in all 136 maternity trusts in England will support the failsafe and completion of the NIPE screening pathway
- The increase in completeness of outcomes recorded on S4N provides assurance of completion of referral for screen positive babies
- The refined definitions for 'too young' and 'too ill' for NIPE screening should support clinicians in completing NIPE prior to discharge from neonatal units and other paediatric settings
- Changes in referral times should improve the efficiency of the NIPE screening pathway

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REFERENCES

1. Newborn and Infant Physical Examination (NIPE) screening programme handbook, PHE April 2021 www.gov.uk
2. Newborn and Infant Physical Examination standards for implementation from 1 April 2021, PHE 12 March 2021 www.gov.uk
3. Proposed changes to the NIPE hip screening pathway. External public consultation. PHE 2018 www.gov.uk
4. Newborn and Infant Physical Examination programme overview PHE 2013 www.gov.uk