Women's Health Academic Centre

Guy's and St Thomas' NHS Foundation Trust

King's College London, University of London

BAPM Antenatal Optimisation Toolkit – Moving mothers, not babies

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NHSE Maternity Lead Maternity - Implementation of Pan London IUT Guideline

Tommy's

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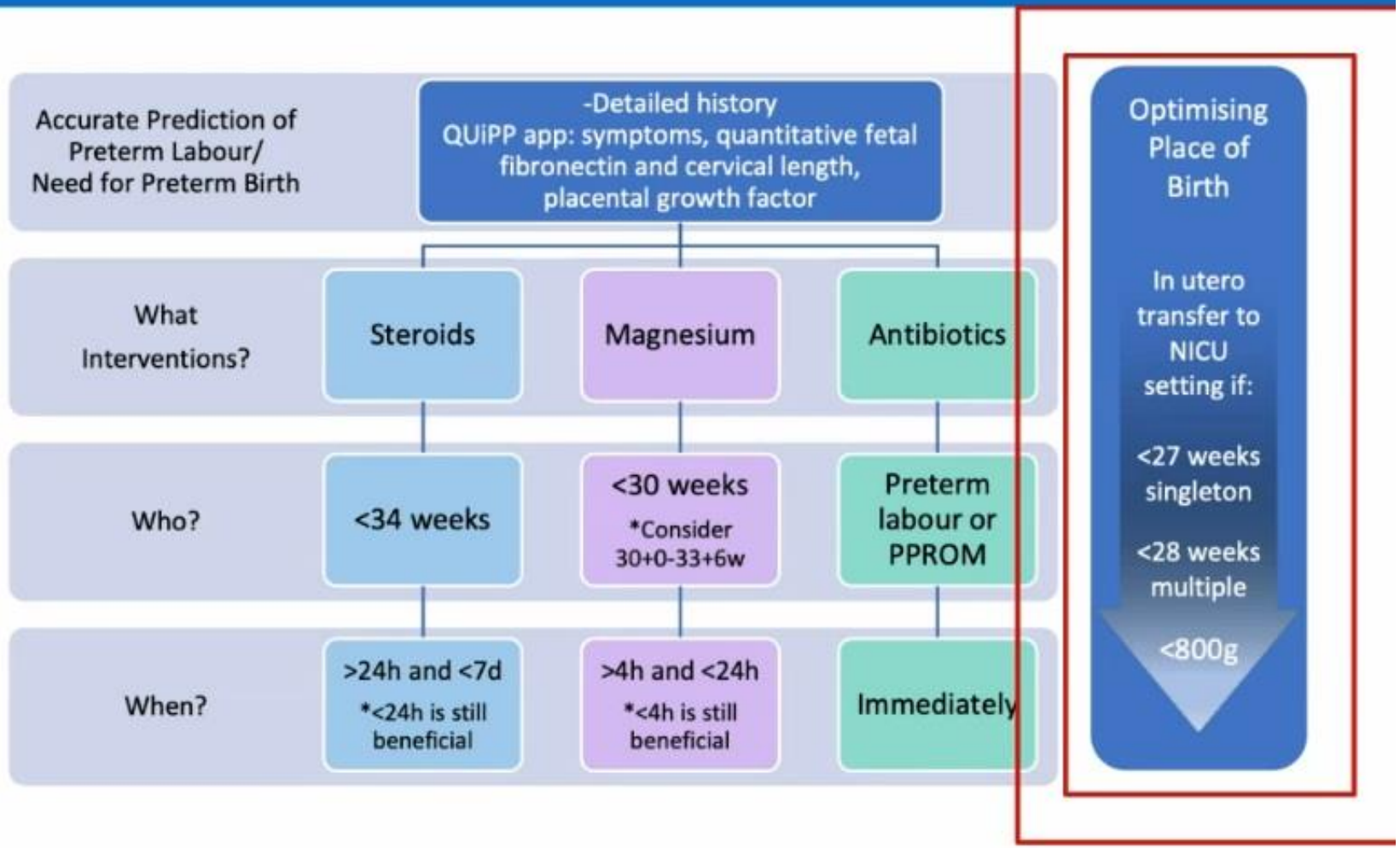
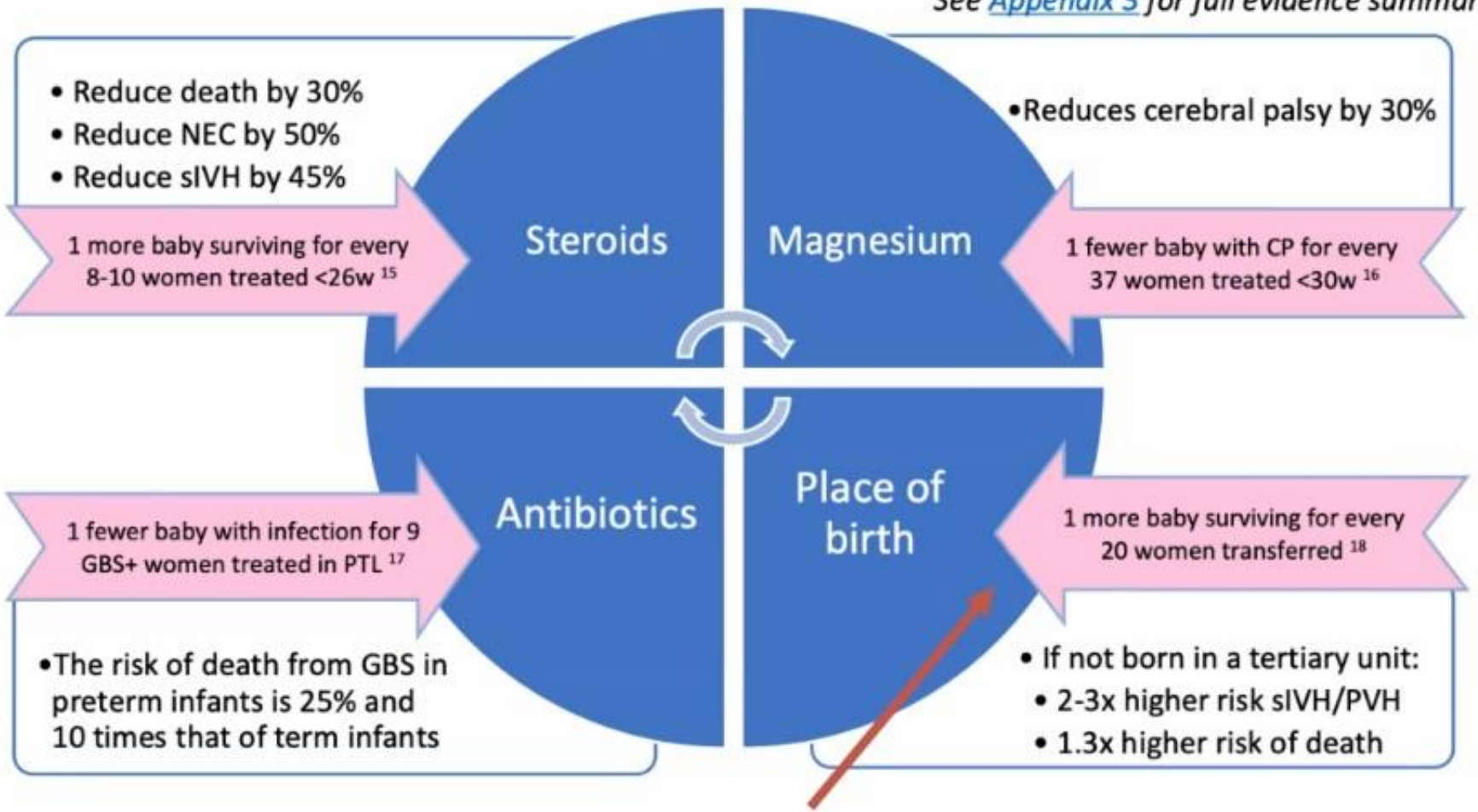
Does place of extreme preterm birth matter?



Antenatal Optimisation to Improve Preterm Outcomes- the rationale

See Appendix 3 for full evidence summary



Does place of extreme preterm birth matter?

Original article

OPEN ACCESS

Perinatal outcomes for extremely preterm babies in relation to place of birth in England: the EPICure 2 study

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ABSTRACT

Background Expertise and resources may be important determinants of outcome for extremely preterm babies. We evaluated the effect of place of birth and perinatal transfer on survival and neonatal morbidity within a prospective cohort of births between 22 and 26 weeks of gestation in England during 2006.

Methods We studied the whole population of 2460 births where the fetus was alive at the admission of the mother to hospital for delivery. Outcomes to discharge were compared between level 3 (most intensive) and level 2 maternity services, with and without transfers, and by activity level of level 3 neonatal unit; ORs were adjusted for gestation at birth and birthweight for gestation (adjusted ORs (aOR)).

Findings Of this national birth cohort, 56% were born in maternity services with level 3 and 34% with level 2 neonatal units; 10% were born in a setting without ongoing intensive care facilities (level 1). When compared with level 2 settings, risk of death in level 3 services was reduced (aOR 0.73 (95% CI 0.59 to 0.90)), but the proportion surviving without neonatal morbidity was similar (aOR 1.27 (0.93 to 1.74)). Analysis by intended hospital of birth confirmed reduced mortality in level 3 services. Following antenatal transfer into a level 3 setting, there were fewer intrapartum or labour ward deaths, and overall mortality was higher for those remaining in level 2 services (aOR 1.44 (1.09 to 1.90)). Among level 3 services, those with higher activity had fewer deaths overall (aOR 0.68 (0.52 to 0.89)).

What is already known on this topic

- International data suggest that survival for babies admitted for neonatal intensive care is improved in regional centres.
- Previous data are difficult to interpret because of the confounding effect of antenatal and postnatal transfer.

What this study adds

- Survival is greater in specialist hospitals in England providing neonatal intensive care and is further improved in higher activity services.
- This improvement is primarily achieved by a reduction in fetal deaths before delivery, and neonatal deaths in the delivery room and over the first week.
- Women who book for their care at specialist hospitals have lower mortality compared with those booking at local (non-specialist) hospitals, although antenatal transfer does result in a group of babies with improved survival chances.

- At 22-26 weeks' perinatal mortality is 72% in a level 1 unit vs 53% in a level 3 facility ($p < 0.0001$).
- Better survival in NICU not associated with increased morbidity (severe ROP, BPD, brain injury or NEC)

Does place of extreme preterm birth matter?

Association of early postnatal transfer and birth outside a tertiary hospital with mortality and severe brain injury in extremely preterm infants: observational cohort study with propensity score matching

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ABSTRACT

OBJECTIVE

To determine if postnatal transfer or birth in a non-tertiary hospital is associated with adverse outcomes.

DESIGN

Observational cohort study with propensity score matching.

SETTING

National health service neonatal care in England; population data held in the National Neonatal Research Database.

PARTICIPANTS

Extremely preterm infants born at less than 28 gestational weeks between 2008 and 2015 (n=17 577) grouped based on birth hospital and transfer within 48 hours of birth: upward transfer (non-tertiary to tertiary hospital, n=2158), non-tertiary care (born in non-tertiary hospital; not transferred, n=2668), and controls (born in tertiary hospital; not transferred, n=10 866). Infants were matched on propensity scores and predefined background variables to form subgroups with near identical distributions of confounders. Infants transferred between tertiary hospitals (horizontal transfer) were separately matched to controls in a 1:5 ratio.

MAIN OUTCOME MEASURES

Death, severe brain injury, and survival without severe brain injury.

odds of death before discharge (odds ratio 1.22, 95% confidence interval 0.92 to 1.61) but significantly higher odds of severe brain injury (2.32, 1.78 to 3.06; number needed to treat (NNT) 8) and significantly lower odds of survival without severe brain injury (0.60, 0.47 to 0.76; NNT 9). Compared with controls, infants in the non-tertiary care group had significantly higher odds of death (1.34, 1.02 to 1.77; NNT 20) but no significant difference in the odds of severe brain injury (0.95, 0.70 to 1.30) or survival without severe brain injury (0.82, 0.64 to 1.05). Compared with infants in the upward transfer group, infants in the non-tertiary care group had no significant difference in death before discharge (1.10, 0.84 to 1.44) but significantly lower odds of severe brain injury (0.41, 0.31 to 0.53; NNT 8) and significantly higher odds of survival without severe brain injury (1.37, 1.09 to 1.73; NNT 14). No significant differences were found in outcomes between the horizontal transfer group (n=305) and controls (n=1525).

CONCLUSIONS

In extremely preterm infants, birth in a non-tertiary hospital and transfer within 48 hours are associated with poor outcomes when compared with birth in a tertiary setting. We recommend perinatal services promote pathways that facilitate delivery of extremely preterm infants in tertiary hospitals in preference to postnatal transfer.

- Retrospective observational cohort study with propensity score matching to determine if postnatal transfer or birth in a non-tertiary hospital is associated with adverse outcomes in preterm infants.
- Data was collected from the UK National Neonatal Research Database.
- n=17577 PTB <28 weeks between 2008-2015
- Births in a non-tertiary hospital and transfer within 48 hours associated with poorer outcomes.
- Conclusion: perinatal services should be organised to facilitate delivery of extremely preterm infants in tertiary hospitals in preference to postnatal transfer

Does place of extreme preterm birth matter?

JAMA Pediatrics | Original Investigation

Neonatal Mortality After Interhospital Transfer of Pregnant Women for Imminent Very Preterm Birth in Illinois

Kshama P. Shah, MD; Raye-Ann O. deRegnier, MD; William A. Grobman, MD; Amanda C. Bennett, PhD

Editorial page 329

IMPORTANCE Reducing neonatal mortality is a national health care priority. Understanding the association between neonatal mortality and antenatal transfer of pregnant women to a level III perinatal hospital for delivery of infants who are very preterm (VPT) may help identify opportunities for improvement.

OBJECTIVE To assess whether antenatal transfer to a level III hospital is associated with neonatal mortality in infants who are VPT.

DESIGN, SETTING, AND PARTICIPANTS This population-based cross-sectional study included infants who were born VPT to Illinois residents in Illinois perinatal-network hospitals between January 1, 2015, and December 31, 2016, and followed up for 28 days after birth. Data analysis was conducted from June 2017 to September 2018.

EXPOSURES Delivery of an infant who was VPT at a (1) level III hospital after maternal presentation at that hospital (reference group), (2) a level III hospital after antenatal (in utero) transfer from another hospital, or (3) a non-level III hospital.

MAIN OUTCOMES AND MEASURES Neonatal mortality.

RESULTS The study included 4817 infants who were VPT (gestational age, 22-31 completed weeks) and were born to Illinois residents in 2015 and 2016. Of those, 3302 infants (68.5%) were born at a level III hospital after maternal presentation at that hospital, 677 (14.1%) were born at a level III hospital after antenatal transfer, and 838 (17.4%) were born at a non-level III hospital. Neonatal mortality for all infants who were VPT included in this study was 573 of 4817 infants (11.9%). The neonatal mortality was 10.7% for the reference group (362 of 3302 infants), 9.8% for the antenatal transfer group (66 of 677 infants), and 17.3% for the non-level III birth group (145 of 838 infants). When adjusted for significant social and medical characteristics, infants born VPT at a level II hospital after antenatal transfer from another facility had a similar risk of neonatal mortality as infants born at a level III hospital (odds ratio, 0.79 [95% CI, 0.56-1.13]) after maternal presentation at the same hospital. Infants born at a non-level III hospital had an increased risk of neonatal mortality compared with infants born at a level II hospital after maternal presentation to the same hospital (odds ratio, 1.52 [95% CI, 1.14-2.02]).

CONCLUSIONS AND RELEVANCE The risk of neonatal mortality was similar for infants who were VPT, whether women initially presented at a level III hospital or were transferred to a level III hospital before delivery. This suggests that the increased risk of mortality associated with delivery at a non-level III hospital may be mitigated by optimizing opportunities for early maternal transfer to a level III hospital.

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- Population-based cross-sectional study
- Assessed if antenatal transfer to a level III hospital is associated with neonatal mortality in infants who are very preterm.
- The study included 4817 infants born at gestational age of 22-31 completed weeks to Illinois residents and were followed up for 28 days after birth during 2015-16.
- The authors looked at the neonatal mortality based on place of birth - at a level III hospital after maternal presentation at that hospital, at a level III hospital after in- utero transfer from another hospital, and at a non-level III hospital.
- The study found that the risk of neonatal mortality was similar for very preterm infants whether women initially presented at a level III hospital or were transferred to a level III hospital before delivery. This suggests that the increased risk of mortality associated with delivery at a non-level III hospital may be mitigated by optimizing opportunities for early maternal transfer to a level III hospital.

Best Practice in Delivery of Antenatal Optimisation Interventions

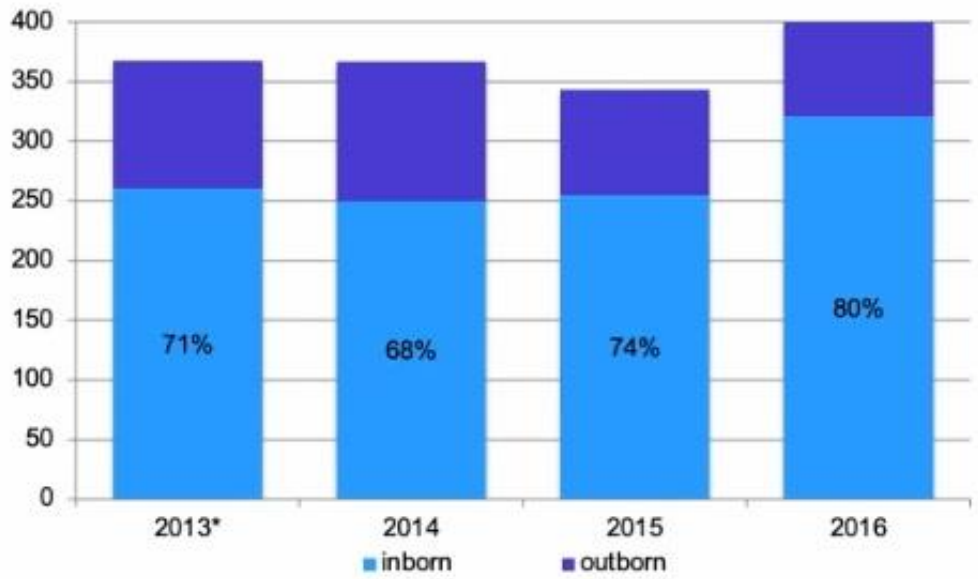
In utero transfer

To ensure efficient and effective referral and transfer processes, networks should work to establish:

- A network-wide combined maternity and in utero transfer policy including reciprocal transfer
- A central referral hub with defined turnaround time (auditable) for requests
- Decisions about appropriateness of transfer being made by senior clinicians and supported by risk assessment tools using details of maternal and fetal wellbeing and progression of labour
- Remote support for clinicians in LNU/SCUs by those in NICU settings
- NICU and associated Maternity Unit policy of 'auto-acceptance' of in utero transfers
- Guidance about staff resource and experience required to accompany in utero transfer
- Guidance for Ambulance Service Partners about time critical nature of transfer

QI: Optimising place of birth in London

Percentage of extreme PTB (<27/40) born in NICU in London



Infants <27 weeks' gestation born in the right place in London

	Born in NICU / Total (%)			
	2016	**2017**	**2018**	**2019***
NCEL London	129/164 (79%)	93/136 (68%)	96/142 (68%)	96/122 (79%)
NW London	92/105 (88%)	58/72 (81%)	82/99 (83%)	66/94 (70%)
S London	106/141 (75%)	107/142 (75%)	90/116 (78%)	88/116 (76%)
London ODN	**327/410 (80%)**	**258/350 (74%)**	**268/357 (75%)**	**254/332 (77%)**
England	-	**1266/1670 (76%)**	**1298/1655 (78%)**	-

Impact of being born in the appropriate neonatal facility

- If 95% of babies <27 weeks' gestation were born in London NICU centres each year, it is likely that **~30 more would survive**

Why do in utero transfers ‘fail’ in London?

- 45% due to clinical reasons (90% too late, 10% mother too unstable)
- 14% due to pathway issues (50% NICU says no; 50% Labour Ward says no)
- 41% IUT not requested but no good clinical reason for lack of request

At least 55% of these are preventable

What are the barriers to antenatal transfers?

Too difficult…

- Neonatal capacity
- Maternity capacity
- In utero referral can take HOURS
- Most women with threatened preterm labour do not deliver, but they may block clots

Not prioritized…

Not what trained for

Failures viewed as systemic

Poor outcomes not visible to those jointly responsible

Pan London in utero transfer service – a 6-month pilot (09/20-03/21)

- Guideline written and disseminated 2018
- Little improvement to process
- NHSE commitment – 2 leads for implementation
- Who should/ should not be transferred?
- QUiPP App - Risk stratification to reduce unnecessary transfers.
- Standard Network Pathway embedded within Emergency Bed Service
- Stakeholder engagement

QUiPP

fFN	20	76.92%
PartoSure	4	15.38%
No Test	1	3.85%
Unknown	1	3.85%

NHS London Neonatal Operational Delivery Network

NHS London Ambulance Service

Pan-London In-Utero Transfer Service Pilot: Update since the launch on 21st September 2020

So far, the first 2 weeks of the pilot, progress has been extremely encouraging: The Emergency Bed Service (EBS) has facilitated 14 IUTs and most of these have been straightforward without complication. However, there are some points that require further clarification: -

- This pilot only accommodates IUT for mothers who are at risk of preterm birth at **27 weeks or below gestation**
- The evidence concludes that the survival of babies born 27 weeks or below is improved when their birth occurs in a maternity service with a neonatal intensive care unit (NICU).
- Since 2019, it is expected that **85%** of babies 27 weeks or less must be born in a maternity service with a NICU (NHS England and Improvement 2019).
- In London during the period of April 2019 to March 2020, there was a total of 344 babies born who were 27 weeks or less and 261 of those babies were born in a maternity service with a NICU, which equates to 76%

Therefore, the ambition for London is that more than 85% of these babies are born in a maternity service with a NICU. There are 8 maternity services with NICUs in London (see map below)

- EBS co-ordinates all requests for an IUT as indicated above and facilitates the transfer to the appropriate maternity unit when arranged
- Thus, when the EBS contacts a neonatal unit for an available cot, the neonatal unit co-ordinates the discussion with the labour ward coordinator and consultant obstetrician. Then the neonatal unit contacts the EBS with a final answer on behalf of the perinatal service within one hour of the request.
- **Call EBS on 0207 407 4999 for all requests to transfer a mother at risk of preterm birth who are 27 weeks pregnant or less**

For further support, please contact the Clinical implementation leads:

- Dr Manju Chandiramani, Manju.Chandiramani1@gstt.nhs.uk
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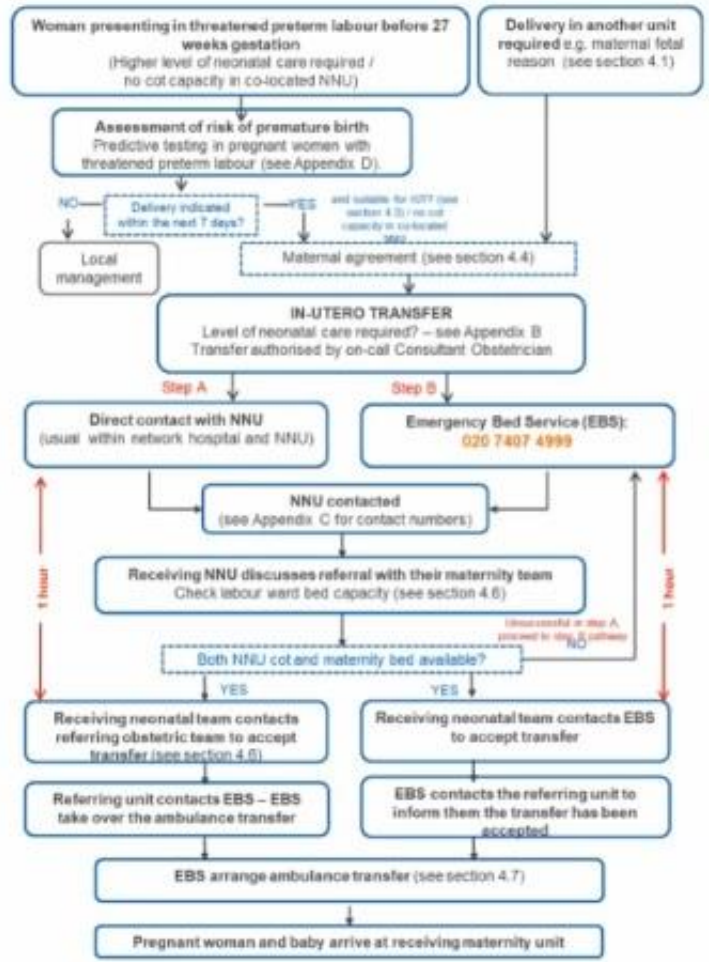
Engagement Surgeries are continuing weekly – please contact Clare Capito for more information ClareCapito@nhs.net

NHS London Neonatal Operational Delivery Network

NHS London Ambulance Service



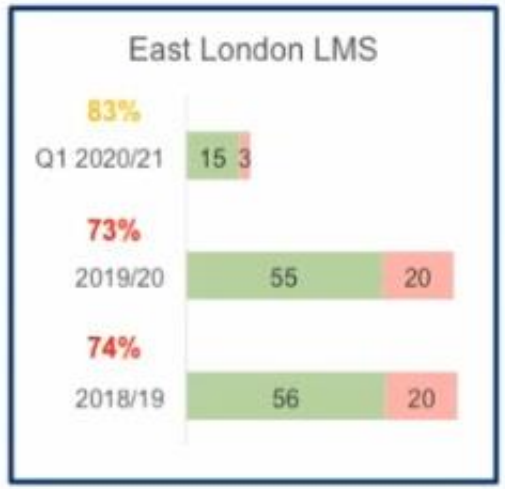
NHS England and NHS Improvement

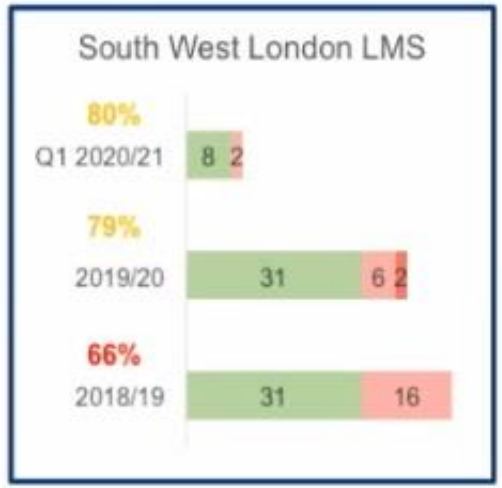
Right place of birth for extreme premature babies
(% <27 weeks born in OU co-located with Neonatal Intensive Care Unit)

	2018/19	2019/20	Q1 2020/21
East London LMS	56/76 babies	15/18 babies	8/11 babies
North Central London LMS	41/60 babies	18/28 babies	8/11 babies
North West London LMS	78/98 babies	71/83 babies	14/19 babies
South West London LMS	31/47 babies	31/39 babies	8/10 babies
South East London LMS	58/72 babies	58/71 babies	13/14 babies
London	264 / 353	193 / 239	51/65

Neonatal unit level place of birth for extreme premature babies (total numbers)

NICU LNU SCBU





London movement:

Q1 2020/21: 78%

2019/20: 81%

2018/19: 75%

England 2019/20: 79%

We predict to target our resources and evidence-based interventions where they are needed. When we cannot prevent preterm birth, we ARE responsible for optimising outcomes.

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