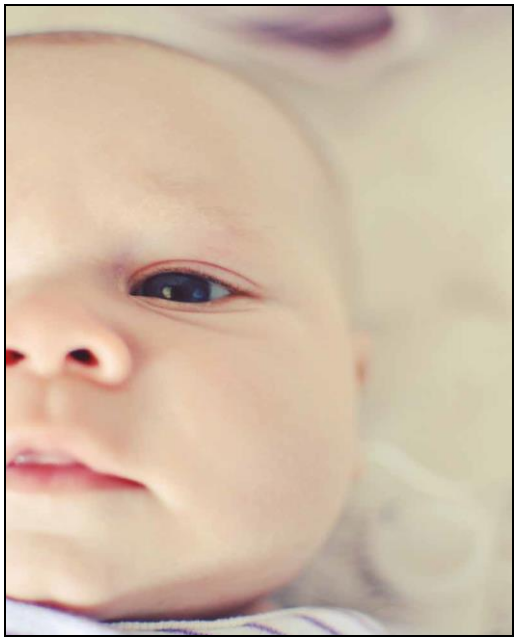
A Five-Year Forward Plan for Maternity and Neonatal Services

Neonatal Intensive Care

Options Appraisal Report

July 2023

Scottish Government
Riaghaltas na h-Alba



THE BEST START

A Five-Year Forward Plan
for Maternity
and Neonatal Services

Neonatal Intensive Care

Options Appraisal Report By Perinatal Sub Group

The Best Start Recommendation 45 - Neonatal intensive care:

The new model of neonatal services should be redesigned to accommodate the current levels of demand, with a smaller number of intensive care neonatal units, supported by local neonatal and special care units. Formal pathways should be developed between these units to ensure that clear agreements are in place to treat the highest risk preterm babies and the sickest term babies in need of complex care in fewer centres, while returning babies to their local area as soon as clinically appropriate. Three to five neonatal intensive care units should be developed, supported by 10 to 12 local neonatal and special care units.

Contents

Introduction

The Perinatal Sub Group of the Best Start Implementation Programme Board was asked to lead on taking forward implementation of recommendation 45 noted above.

To identify which out of Scotland's current eight neonatal intensive care Units should be the final three Units as proposed by Best Start, the Perinatal Sub Group embarked on an options appraisal process.

This report describes the options appraisal process undertaken, and the feasibility analysis and testing that followed the conclusion of that process. In addition, it outlines the review undertaken following the pause brought about by Covid, including consideration of additional evidence and data since the publication of The Best Start, and an assessment of readiness of the proposed final three neonatal intensive care units.

This report summarises conclusions from this process and sets out recommendations for three neonatal intensive care Units in Scotland, including the process for moving forward with implementation on a Scotland-wide basis.

Governance

1. The Perinatal Sub Group reports to the Implementation Programme Board (IPB) of The Best Start, chaired by Jane Grant as appointed by Scottish Ministers. This Board also serves as the Scottish Perinatal Network Oversight Board.

Membership (2022)

Chairs: Jim Crombie, Deputy Chief Executive, NHS Lothian & Andrew Murray, Medical Director NHS Forth Valley

Members:

- Alison Wright, Advanced Neonatal Nurse Practitioner, NHS Tayside, Chair of Scottish Neonatal Nurses Group;
- Tara Fairley, Clinical Lead, National Maternity Network;
- Caroline Lee-Davey, Chief Executive, Bliss;
- Lesley Jackson, Clinical Lead, National Neonatal Network;
- Carsten Mandt, Scottish Perinatal Network Programme Manager;
- Allan Jackson, Clinical Lead, ScotSTAR Neonatal;
- Colin Peters, Clinical DirectorNHS GGC Neonatal Services ;
- Corinne Love, Senior Medical Officer Maternity & Woman's Health, Scottish Government/NHS Lothian;
- Shetty Bhushan, Lead clinician and neonatologist NHS Tayside & Scottish Neonatal Consultants Forum;
- Kenny Mitchell, Scottish Ambulance Service;
- Eddie Doyle, Professional Advisor Paediatrics, Scottish Government/NHS Lothian;
- Dr Mary Ross-Davie, Director of Midwifery , NHS GGC;
- Professor Ben Stenson, Neonatal Consultant, NHS Lothian;
- Philine Van Der Heide, Consultant Paediatrician/ Neonatologist, NHS Highland.

Background and Evidence

2. The Best Start, published in January 2017, outlined a new model of neonatal service provision which suggests care for the smallest and sickest babies is consolidated to deliver the best possible outcomes; emphasises parents as key partners in caring for their baby and; aims to keep mothers and babies together as much as possible, with services designed around them.

3. The recommendations for the new neonatal model of care are underpinned by strong evidence that population outcomes for the most premature and sickest babies are improved by delivery and care in units looking after a "critical mass" of these babies. They include:

- That access to on site paediatric, surgical, laboratory and radiology services is beneficial for the most preterm babies;
- That parents are partners in care, involved in decision making and care delivery;
- That mothers and babies should not be separated unless essential for care of one or other;
- That early discharge and ongoing care is in the interest of families;
- That parents should receive clear information;
- That kangaroo mother care and breastfeeding are essential to high quality care;
- That a skilled workforce is essential in units of all designation.

4. The wider package of recommendations include:

- Providing accommodation for parents to stay on or near the unit and facilities within the unit to encourage kangaroo skin to skin care and early support for breastfeeding;
- Development of Transitional Care.

5. In Scotland there were approximately 48,000 births in the year to 31 March 2020.[1] Numbers fluctuate, but of these, around 5200 babies a year are admitted to neonatal care. Approximately 1,100 of these require a significant level of care which is described as intensive care. A very small proportion of these babies will be affected by the change in model of care.

6. The vast majority of babies (around 3000) admitted to a neonatal unit need care described as "Special Care". Some of these babies may alternatively receive additional support alongside their mothers, on postnatal wards or in Transitional Care units. A further 1,100 need High Dependency care, and around 1,100 are admitted to a Neonatal Intensive Care. A very small proportion of these babies (around 50 – 60 per annum) will be affected by the change in model of care. All fifteen [2]Neonatal Units provide special care, some neonatal units also provide high dependency care and eight of those Units provide intensive care.

[1] Births in Scottish Hospitals (2022)

[2] Including Dr Gray's

7. At the time of publication, The Best Start recommended that Scotland should move from the current model of eight Neonatal Intensive Care Units (NICU) to a model of three to five units in the short term, progressing to three units within five years supported by the continuation of current NICUs redesignated as Local Neonatal Units (LNU). These Local Neonatal Units will continue to provide a level of neonatal intensive care, but the most preterm and sickest babies will receive specialist complex care in fewer Neonatal Intensive Care Units, while returning babies to their local area as soon as clinically appropriate. To support service redesign, formal pathways between these units were recommended, to ensure smooth transfer and repatriation processes.

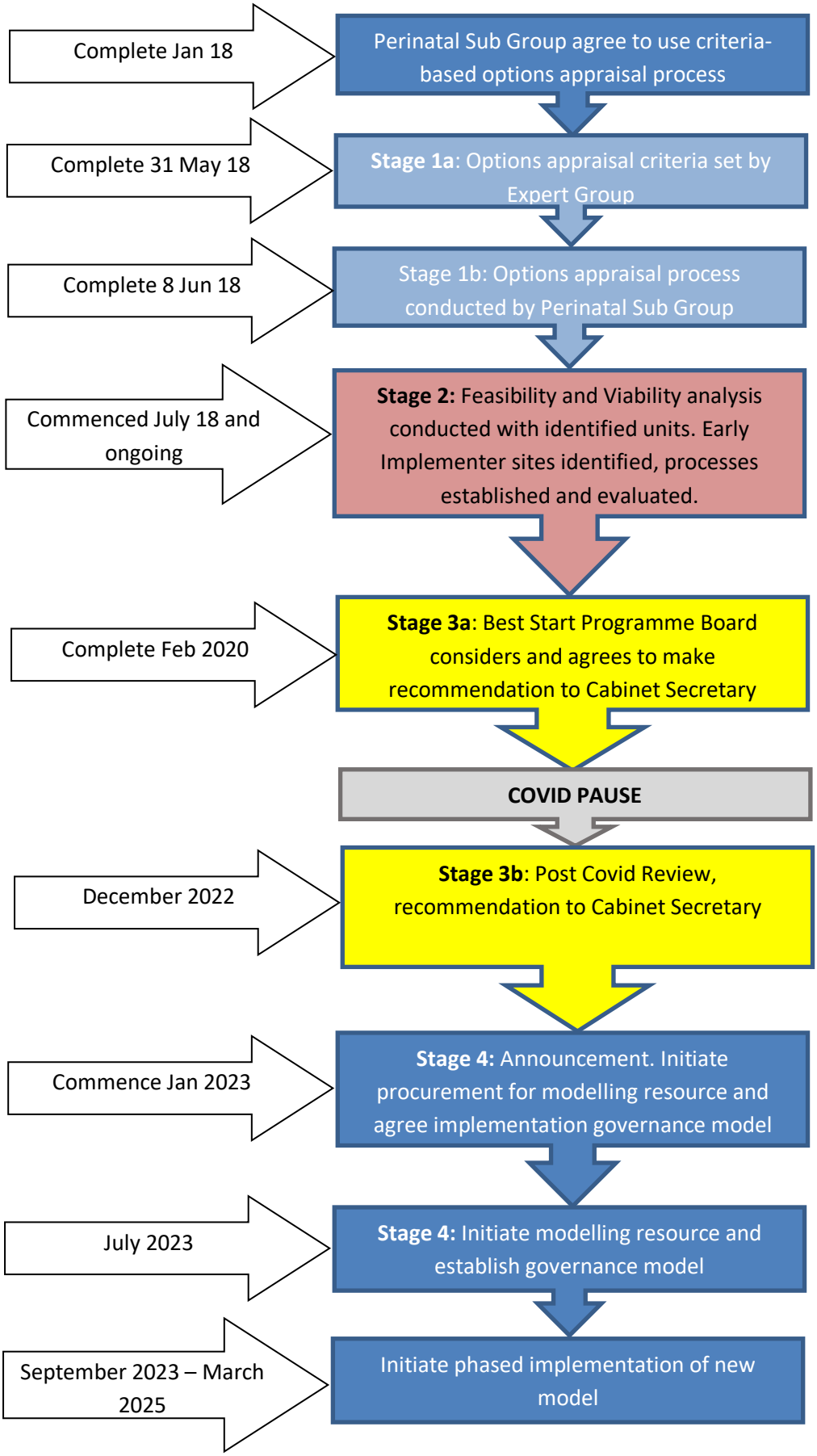
8. This is part of a larger package of measures outlined above to redesign neonatal services described in Best Start, aiming to minimise separation of families (through the development of Transitional Care and community support to facilitate early discharge), to provide care appropriate to need, and to improve outcomes for the most preterm and sickest babies. In addition, the Young Patient's Family Fund, formerly the Neonatal Expenses Fund, supports families with the additional cost associated with having to travel to be with their baby in hospital. Transformation of neonatal care in Scotland is underway and further detail on progress relating to redesign of neonatal services is available at **Annex B**.

Evidence to Support the Change in Model of Care

9. This recommendation is aimed at the most premature and sickest of babies and is based on a review of evidence (carried out by Dr Anna Gavine, Dr Steve MacGillivray and Prof Mary Renfrew of the University of Dundee and published alongside The Best Start). The evidence showed that outcomes for very low birth weight babies (VLBW) are better when they are delivered and treated in NICUs with full support services, experienced staff and a critical mass of activity (expert recommendation defines this as care for a minimum of 100 VLBW babies a year).

10. [Note: This evidence has since strengthened with the publication in 2021 of the British Association for Perinatal Medicine (BAPM) Framework for Practice, which sets out optimal arrangements for neonatal intensive care]

DECISION MAKING AND IMPLEMENTATION PROCESS FLOW CHART



OPTIONS APPRAISAL PROCESS STAGE 1: IDENTIFYING UNITS

Overall aim:

11. In January 2018 The Perinatal Sub Group agreed to undertake an options appraisal process which would identify the immediate and the longer- term units that would make up the model of neonatal intensive care for Scotland. The Group would report the outcomes of the options appraisal and make recommendations to the Best Start Programme Board.

12. NHS National Services Scotland (NSS) were engaged in March 2018 to provide expertise on the design and implementation of the options appraisal process. The Perinatal Sub Group then agreed the proposed criteria-based options appraisal process.

OPTIONS APPRAISAL PROCESS

IDENTIFYING OPTIONS

13. The Perinatal Sub Group identified possible parameters/criteria for the options appraisal process. A long list of criteria for neonatal intensive care units was developed, drawn from a range of sources including The Best Start, British Association of Perinatal Medicine Publications and other relevant policy and guidance documents. The Group devised a template based on the long list criteria and this was issued to Boards to gather site information to inform the options appraisal process.

14. NSS continued to provide expert advice on models of options appraisal and to support the process. Following discussions with NSS the Chairs of Perinatal Sub group agreed to separate the consideration of the criteria and weighting from the scoring process, and to establish a small expert group to identify the short list criteria and weighting.

DETERMINING CRITERIA AND WEIGHTING

15. An expert group was convened on 31 May 2018 to consider a set of criteria and weighting as part of the options appraisal process. The group comprised:
Helen Mactier, Chair of Scottish Neonatal Consultants Group, former Co-Chair of Neonatal Sub Group of Review of Maternity and Neonatal Services in Scotland,

Implementation Programme Board member, (then) Honorary Secretary of President of British Association of Perinatal Medicine (BAPM) and consultant neonatologist, NHS GG&C;
Gopi Menon, (then) President of BAPM and consultant neonatologist, NHS Lothian;
Alan Fenton, Consultant Neonatologist, Newcastle Neonatal Services, immediate past President of BAPM, Chair of Independent Advisory Group for the National Neonatal Audit Programme Advisory Group;
Corinne Love, Consultant Obstetrician, NHS Lothian Senior Medical Officer, Scottish Government;
Eddie Doyle, Associate Medical Director, Women's and Children's, NHS Lothian, Senior Medical Advisor, Paediatrics and Neonatal, Scottish Government.

16. There was consensus from the group on the importance of units identified as Neonatal Intensive Care units **as a result**[3] of the option appraisal process meeting the following criteria as identified in The Best Start (2017):

- provide care for a minimum of 100 VLBW babies per year (VLBW =<1500g)
- deliver more than 2000 respiratory care days per year

17. The group also identified the importance of the discussions with Boards (planned for stage 2 of the options appraisal process) that will focus on capacity/potential capacity of units, and staffing, skill mix and recruitment. The group recognised the value in having a geographic spread of units, noting that this may necessarily result in some compromise over numbers of admission. The table in **Annex A** sets out the criteria and weighting agreed by the group.

SCORING OPTIONS AND CONSIDERING RESULTS

18. The Perinatal Sub Group met on 8 Jun 2018 to carry out the next stage of the options appraisal. The Group were provided with:

- The short list criteria, weighting and definitions (attached at Annex A)
- The responses from Boards to the site information questionnaire
- Data on unit deliveries (attached at Annex B)

19. The Perinatal Sub Group reviewed the short list criteria, definitions and weighting, and the site information and agreed to use this as the basis for the options appraisal process. The Group then scored the eight level 3 neonatal units against the short list criteria, using the definitions and weighting provided, and using the information provided by the Boards.

[3] To note, based on data available at the time of the options appraisal, no units in Scotland met the requirement to provide care for a minimum of 100 VLBW babies per year.

20. The scoring sheets were collected and the scores logged, and overall marks presented to the group. The group then discussed the markings. The outcome of the scoring process ranked the existing Level 3 neonatal units in the following order (scores out of a possible 100 in brackets):

Queen Elizabeth University Hospital, Glasgow (99)
Edinburgh Royal Infirmary (93)
Aberdeen Maternity Hospital (82)

Ninewells, Dundee (53)
Princess Royal Maternity, Glasgow (34)

Wishaw General (30)
Victoria Hospital, Kirkcaldy (24)
Crosshouse Hospital, Kilmarnock (18)

21. The group discussed the results and agreed the following:

- The three long term NICU's were clearly identifiable from the table.
- However more work was required with Boards on patient flows in order to identify whether the three units would each be able to deliver care for more than 100 very low birth weight babies /annum as per the evidence for improved outcomes.
- The 4th and 5th short/medium term units would be Ninewells and PRM. The group had an extensive discussion over the two units ranked 5th and 6th as their scores were close, however it was felt on balance due to PRM's proximity to other critical services in GG&C and potential for cross-working with QEUH to facilitate management of capacity, then it should be the fifth unit in the short/medium term.
- The group agreed capacity should only be built in the top three units, and the fourth and fifth would remain as they are only in the short/medium term until such time as capacity has been built in the three larger units.
- The group agreed that the next step should be meetings with NHS GG&C, Lothian and Grampian to discuss the results, consider patient flows and staffing, capacity and timing, before making a recommendation to the IPB.
- The group agreed that the outcome would be kept confidential whilst the testing the feasibility of the initial findings of the options appraisal was still in progress until final conclusions had been reached.

OPTIONS APPRAISAL STAGE 2: FEASIBILITY, VIABILITY AND TESTING

FEASIBILITY AND VIABILITY

22. In July 2018, representatives from the Perinatal Sub Group comprising Chair and Clinical leads met with senior representatives and clinicians from the Boards/Units which scored highest in the options appraisal (NHS GG&C, NHS Lothian and NHS Grampian). The purpose of the meeting was to discuss the outcomes of stage one of the options appraisal and to discuss practical aspects of implementation of the change to five and then to three neonatal intensive care units, including patient flows, staffing, capacity and timing. This was further informed by a series of bilateral meetings with each of the three Boards.

TESTING

23. At the request of the then Cabinet Secretary for Health, in order to enable a better understanding of the processes required to implement the new model of care, it was rolled out first in two sites in Scotland to enable testing of the entire model ahead of wider roll out. The proposed test sites were Crosshouse and Queen Elizabeth University Hospital in the west, and the Victoria Hospital and Edinburgh Royal Infirmary in the east. This was announced in February 2019. Discussions with these early implementer sites began in late 2018 and they began to operationalise the new model in summer 2019. The Boards were asked to roll out a range of aspects of the new model of neonatal care, including the new model of neonatal intensive care, to enable better understanding of the implications for patient flow associated with other aspects of the new model. Planning Groups were established in the west and the east, which included representatives from the Perinatal Sub Group. These Early Implementer Boards reported progress with establishment and operation of the new model to the Perinatal Sub Group.

24. To inform roll out of the new model, the Perinatal Sub Group developed the following:

    1. **Criteria to Define Levels of Neonatal Care Including Repatriation Within NHS Scotland: a Framework**

    This document describes a clear framework across NHS Scotland for:

    - The management of babies who require Intensive Care, High Dependency Care or Special Care.

- The safe and efficient transfer of babies to the most appropriate care facilities to receive care to meet their clinical requirements.
- The safe and effective repatriation of babies to the nearest appropriate care facility as soon as clinically indicated.

2. Neonatal Care: Information leaflet for women in Scotland

The leaflet provides information for families on the new model of care, different levels of care and where care is provided, and what to expect in the event of the need to transfer mother and/or baby.

25. Feedback on the Framework and the leaflet was sought from the early implementers as they tested the process.

OUTCOME OF TESTING

26. Numbers of babies and women included in the early implementer testing phase was always predicted to be small therefore evaluation focused on testing system processes and communications. Clinical outcomes were not evaluated. In the first half of 2019 significant work was invested in identifying system and process changes required and agreeing new protocols and procedures between the two units in each axis and the Scottish Ambulance Service, specifically the in-utero co-ordination service within the established dispatcher team of the SAS. Key measures included whether the right mothers and babies were identified and transferred, the timeliness of transfer, whether facilities were in place to allow mother and baby to stay together, communication between units, with Scottish Ambulance Service and with families, and timely repatriation of babies.

27. From the start of the Early Implementer process in the summer of 2019 to the end of 2019 there were nine *in-utero* transfers and one *ex-utero* neonatal transfer from Fife to Lothian which met the Early Implementer criteria. Retrospective data was gathered following the onset of the pandemic for the period 1st January 2020 to 31st October 2022. In this time period there were fifteen *in-utero* transfers from Fife to Lothian which met the criteria, ten of which subsequently delivered at RIE, and five *ex-utero* neonatal transfers.

28. Between summer 2019 to end 2019 there were four *in-utero* transfers and no *ex-utero* neonatal transfers from Ayrshire to Glasgow which met the criteria. None of the in-utero transfers resulted in deliveries in Glasgow. Retrospective data was gathered following the onset of the pandemic from summer 2019 to 31st October 2022, during which time there were eight *in-utero* transfers and six *ex-utero* transfers from Ayrshire to Glasgow which met the criteria.

Findings and key learning points

29. Establishing systems and processes: Significant time had to be invested by clinicians and managers on all sites to establish delivery groups, to understand the criteria, to gather data, to develop agreed systems and protocols, to build awareness and achieve buy in from clinicians in both neonatal and obstetric services, and to develop communications processes. As a result the lead-in times for commencement were longer than expected. In particular Boards highlighted the importance of securing early obstetric engagement in planning the change.

30. Learning points: Once the agreed protocols and criteria were implemented, the Boards were asked to report against a set of quality measures and this identified the following themes:

- The communications systems that were established largely worked well and sites reported improved communications and a high level of staff awareness of the new system;
- Arrangements for transfer functioned smoothly between sites and with the Scottish Ambulance Service;
- Arrangements for repatriation worked, with a minor issue identified early on and addressed;
- Of the ten transfers which occurred, nine were in utero transfers, demonstrating systems for early identification of possible extreme pre-term labour were effective;
- Of note most women transferred in-utero during this process did not deliver and were discharged from the receiving Maternity Unit;
- A couple of minor process learning points were identified as the testing was underway and were acted upon promptly and communicated;
- Concerns about process for maternal transfer that came up during the process were dealt with. Guidance/support for *in-utero* transfers needs to be a priority focus for further roll out of the model, which has since been developed by the Scottish Perinatal Network's Maternity Transport Group, with IUT guidance and pathway near finalised;
- Arrangements for continuity of bereavement care in relation to cross-Board transfer also requires to be considered. This is a learning point for all cross board transfer, not just for the families involved in the early implementer sites and is being addressed.

31. The Neonatal Care Information leaflet developed by the Perinatal Sub Group was available to women who required to be transferred. The transfers were discussed with all parents and clinicians reported that no concerns were raised, however due to the low numbers, only one parent provided formal written feedback early on in the process, which was positive. In moving forward with plans for implementation, Boards will be expected to use local mechanisms to continue to gather feedback on operation of the model.

32. In addition to the testing in relation to extreme preterm delivery, the units were asked to move forward with establishment of other aspects of the neonatal model of care. Three out of four of the units have now established Transitional Care Units, enabling babies with moderate additional care needs to be kept with their mothers on the postnatal ward, and the fourth unit (Royal Hospital for Children's Neonatal Unit, QEUH, NHS GG&C) has phased planning in place to develop this service, primarily in the PRM, and then in QEUH. All units are also working towards delivery of neonatal community care, and Lothian are already seeing results with a reduced length of stay (an average reduction of 5 days) for babies that have been able to receive support from the community service.

33. Accommodation is currently available for families in both of the receiving intensive care units to enable them to stay with their babies, although GG&C highlighted building accommodation limitations in RHC/QEUH neonatal units which restrict expansion of physical capacity. When accommodation reaches capacity, the Young Patient's Family Fund, will provide reasonable reimbursement of accommodation costs for parents, where that has to be found outwith the hospital estate. All four units are now working towards Bliss Baby Charter accreditation, which will demonstrate that principles of family centred care are embedded within neonatal units. The The Royal Hospital for Children, Neonatal Unit at the QEUH has become the first Unit in Scotland to be awarded the Gold standard in family centred care.

34. In conclusion mothers at risk of extreme pre-term delivery and extremely pre-term babies were identified and transferred promptly, and appropriately discharged back to their local unit. Mothers and babies were kept together where appropriate. No significant patient safety concerns were raised. The Early Implementer Boards agree that the process is now operationalised following the testing period. Whilst acknowledging that clinical teams are discussing babies that fall into the sickest criteria in the framework, a start date needs to be agreed to formally implement this aspect of the criteria document. Units agree that reporting should now move to an exception basis. While no negative feedback was received from families about the process, small numbers have made it difficult to achieve the depth of parent feedback hoped for. Neonatal units have agreed to continue to seek parent feedback to ensure opportunities to improve the experiences of families are identified on an ongoing basis.

OPTIONS APPRAISAL PROCESS STAGE 3: POST COVID REVIEW

35. The advent of the COVID pandemic paused progress with the new model of neonatal care. However the Early Implementer Boards continued to operate the new model of care, as outlined in data in the previous chapter.

36. Ahead of receiving advice on the outcome of the options appraisal process and feasibility testing, Scottish Ministers asked the Perinatal Sub Group to:
    - Review current data to understand whether the profile of babies in neonatal care has changed significantly during the pandemic;
    - Review readiness in light of COVID and include advice on planning for capacity management and implementation and develop a phased plan for the transition and;
    - Consider communication.

37. The Perinatal Sub Group were therefore remobilised following the pause brought about by Covid and reviewed current Public Health Scotland (PHS) data on the number of extreme pre-term babies being born in Scotland. The Group also agreed a planned programme of engagement including:
    - Discussions with the Neonatal Early Implementers on operation of the model
    - Discussion with the final three neonatal ICUs on readiness to restart, including capacity, phasing of implementation (where required), pathways and protocols, training requirements, ScotSTAR pathways, information for parents and local communication.

Neonatal Early Implementers – Summary of Discussions and Key Points

Successes:

38. The Model, including pathways and repatriation is operating well, with only a very small number of out of pathway transfers.
39. Lothian reflected upon the successful work on 'Keeping mums and babies together' including delivery of more neonatal care in the community through a well-established seven-day neonatal community service, with criteria led discharge, as well as development of transitional care and home phototherapy.
40. Lothian, Fife, GG&C and Ayrshire and Arran teams all reported improved and good quality communication and collaboration. This included regular meetings between clinical teams to discuss operation of the new model, which encouraged collaborative working, sharing of expertise and ideas as well as providing an opportunity to reflect upon and improve processes. Repatriation protocols were also reported as working well.

Issues to address:

41. Staffing remains an ongoing challenge. The advent of Covid saw staffing challenges impacting capacity across all Units in Scotland. Capacity in RIE and QEUH neonatal Units meant they were closed to admissions on occasion, simultaneously at one point which led to a small number of out-of-pathway transfers. Maternity capacity remains a challenge.

42. NHS Fife noted that they did not think there was any anticipated saving on QIS staff required because of an increased acuity of care, and because, whilst some intensive care is no longer provided in Fife in their function as a LNU, they still accept babies from others Units that do require some level of intensive care.

43. NHS Fife also expressed concerns about decreased confidence and de-skilling amongst nursing and medical staff in situations where they may have to provide the initial care for an extreme pre-term baby, prior to transfer to a neonatal intensive care unit.

Discussions with Three NICU Boards

44. In addition to understanding operation of the early implementers, preliminary discussions were held with senior leads in all three NICU Boards to alert them to the remobilisation of the work and discuss readiness to proceed. Key points from all those discussions:

- Lothian, Grampian and GG&C are all content to move forward. GG&C is already doing some planning work.
- GG&C highlighted building accommodation limitations in RHC/QEUH Neonatal Units which restrict expansion of physical capacity.
- Grampian highlighted considerations in relation to work on Dr Grays and opening of the new Baird Family Hospital, which will have single bay neonatal accommodation and a family hotel (scheduled to open early 2024).
- All Boards highlighted essential modelling (maternity and neonatal) required to inform capacity planning, and staffing (in particular the importance of including maternity capacity planning, and NHS Lothian are doing some work on this).
- Accommodation for parents: Both Lothian and GG&C reported challenges with parental accommodation capacity, which would increase with numbers of very sick babies transferred in.
- A sustainable staffing model for the three neonatal intensive care units and recurrent funding of any uplift were highlighted as key requirements.

Consideration of timescales, governance and funding to support implementation

Governance

45. The Perinatal Sub Group propose that:
    a. Regional Planning leads (Chief Execs NHS GG&C, Lothian & Grampian) should drive forward implementation within and between Boards.
    b. The Best Start Programme Board's Terms of Reference should be amended to include oversight of implementation.
    c. Progress on implementation will be reported into the Best Start Programme Board on a quarterly basis.
    d. The Boards where the final three neonatal intensive units will be located should be asked to submit an implementation plan to the NHS Chief Operating Officer and Scottish Ministers by September 2023.
    e. Should issues or delays arise in relation to implementation, the NHS Chief Operating Officer will work with those Boards to further understand any identified issues and identify possible solutions.

Timescales

46. It is evident through discussions with the neonatal community that capacity and staff planning and modelling work is required to further inform implementation, including potential phasing, of moving to three neonatal intensive care units.

47. Through discussions with the Boards where the final three intensive care units will be located, it is clear that there is limited capacity within those Boards to undertake the Scotland-wide detailed cross-Board planning and modelling for the change, so the Perinatal Sub-Group proposes that this could be carried out by a third party. This will also add a level of external assurance to the planning process.

48. This further underlines the requirement for a decision on the location of the final three units to be publicly known, as detailed discussions around capacity, staff planning and modelling cannot commence with all Boards affected by the change, until this is known.

49. Modelling should be completed by Summer 2023, giving Boards a year to fully implement the new model, keeping within timescales set out for the implementation of Best Start. The phased roll out of the new model of Neonatal Intensive Care should then commence across Scotland, based on the new criteria set for the transfer of the smallest babies. An initial outline of timescales is set out below:

- **Early 2023** – Public announcement on location of final three Units. Initiate procurement process to identify expertise to undertake modelling work required.
- **Feb 2023** – Best Start Programme Board meeting to agree revised terms of reference to oversee implementation.
- **Summer 2023** – Outputs from detailed modelling received. Regional planning leads to establish delivery groups in each of the regions.
- **Autumn 2023** - submission of implementation plan, including phasing to Scottish Ministers.
- **September 2023 – March 2025** – phased implementation of new model.

Funding

50. Since 2018/2019, the Scottish Government has invested £2.4 million to support the Early Implementer Boards to plan for the changes and to support NHS Lothian and NHS GG&C in capacity building in preparation for full implementation of the changes.
51. The Neonatal Expenses Fund (NEF) was established on 1 April 2018 and supports parents with babies in neonatal care with the cost of meal and travel expenses. The scope of this fund has since been widened to include all families with a child under the age of 18 in hospital and includes reimbursement of reasonable accommodation costs, allowing more equity of access for parents and is now called the Young Patients' Family Fund.
52. NHS Directors of Finance should be commissioned to develop a cross boundary model for recurrent funding that sees a transfer of resource whereby the funding follows the mothers and babies.
53. Best Start transformational change funding will continue to be provided to bridge any gap in funding to support capacity building in the final three Units, until a sustainable funding model is in place. In 2022/2023 this amounts to £1.1m and we expect the same level of funding in 2023/2024.
54. The Best Start Programme Board should drive development of this sustainable funding model.

Evaluation

55. All units should be monitored in respect of the numbers of very low birth weight babies treated, capacity, patient flow and pathways and parental feedback as part of an ongoing annual evaluation of services against the new model of care which will be overseen by the Best Start Programme Board reporting to Scottish Government. In addition the quality of care provided in all three Units will continue to be monitored through the NMPA, MBRRACE and NNAP national audits.

RISKS AND ISSUES

Tayside babies

56. Based on historical patient numbers, of the three recommended future NICUs, the unit in Aberdeen is currently admitting the fewest babies with birth weights <1500g. Despite proposed redesign, Aberdeen is very unlikely to reach the benchmark of 100 VLBW babies per annum associated with improved outcomes. However, having a third Unit in the North would support accessible services for local populations, taking into account the geography of Scotland. This would negate the need for families in the North to potentially have to travel extensively to receive care.

57. The Perinatal Sub Group discussed the destination for Tayside babies that fall within the criteria for transfer under the new model. Tayside have expressed concerns about transferring babies to Aberdeen, as whilst it will increase the number of VLBW babies being cared for by Aberdeen clinicians and therefore bring them nearer to the 100 VLBW babies, they will still not make the expert recommendation defined as care for a minimum of 100 VLBW babies a year. For some Tayside families, such as those in Angus, Aberdeen is geographically closer and therefore they may choose this option. Perthshire, North Fife and Dundee families are equidistant from Edinburgh or Glasgow.

58. As Aberdeen is unlikely to meet the 100 VLBW babies a year expert recommendation, the Perinatal Sub Group proposes close monitoring of implementation and enhanced support for staff in the Unit in Aberdeen. It will be important to ensure accurate patient information is available to support informed parental choice.

Maternity Engagement and Capacity

59. The Early Implementers highlighted the need to engage with maternity services at an early stage in planning and modelling for the change. Women who are suspected of being in pre-term labour (or likely to be at high risk of pre-term labour) need to be identified by maternity services. Best Start recommends that women in pre-term labour are transferred in utero so that their babies can be born in maternity units with Neonatal Intensive Care Units on site. This will have an impact on the receiving maternity services, and the predicted capacity increase will need to be modelled and resourced. In addition staff in transferring units will need to understand the new model, the anticipated benefits and ensure pathways are in place and families

informed and supported. The Perinatal Network has work underway to improve the efficiency and accurate prediction of the need for in-utero transfer.

Skills maintenance

60. Clinicians in the early implementer units identified skills depletion as a key concern for those units no longer categorised as a NICU. This is based on the expectation that small and sick babies will continue to be delivered unexpectedly outwith NICUs and that some babies in local neonatal units and special care units will require stabilisation and transfer for additional care in NICUs. However, LNUs will continue to deliver intensive care and care for babies from 27+0 weeks that need stabilisation and treatment, so both nursing staff and medical staff will continue to have experience in delivering these aspects of intensive care.

61. Skills maintenance should be considered on a tiered basis:
    (i) emphasising ongoing local Health Board responsibilities
    (ii) building and strengthening clinical interactions between units (NICUs and LNUs/SCUs) to support decision making
    (iii) developments specifically to assist in skill maintenance.

Current Position and Opportunities

62. <u>Actions for Health Boards:</u>

- Health Boards have a responsibility to ensure all relevant staff have mandatory neonatal resuscitation training.
- Simulation (SIM) training is recommended for medical staff as a local Board responsibility and increasingly multidisciplinary teams are recommended to undertake SIM training together as a perinatal team (BAPM and Periprem etc).
- Simulation programmes both within neonatal units and across Perinatal teams should be recommended in all units.
- Boards should ensure clinical teams utilise all opportunities for shared educational opportunities at both national and local level, including attendance at morbidity and mortality meetings, repatriation calls and grand rounds - both in person and virtually.

63. <u>Actions for the Scottish Perinatal Network</u>

- Opportunities should be identified for a regular clinical update item within network events and specifically within the Consultant forum as a quarterly agenda item, these would be updating on evidence rather than practical skills training.

- Ensuring sharing of new and updated clinical guidelines across the network highlighting any changes to clinical practice this entails.
- Emphasis should be on building on existing interactions as teams and reinforcing working as one team across Scotland.
- Explore opportunities for Consultants within LNUs and SCUs to attend NICU ward rounds.

64. Actions for NHS Education for Scotland (NES)
    - NES could support/coordinate a perinatal approach to development and participation in SIM training programmes. Consideration should be given to a NES role specifically in enabling all teams to have the skills, training and leadership to deliver SIM training as this is often the barrier to successful implementation of SIM programmes.
    - Recommend that the QIS working group look at the importance of post QIS training and competencies that should be developed within a post QIS Framework.
    - NES are best placed to offer specific skill training where this is requested (recognising there is already a joint NES ScotSTAR Stabilisation course developed and run for CMU staff). Developing an aligned course for LNUs/SCUs should be further discussed with NES.

Planning and modelling

65. Through the experience of the early implementers it is clear that Boards need sufficient time to plan and prepare for implementing the changes, and that this needs to involve the whole multidisciplinary team (maternity and neonatal).

Funding and Timescales

66. There will be costs associated with resourcing implementation of the new model of care, and with the redistribution of neonatal workload. While the Scottish Government can seek to identify short term transformational funding, a long-term sustainable model for recurrent funding will be required to meet those costs and a funding mechanism agreed through Directors of Health Finance and with Boards. Detailed clinical modelling work undertaken in early 2023 will inform the financial modelling.
67. Best Start transformational change funding will continue to be provided to bridge any gap in funding to support capacity building in the final three Units, until a sustainable funding model is in place. In 2022/2023 this amounts to £1m and we expect the same level of funding in 2023/2024.

Conclusions and Recommendations

Conclusion

68. Following consideration of the aforementioned data on the number of extreme pre-term deliveries in Scotland which is attached at Annex C, and the outcome of planning and implementation discussions, the Perinatal Sub-Group agreed that:

a. The data strongly suggests that we should continue with the current direction of travel for implementation and that it should continue to be monitored moving forward.

b. Further modelling, and implementation planning information be commissioned which will be worked up with planning experts, and which should take account of any operational challenges.

c. The outcome of the options appraisal process is not publicly known and limited planning can be undertaken until the decision is ratified and made public by Scottish Ministers.

d. The default destination for babies due to be born in Tayside requiring transfer under the new model should be Grampian, whilst allowing for fully informed parental choice, with accurate information for families and clinicians being key to support that choice.

e. The neonatal criteria paper should be published as a resource for clinicians, at the same time as the announcement about the location of the NICUs.

Recommendations

69. That the outcome of the options appraisal process is now concluded and Ministers are invited to agree to the recommended final three units and that detailed modelling and phased implementation planning can now be be commissioned.

70. Those three Neonatal Intensive Care units for Scotland would be located in the Royal Hospital for Children, Queen Elizabeth University Hospital in Glasgow, Simpson's Centre for Reproductive Health, Edinburgh Royal Infirmary and Aberdeen Maternity Unit. The new model of neonatal intensive care should now be fully implemented on this basis, with consideration given to phasing roll out over the next two financial years, informed by capacity and staff planning and modelling work.

71. The smallest and sickest babies should be born in maternity units collocated with a Neonatal Intensive Care Unit where possible. That care should be delivered in the unit closest to their home and babies should be repatriated to their local neonatal unit as soon as clinically appropriate.

72. Based on historical patient numbers, of the three units recommended as NICUs, the unit in Aberdeen is currently admitting the fewest babies with birth weights <1500g.

Even with the planned changes to service Aberdeen is not likely to reach the benchmark of 100 of these babies per year, the number considered necessary to demonstrate improved outcomes. The subgroup does however recognise the geographical advantages for women of having a unit located in the North and recommends that enhanced monitoring and opportunities for shared learning and skills maintenance be considered for that unit.

73. NHS Directors of Finance should be commissioned to develop a cross boundary flow of recurrent funding that sees a transfer of resource so that the funding follows mothers and babies.

74. Transformational change funding should be identified to bridge any gap in funding to support capacity building in the final three Units until, until a sustainable funding model is in place.

75. The Best Start Programme Board should drive development of this sustainable funding model.

Communications

76. The Criteria Framework and parent information leaflets have been signed off by the Perinatal Sub Group and should be published alongside the announcement of the outcome of the options appraisal process. There should be a clear process of communications with families, professionals and Boards to support the announcement.

Wider Considerations

77. Work to progress recommendation 55 on development of a standardised risk assessment tool in relation to in-utero transfer is well underway to support wider roll out of the new model of care. This work is being led by the Scottish Perinatal Network.

78. Families who have to travel to be with their baby in a Neonatal Intensive Care Unit will be eligible to claim expenses to help with the cost of travel, meals and accommodation through the Young Patient's Family Fund.

ANNEX A

Agreed Criteria and Weighting for Options Appraisal Process

CRITERIA	Definitions	Source/Evidence	Weighting
1. **Co-located neonatal general surgery**, including: 1. Acute provision of surgery for necrotising enterocolitis (NEC) 2. Surgical insertion of central lines 3. Repair of diaphragmatic hernia 4. Repair of oesophageal atresia and tracheo-oesophageal atresia (TOF) 5. Repair of abdominal wall defects	Maximum score: Full range of neonatal surgery is performed on site. Minimum score: No neonatal surgery is performed on site. [Possible range in between based on comparative levels of neonatal surgery provided.]	BAPM	25
2. **Co-located paediatric medical sub specialist services**, including: 1. Respiratory paediatrics and ENT airway service 2. Neurology & neurosurgery 3. Paediatric gastroenterology 4. Genetics 5. Ophthalmology 6. Paediatric critical care (intensive care and high dependency care)	Maximum score: All paediatric medical sub speciality care and paediatric critical care on site. Minimum score: No paediatric medical sub specialities or paediatric critical on site. [Possible range in between based on comparative levels of services provided.]	BAPM	25
3. **Co-located Fetal medicine sub speciality services,** providing detection and treatment of fetal malformation including: 1. Cardiac 2. CNS and/or facial 3. congenital diaphragmatic hernia 4. Abdominal wall defect 5. Twin pregnancy with complications (e.g. ultrasound identification of	Maximum score: Full range of fetal sub speciality services available on site provided by consultants trained in subspecialist maternal and fetal medicine. Minimum score: No fetal sub speciality services on site. [Possible range in between based on comparative levels of service available and staff training.]	RCOG Framework for Maternity Standards EGAMS	20

twin-twin transfusion 6. Fetal infection 7. Skeletal			
4. **Co-located Maternal medicine sub speciality services**, including: • Cardiology service with expertise in adult congenital heart disease • Haematology • Neurology and neurosurgery • Renal disease including renal failure and dialysis • Organ transplant (heart, lung, liver, kidney) • Genetic disorders (e.g. Marfan's syndrome, Ehlers Danlos syndrome) • Adult intensive care	Maximum score: Full range of maternity sub speciality services and adult ITU available on site provided by consultants trained in subspecialist maternal and fetal medicine Minimum score: No maternity sub speciality services or adult ITU on site. [Possible range in between based on comparative levels of maternity sub speciality services and/or adult ITU provided and staff training.]	The Best Start p79 RCOG Framework for Maternity Standards MBRRACE Confidential Inquiry EGAMS	20
5. **Co-located 24/7 paediatric radiology service**	Maximum score: 24/7 paediatric radiology service on site capable of providing full range of investigations. Minimum score: No 24/7 paediatric radiology service on site.	Expert group	10
Total:			**Max 100**

ANNEX B

Current Status and Work Completed to Date with Implementing the New Model of Neonatal Care

Parents as Partners in Neonatal Care

At a local level, Boards have been supported by the Scottish Government to work towards Bliss Baby Charter accreditation, which will support the ethos of parents being partners in care. The Bliss Baby Charter Scheme accredits neonatal units which deliver the gold standard of Family Centred Care. This means parents are fully involved in decisions about their baby when they are in neonatal care, and that they are supported to be primary care givers, providing as much day to day care as possible for their baby.

All Boards are signed up and are at different stages of accreditation. The Scottish Government continues to support Bliss to roll out the Bliss Baby Charter in Scotland, negating the requirement for Boards to pay a fee to be involved in this process. The Royal Hospital for Children's Neonatal Unit at the QEUH has become the first Unit in Scotland to be awarded the Gold standard in family centred-care.

The neonatal community have also welcomed the introduction of The Neonatal Expenses Fund (NEF) since 1 April 2018 which supports parents with babies in neonatal care with the cost of meal and travel expenses. Promoted to parents at a local level, NEF supports keeping families together and ensuring that parents are key partners in care. The scope of this fund has now been widened to include all families with a child under the age of 18 in hospital allowing more equity of access for parents and is now called the Young Patients' Family Fund.

Keeping Mums and Babies Together With Services Designed Around Them

The Best Start recognised that many babies requiring special care could be discharged home earlier if appropriate neonatal/community services were in place and highlighted that significant variance existed across Scotland. Under the umbrella of the Best Start Perinatal Sub-Group, Guidelines for post-discharge follow up, including a model for a neonatal community service, have been developed and published by the National Neonatal Network.

As some aspects of neonatal care will be delivered in fewer NICUs over time, the importance of a consistent approach to repatriation across neonatal services was also recognised. Additionally, The Best Start noted that neonatal care should continue after the baby is discharged home and that a consistent follow up process, supported by clear guidelines should be developed to support families at home. The National Neonatal Discharge Planning and Follow Up Framework was launched in November 2019, supplemented by information for parents on neonatal care. It sets out a Once for Scotland approach to effective discharge planning, repatriation and follow-up neonatal care. It's publication completes the original asks of recommendations in relation to discharge planning set out in Best Start and the National Neonatal Network will support units in the implementation of the principles set out in this framework. They will also highlight progress, as well as areas of on-going challenge by

interval audit and be responsible for hosting the accompanying resources and parental information to support the implementation of this framework.

More families are being enabled to stay together through the introduction of Neonatal Transitional Care. Under the auspices of the Best Start Continuity of Carer Sub-Group a framework for Transitional Care has been developed, which Boards can use as a benchmark for planning development of this service. Since the publication of The Best Start, there has been an increase from two to eight Transitional Care units and in some units this has resulted in a 20% reduction in admissions to the LNU.

Launch of the National Neonatal Network

The Best Start also recommended the creation of a single national neonatal network to facilitate integrated working across NHS Board boundaries, including input from service management and clinical staff, to support the new model of neonatal care. The National Neonatal Network was launched in 2019 and is managed together with the National Maternity Network under the umbrella of the Scottish Perinatal Network (SPN). It aims to encourage collaboration across maternity and neonatal care services and supports the best possible outcomes for mothers, babies, fathers and partners and their wider families.

Since its creation, a Core Steering Group has agreed a work plan which will support the implementation of the new model of neonatal care. It details a number of projects which will create nationally consistent protocols, guidance and care pathways across neonatal services; support NHS Boards with implementation of national or regional pathways at local level as agreed by The Best Start Programme Board/SPN Oversight Board; support appropriate quality assurance, clinical pathways and continuous improvement to further enhance standards of care and outcomes for women and babies; and support CPD and training opportunities.

For example, The Network's Escalation and Cot Capacity Group has progressed work on guidance for escalation of unit closures and has further developed the ScotCAT tool for determining unit cot and staff capacity. This work has now linked up with the development of national Real Time Staffing Resource tools, led by Healthcare Improvement Scotland in support of full implementation of the Health and Care (Scotland) Staffing Act 2019. Utilising emerging Real Time Staffing Resource tools for neonatal capacity management and escalation will allow these processes to be streamlined and delivered consistently.

A repatriation sub-group has been developed, reporting to the Network's Steering Group. It continues to support the implementation of the Discharge Planning Framework working with individual Boards to develop streamlined repatriation criteria and cot cards for babies who have transferred to a tertiary centre for care, which details base hospitals and timescales for repatriation. Regular communication meetings have also been set up between boards to facilitate improved communication and sharing of information. Virtual planning meetings are now encouraged that include parents and units are sharing virtual unit tours with parents prior to repatriation to familiarise themselves with the new unit.

The Network has also established a Consultant Forum, (following on from the previous Scottish Neonatal Consultants Group) and AHP Forum. Proposals for a remote and rural

forum (to be taken forward across both neonatal and maternity networks) are currently being agreed.

The Network's Core Steering Group, will report to the IPB, currently serving as the Oversight Board. The Scottish Government will continue to work with the Network to support Boards in establishing processes which will facilitate the implementation of the new model of neonatal care.

ANNEX C

NEONATAL UNITS: DATA 2015 – 2017 compared to DATA 2018/19 – 2021/2022

Unit/Level	Level	<27 Weeks							<1500g						
		2015	2016	2017	2018/ 2019	2019/ 2020	2020/2021	2021/2022	2015	2016	2017	2018/ 2019	2019/ 2020	2020/ 2021	2021/2022
Queen Elizabeth University Hospital, Glasgow	3	14	9	18	16	14	17	27	51	64	75	62	76	64	83
Princess Royal Maternity, Glasgow	3	21	18	21	25	15	16	20	63	62	70	81	56	56	61
Edinburgh Royal Infirmary	3	24	22	16	26	25	22	33	85	87	93	99	77	72	73
Aberdeen Maternity Hospital	3	14	6	8	8	13	10	18	54	56	63	59	50	55	60
Wishaw General	3	12	15	18	21	14	17	23	42	64	76	59	55	42	70
Ninewells, Dundee	3	10	7	5	11	8	12	14	51	47	25	51	44	42	50
Crosshouse Maternity, Kilmarnock	3	6	8	9	3	10	4	2	42	45	29	38	36	19	20
Victoria Hospital, Kirkcaldy	3	12	11	11	5	6	0	2	32	50	52	28	20	15	21
Forth Valley, Larbert	2	0	6	10	4	0	10	8	17	21	11	27	21	36	29
Raigmore, Inverness	2	1	3	1	3	2	1	1	8	10	10	10	11	9	6
St Johns, Livingstone	2	2	1	0	1	1	0	0	7	10	3	7	8	3	1
Royal Alexandra Hospital, Paisley	2	4	2	7	0	2	5	2	25	20	28	22	13	22	26
Cresswell, Dumfries	1/2	0	1	1	1	3	1	0	18	13	13	7	5	4	6
Borders General,	1	0	1	1	0	1	0	0	0	4	3	1	2	1	0

Melrose															
Dr Grays, Elgin	1	-	-		0	0	0	0	0	0	0	0	0	0	0
Total		120	110	126	124	114	115	151	495	553	551	551	474	440	531

ANNEX D

NEONATAL UNITS: DATA 2015 – 2017

Unit/Level	Level	Deliveries 2016 (ISD)	Neonatal Admissions (2016)	<27 Weeks			<1500g			ITU cots*	HDU cots*	SC cots*	TC
				2015	2016	2017	2015	2016	2017				
Queen Elizabeth University Hospital, Glasgow	3	5728	593	14	9	18	51	64	75	16	14	20	0
Princess Royal Maternity, Glasgow	3	5964	466	21	18	21	63	62	70	4	6	18	0
Edinburgh Royal Infirmary	3	6241	815	24	22	16	85	87	93	9	8	22	0
Aberdeen Maternity Hospital	3	5134	886	14	6	8	54	56	63	10	7	19	0
Wishaw General	3	4669	787	12	15	18	42	64	76	8	10	11	6
Ninewells, Dundee	3	3975	566	10	7	5	51	47	25	4	3	14	4
Crosshouse Maternity, Kilmarnock	3	3549	480	6	8	9	42	45	29	5	4	11	4
Victoria Hospital, Kirkcaldy	3	3473	366	12	11	11	32	50	52	4	2	14	0
Forth Valley,	2	3118	362	0	6	10	17	21	11	5	2	13	0

Larbert													
Raigmore, Inverness	2	2035	263	1	3	1	8	10	10	2	1	8	0
St Johns, Livingstone	2	2629	269	2	1	0	7	10	3	0	2	8	0
Royal Alexandra Hospital, Paisley	2	3546	383	4	2	7	25	20	28	3	3	10	0
Cresswell, Dumfries	1/2	1211	199	0	1	1	18	13	13	2	0	9	0
Borders General, Melrose	1	991	112	0	1	1	0	4	3	0	2	6	0
Dr Grays, Elgin	1	1013	-	-	-					0	0	4	0
Total		53276	6547	120	110	126	495	553	551	72	64	187	14

*The cot numbers on this list are indicative figures, as there is flexibility built into the operation of levels of care. Data from 2016

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