Letter to the Editor:

Current availability of cerebral function monitoring and therapeutic hypothermia equipment in UK neonatal units and networks

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Therapeutic hypothermia (TH) with intra-corporeal temperature monitoring commenced within 6 h of birth is standard of care for babies with suspected hypoxic-ischaemic encephalopathy.[1] While the 2010 British Association of Perinatal Medicine position statement advised active or passive cooling to provide TH,[2] subsequent data from transport services showed that active cooling with intra-corporeal temperature monitoring minimised stabilisation and transfer times and achieved target temperature in 100% of cases compared to passive cooling.[3] Routine cerebral function monitoring (CFM) can aid the early diagnosis and treatment of encephalopathy and seizures. Our previous UK-wide survey in 2009 highlighted that overall <50% of units across UK had CFM and <30% had active cooling equipment.[4] A decade on, we have repeated a UK-wide telephone survey to understand the current situation.

Between December 2019 and July 2020, we surveyed all UK neonatal units through a senior nurse, unit manager or consultant. We obtained responses from all 189 (100%) units. **Table 1** summarises the results by UK neonatal network and level of units within each network. Of neonatal intensive care units (NICUs), currently only 2/57 (4%) units do not have access to either CFM or active cooling equipment. However, 32/57 (56%) NICUs do not have out-of-hours access to formal EEG (electroencephalogram) services. Of local neonatal units (LNUs), currently <50% provide active cooling although more than two thirds have CFM available. **Figure 1** illustrates variations across the UK neonatal networks in terms of availability of CFM and active cooling equipment. Only two networks had 100% availability of CFM in all their units, and one network had active cooling available in >90% of its units.

In summary, despite an increase in CFM use and active cooling since 2009, there are significant variations geographically based on the network policies. Early aEEG was a sufficiently sensitive screening tool used in the main hypothermia trials for selection of babies for TH. It also reduces overtreatment of seizures which impacts ongoing neurological assessment. Nevertheless, use of CFM requires training and maintenance of skills along with expertise for correct interpretation. Network NICUs and transport teams could help with interpretation via remote electronic review of aEEG traces. Although all transport teams and almost all NICUs use servo-controlled active cooling, earlier achievement of target temperature at LNUs and special care baby units is possible for eligible encephalopathic babies by using active cooling equipment, and this would potentially improve their outcomes.[5] The introduction of modern servo-controlled active cooling equipment and non-needle CFM devices and neonatal EEG sensor caps can minimise staff training needs.

While aEEG and active cooling are both considered gold standard for units providing TH, the current state reflects the complexity of translating advances in monitoring and treatment into practice. With the sharing of best practices amongst networks, increased use of telemedicine and modern equipment, earlier initiation of TH reliably in all local hospitals

using active cooling with routine neurophysiological monitoring is feasible. This would permit a more consistent approach to the management of neonatal encephalopathy for all babies irrespective of their place of birth.

Table 1: Regional availability of CFM and active cooling facilities based on neonatal networks

Neonatal Network	**Percentage of CFM availability by level of care** SCBU/LNU/NICU (Total) %	**Percentage of active cooling availability by level of care** SCBU/LNU/NICU (Total) %	**Total number of neonatal units by level of care** SCBU/LNU/NICU (Total)
South West	100/100/100 (100%)	0/100/100 (75%)	3/6/3 (12)
Wales	100/100/100 (100%)	0/80/100 (64%)	3/5/3(11)
East of England	50/100/100 (88%)	50/20/100 (29%)	4/10/3 (17)
East Midlands	40/100/100 (79%)	0/40/100 (43%)	5/5/4 (14)
London	25/85/89 (77%)	0/46/89 (54%)	4/13/9 (26)
West Midlands	0/80/100 (73%)	0/40/100 (55%)	2/5/4 (11)
North West	50/58/100 (71%)	50/33/100 (57%)	2/12/7 (21)
Scotland	0/50/100 (71%)	0/25/100 (64%)	2/4/8 (14)
Kent Surrey & Sussex	17/100/100 (62%)	83/100/100 (92%)	6/3/4 (13)
Northern Ireland	0/75/100 (57%)	0/100/100 (71%)	2/4/1 (7)
Thames Valley & Wessex	0/56/100 (57%)	0/44/100 (50%)	2/9/3 (14)
Yorkshire & Humber	0/40/80 (42%)	0/0/80 (21%)	4/10/5 (19)
Northern	0/0/100 (30%)	0/0/100 (30%)	7/0/3 (10)
Grand Total	**133/189 (71%)**	**99/189 (52%)**	**189**

SCBU - Special Care Baby Unit; LNU - Local Neonatal Unit; NICU - Neonatal Intensive Care Unit

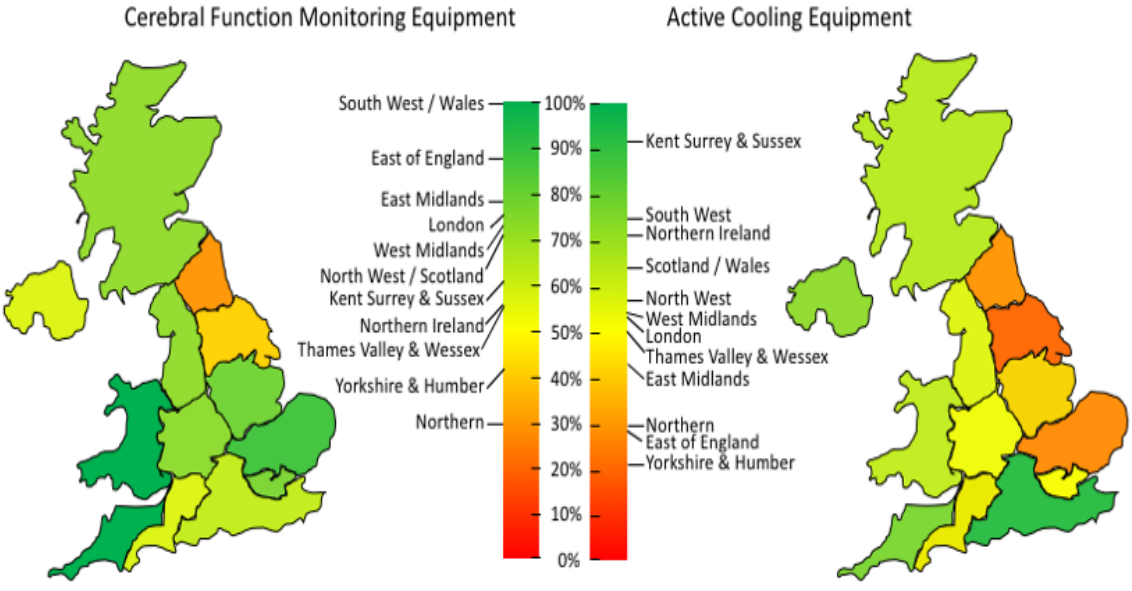

Figure 1: Geographical variations in availability of cerebral function monitoring and active cooling facilities

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