Document filename:	**Requirements Specification for Maternity Outcomes Signal System (MOSS)**		
Project / Programme	**Maternity and Neonatal Programme**	Project	**MOSS**
Document Reference			
Project Manager	**REDACTED**	Status	**Final**
Owner	**REDACTED**	Version	**1.0**
Author	**REDACTED**	Version issue date	**13/07/2026**

Requirements Specification for Maternity Outcomes Signal System (MOSS)

Document management

Revision History

Version	Date	Summary of Changes
1.0	13/02/2026	Version finalised, update to dissemination section

Reviewers

This document must be reviewed by the following people:

Reviewer name	Title / Responsibility	Date	Version
REDACTED	Senior IG Manager, NHS England	13/02/2026	0.4
REDACTED	IG Lead, NHS England	24/06/2026	0.4
REDACTED	Programme Manager, Maternity and Neonatal Programme	24/06/2026	0.4
Kevin Willis	Head of Information Law, NHS England	15/04/2026	0.4
Arjun Dhillon	Deputy Caldicott Guardian, NHS England	04/06/2026	0.4

Approved by

This document must be approved by the following people:

Name	Title	Date	Version
REDACTED	National Specialty Advisor for Maternity and Neonatal, NHS England	26/06/2026	0.4
REDACTED	Director – Inquiry, Health Inequalities, Maternity Taskforce, Department of Health and Social Care	13/07/2026	0.4
Jackie Gray	Director of Privacy and Information Governance, NHS England	29/6/2026	0.4
Frankie Swords	Medical Director and Caldicott Guardian, NHS England	26/06/2026	0.4

Glossary of Terms

Term / Abbreviation	What it stands for
MOSS	Maternity Outcomes Signal System
SPEN	Submit a Perinatal Event Notification service
UDAL	Unified Data Access Layer (NHSE pseudonymised data environment)
AGEM DSCRO	Arden and Greater East Midlands Data Services for Commissioners Regional Office

Document Control:

The controlled copy of this document is maintained in the NHS England corporate network. Any copies of this document held outside of that area, in whatever format (e.g. paper, email attachment), are considered to have passed out of control and should be checked for currency and validity.

Purpose of document

This document sets out the requirements for the **Maternity Outcomes Signal System (MOSS)** and should be read alongside the

Outcomes and Registries Directions 2024 (Directions), issued by the Secretary of State for Health and Social Care.

Introduction / Purpose of data collection

The Maternity Outcomes Signal System (MOSS) has been developed by NHS England to address the first recommendation in the Reading the Signals report on East Kent maternity service (referred to as the East Kent report) which called for the identification of "valid maternity and neonatal outcome measures capable of differentiating signals among noise to display significant trends and outliers".

MOSS raises signals about potential safety issues in maternity intrapartum care. Signals prompt a rapid critical safety check, undertaken by the maternity service, to determine any underlying safety issues and whether any further action is required to improve clinical and operational safety and ultimately outcomes for women and babies. Guidance is provided in the MOSS standard operating procedures.

MOSS is intended to be used as part of routine safety monitoring within the Perinatal Quality Oversight Model. Safety information should be shared by maternity services in line with the appropriate governance set out in the standard operating procedures, which are aligned to the model. The model requires Integrated Care Board, regional and national oversight depending on the escalation of a concern. ***MOSS should not be used as a performance management tool and a signal does not necessarily mean that a service is unsafe – it is the critical safety check and governance review of the trust's response that should determine this.***

MOSS uses 3 outcome measures at trust site level (based on delivering NHS Trust) to generate signals:

- Term stillbirths;
- Term neonatal deaths up to 28 days and;
- Term Hypoxic Ischaemic Encephalopathy (HIE) at grade 2 and 3

These outcomes were chosen as they have a high potential of causation from care and service delivery issues (duty of candour, avoidable harm, sub-optimal care), they have a low index of causation from known clinical conditions, and they are defined and recorded in a consistent and standardised way in clinical information systems.

MOSS supports the overarching ambitions of the Maternity and Neonatal Programme to reduce stillbirths, neonatal and maternal deaths and serious brain injuries and is mentioned in NHS England's 10 Year Health Plan for England.

Maternity Outcomes Signal System (MOSS)

MOSS data will be updated on a daily basis by NHSE to deliver timely trend data and signals of potential safety issues that prompt a local safety check by maternity services. In simple terms, MOSS signals are generated when the accumulation of term events at a trust site exceeds what would normally be expected based on its term birth rate. Signals and trend data are displayed in a cumulative SUM chart (CUSUM) and excess events chart. Automated email alerts are sent immediately to relevant organisations when a signal occurs. Full explanations of the statistical methodology used are provided to MOSS users and in the MOSS tool and standard operating procedures.

MOSS will present pseudonymised events data, including the site of event and date of birth at patient level to trusts, ICBs and NHS England regions. This information is important to support rapid information gathering and safety checks run locally by maternity services in trusts and to facilitate escalation of safety issues to ICBs, regions and nationally and ensure that additional support and oversight is put in place under the established Perinatal Quality Oversight Model.

Data collection

Scope

The scope of collection is England only.

Source

Data will be collected from NHS Trusts and Foundation Trusts in England that have maternity and/or neonatal units submitting notifications of stillbirths, early neonatal deaths, severe brain injuries and maternal deaths. The data will be extracted from the Submit a Perinatal Event Notification (SPEN) service system hosted by NHSE England and used to centralise the reporting of qualifying perinatal safety events, including maternal and neonatal deaths, and potential severe brain injuries in term babies.

Under section 259(1)(a) of the 2012 Act, a Data Provision Notice will be served in accordance with the procedure published as part of NHS England's duty under section 259(8).

Category

The MOSS data collection comprises confidential patient information. Identifiable data will be collected from NHS Trusts that will enable derivation of the measures given above.

Personal data collected shall include:

- Baby's NHS number
- Baby's date of birth
- Baby's date of death
- Where the birth and (if relevant) the death happened, i.e. name of Hospital
- What type of event it was (for example, stillbirth, newborn death, or moderate to severe HIE)

- Dates linked to the event (such as the incident date)
- Information about the birth (such as gestational age and birth weight)
- A small number of clinical details used to understand the event (for example, whether therapeutic cooling was used).

Additional information regarding maternal death will include:

- Type of maternal death (direct/indirect)
- Mother's date of death
- Mother labour status

The full list of data items to be collected and analysed is described in the MOSS technical data specification

Frequency

This will be an ongoing collection. Data is collected via SPEN and can be submitted by NHS Trusts throughout the 24-hour daily period, 365 days a year. The specified data fields will be extracted for analysis and updating of the MOSS visualisation tool by NHSE on a daily basis.

Analysis

Internal processing

The SPEN portal is hosted on the Azure NHSE Strategic Tenancy. The personal data fields specified will be extracted from the NHSE Strategic Tenancy via an Application Programming Interface (API) into an identifiable secure data environment.

Data linkage

NHS numbers will be pseudonymised before being flowed into a separate Secure Data Environment for pseudonymised data. Analysts will link cases of neonatal death with cases of HIE via the pseudonymised NHS number to eliminate double counting ‘signals’ and generating false positive signals in MOSS.

Use of personally identifiable data required in MOSS is summarised below:

Personally identifiable data required from SPEN	**Transformation**	**Published in MOSS**	**Rationale**
Baby’s NHS Number	Pseudonymised	No	Required by analysts to link neonatal death data with cases of HIE to eliminate double counting ‘signals’ and generating false positive signals.

Baby's date of birth	None	Yes	Required under statistical model which analyses the accumulation of events over time.
Baby's date of death	None	Yes	Required under statistical model which analyses the accumulation of events over time.

Data sourced via the Personal Demographic Service (PDS) birth notifications will also be used to calculate total term births at site level to create the 3 year rolling reference rates that MOSS requires to generate signals. However, this data is not used for linkage with the data collected from SPEN and PDS data will not be retained in the MOSS asset

Data Analysis

MOSS signals when there is an accumulation of events over time beyond what might normally be expected in a maternity service. Maternity services are alerted to signals through an automated email which is sent at the time a signal is generated. Signals prompt a service-led critical safety check to determine if there are safety issues.

MOSS presents pseudonymised information back to services. It shows events by type as trend information at NHS trust maternity unit level. It also shows the baby's date of birth linked to the event. This enables MOSS to focus more on care provided during labour and birth and helps services understand which events contributed to a signal to support their response.

Data related to maternal death is collected and will be used as part of routine safety monitoring within the Perinatal Quality Oversight Model alongside MOSS. NHS England . Colleagues working in the Maternity and Neonatal Programme in the national team responsible for in NHS England will be able to view and may use this information, together with other pseudonymised information held by NHS England, to support national policy and planning and to help target support to services from a national and/or regional level.

Statistical analysis

A range of statistical analysis of the measures will be built into MOSS as described below:

Cumulative Sum (CUSUM) Chart - The national reference rate of events is calculated. To get the expected number of adverse events in each trust, the national rate is applied to the average number of births in the trust for the time period.

Excess adverse events - This chart (A Variable Life Adjusted Display) shows the cumulative number of excess events over time compared to the national reference. The national reference rate is calculated by taking the total number of events and dividing by the total number of births.

The resulting reporting is uploaded to MOSS within a restricted access Tableau site and accessed in accordance with the Dissemination section below.

Internal Access

It is also anticipated that data obtained under this Direction may be analysed under the NHS England De-Identified Data Analytics and Publication Directions 2023 (Data Analytics Direction). Any analysis under the Data Analytics Direction will only occur where approved in accordance with Information Governance procedures and controls, including where required in accordance with the statutory guidance issued under s274A of the 2012 Act, and advice from the NHS England Advisory Group for Data.

NHS England may also analyse the Information in accordance with the Life Sciences Directions 2019, where this has been approved.

Consultation

The development of MOSS has been guided by the Maternity and Neonatal Outcomes Group which contains clinical, statistician and service user expertise. Progress is reported into the Maternity and Neonatal Programme Board and updates have also been delivered to the NHS England Executive Quality Board.

The Maternity and Neonatal Outcomes Group contains representation from the following bodies/organisations:

- Service users
- Patient Safety team in NHS England
- Royal College of Obstetricians and Gynaecologists
- Royal College of Midwifery
- Royal College of Anaesthetists
- British Association of Perinatal Medicine
- National Neonatal Audit Programme
- University of Bristol (host of the National Child Mortality Database)
- University of Cambridge (Statistics Department)
- MBRRACE-UK
- NHS Resolution
- Department of Health and Social Care
- Mid-Yorkshire Hospital Trust
- Somerset Integrated Care Board
- East of England Neonatal Operational Delivery Network
- Great Ormond Street Hospital NHS FT
- Dr. Bill Kirkup as an Independent Expert and author of the East Kent report
- Jonathan Neale as an independent expert on signal systems
- Care Quality Commission

- Neonatal Data Analysis Unit, Imperial College London

Dissemination/Sharing

Regular Dissemination/Sharing

Subject to established NHS England governance procedures and approvals detailed below, data providers will be able to view their own data in MOSS where appropriate access governance controls have been met.

Data in MOSS will be presented at NHS site level, based on the site where the delivery occurred. Aggregate reports and record level data available is limited to:

- date of birth related to the event,
- what type of event it was (for example, stillbirth, newborn death, or grade 2 or 3 HIE),
- the level of the Signal; and
- where the event happened i.e. name of hospital.

The visualised reports will be viewable at these levels:

- NHS Trusts will be able to view their own visualised data for their patients
- ICBs will be able to view trusts' visualised data in their footprint
- Regional maternity and neonatal colleagues in NHS England will be able to view trusts' visualised data in their footprint

As stated above sharing this information is important to support rapid information gathering and safety checks run locally by maternity services in trusts and to facilitate escalation of safety issues to ICBs, regions and nationally and ensure that additional support and oversight is put in place under the established Perinatal Quality Oversight Model.

NHS England will share this data with NHS Trusts and Integrated Care Boards in order to meet their statutory functions by virtue of section 261(5)(d) of the Health and Social Care Act 2012.

Data Access Request Service (DARS)

Data from this collection will be made available through DARS to applicants that have a lawful basis to process the data and subject to the organisations entering into a data sharing agreement.

Full date of event, date of birth or date of death will be pseudonymised by NHS England prior to sharing data, by exception these may be shared where a lawful basis is demonstrated by the applicant.

All releases of data are published in NHS England's Data Uses Register.

For any dissemination of confidential patient data by NHS England, national data opt-outs will be applied in line with the national data opt-out operational policy guidance.

Publication

Data to be published

Under section 260(1) of the Health and Social Care Act 2012, NHS England will publish information it obtains by complying with a direction under section 254 unless the information falls within section 260(2) of the 2012 Act,

Annual or biannual reports will be published by NHS England on each NHS Trust, containing signals that occurred during the period by trust.

Change control process

Changes to this Specification will be managed by NHS England in conjunction with the Department of Health and Social Care to ensure such changes are aligned with the Outcomes and Registries Directions 2024 Direction.