Disparities in Access to the Northwest Ambulance Service during pregnancy, birth and postpartum period and its association with neonatal and maternal outcomes [DiAAS]: a retrospective cohort study and qualitative framework analysis

HEYS, Stephanie, PEGLER, Daisy, ELAHI, Anam, HEAZELL, Alexander E P, WATSON, Kylie, HOPE, Holly, FULLWOOD, Cathrine and SOLTANI, Hora <http://orcid.org/0000-0001-9611-6777>

BMC Pregnancy and Childbirth

STUDY PROTOCOL Open Access

Disparities in Access to the Northwest Ambulance Service during pregnancy, birth and postpartum period and its association with neonatal and maternal outcomes [DiAAS]: a retrospective cohort study and qualitative framework analysis

Stephanie Heys[1*], Daisy Pegler[2], Anam Elahi[3], Alexander E P Heazell[4], Kylie Watson[2], Holly Hope[4], Cathrine Fullwood[2,4] and Hora Soltani[5]

Abstract

Background This study will be the first UK-based study to investigate access to ambulance services for women and families from diverse backgrounds during pregnancy, birth and early postpartum period. The study will explore relevant maternal and infant outcomes for families who seek help from the ambulance service to explore health disparities in accessing urgent and emergency care. Findings from this study will inform local and national policy aimed at reducing maternal and perinatal mortality and morbidity. This will contribute to the identification of access challenges experienced by seldom-heard women in a crucially important, but under investigated area of unscheduled urgent and emergency maternity care.

Methods A mixed methods approach including two workpackages (WP). WP1 includes a retrospective comparative cohort study (WP1) to describe the characteristics of and outcomes for pregnant women and their neonates who are transferred via ambulance to Manchester University NHS Foundation Trust (MFT) and those that are not. Descriptive statistics with comparative analyses will be presented. WP2 includes a qualitative framework analysis of a purposive sub-sample of routinely collected free-text digital records documented by paramedics for women who arrived at the unit via ambulance. Purposive sampling will be undertaken for women who are identified at an increased risk of poor maternal and/or neonatal outcomes following WP1 analyses. The patient journey will be mapped, and patient profiles constructed. An explanatory mixed methods approach will be undertaken for triangulation of data for insight.

Discussion The study aims to provide an in-depth understanding of access to emergency maternity care to allow investigation of opportunities for alternative clinical decision making and review of current service provision. This

*Correspondence:
Stephanie Heys
Stephanie.heys@nwas.nhs.uk

Full list of author information is available at the end of the article

also helps to identify women with increased risk factors for accessing urgent and emergency care as a gateway to maternity services. This will help to address timely access to the most appropriate services, reducing risk factors for adverse maternity and neonatal outcomes and associated impact upon the emergency services. Findings will be used to inform local and national interventions for at risk populations who access ambulance services during pregnancy, birth, and early postpartum. Findings will also support system conversations around the reasons for seeking help from the ambulance service in the perinatal period and ways to improve access and care provisions for underserved communities.

Study registration number This study/project is funded by the National Institute for Health and Care Research (NIHR) [Research for Patient Benefit NIHR206378]. The views expressed are those of the author(s) and not necessarily those of the NIHR or the Department of Health and Social Care.

Keywords Pre-hospital maternity care, Health disparities, Health inequalities, Ambulance services, Data linkage, Perinatal, Ethnicity, Deprivation, Maternity care access, Emergency maternity care

Background

Maternity care provided outside of a hospital setting is often aligned with care pathways supporting women to make informed choices to birth in a freestanding birth unit or at home. A less understood cohort of women are those attended to by the ambulance service throughout the perinatal period. Whilst most planned births in the prehospital setting are uneventful [1], those that require emergency assistance via the ambulance service are associated with adverse outcomes for women and babies [2–4]. In addition, not all maternity calls to the ambulance service relate to birth. Some of the most complex cases attended to in the prehospital setting relate to emergencies throughout pregnancy and following birth [5]. Babies born across a range of gestations in the prehospital setting are also at an increased risk of mortality and morbidity [6, 7]. Alongside the risks associated with unplanned birth and maternity emergencies prehospital, research has identified a lack of confidence and skills amongst ambulance clinicians in dealing with both low and high acuity maternal and neonatal presentations [8, 9].

Women from ethnic minority backgrounds and those who are socioeconomically disadvantaged are at a higher risk of perinatal mortality and morbidity [10], potentially due to poorer access to care. Calling the ambulance service during and following pregnancy is a gateway to seeking emergency maternity care. However, disparities in accessing emergency services during this period, with a particular focus on vulnerabilities such as being from ethnic minority, migrant or deprived backgrounds, have not been previously investigated. The national Equality and Equity strategy for maternity services recommends that Local Maternity and Neonatal Systems take decisive action to ensure equity of health outcomes is achieved, and preventable mortality is reduced amongst maternity and newborn patients [11]. Seeking to understand drivers and barriers to accessing maternity care is crucial and aims to understanding how best to meet the needs of perinatal populations.

Ambulance service context

A recent report focused on maternity and perinatal outcomes highlights comorbidities and poor outcomes associated with not receiving care in the right place at the right time [6]. The added complications for women and families who seek emergency services is concerning, however this has not been previously contextualised within the key national reprots such as "Mothers and Babies: Reducing Risk through Audits and Confidential Enquires report (MBRRACE-UK) [10]. Understanding factors that influence access to emergency services, particularly those which may interact with key sociodemographic characteristics associated with maternal and neonatal mortality, such as ethnicity and deprivation, are important to inform policy and practice development in addressing inequalities for underserved communities.

Across the UK there are 13 NHS ambulance services. A unique branch of healthcare provision, ambulance services operate outside the boundaries of traditional health and care provider organisations, operating in place - on site, in primary, acute and community settings, across rural and urban areas and most importantly, in people's homes. The ambulance service is an active system partner to closing the gap on healthcare inequalities and poorer health outcomes faced by communities across the multitude of health and care touchpoints of patient pathways and journeys [12, 13]. This study is a vital step in using routinely collected data to improve outcomes. The three-year Single Delivery Plan for maternity services supports this vision asking services to collect and disaggregate local data and feedback by population groups to monitor differences in outcomes and experiences for women and babies from different backgrounds [14, 15]. Such a focus also aims to reduce costs and burden on stretched ambulance services to ensure those that who do require emergency assistance are receiving timely care, whilst addressing the unnecessary utilisation of the ambulance service by identifying alternative pathways and accessibility issues. This proposed work will use data to inform

local and national polices and training programmes to address disparities in care for vulnerable women and families who access emergency care during the perinatal period, with a focus on how to apply a preventative and targeted approach to meeting the care needs of diverse populations.

Focus on addressing system pressures and disparities in care provision that may result in adverse outcomes for patients in the prehospital setting is timely [11, 16]. National reports exist to support maternity teams in addressing concerns over inequitable care provision [15, 17, 18], however inequality of access and outcomes for certain groups of women receiving emergency prehospital care via the ambulance service remains unclear and has not previously been investigated in the UK context.

Aims

This study will explore characteristics of women and families using the ambulance service as an entry point to maternity care and the factors that influence access the ambulance service during pregnancy, birth, and early postpartum. We also aim to assess maternal and neonatal outcomes with a focus on women from ethnic minorities and those living in areas of social deprivation.

Objectives

1. To explore the relationship between maternal ethnicity and sociodemographic characteristics and access to the ambulance service across Manchester.
2. To map digitally available data for women who transferred into the maternity unit via the ambulance service.
3. To investigate ethnicity and deprivation inequalities associated with transfer into hospital via ambulance and to describe outcomes for women and neonates.
4. To undertake a textual framework analysis of records to provide a deeper understanding of reasons for contact and communications between women and care providers.

Study design

Methods

This study uses a mixed methods approach, consisting of a retrospective comparative cohort study in Workpackage 1 (WP1) and qualitative free-text framework analysis of maternal ambulance records in Work-package 2 (WP2). A sequentional explanatory design will be used to collect, analyse and interpret quantitative and qualitative data. Triangulation of data will generate recommendations to improve access to maternity services and care, for women at an increased risk of mortality and morbidity.

Study setting

The Northwest Ambulance Service (NWAS) is the largest ambulance service in the UK serving more than seven million people across approximately 5,400 square miles, including 23 maternity care providers. Approximately 40% of maternity and newborn related 999 calls received into NWAS are from Greater Manchester (GM). This area has a high incidence of social deprivation (43% of neighbourhoods are highly deprived) [19], a third of pregnant women live in the most deprived Local Super Output Areas (LOSA) and up to 33% of the pregnant population are from ethnic minority backgrounds [20]. MFT comprises of three maternity units and approx. 15,000 births a year. For this research to have the greatest impact, whilst being pragmatic, we have focused the study in the Manchester area which alongside receiving the highest percentage of maternity calls into NWAS, also has a diverse population, allowing it to be more generalizable across diverse parts of the country.

Although annually approximately 12,000 women are transferred into obstetric units by NWAS, mainly in the absence of a midwife, little research exists on this cohort of women. Some women, particularly those from ethnic minority or migrant backgrounds, may call the ambulance service because they do not know how or whom to access within maternity care [21, 22], conversely, 1 in 10 Maternal deaths investigated by the maternity and Neonatal Safety Investigation Branch include the ambulance service, highlighting the spectrum of need amongst this cohort. Such concerns are compounded by persistent inequalities that exist for Black and Asian women and women facing severe and multiple disadvantages [10, 23, 24], who are more likely to seek urgent or emergency medical assistance [25, 26]. Additionally, there is no formal recognition of the ambulance service as the first port of call for women when barriers to accessing maternity services are experienced [13, 22], with increasing gaps in our understanding of the multiple touchpoints within women's journey through care that could provide opportunities for earlier support and intervention.

Study site

Greater Manchester (GM) is situated in the North-West of England with a growing population of 2,867,769. In comparison to the rest of the UK it is one of the more diverse areas with respect to ethnicity and socioeconomic status. Based on recent census data 28.7% of GM's population are from an ethnic minority and in the district of Manchester, where two of the three study maternity units in the study are located, the proportion of ethnic minority residents is 51.3% [27]. GM's migrant residents originate from 189 countries, representing 90 different main languages, while a quarter of the ethnic minority residents arrived in the UK in the last 10 years. Overall,

Table 1 Outcomes

Maternal Composite Primary Outcome	**Neonatal Composite Primary Outcome**
Maternal death (within 6 weeks of birth)	Stillbirth
Admitted to ICU or HDU (maternity and/or main hospital)	Neonatal death (up to 28 days)
Unplanned hysterectomy	APGAR score < 7 at 5 min
Postnatal readmission to hospital (within 6 weeks of birth)	Fetal growth restriction < 3rd birthweight centile
Major PPH (> 2000 ml)	Low arterial cord pH (< 7.05)
3rd or 4th degree perineal tear (OASI)	Admission to neonatal intensive care unit (NICU)
Placental abruption	Preterm birth (< 34 weeks gestation)
Eclampsia	Specified birth-related injuries (brachial plexus injury, fractures
HELLP syndrome	Diagnosis of hypoxic ischemic encephalopathy (HIE)
Secondary Maternal Outcomes:	**Secondary Neonatal Outcomes:**
Fetal loss < 24 weeks gestation	Birthweight (g)
Antepartum haemorrhage (APH)	Birthweight centile
Gestational diabetes	Small for gestational age (SGA)
Need for blood transfusion	Large for gestational age (LGA)
Obstetric cholestasis	Gestational age at birth
Gestational hypertension	Preterm birth (< 37 weeks gestation)
PPH (500 ml – 2000 ml)	Cord prolapse
Preeclampsia	Length of stay in NICU after birth (if applicable)
Admitted with Influenza, COVID-19, Whooping Cough or RSV	Breastfeeding at discharge
	Birth before arrival at hospital
Venous thromboembolism	Length of stay in hospital after birth
Episiotomy	Neonatal temperature on admission to NICU AND all outcomes from neonatal composite individually
Caesarean birth	
Instrumental birth	
Breech birth	
Spontaneous, vaginal birth	
Length of stay in hospital after birth	
Number of antenatal visits	
Number of ultrasound scans AND all outcomes from maternal composite individually	

40% of the population live in the 20% most deprived areas in England [19].

Study population and eligibility criteria

Women who arrived via ambulance across three maternity hospital sites within Manchester University NHS Foundation Trust (MFT) over a 24-month period will be included in the study. The first stage will use maternity care records from one large North-West maternity provider (15,000 births/year) of women who did or did not arrive at the maternity unit by ambulance during pregnancy or after birth, to see if there are any differences in backgrounds and outcomes between the two groups. The second stage will look at care records of women who arrived by ambulance to see if there are any similarities and differences in reasons for these women accessing the ambulance service and the type of advice, care and support they were given. The patient journey will be mapped, and patient profiles constructed to explore potential alternative clinical decision making and to identify factors that may influence accessing the ambulance service. Findings from both stages will be combined into themes to generate recommendations for how access to maternity and emergency services can be improved.

Outcomes measures

Composite primary outcomes were developed to detect severe maternal and neonatal morbidity as well as a series of secondary outcomes amongst those accessing the ambulance service during the perinatal period. All variables within the composite outcomes will also be analysed independently. A list of primary and secondary outcomes are presented in Table 1.

Workpackage 1

A retrospective cohort analysis of maternity care data from one large North-West maternity provider (approx. 15,000 births/year) of women who did or did not arrive at the maternity unit by ambulance during pregnancy or after birth, to identify any differences in backgrounds and outcomes between the two groups. Over 24 months, the characteristics of and outcomes for these pregnant women and their

Data analysis

Appropriate descriptive statistics with graphics will be presented for each variable to understand completeness and form. No imputation will be made for missing data, but in the event of large numbers post-hoc sensitivity analysis will be considered. To explore the association between ambulance service usage and maternal and neonatal outcomes, in an ethnicity and socioeconomic context, a pre-defined list of outcomes related to pregnancy and birth for all women who attend the maternity unit is detailed in Table 1. Initially the outcome measures and demographics, specifically ethnicity and socioeconomic status, will be presented with appropriate descriptive statistics for each cohort. Exploratory modelling using either logistic or generalised linear models for binary or continuous data, respectively, will be used to investigate any potential health disparities. Where there are health disparities associated with being from an ethnic minority or deprived background, exposure to ambulance

transfers will be included in the model. If the health disparity attenuates, we can infer that ambulance use does in part explain the observed health disparity. These models will include adjustment for a-priori confounders such as age and calendar variables or known medical confounders. In the event of rare, or less frequently observed outcomes, descriptive statistics will be reported alone. The unit of analysis will be pregnancy episode, therefore standard errors of effects will be adjusted accounting for women with more than one pregnancy episode during follow-up. In the event of multiple cases where women have many emergency transfers during a single pregnancy, sensitivity analyses will investigate the effect of frequent transfers.

Workpackage 2

A qualitative framework analysis of routinely collected free-text data will be undertaken on a purposive sample of de-identified digital care records of women who arrived at the unit via ambulance. Sample size will be informed by The patient journey will be mapped, and patient profiles constructed to explore potential barriers to accessing healthcare, alternative clinical decision making and to identify factors that may influence their accessing the ambulance service.

Data analysis

A framework analysis method will be utilised, allowing insight from existing literature, WP1 and the PPAG to guide the development of a coding framework, supporting a content analysis of the case notes. Abstraction and interpretation of the data via a qualitative framework method will allow for a rich and nuanced understanding of free text details by paramedics, providing meaningful insights to inform theory, practice and policy. Guided by findings from WP1, the research team will purposively sample a selection of free-text entries from ambulance care records to identify key phrases, ideas, or statements, relevant to the research questions. During analysis, data will be sifted, charted, and sorted in accordance with key issues and themes using five steps: familiarization; thematic framework identification; indexing; charting; and mapping and interpretation [28]. The team will group similar items together helping to simplify complex information while retaining its core meaning [29]. With support from the PPAG, the team will organise grouped items into higher-order themes to construct a working thematic framework [30]. Once formulated, the working analytical framework will be applied back onto another purposive sample of remaining free-text entries to investigate themes across the remaining dataset [30].

PPI

A Patient Public Advisory Group (PPAG) have been involved in planning the study and will continue contributing to the project development throughout the study. Individuals will either be of ethnic minority and/or from socioeconomically deprived areas. PPAG members will help define focus for WP1 and WP2. PPAG members will be invited to help with coding transcripts and generating themes and distribution of the findings. Data from WP1 will help define focus for WP2 when creating a coding framework for analysis.

Ethics approval

This project utilises routinely collected data, prepared for research purposes by MFT Clinical Data Science Unit (CDSU). Data will be used anonymously and any decision that individuals have made to "opt out" of research via the NHS National Data Opt Out scheme will be respected. Study activities will be carried out under an existing favourable ethics opinion granted to the CDSU database (IRAS Project ID 324398) and therefore will not need to seek separate ethical approval. The project has been granted approval from the CDSU Data Trust Committee, comprising of members of MFT staff, patients, service users and members of the local community, to ensure that the proposed use of data corresponds with that expected by patients and their family members.

IRAS project ID: 324,398 (REC ref. 23/NE/0076). Approval granted on 12th May 2023 from North-east – Newcastle & North Tyneside 1 Research Ethics Committee.

Discussion

This study will be the first UK-based study to investigate health disparities amongst maternal and neonatal populations accessing emergency care. Findings from this study will have practical applications for the benefit of women and families during the perinatal period and will inform local and national policy aimed at reducing maternal and perinatal mortality and morbidity. This research specifically addresses recent calls by national and international bodies recommending urgent action to understand the pattern, routes and causes of maternal health disparities [10, 17, 18, 22, 24, 26].

A significant strength of this study is its mixed methods approach, which combines quantitative data on maternal and neonatal outcomes with qualitative insights from free-text ambulance records. The use of a retrospective cohort study (Workpackage 1) enables the exploration of health disparities between women who arrive at maternity units via ambulance and those who do not, providing insight into potential factors influencing these disparities. By focusing on sociodemographic characteristics such as ethnicity and socioeconomic status, this study aims to

highlight how such factors may influence access to emergency care and, consequently, health outcomes. The integration of a qualitative framework analysis (Workpackage 2) will further enrich these findings by providing a deeper understanding of why and how women from diverse backgrounds interact with ambulance services and navigate their care pathways. This is particularly important given the challenges iin identifying the drivers of health inequalities, especially when considering the intersectionality of ethnicity, deprivation, and healthcare access.

The ambulance service plays a critical role in closing the gap in healthcare inequalities by acting as a first point of contact for many women who are unable to access traditional maternity services. As highlighted in previous research, ambulance clinicians may lack the confidence and training required to manage maternal and neonatal emergencies [5, 7–9], which can have serious implications for patient outcomes. By investigating the reasons women access ambulance services and identifying potential gaps in care, this study aims to inform the development of training programs for ambulance personnel, ensuring they are equipped to respond effectively to the needs of pregnant women and new mothers. Additionally, understanding the complexities of ambulance use in maternity care can help identify alternative pathways for care, preventing unnecessary ambulance calls while ensuring that women who genuinely require urgent care are not delayed in receiving timely assistance.

This study's findings could have significant implications for the development of local and national policies aimed at improving maternity care. By identifying the factors that influence women's decisions to seek ambulance care and understanding the barriers they face, this research aims to inform strategies to improve access to care, particularly in areas of high social deprivation and for women from ethnic minority backgrounds. Furthermore, the exploration of maternal and neonatal outcomes associated with ambulance transfers will help to clarify the role of ambulance services in mitigating or exacerbating health disparities, thereby contributing to a more nuanced understanding of the intersection between emergency services, maternity care, and health inequalities. Informed by findings from this study, future work aims to examine and understand how and why women and families engage and access urgent and emergency care services (111/999 and Emergenncy Departments) along the maternity care pathway, including during early pregnancy, as to strengthen integrated pathways and to improve timely access. The proposed study will provide valuable guidance to apply the methodology used across all ambulance services, representing a vital step in using readily available data to improve outcomes [14].

In conclusion, this study represents an important step forward in understanding how women and families from diverse and often marginalised backgrounds access emergency maternity care in the UK. By highlighting the challenges they face and the potential for alternative clinical decision-making, this research aims to drive improvements in both service provision and policy. Ultimately, the goal is to ensure that all women, regardless of their background, have access to timely and effective care during the perinatal period, reducing the risk of adverse outcomes and contributing to the broader goal of improving health equity in maternity services.

Strengths and limitations

To our knowledge this protocol represents the first study to explore maternity and neonatal outcomes for women transferred to maternity units via ambulance with a focus on ethnicity and deprivation. In line with the retrospective cohort design we will describe association not causation, however findings will support insight to disparities in access to maternity care, a key focus documented within recent MBRRACE reports [10, 22, 31]. Missing demographic and health information may be more common among the ambulance transfer group because they may be less likely to have had prior contact with health services. Using a mixed methods approach strengthens the design of the study so that the qualitative element provides an explanation for the observed variations in the study sample profile and related outcomes.

Acknowledgements

We acknowledge the support of the Clinical Data Science Unit, Manchester University NHS Foundation Trust for managing and supplying the pseudonymised data from the original data source.

Authors' contributions

SH: conceptualisation, funding acquisition, methodology, writing (original draft preparation). SH, HS, HH, AH, AE, CF, KW conceptualisation, funding acquisition, methodology, supervision, writing (review and editing). SH, HS, DP, HH, AH, AE, CF, KW, CDSU methodology, writing (review and editing). All authors read and approved the manuscript.

Funding

This study/project is funded by the National Institute for Health Research (NIHR) Research for Patient Benefit NIHR206378. The views expressed are those of the author(s) and not necessarily those of the NIHR or the Department of Health and Social Care.

Data availability

No datasets were generated or analysed during the current study.

Declarations

Ethics approval and consent to participate

This study/project is funded by the National Institute for Health and Care Research (NIHR) [Research for Patient Benefit NIHR206378] inclusive of a full peer review. The views expressed are those of the author(s) and not necessarily those of the NIHR or the Department of Health and Social Care. Ethics approval for the study has been gained: IRAS project ID: 324398 (REC ref. 23/NE/0076). Approval granted on 12th May 2023 from Northeast – Newcastle & North Tyneside 1 Research Ethics Committee.

Consent for publication

Not applicable as it is a protocol article.

Competing interests
The authors declare no competing interests.

Author details
[1]The Northwest Ambulance Service. Honorary Clinical Fellow, The University of Liverpool, Manchester, England
[2]Manchester University Foundation Trust, Manchester, England
[3]The University of Liverpool. Liverpool, Lecturer, England
[4]The University of Manchester, Manchester, England
[5]Sheffield Hallam University, Sheffield, England

Received: 28 February 2025 / Accepted: 21 August 2025
Published online: 17 October 2025

References

1. Hollowell J, Puddicombe D, Rowe R, Linsell L, Hardy P, Stewart M, Brocklehurst P. The Birthplace national prospective cohort study: perinatal and maternal outcomes by planned place of birth Birthplace in England research programme. 2011. Available from: http://www.wrap.warwick.ac.uk/46562/1/WRAP_Petrou_bmj.d7400.full.pdf. Last Accessed 26 Jan 2023.
2. Vagle H, Haukeland GT, Dahl B, Aasheim V, Vik ES. Emergency medical technicians' experiences with unplanned births outside institutions: A qualitative interview study. Nurs Open. 2019;6(4):1542–50.
3. Thornton CE, Dahlen HG. Born before arrival in NSW, Australia (2000–2011): a linked population data study of incidence, location, associated factors and maternal and neonatal outcomes. BMJ Open. 2018;8(3):e019328.
4. Unterscheider J, Ma'Ayeh M, Geary MP. Born before arrival births: impact of a changing obstetric population. J Obstet Gynaecol. 2011;31(8):721–3.
5. McLelland G, McKenna L, Morgans A. Epidemiology of unplanned out-of-hospital births attended by paramedics. BMC Pregnancy Childbirth. 2018;18:15. https://doi.org/10.1186/s12884-017-1638-4.
6. NHS England. Implementing the Recommendations of the Neonatal Critical Care Transformation Review. 2019. Available from: https://www.england.nhs.uk/publication/implementing-the-recommendations-of-the-neonatal-critical-care-transformation-review/. Last Accessed 26 Jan 2023.
7. Boland RA, Davis PG, Dawson JA, Stewart MJ, Smith J, Doyle LW. Very preterm birth before arrival at hospital. Aust N Z J Obstet Gynaecol. 2018;58(2):197–203.
8. Heys S, Rhind S, Tunn J, Shethwood K, Henry J. An exploration of maternity and newborn exposure, training and education among staff working within the North West ambulance service. Br Paramedic J. 2022;7(2):50–7.
9. Goodwin L, Voss S, McClelland G, Beach E, Bedson A, Black S, Benger J. Temperature measurement of babies born in the pre-hospital setting: analysis of ambulance service data and qualitative interviews with paramedics. Emerg Med J. 2022;39(11):826–32.
10. Knight M, Bunch K, Patel R, Shakespeare J, Kotnis R, Kenyon S, Kurinczuk JJ. On behalf of MBRRACE-UK. In: Saving lives, improving mothers' care core Report - Lessons learned to inform maternity care from the UK and Ireland confidential enquiries into maternal deaths and morbidity 2020-22. Oxford: National Perinatal Epidemiology Unit, University of Oxford; 2024. https://www.npeu.ox.ac.uk/mbrrace-uk/reports.
11. NHS England. Equity and equality: guidance for local maternity systems, 2021. 2021. Available from: https://www.england.nhs.uk/publication/equity-and-equality-guidance-for-local-maternity-systems/. Last Accessed 26 Jan 2023.
12. The Association of Ambulance Chief Executives. Strengthening the role of the ambulance sector in reducing health inequalities. 2023. Accessed: https://aace.org.uk/wp-content/uploads/2023/06/AACE-NHSE-RHI-WHAT-WE-KNOW-JUNE-2023-F2.pdf.
13. Heys S, Main C, Humphreys A, Torrance R. Displaced risk. Keeping mothers and babies safe: a UK ambulance service lens. Br Paramedic J. 2023;8(2):52–6.
14. Department of Health and Social Care. Data saves lives: reshaping health and social care with data. 2022. Accessed: https://www.gov.uk/government/publications/data-saves-lives-reshaping-health-and-social-care-with-data.
15. NHS England. Three-year delivery plan for maternity and neonatal services. 2023. Accessed: https://www.england.nhs.uk/long-read/three-year-delivery-plan-for-maternity-and-neonatal-services/.
16. Anderson M, Pitchforth E, Asaria M, Brayne C, Casadei B, Charlesworth A, Mossialos E. LSE–Lancet Commission on the future of the NHS: re-laying the foundations for an equitable and efficient health and care service after COVID-19. The Lancet. 2021;397(10288):1915–1978.
17. House of Commons. The House of Commons-Women and Equalities Committee-Black maternal health report. 2023. Accessed: https://committees.parliament.uk/publications/38989/documents/191706/default/.
18. Health and Social Care Committee. The safety of maternity services in England. 2021. https://publications.parliament.uk/pa/cm5802/cmselect/cmhealth/19/1902.htm.
19. Manchester City Council. Indices of Deprivation Report 2019. 2019. Accessed: https://www.manchester.gov.uk/downloads/download/414/research_and_intelligence_population_publications_deprivation.
20. Greater Manchester Local Maternity Systems. Equity and Equality Plan. 2022. Accessed: https://www.gmcvo.org.uk/system/files/GMEC%20Equity%20Equality%20Action%20Plan%20-%20August.pdf.
21. Fair F, Raben L, Watson H, Vivilaki V, van den Muijsenbergh M, Soltani H, ORAMMA team. Migrant women's experiences of pregnancy, childbirth and maternity care in European countries: A systematic review. PLoS ONE. 2020;15(2):e0228378.
22. Kenyon SL, Gallimore ID, Evans TC, Page GL, Felker A, Fenton AC, editors, on behalf of the MBRRACE-UK Collaboration. MBRRACE-UK Perinatal Confidential Enquiry. The care of recent migrant women with language barriers who have experienced a stillbirth or neonatal death: State of the nation report. Leicester: TIMMS, Department of Population Health Sciences, University of Leicester. 2024.
23. Raleigh V, Holmes J. The health of people from ethnic minority groups in England. King's Fund. 2021. Accessed: https://www.kingsfund.org.uk/publications/health-people-ethnic-minority-groups-england.
24. NHS Race and Health Observatory. Ethnic Inequalities in Healthcare: A Rapid Evidence Review. 2022. Retrieved from https://www.nhsrho.org/publications/ethnic-inequalities-in-healthcare-a-rapid-evidence-review/World. Health Organization. (2022). Maternal health. Retrieved from https://www.who.int/health-topics/maternal-health.
25. Birthrights. Systemic racism not broken bodies. An inquiry into racial injustice and human rights in maternity care. Executive Summary. 2022. Accessed: https://www.birthrights.org.uk/wp-content/uploads/2022/05/Birthrights-inquiry-systemic-racism_exec-summary_May-22-web.pdf.
26. Knight et al. Saving Lives, Improving Mothers' Care 2024 - Lessons learned to inform maternity care from the UK and Ireland Confidential Enquiries into Maternal Deaths and Morbidity 2020-22 Saving Lives, Improving Mothers' Care 2024 - Lessons learned to inform maternity care from the UK and Ireland Confidential Enquiries into Maternal Deaths and Morbidity 2020-22. 2024.
27. Office for National Statistics. Birth Characteristics in England and Wales. 2022. Accessed: https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/livebirths/bulletins/birthcharacteristicsinenglandandwales/2020#Preterm%20Birth.
28. Gale NK, Heath G, Cameron E, Rashid S, Redwood S. Using the framework method for the analysis of qualitative data in multi-disciplinary health research. BMC Med Res Methodol. 2013;13(1):1–8.
29. Lindgren BM, Lundman B, Graneheim UH. 2020 Abstraction and interpretation during the qualitative content analysis process. International Journal of nursing studies. 2020;108:103632.
30. Arifin SRM, Cheyne H, Maxwell M, Pien LS. Framework analysis: a worked example from midwifery research. Enferm Clin. 2019;29(2):739–46.
31. Knight et al. Saving Lives, Improving Mothers' Care 2024 - Lessons learned to inform maternity care from the UK and Ireland Confidential Enquiries into Maternal Deaths and Morbidity 2019-21 Saving Lives, Improving Mothers' Care 2023 - Lessons learned to inform maternity care from the UK and Ireland Confidential Enquiries into Maternal Deaths and Morbidity 2019-21. 2023.

Publisher's Note