Maternal, Newborn and Infant Clinical Outcome Review Programme

MBRRACE-UK
Mothers and Babies: Reducing Risk through Audits and Confidential Enquiries across the UK

Saving Lives, Improving Mothers' Care

State of the Nation Report

Surveillance findings and lessons learned to inform maternity care from the UK and Ireland Confidential Enquiries into Maternal Deaths from hypertensive disorders, cardiac disease, mental health-related causes, homicide and accidents 2021-23, and morbidity findings for women living in the most deprived areas.

September 2025

HQIP Healthcare Quality Improvement Partnership
University of Leicester
University of Birmingham
The Newcastle upon Tyne Hospitals NHS Foundation Trust
TIMMS
sands Saving babies' lives. Supporting bereaved families.
NHS Chelsea and Westminster Hospital NHS Foundation Trust
University of Oxford
Oxford Population Health
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www.npeu.ox.ac.uk/mbrrace-uk/reports/maternal-reports/maternal-report-2021-2023

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Contents

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Key messages

from the surveillance report 2025

MBRRACE-UK
Mothers and Babies: Reducing Risk through Audits and Confidential Enquiries across the UK

In 2021-23, **257 women died** during or up to six weeks after pregnancy among 2,004,184 women giving birth in the UK

This represents a maternal death rate of **12.82 women** per 100,000 women giving birth

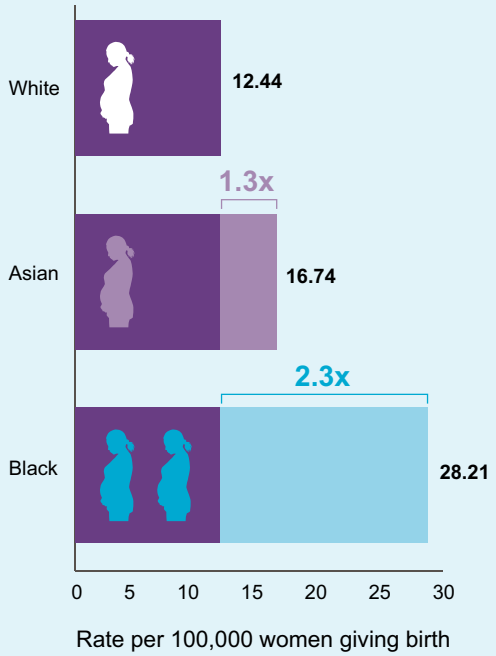
Leading causes of maternal deaths

1. Blood clots
2. Heart disease*
3. COVID-19*
4. Mental health conditions
5. Epilepsy and stroke

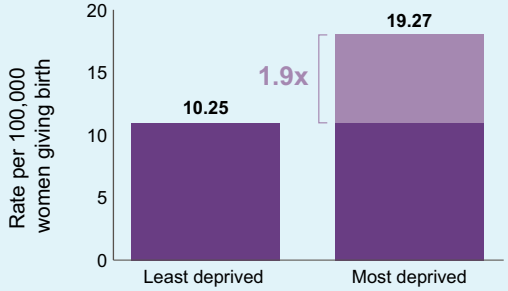
*Responsible for the same number of maternal deaths in 2021-23

Inequalities in maternal mortality

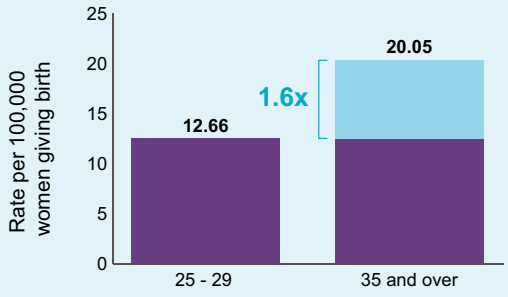
Ethnic group



Deprivation



Age



Key messages

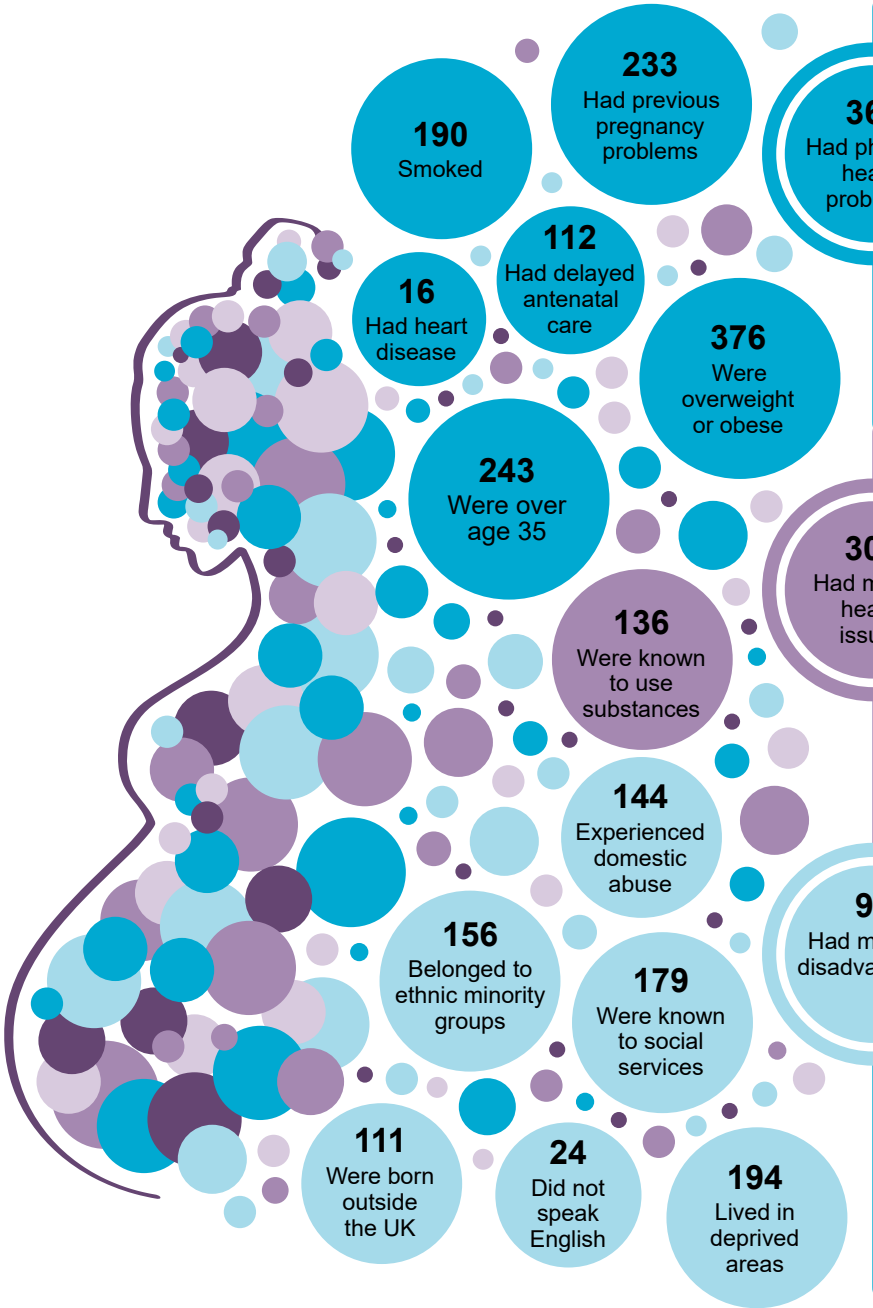
from the confidential enquiries 2025

MBRRACE-UK
Mothers and Babies: Reducing Risk through Audits and Confidential Enquiries across the UK

A constellation of biases

The 2025 MBRRACE-UK report looks at the care of **643 women** who died during or up to one year after pregnancy in the UK and Ireland

Of these women, **583 (91%)** faced multiple interrelated challenges



Ready for pregnancy

The period before or between pregnancies is an ideal time to counsel women about their health, including **weight** or **smoking**, and to create a plan to manage pre-existing conditions

Perinatal mental health team (PMHT)

Women with **mental health issues** who are pregnant, recently pregnant or who have experienced the loss of a child through pregnancy loss, bereavement or custody loss, should receive PMHT referral and leadership

Individualised care

Many women experience multiple, severe disadvantages including **social service involvement, domestic abuse** and **deprivation** and may require additional supports and services

1. Introduction and methods

In accordance with funder requirements, the findings of the Maternal, Newborn and Infant Clinical Outcome Review Programme, including the MBRRACE-UK Confidential Enquiry into Maternal Deaths and Morbidity are now released as a condensed State of the Nation report highlighting the key surveillance findings, national recommendations and new lessons learned from the review of the care received by women who died from specific causes or experienced morbidity and were living in the most deprived areas. This report also emphasises selected clinical messages for healthcare providers and re-states previous recommendations that require improved implementation.

Supplemental material including the full data on maternal mortality rates and the characteristics of the women who died, quality improvement messages concerning the women who were reviewed as part of the confidential enquiries into maternal mortality and morbidity, and the background, details of methods and chapter authors for different topics are available online at:

www.npeu.ox.ac.uk/mbrrace-uk/reports/maternal-reports/maternal-report-2021-2023

Key to colour coding

Vignettes concerning the care of women who died are described in blue shaded boxes.

Vignettes concerning the care of women who had severe morbidity but survived are described in purple shaded boxes with the character M in the corner. ***M***

Key surveillance findings

Key surveillance findings are presented in purple boxes.

National recommendations

NEW

New national recommendations are presented in purple boxes.

Clinical or multidisciplinary team training messages

Clinical or multidisciplinary team training messages to emphasise previous recommendations or existing guidance are presented in blue boxes.

All previous recommendations or existing guidance requiring improved implementation are presented in green boxes.

NICE 2345

2. Summary messages

2.1 Key surveillance findings

Key surveillance findings

1. There was a statistically non-significant decrease in the overall maternal death rate in the UK between 2020-22 and 2021-23. When deaths due to COVID-19 were excluded, maternal death rates were similar to corresponding rates in the three previous overlapping triennia encompassing the years of the COVID-19 pandemic (2018-20, 2019-21, 2020-22).

2. Thrombosis and thromboembolism was the leading cause of maternal death in the UK in 2021-23 during or up to six weeks after the end of pregnancy. Cardiac disease and COVID-19 were the second most common causes of maternal death occurring at equal rates.

3. Rates for late maternal deaths occurring between six weeks and one year after the end of pregnancy continued to increase and were significantly higher in 2021-23 compared to 2018-20. Maternal suicides were the leading cause of deaths occurring between six weeks and one year after the end of pregnancy. As a whole, deaths from psychiatric causes accounted for 34% of maternal deaths during this period.

4. Inequalities in maternal mortality remained in 2021-23. Compared to women aged 25-29, women aged 35 or older were nearly two times more likely to die. While the maternal mortality rate for women from Black ethnic backgrounds continued to decrease in 2021-23, there remained a two-fold difference in maternal mortality rates for Black women compared to White women. Asian women also had a slightly increased risk compared to White women. Women living in the most deprived areas continued to have a maternal mortality rate twice that of women living in the least deprived areas.

2.2 National recommendations

NEW **National recommendations**

1. Set up an urgent referral pathway in early pregnancy for women with high-risk medical conditions or complex social circumstances to ensure they receive early triage for senior or specialist consultation **[ACTION: Maternal Medicine Networks in England and Health Boards in devolved nations]**

2. Discharge summaries for primary care should clearly indicate in an initial summary box the key conditions that require ongoing support or management and a clear plan for postnatal care. Detailed information about medical, mental health and social complexities and ongoing medications, monitoring requirements or safeguarding concerns must be included to facilitate a clear plan for postnatal care **[ACTION: Integrated Care Boards and Health Boards]**

3. Update guidelines on the care of women with complex social factors to include clear guidance for a standardised assessment and documentation of social risk factors at booking appointments and at least once more later in pregnancy. In the absence of sufficient evidence to update guidance, commission research to explore the unique care needs of vulnerable populations **[ACTION: National Institute for Health and Care Excellence (NICE) and National Institute for Health and Care Research (NIHR)]**

4. Develop guidance for information sharing within maternity services and across health services and other agencies in the event of safeguarding concerns. Ensure that codes for flagging domestic abuse are applied in women's records and are known to all those caring for her **[ACTION: National Institute for Health and Care Excellence (NICE)]**

5. Ensure specialist perinatal mental health teams undertake a leadership role for the care of pregnant or recently pregnant women with mental health conditions even if women are not accepted for care under their services. This should include a risk assessment, provision of advice and guidance, oversight for joint care planning and support to ensure rapid onward referral into other appropriate mental health services **[ACTION: Integrated Care Boards and Health Boards]**

2.3 Clinical messages

Clinical messages

1. **'Get ready for pregnancy'** – the period before conception, or between pregnancies, is an ideal time to counsel women about their health and address any physical or mental health conditions or social needs that may require management prior to becoming pregnant. Counselling should include, but is not limited to, optimisation of medications for chronic conditions, advice on weight management or smoking cessation and specialist referral to mental health or addiction services.

2. **'FIGO pregnancy passport'** – There are tools available to help inform women and those caring for them about their future health risks after pregnancy complications. The ***pregnancy passport*** designed by The International Federation of Gynaecology and Obstetrics (FIGO) was created for women with pre-pregnancy or pregnancy-induced risk factors for cardiometabolic diseases. It is designed to be provided to women after childbirth and before discharge from hospital to facilitate screening and management. It includes advice on recommended follow-up checks and information about potential risks on future health, and offers interventions to reduce such risks.

3. **'Need for inquisitiveness'** – When women present with unexplained symptoms or declining physical or mental health it is important to ask why and consider the whole picture. This includes the recognition of symptoms in the context of personal and family history as well as consideration of mental health problems and social risk factors or stressors that may impact health and how women engage with healthcare.

4. **'Recognise decline'** – Deterioration of mental health in pregnancy or the postnatal period can be extremely rapid. It is important to recognise and act on 'red flags' including a significant change in mental state or the emergence of new symptoms, thoughts or acts of violent self-harm, or expressions of incompetency as a mother or estrangement from the infant. These symptoms must not be underestimated and should prompt early review, urgent assessment and intervention.

2.4 Multidisciplinary team training message

Multidisciplinary team training message

1. **'Make every contact count'** - Maternity staff, or other frontline staff in contact with pregnant or recently pregnant women, should be trained to recognise the risks and indicators of domestic abuse including the increased risk in pregnancy and association with childhood adversity, mental health and substance use. Staff should know how to ask relevant questions and create a secure environment to facilitate disclosure of current or past domestic abuse. Training must also include guidance on how to respond to disclosures of domestic abuse in a sensitive manner that ensures people's safety and staff should be aware of local referral pathways for specialist services. Any training provided must be trauma-informed and culturally sensitive in order to recognise the complexities of coercive control including how certain ethnic and social characteristics may impact disclosure (National Institute for Health and Care Excellence 2016).

3. Surveillance and epidemiology

Note that more in-depth analysis is available at:
www.npeu.ox.ac.uk/mbrrace-uk/reports/maternal-reports/maternal-report-2021-2023

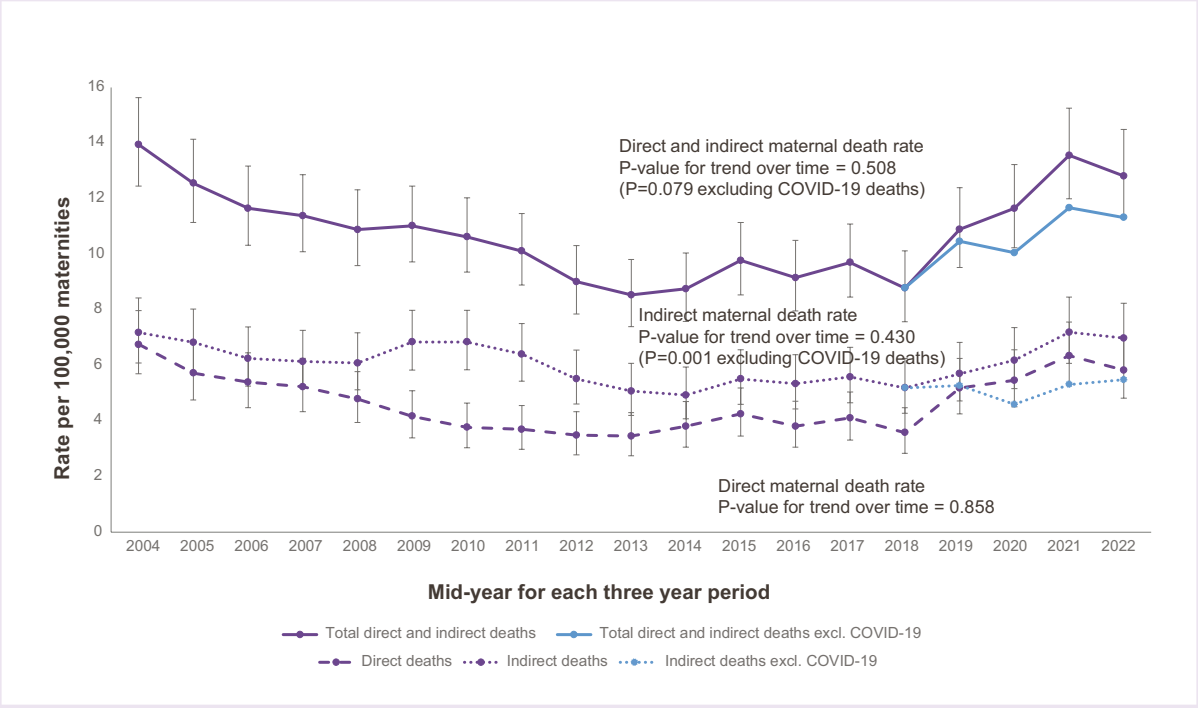
3.1 Causes and trends

Overall, 284 women died in 2021-23 during pregnancy or within 42 days of the end of pregnancy in the UK. The deaths of 27 women were classified as coincidental. Thus, in this triennium, 257 women died from direct and indirect causes, classified using ICD-MM (World Health Organisation 2012), among 2,004,184 maternities, a UK maternal death rate of 12.82 per 100,000 maternities (95% CI 11.30-14.49). This compares to the rate of 13.56 per 100,000 maternities (95% CI 12.00-15.26) in 2020-22 (rate ratio (RR) 0.95, 95% CI 0.79-1.13, p=0.522). Maternal mortality rates for each of the four UK nations were not significantly different from the overall UK rate, noting that these comparisons have very limited statistical power.

There were 24 deaths directly attributed to COVID-19 infection in 2021 and six in 2022-23. If the 30 deaths directly caused by COVID-19 were excluded, the maternal mortality rate for 2021-23 would be 11.33 per 100,000 maternities (95% CI 9.90-12.90). This is not significantly different from the corresponding rates in the three previous triennia that encompass the years of the COVID-19 pandemic.

Figure 1 (***Supplemental Table 2.1***) shows rolling three-yearly maternal death rates since 2003 classified using ICD-MM. As in last year's report, there was no statistically significant change in maternal death rates between 2003-05 and 2021-23 (RR 0.92, 95% CI 0.77-1.09, p=0.508 for trend in rolling rates over time). This was also true when deaths directly due to COVID-19 were excluded (RR 0.81, 95% CI 0.68-0.97, p=0.079 for trend in rolling rates over time). Similarly, between 2003-05 and 2021-23, there were no statistically significant differences in the rate of direct maternal deaths (RR 0.86, 95% CI 0.67-1.10, p=0.858 for trend in rolling rates over time) or indirect maternal deaths (including deaths due to COVID-19) (RR 0.97, 95% CI 0.77-1.23, p=0.430 for trend in rolling rates over time). If the 30 deaths attributable to COVID-19 were excluded, the indirect maternal death rate in 2021-23 would be significantly lower than in 2003-05 (RR 0.76, 95% CI 0.59-0.98, p=0.001 for trend in rolling rates over time).

Figure 1: Three-year rolling average direct and indirect maternal mortality rates per 100,000 maternities, deaths classified using ICD-MM and previous UK classification systems, UK 2003-23



Sources: CMACE, MBRRACE-UK

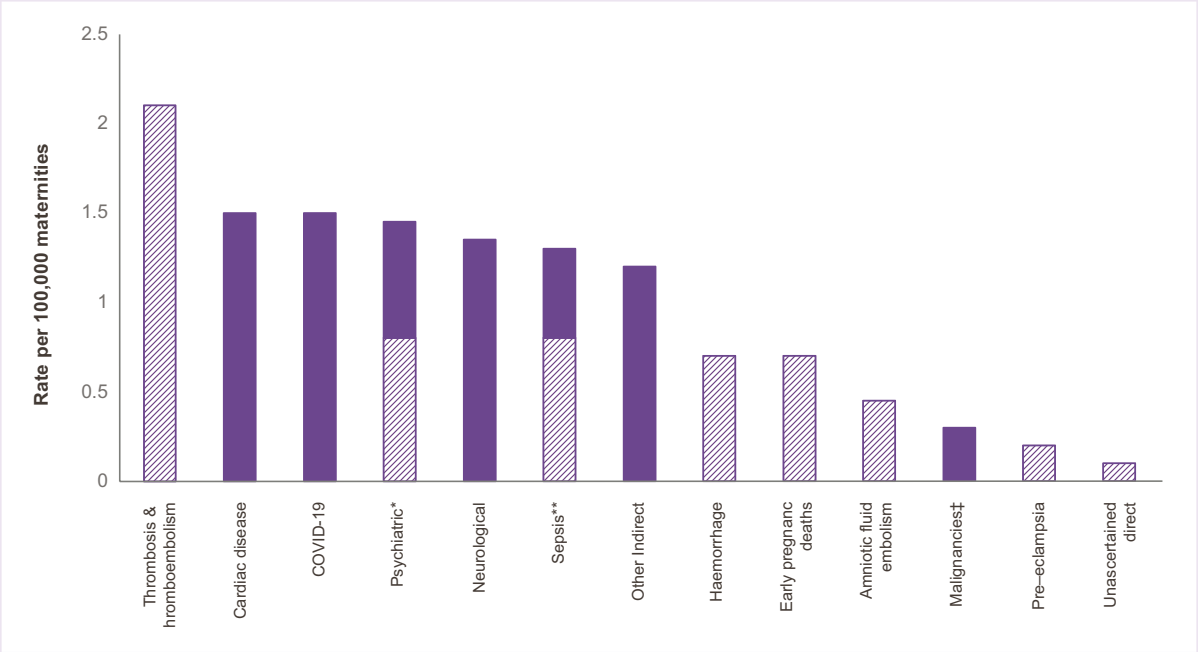
Discrete triennial rates since 2003 are shown in ***Supplemental Table 2.2 and Supplemental Figure 2.2***. As this year's report marks the completion of a new triennium, these figures have been updated and show a sustained increase in maternal mortality since 2012-14. Compared to the last complete triennium, 2018-20, the overall, direct and indirect rates of maternal mortality were higher in 2021-23, but these increases were not statistically significant (RR for overall maternal mortality 1.18, 95% CI 0.98-1.41, p=0.073; RR for direct deaths 1.13, 95% CI 0.86-1.47, p=0.375; RR for indirect deaths 1.22, 95% CI 0.95-1.57, p=0.105). If the nine deaths in 2018-20 and 30 deaths in 2021-23 that were attributable to COVID-19 were excluded, the overall maternal death rate in 2021-23 would remain non-statistically higher than in 2018-20, but the magnitude of this increase would be reduced (RR 1.08, 95% CI 0.89-1.31, p=0.405). There was no difference in the rate of indirect maternal death between 2018-20 and 2021-23 when deaths due to COVID-19 were excluded (RR 1.04, 95% CI 0.79-1.37, p=0.775).

3.1.1 Deaths due to individual causes during pregnancy or up to six weeks after the end of pregnancy

Maternal deaths by cause in 2021-23 are shown in Figure 2 (***Supplemental Figure 2.3 and Supplemental Tables 2.3-2.5***). Figure 3 (***Supplemental Table 2.4***) shows the changes in the rates of death by discrete triennia. In 2021-23, thrombosis and thromboembolism (VTE) continued to be the leading cause of direct deaths occurring during or within 42 days of the end of pregnancy. The mortality rate from VTE remains unchanged from last year's report and was more than twice that of any other direct cause in 2021-23. The rate of maternal deaths due to VTE was 52% higher than it was in 2018-20, the last complete triennium, though this increase is not statistically significant (RR 1.52, 95% CI 0.92-2.53, p=0.083). After thrombosis and thromboembolism, suicide and pregnancy-related sepsis were the next most frequent direct causes of maternal deaths in 2021-23 occurring at equal rates (0.80 per 100,000 maternities (95% CI 0.46-1.30)).

Deaths due to indirect causes comprised just over half (54%) of direct and indirect maternal deaths in the UK in 2021-23. Cardiac disease and COVID-19 were the leading causes of indirect maternal death in 2021-23, each with a maternal mortality rate of 1.50 per 100,000 maternities (95% CI 1.01-2.14). There has been a decrease in the maternal mortality rate from cardiac disease since enhanced case ascertainment was introduced (2003-05) but this is not statistically significant (RR 0.66, 95% CI 0.40-1.06, p=0.072). This suggests that the lessons for the care of women with cardiac disease described in section 4.2 remain imperative for continued reduction in maternal deaths.

Figure 2: Maternal mortality rates by cause per 100,000 maternities, UK 2021-23



Hatched bars show direct causes of death, solid bars indicate indirect causes of death

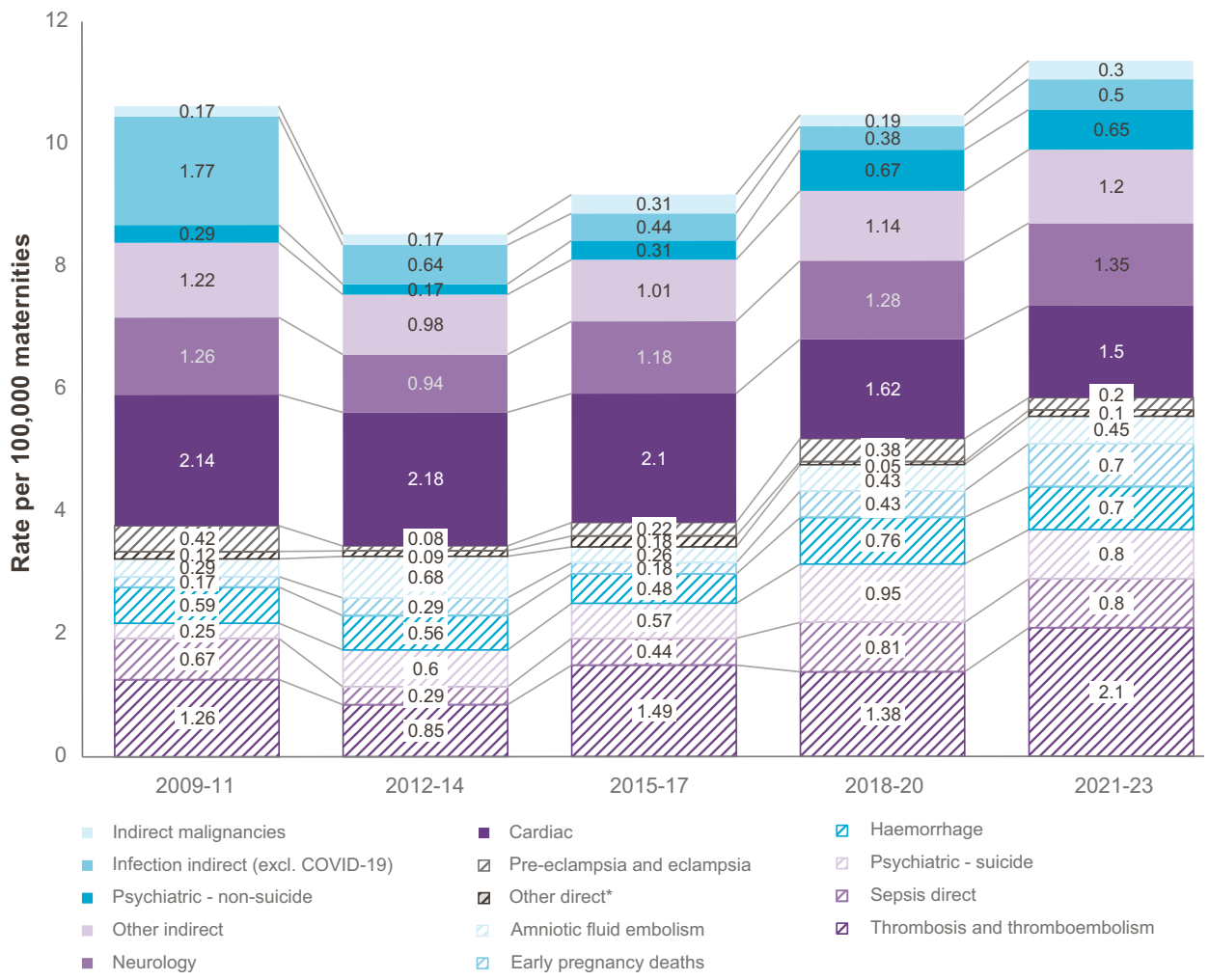
*Rate for suicides (direct) is shown in hatched and rate for indirect psychiatric causes (drugs/alcohol) in solid bar

**Rate for direct sepsis (genital tract sepsis and other pregnancy-related infections) is shown in hatched and rate for indirect sepsis (influenza, pneumonia, others) in solid bar

‡Rate for indirect malignancies (breast/ovary/cervix)

Source: MBRRACE-UK

Figure 3: Maternal mortality rates per 100,000 maternities, by cause and discrete triennia, UK 2009-23



Hatched bars show direct causes of death, solid bars indicate indirect causes of death

*Other direct causes of death include deaths due to anaesthesia, direct malignancy and unascertained direct causes

3.1.2 The women who died between six weeks and one year after the end of pregnancy

Rolling triennial rates of late maternal deaths are shown in Figure 4 and causes of late maternal deaths in Figure 5. In the triennium 2021-23, 327 women died between six weeks and one year after the end of pregnancy, representing a mortality rate of 16.32 per 100,000 maternities (95% CI 14.60-18.18). This compares to a late pregnancy-associated mortality rate of 13.66 per 100,000 maternities in 2009-11, the first MBRRACE-UK confidential enquiry report (RR 1.19, 95% CI 1.02-1.40, p=0.080 for trend in rolling rates over time). The rate of late deaths has been consistently rising across the previous overlapping triennia, and was significantly increased in 2021-23 from 2018-20 (RR 1.19 95% CI 1.01-1.39, p=0.034). Maternal suicides were the leading cause of deaths occurring between six weeks and one year after the end of pregnancy, surpassing deaths due to other psychiatric causes. As a whole, deaths from psychiatric causes accounted for 34% of maternal deaths during this period emphasising the importance of the lessons for psychiatric care illustrated in section 4.4 of this report.

Figure 4: Rates of maternal deaths occurring between six weeks and one year after the end of pregnancy, UK 2009-23

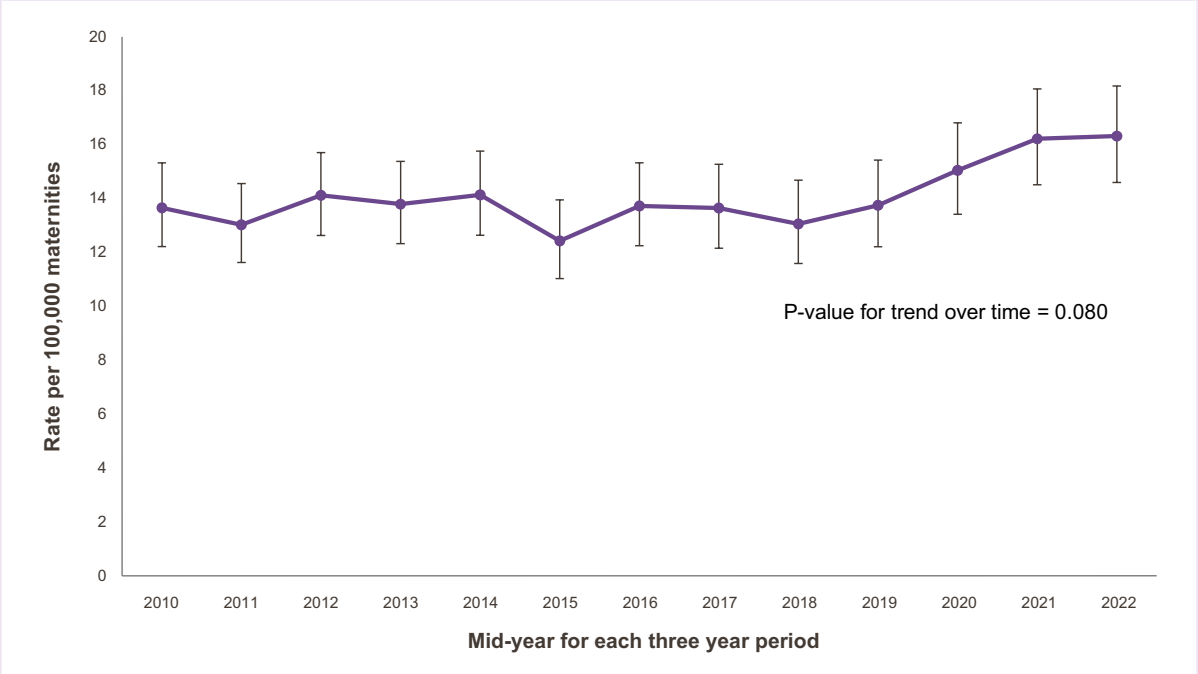
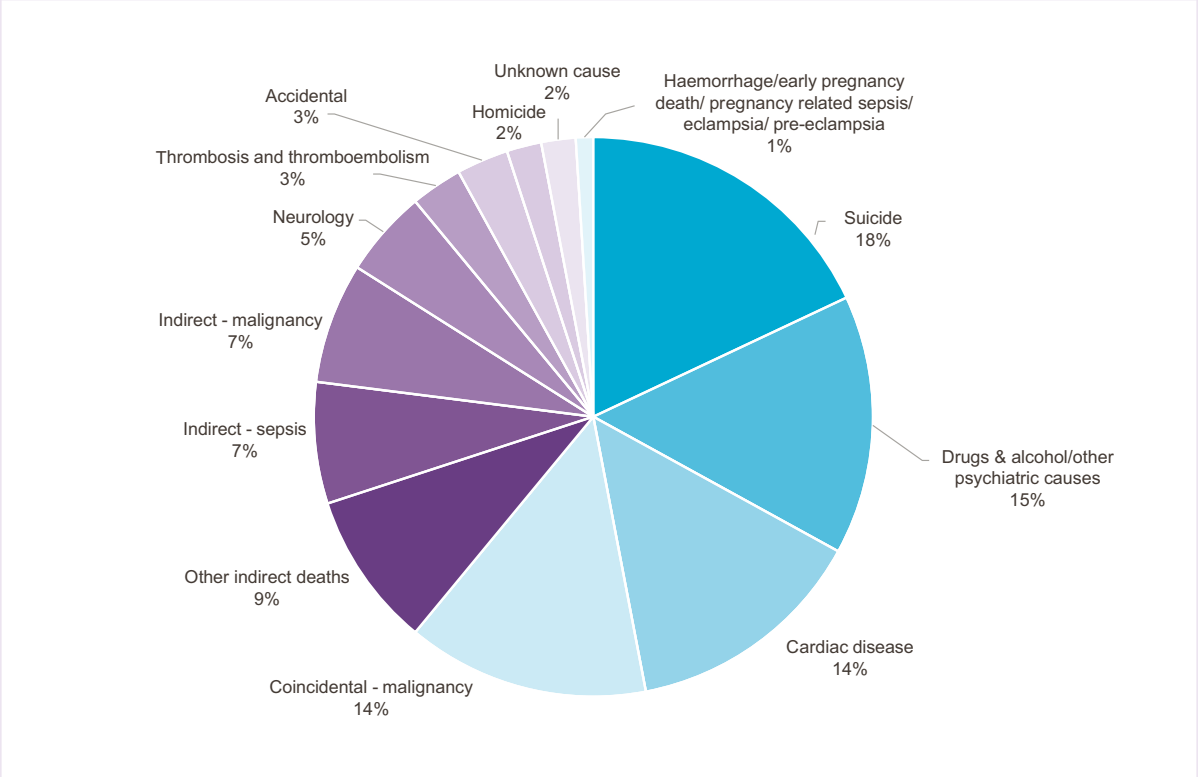


Figure 5: Proportion of maternal deaths by cause, amongst women who died between six weeks and one year after the end of pregnancy, UK 2021-23



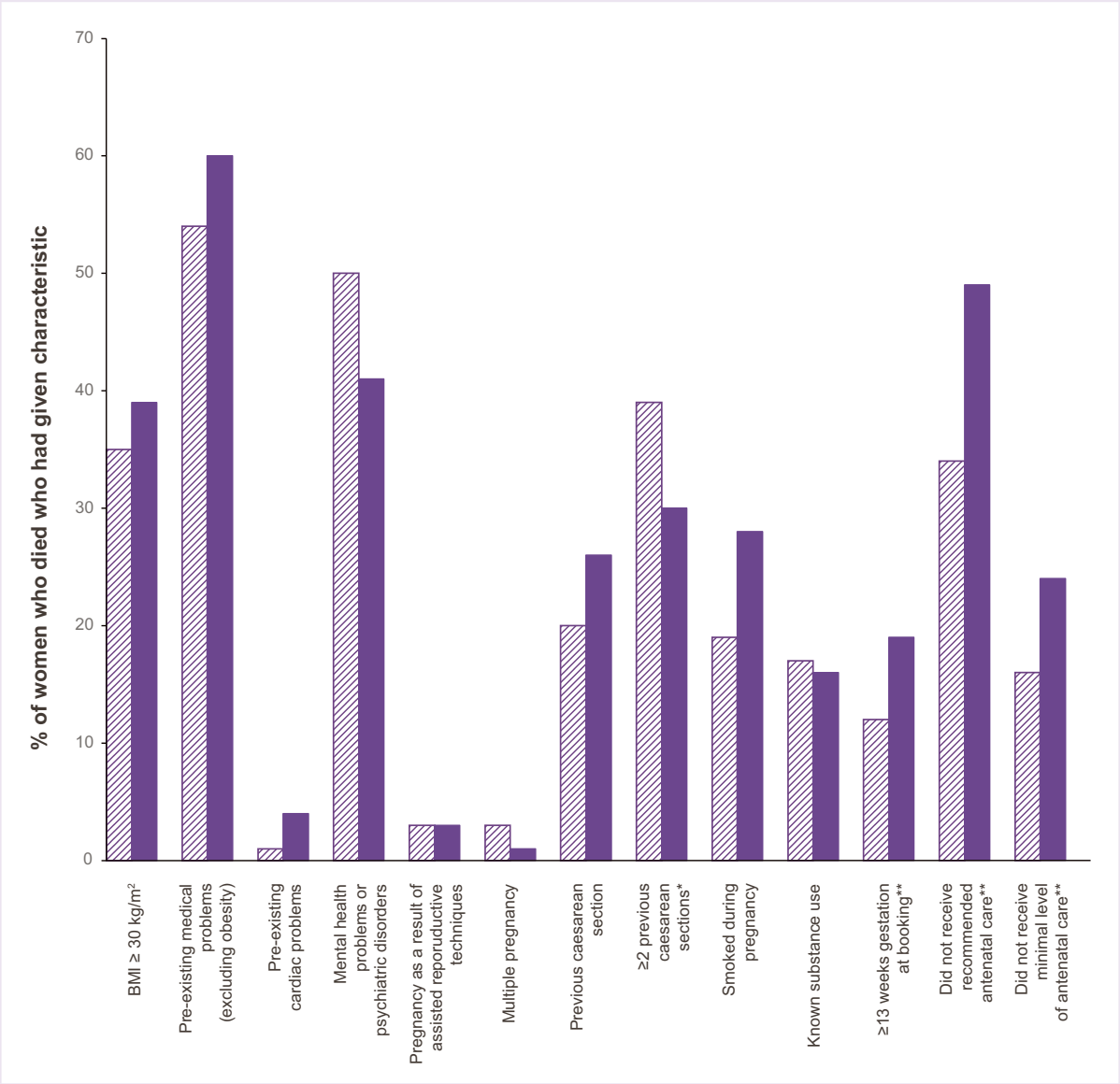
3.2 The characteristics of the women who died 2021-23

Of the 257 women who died from direct and indirect causes during or up to 42 days after the end of their pregnancy in 2021-23, 31% (80 women) were still pregnant at the time of their death. Of these women, 56 (70%) died when they were ≤20 weeks' pregnant (***Supplemental Table 2.7***). The majority of the 145 women who gave birth did so in hospital (81%). A further 9% of women gave birth in an emergency department or an ambulance and 10% at home (***Supplemental Table 2.8***)

3.2.1 Sociodemographic characteristics

The Sociodemographic characteristics of women who died in 2021-23 are shown in Figure 6 (***Supplemental Tables 2.9 and 2.14-2.16***).

Figure 6: Selected characteristics of women who died from direct or indirect causes, UK 2021-23



Hatched bars indicate direct causes of death, solid bars indicate indirect cause of death

*Amongst women who had a previous caesarean birth

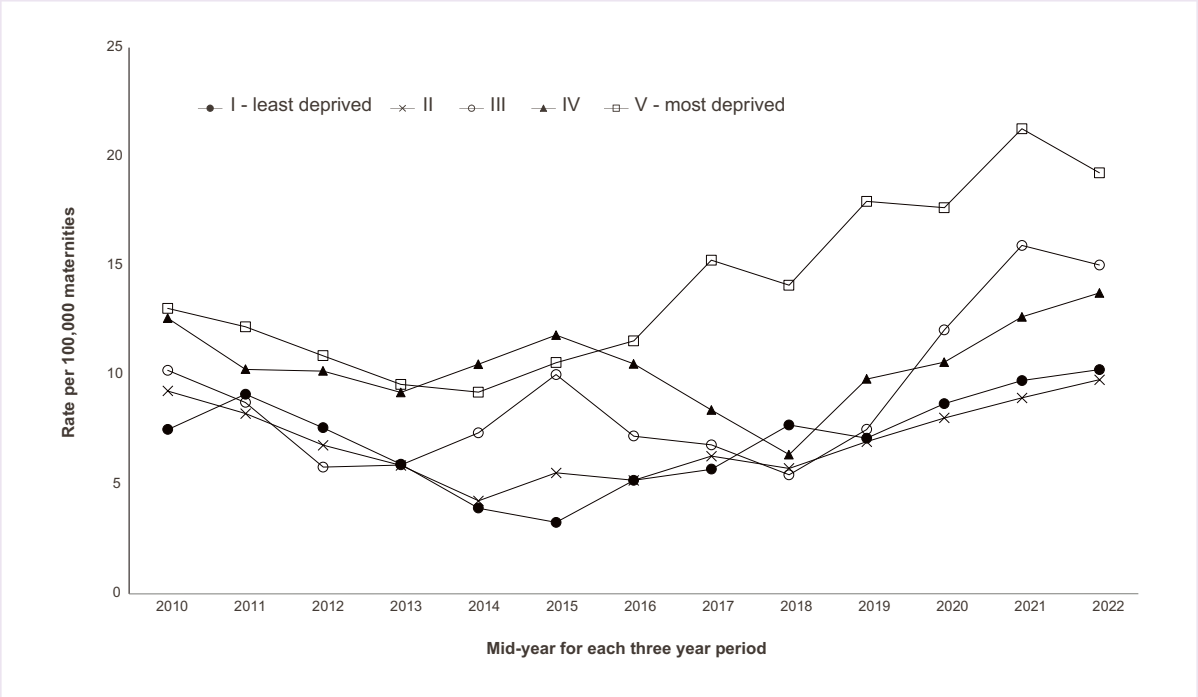
**NICE recommended antenatal care: booked at 10 weeks or less and no antenatal visits missed. Minimum level of care: booked at less than 13 weeks and 3 or fewer antenatal visits missed.

Compared to women aged 25-29, women aged 35 or older had significantly increased rates of maternal death (RR 1.58, 95% CI 1.15-2.19, p=0.003). This was largely driven by a nearly three-fold higher risk of death amongst women aged 40 and over (RR 2.53, 95% CI 1.61-3.92, p<0.001). Women aged 35-39 were also at an increased risk of death compared to women aged 25-29, but this was not statistically significant (RR 1.35, 95% CI 0.95-1.92, p=0.083) (***Supplemental Table 2.12***).

Women living in the most deprived areas of England continued to have the highest maternal mortality rates emphasising the importance of the lessons for the care of these women learned in this year's morbidity confidential enquiry discussed throughout this report. In 2021-23, the mortality rate for women living in the most deprived areas was nearly two times higher than for women living in the least deprived areas (RR 1.88, 95% CI 1.18-3.08, p=0.004). However, as noted in previous reports, there has been an increase in recent years in maternal mortality in women living in all areas, including the least deprived areas (Figure 7 and ***Supplemental Table 2.12***).

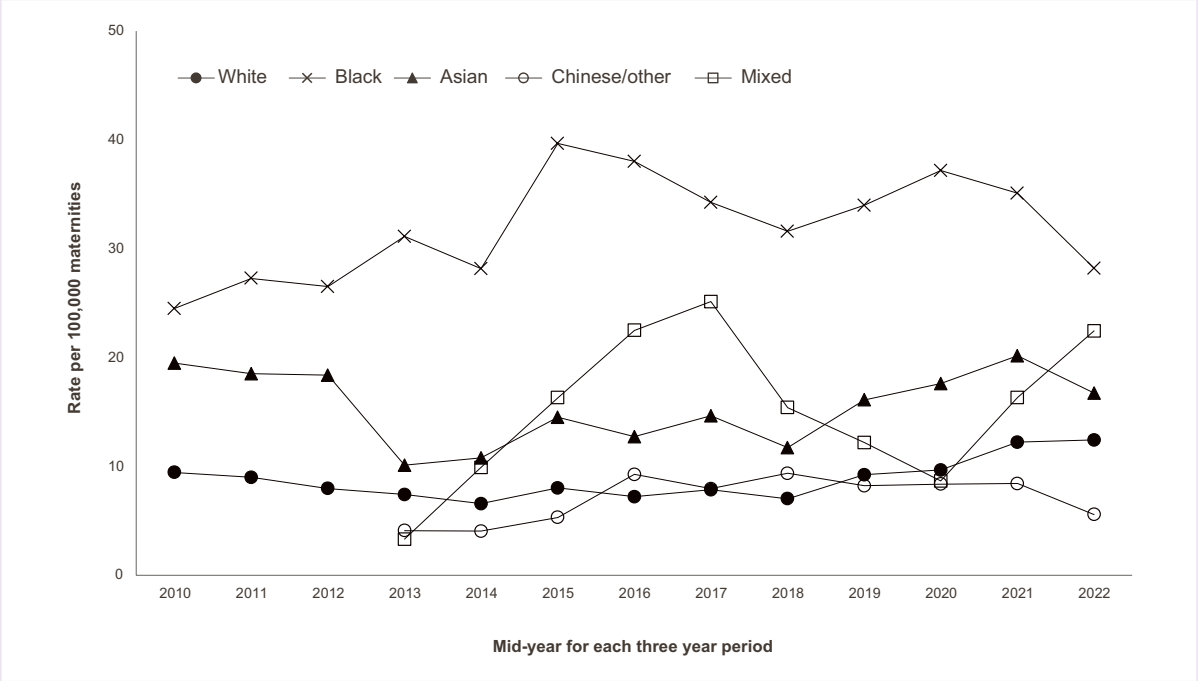
The overall mortality rates among women from different ethnic groups in England are shown in Figure 8 (***Supplemental Table 2.12***) and mortality rates by cause of death for different ethnic groups are shown in Figure 9. While the maternal mortality rate for women from Black ethnic backgrounds continued to decrease in 2021-23, the risk of maternal death for Black women remained more than two-fold higher compared to White women (RR 2.27; 95% CI 1.44-3.45, p<0.001). In 2021-23, the maternal mortality rate for Black women was the lowest it had been since 2013-15 but Black women still died from thrombosis and thromboembolism and cardiac disease at nearly three times the rate of White women (thrombosis and thromboembolism: RR 2.80, 95% CI 0.95-6.86, p=0.040; cardiac disease: RR 2.85, 95% CI 0.70-8.56, p=0.088). After year-on-year increases, the mortality rate for women from Asian backgrounds was also non-significantly lower in 2021-23 compared to the rate in 2020-22, but Asian women continued to have a higher risk of maternal mortality compared to White women, albeit not statistically significantly so (RR 1.35, 95% CI 0.91-1.94, p=0.113). In 2021-23, Asian women died from COVID-19 at rates that were more than four times higher that of White women (RR 4.43, 95% CI 1.82-10.50, p<0.001). Maternal mortality rates amongst women from Mixed ethnic backgrounds continued to increase in 2021-23 and were almost two-fold higher compared to White women (RR 1.80, 95% CI 0.81-3.52, p=0.106), noting that low numbers of women from Mixed ethnic backgrounds mean that this rate is subject to high levels of random variation.

Figure 7: Maternal mortality rates per 100,000 maternities according to women's area of residence, England* 2009-23



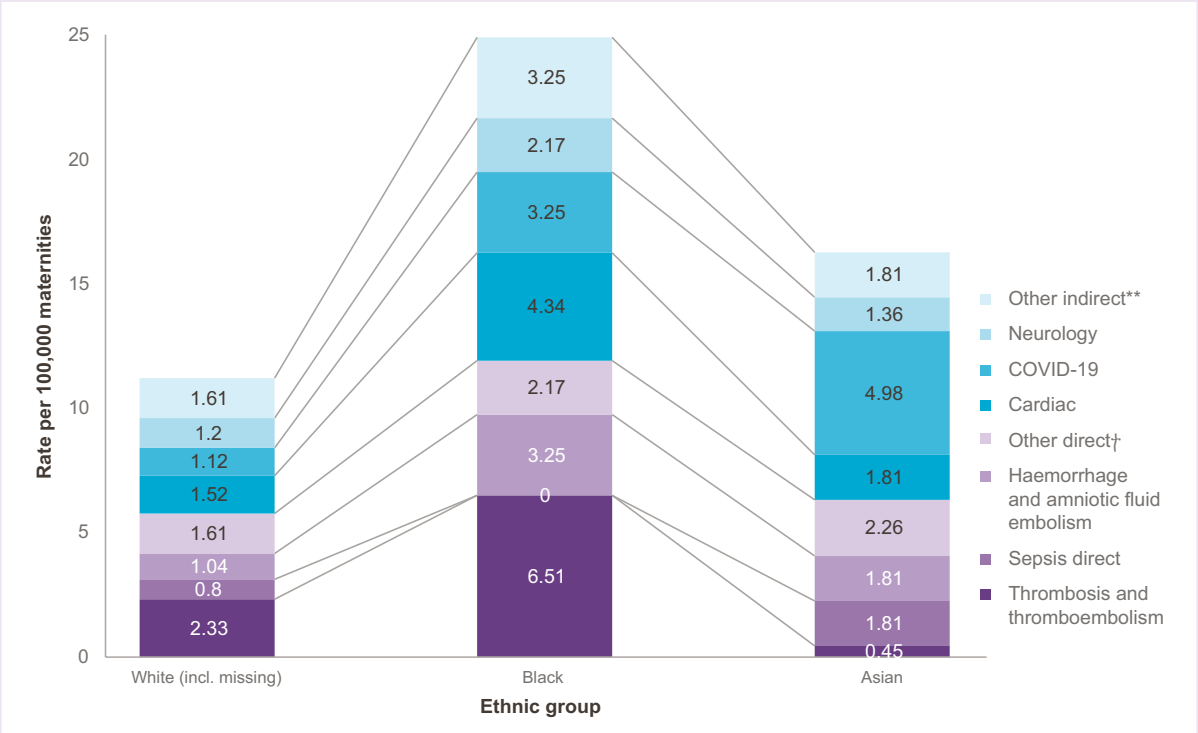
*Data for England only due to availability of denominator data

Figure 8: Maternal mortality rates per 100,000 maternities amongst women from different ethnic groups, England* 2009-23



*Data for England only due to availability of denominator data

Figure 9: Maternal mortality rates per 100,000 maternities, by select causes of death and ethnic group, England* 2021-23



*Data for England only due to availability of denominator data

**Other indirect causes of death including general medical and surgical conditions, indirect malignancy, indirect sepsis (excluding COVID-19) and indirect psychiatric causes (drugs/alcohol/other)

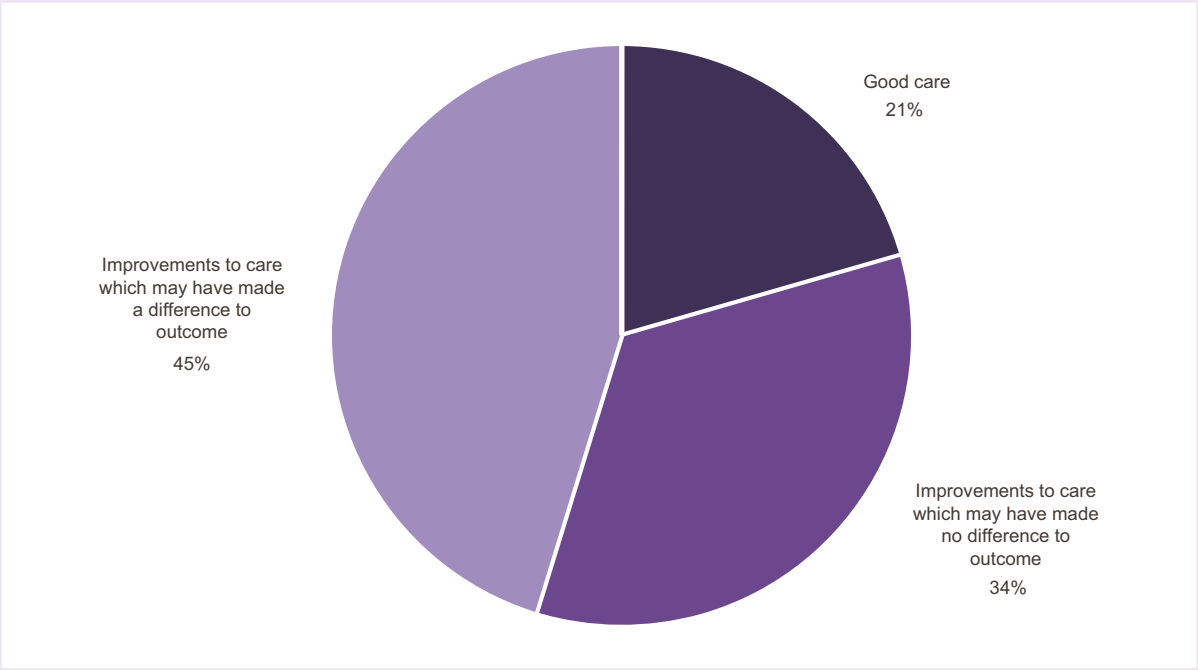
†Other direct causes of death including early pregnancy deaths, pre-eclampsia and eclampsia, suicide and unascertained direct causes

It has been increasingly noted in these enquiries that women at severe disadvantage appear to be over-represented amongst the women who die. Twenty-two percent of the women who died were subject to domestic abuse either prior to or during pregnancy. This proportion has been continually increasing since MBRRACE-UK reporting began and, in 2021-23, was nearly four times higher than its nadir in 2012-2014. In addition, 7% of the women who died had a history of abuse as a child, 21% were known to social services, 17% had known substance use and 46% had mental health problems. In total, for the 257 women who died during pregnancy or up to six weeks after pregnancy from direct or indirect causes in 2021-23, 35 (14%) were considered to have multiple disadvantages on the basis of the data available. These figures underscore the importance of the lessons for care outlined for women with multiple disadvantages in section 4.3.

3.2.2 Classification of quality of care for women who are included in the confidential enquiries

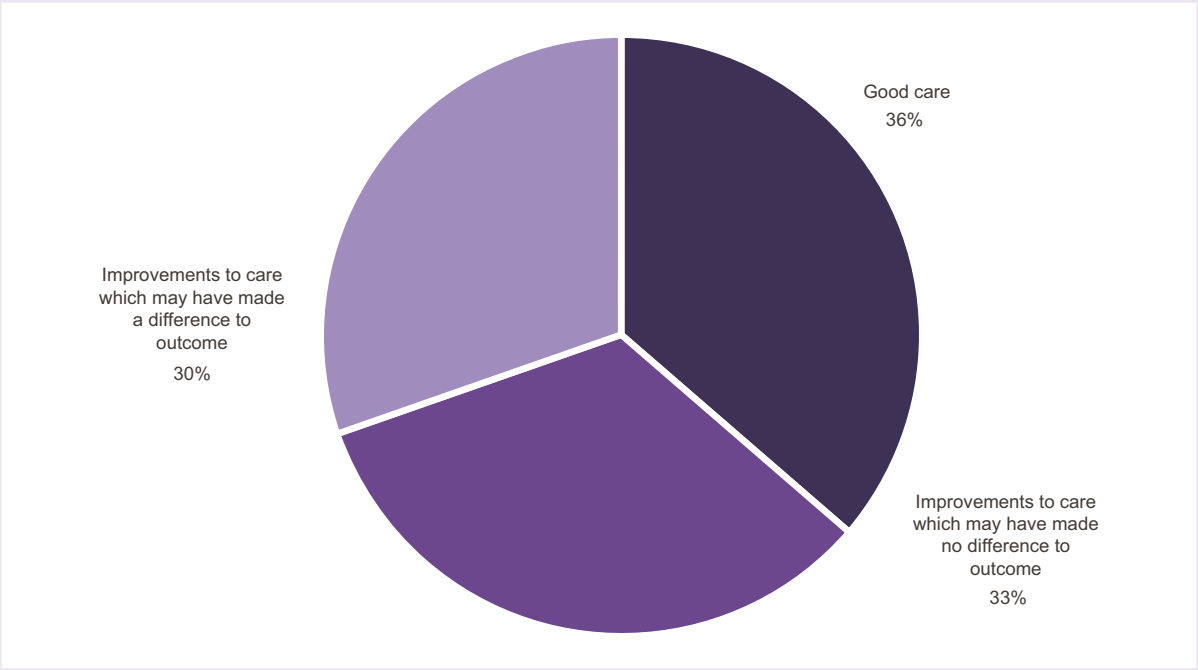
This section includes information on women who died between 2021-23 and who are included in this year's confidential enquiry reports (including women who died between six weeks and a year after the end of pregnancy and women from the Republic of Ireland). Figure 10 (***Supplemental Table 2.17***) shows the classification of care as agreed by the assessors for 263 of the women who died and Figure 11 (***Supplemental Table 2.17***) shows the classification of care for the 33 women who were included in the morbidity confidential enquiry. Only the women whose case notes were available with sufficient information for an in-depth review are included.

Figure 10: Classification of care received by women who died and who are included in the confidential enquiry chapters*, UK and Ireland 2021-23 (n=263)



*Includes only women whose case notes were available with sufficient information for an in-depth review

Figure 11: Classification of care received by the women who are included in the morbidity confidential enquiry into the care of women with deprivation, UK 2023 (n=33)



4. Confidential enquiries into maternal deaths

4.1 Hypertensive disorders

4.1.1 The women who died

In 2021-23, six women died from hypertensive disorders of pregnancy in the UK and Ireland. Five women died during pregnancy or up to six weeks after pregnancy and one died between six weeks and one year after the end of pregnancy. The mortality rate due to hypertensive disorders in 2021-23 (0.28 per 100,000 maternities, 95% CI 0.10-0.60) was not statistically significantly different to 2018-20 (RR 0.79, 95% CI 0.22-2.58), and remained nearly four times higher than its nadir in 2012-14 (RR 3.52, 95% CI 0.63-35.63, p=0.197).

Of the six women who died in 2021-23, half were aged 35 or older and the majority (n=5) were either overweight or obese. Half of the women were in their first pregnancy and the remaining half had chronic hypertension or previous pre-eclampsia. Half of the women were White, two thirds of the women were born outside the UK or Ireland and almost all lived in the most deprived areas (IMD IV or V, 80%). None of the women who died had a multiple pregnancy or a pregnancy as a result of an assisted reproductive technology.

Notes for all six women were available for review and assessors felt that different care may have made a difference to the outcome for five of the women who died (83%).

4.1.2 Overview of care and new lessons to be learned

Pre-pregnancy counselling and urgent referral of high-risk women

An older White woman had both a family and personal history of essential hypertension and had developed pre-eclampsia in her previous pregnancy. She stopped her antihypertensive medications when she became pregnant. At booking her blood pressure (BP) was elevated and she was started on aspirin but no other action was taken. She was booked for consultant-led care and was seen at a consultant clinic five weeks later in the second trimester. Her BP remained elevated but there was no review of her history or medications. In her third trimester she was admitted to hospital with elevated BP. After a caesarean birth at term, she was reviewed by a resident doctor and was discharged without labetalol or a clear plan to manage her hypertension postnatally. Her BP continued to be poorly controlled and two weeks after giving birth she died from an intracranial haemorrhage.

Half of the women who died from hypertensive disorders in 2021-23 had pre-existing hypertension and were on antihypertensive medications prior to becoming pregnant. However, as for this woman and many others in this and past years' reports (Knight, Bunch et al. 2022, Knight, Bunch et al. 2023), there was little evidence of pre-pregnancy counselling amongst the high-risk women who died. As a result, some women's blood pressure (BP) was not controlled prior to pregnancy and others, including this woman, did not seem to be aware of the risks of becoming pregnant or of stopping or changing medication without proper management and monitoring. Guidelines from the National Institute for Health and Care Excellence (NICE) recommend that women with chronic hypertension are referred to a specialist in hypertensive disorders of pregnancy prior to becoming pregnant in order to discuss antihypertensive treatments (National Institute for Health and Care Excellence 2023). It is essential to discuss the importance of medication adherence and to adjust medications to pregnancy-suitable alternatives before pregnancy in order to optimise their use.

Clinical message

'Get ready for pregnancy' – the period before conception, or between pregnancies, is an ideal time to counsel women about their health and address any physical or mental health conditions or social needs that may require management prior to becoming pregnant. Counselling should include, but is not limited to, optimisation of medications for chronic conditions, advice on weight management or smoking cessation and specialist referral to mental health or addiction services.

Given the high-risk nature of this woman's pregnancy, she was appropriately prescribed aspirin and referred for consultant-led care. However, she was not reviewed by a consultant until five weeks later. At this visit, there was no documented review of her hypertensive history or medications despite an elevated BP. As a result, she did not receive any hypertensive management until she was admitted to hospital in her third trimester. As highlighted in last year's enquiry into the care of women who died from thrombosis and thromboembolism (Felker, Patel et al. 2024), women with complex, high-risk conditions should be urgently referred and appropriately managed early in pregnancy. Assessors stressed the importance of senior consultation or specialist care as soon as possible without delays. This may necessitate very rapid referral, either before or after seeing a midwife for a booking appointment, in order to enable review by obstetrics, obstetric medicine or other specialists.

NEW **National recommendation**

Set up an urgent referral pathway in early pregnancy for women with high-risk medical conditions or complex social circumstances to ensure they receive early triage for senior or specialist consultation.

Hospital discharge and transfer to primary care

The woman described above had a significantly elevated BP after giving birth, but she was not reviewed by a senior doctor prior to her discharge from hospital. Assessors noted that it is commonly resident doctors who complete discharge summaries and considered that some women would benefit from more senior decision-making and input. When women with gestational hypertension are transferred to community care after birth, NICE recommends developing a care plan that includes the indication for referral, who is responsible for ongoing care, the frequency of BP monitoring, and thresholds for reducing or stopping treatment (National Institute for Health and Care Excellence 2023). There was clear evidence from the reviews of women with hypertension, including those with cardiac disorders, that discharge summaries for GPs and other communications with primary or community care could be improved. As for the woman above, there was often no guidance provided to GPs concerning ongoing medication requirements or BP targets. Frequently, discharge summaries also did not include clear instructions or a detailed plan for postnatal care, including a time frame and whose responsibility it was to monitor the woman's hypertension and escalate concerns if needed. GP assessors emphasised that key information for action needs to be in a summary box at the beginning of the discharge letter.

Similar improvements in the format and content of discharge summaries were noted for the care of women with complex social care needs and mental health conditions reviewed in section 4.3 and 4.4 of this report. It is essential that complex conditions requiring ongoing management, including medical or mental health conditions or social vulnerabilities, are known about by GPs, community midwives and other services that have contact with women in the postnatal period. This information should be clearly and succinctly documented in discharge summaries and include an actionable plan with details on medications or safeguarding so that women continue to receive the care they need after the end of pregnancy.

NEW **National recommendation**

Discharge summaries for primary care should clearly indicate in an initial summary box the key conditions that require ongoing support or management and a clear plan for postnatal care. Detailed information about medical, mental health and social complexities and ongoing medications, monitoring requirements or safeguarding concerns must be included to facilitate a clear plan for postnatal care.

Good care

A primiparous woman with a significant medical history including stage 4 kidney disease and malignant hypertension had received comprehensive counselling pre-pregnancy. Once pregnant, she was rapidly referred to a specialist multidisciplinary team that included a nephrologist and obstetrician. She had several admissions for hypertension control in early pregnancy and her blood pressure (BP) medications were adjusted as needed. Late in her second trimester, she was transferred to a tertiary unit with reduced fetal movements, severe hypertension and proteinuria. She was diagnosed with pre-eclampsia superimposed on chronic hypertension. She received multidisciplinary input for her BP and worsening renal function but an intrauterine death was confirmed the day after admission. Postnatally, her hypertension was managed by a renal specialist. M

Similar to the woman above, this woman, identified as part of this year's morbidity enquiry into the care of women from deprived areas, had a very high-risk pregnancy complicated by pre-eclampsia. However, unlike the first woman, she had extensive pre-pregnancy counselling about the risks of becoming pregnant and was counselled again in the first trimester at which point she decided to continue her pregnancy. She had an urgent referral for multidisciplinary, consultant-led care and had her medications reviewed and adjusted in early pregnancy in response to continued, uncontrolled hypertension. Despite multidisciplinary input she had an intrauterine death for which she received appropriate bereavement care. After giving birth, she had further instances of elevated BP that were managed by her renal team.

4.1.3 Recurring lessons to be learned

Assessors noted that there was evidence of good care in the provision of aspirin to high-risk women; all the women with pre-existing hypertension or a history of pre-eclampsia were appropriately prescribed low dose aspirin early in pregnancy as is recommended (National Institute for Health and Care Excellence 2023). However, they also observed that many of the women with hypertension were monitored inconsistently and, in some instances, managed inappropriately during the antepartum and intrapartum periods. This included not performing regular BP measurements as is recommended by NICE at all routine antenatal appointments (National Institute for Health and Care Excellence 2021). There was also evidence of inconsistency in the response to elevated BP readings during pregnancy. Medications were sometimes not prescribed or adjusted in response to consistently elevated BP and it was sometimes felt by assessors that these elevated readings were accepted as a new baseline for women.

Measure and record the woman's blood pressure at every routine face-to-face antenatal appointment using a device validated for use in pregnancy, and following the recommendations on measuring blood pressure in the NICE guideline on hypertension in adults.

NICE NG201: Antenatal care (National Institute for Health and Care Excellence 2021)

In addition to inconsistent BP monitoring and urinalysis, no woman who had hypertension during pregnancy had placental growth factor (PLGF) testing, even when pre-eclampsia was suspected. Assessors emphasised the importance of routine urinalysis and PLGF testing in all women with hypertension during pregnancy, but especially for those with chronic hypertension. Pre-eclampsia can be difficult to diagnosis in the context of chronic hypertension; urinalysis and PLGF testing can help confirm or rule out pre-eclampsia and guide future management including the use of magnesium sulphate ($MgSO_4$).

Offer placental growth factor (PLGF)-based testing to help rule out pre-eclampsia in women presenting with suspected pre-eclampsia (for example, with gestational hypertension) between 20 weeks and 36 weeks and 6 days of pregnancy.

NICE NG133: Hypertension in pregnancy: diagnosis and management (National Institute for Health and Care Excellence 2023)

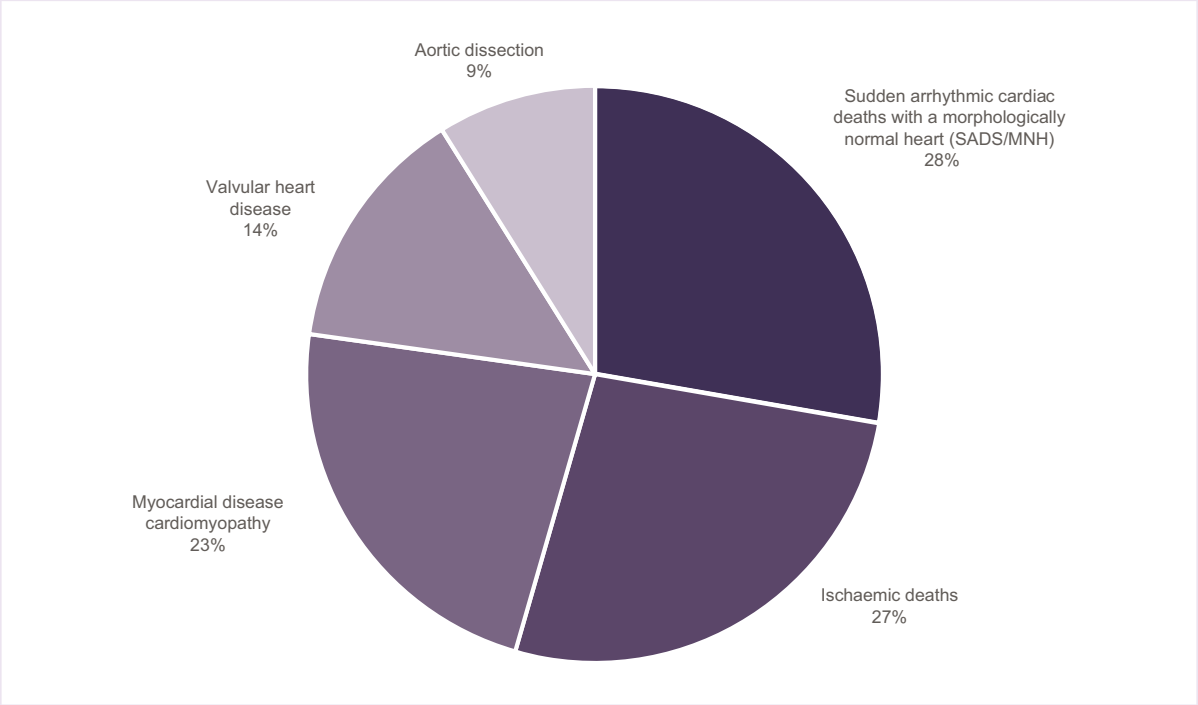
4.2 Lessons on cardiovascular care

4.2.1 The women who died

Overall, 79 women in the UK and Ireland died from heart disease associated with, or aggravated by, pregnancy in 2021-23 (3.64 per 100,000 maternities, 95% CI 2.88-4.54). Of these women, 30 died in the UK during or up to six weeks after pregnancy, a maternal mortality rate of 1.50 per 100,000 maternities (95% CI 1.01-2.14). This rate is non-statistically significantly lower than comparable rates in previous years' reports.

The causes of cardiovascular deaths are shown in Figure 12 (***Supplemental Table 4.2***). Compared to the last two triennia, there was a shift in the leading causes of cardiovascular deaths in 2021-23. While deaths due to myocardial disease remained relatively consistent, there was a statistically non-significant increase in the rate of maternal deaths from ischaemic heart disease in 2021-23 compared to 2018-20 (RR 1.69, 95% CI 0.80-3.80, p=0.1445). Maternal mortality rates due to sudden arrhythmic cardiac death syndrome (SADS) were two-fold higher in 2021-23 compared to 2018-20 (RR 1.94, 95% CI 0.90-4.42, p=0.071). There were no deaths due to congenital heart disease or pulmonary arterial hypertension in 2021-23.

Figure 12: Proportion of cardiovascular deaths by cause, UK and Ireland 2021-23



Only 11% of the women who died from cardiovascular causes were known to have pre-existing cardiac problems, though most women had significant risk factors for cardiac disease. Twenty-seven percent of the women who died were overweight (n=21) and a further 37% were obese (n=29); approximately a third of the women who were classified as obese had a BMI greater than 40 kg/m^2. More than half of the women (56%) had known pre-existing health conditions not including obesity and 34% were known to smoke. Maternal mortality rates from cardiovascular disease generally increased with age. In 2021-23, women aged 35-39 were at a two times higher risk of death and women aged 40 or over were at a three times higher risk of death from cardiovascular disease compared to women aged 25-29. Women living in the most deprived areas of England had a two-fold higher mortality rate from cardiovascular causes compared to women living in the least deprived areas.

There was sufficient information to assess the care of all 79 women who died from cardiovascular disease. Of these women, opportunities to improve care were identified for almost all (86%). Assessors felt that different care was unlikely to change the outcome for 38 women (48%) but may have made a difference to the outcome for 30 of the women who died (38%).

4.2.2 Overview of care and new lessons to be learned

Appreciation and management of individual risk

A multiparous woman in her 40s died a week after giving birth. She had a strong family history of cardiac disease, multiple adversity and cardiac risk factors including a diagnosis of coronary artery disease with angina, obesity and smoking. She was not seen by a cardiologist until 32 weeks' gestation. At this visit she reported feeling fatigued with longstanding chest pain and shortness of breath. Her atypical symptoms were documented but a recent electrocardiogram and echocardiogram were reported as normal and no plans were put in place for intrapartum care. Three days after giving birth, she was noted to be hypertensive. At discharge the following day, her hypertension was not noted and the community midwife who visited a day later was not aware of her complex history. Maternal observations were not carried out. She collapsed at home the next day and could not be resuscitated. A post-mortem confirmed coronary artery thrombosis.

The care of this woman echoes many of the themes discussed in the previous section (4.1) on the management of women with hypertensive disorders including the need for pre-pregnancy counselling and getting 'ready for pregnancy'. Of all the women who died from cardiac disease in 2021-23, 29% had at least three previous pregnancies and assessors felt there were missed opportunities for interpregnancy counselling. This included discussions around medication adherence and optimisation as mentioned in section 4.1, and interventions to address modifiable risk factors such as obesity and smoking, which may help improve overall cardiometabolic health.

Although this woman's care included multidisciplinary discussion with an obstetric cardiologist, as is recommended (National Institute for Health and Care Excellence 2019), this consultation was delayed to the third trimester. As highlighted in the new recommendation in section 4.1, high-risk women should have urgent referral for senior, specialist review as soon as possible in pregnancy. Assessors felt that this woman would have benefited from being under the care of the local maternal medicine team who would have been able to coordinate and plan her care during and after pregnancy.

At discharge this woman did not have senior obstetric review or a clear postnatal plan to manage her ongoing hypertension. Information was not shared with the community team regarding her family, medical and obstetric history. As a result, her risks were not appreciated and observations were not carried out when she reported feeling well. Women need to be made aware of their individual risks and be empowered to discuss their health with all those caring for them, regardless of the location.

Clinical message

'FIGO pregnancy passport' – There are tools available to help inform women and those caring for them about their future health risks after pregnancy complications. The ***pregnancy passport*** designed by The International Federation of Gynaecology and Obstetrics (FIGO) was created for women with pre-pregnancy or pregnancy-induced risk factors for cardiometabolic diseases. It is designed to be provided to women after childbirth and before discharge from hospital to facilitate screening and management. It includes advice on recommended follow-up checks and information about potential risks on future health, and offers interventions to reduce such risks.

This woman had established coronary artery disease, which is known to increase the risk of adverse events during and after pregnancy. When she presented with chest pain, she appropriately underwent an electrocardiogram (ECG) and echocardiography but there was no documented measurement of troponin levels, which is recommended for pregnant women with chest pain, especially in the context of coronary artery disease (Regitz-Zagrosek, Roos-Hesselink et al. 2018). Instead, her atypical symptoms were dismissed and no precautions were made including earlier management of ongoing anaemia, which may have helped reduce strain on her heart.

Recognition of symptoms

A young woman had significant mental health issues and social complexities. During pregnancy she faced numerous stressors. In light of her history, she received significant multi-agency support from social and mental health services. During pregnancy, she had multiple presentations outside of antenatal care including ten in the last trimester for reduced fetal movements, dizziness, itchiness, visual disturbances, abdominal pain, palpitations and shortness of breath. She was also increasingly anaemic and persistently tachycardic with low B12 and folate. Less than a month after birth she presented to the emergency department with sepsis and remained unwell after initial treatment. Further investigations resulted in a diagnosis of cardiomyopathy. Her cardiac function deteriorated and she died five months postpartum.

While the support that this woman received for her mental health and social vulnerabilities was commendable, assessors felt that these concerns may have dominated her care and overrode any assessment of physical symptoms. There was extensive documentation about her mental health and social risks within her medical records, but assessors noted that, despite her multiple attendances to the emergency department, there were no Maternity Early Warning Score (MEWS) charts to review and very few recorded observations. For instance, her BP and respiratory rate were seldom mentioned despite a persistent tachycardia. As noted in previous MBRRACE-UK reports, persistent tachycardia is a 'red flag' symptom that requires thorough investigation, particularly when there is associated chest pain or breathlessness (Knight, Nair et al. 2016, Knight, Bunch et al. 2019). This woman's tachycardia was attributed to her anaemia after a normal ECG without further investigation of the cause or efforts to better treat her severe anaemia, which persisted despite oral iron supplementation. There was evidence of similar dismissal of 'red flag' or repeat symptoms amongst most of the women reviewed. In several instances, assessors felt that the acceptance of abnormal symptoms or test results as normal may have prevented earlier recognition of underlying cardiac problems.

Assessors also noted that this woman's B12 and folate levels were low in the third trimester and continued to decrease postnatally. Folate was prescribed, but there was no consideration of her B12 levels. Low B12 can imply a dietary deficiency and assessors felt that malnourishment should have been considered. She had clear evidence of self-neglect related to her mental health problems and had many symptoms of malnutrition, including severe anaemia that did not respond to oral iron supplementation, significant lymphopenia and a low BMI with further weight loss after pregnancy. Many of the women's atypical symptoms including itchiness, dizziness and visual disturbances could also be attributed to malnourishment. Malnourishment can put a strain on the heart and can be a cause of cardiomyopathy, which assessors felt should have been considered as contributory to her death.

Clinical message

'Need for inquisitiveness' – When women present with unexplained symptoms or declining physical or mental health it is important to ask why and consider the whole picture. This includes the recognition of symptoms in the context of personal and family history as well as consideration of mental health problems and social risk factors or stressors that may impact health and how women engage with healthcare.

Physical and mental health comorbidities

Nearly 40% of the women who died from cardiac disease, including the woman described above, had known mental health problems. Assessors felt that, for some women, the physical pathology they were experiencing was wrongly attributed to mental health conditions without further investigation or curiosity about the underlying cause. For instance, one woman's increased respiratory rate and low oxygen saturation were attributed to a panic attack when they were actually signs of significant deterioration, which led to cardiac arrest. For other women, assessors observed that their mental health may have affected their physical health. Eating disorders, which were noted amongst several women who died from SADS, are associated with cardiac abnormalities (Sachs, Harnke et al. 2016) and a greater incidence of cardiovascular disease (Tith, Paradis et al. 2020). Also, a high proportion of women who died from valvular heart disease (36%) were known to use substances and, in some instances, intravenous drug use was thought to be the cause of infective endocarditis. The lessons learned from the care of women who died from psychiatric causes, including substance use, are discussed in section 4.4 of this report.

4.2.3 Recurring lessons to be learned

As illustrated in the first vignette above and emphasised in past reports, risk assessment is essential for early diagnosis and management of cardiac disease, especially within a maternity population where heart disease is often overlooked due to relatively young age. Assessors questioned whether there is adequate, dedicated risk screening for cardiac conditions at booking. This includes taking a cardiac obstetric history, as previous pre-eclampsia is an independent risk factor for future heart failure, coronary heart disease and stroke (Wu, Haththotuwa et al. 2017). Of the women who died from ischaemic heart disease, 19% had a history of hypertensive disorders of pregnancy and all had known risk factors including older maternal age, smoking, obesity, diabetes or a family history of cardiovascular disease. In addition, four (20%) of the women who died from ischaemic heart disease were from South Asian ethnic backgrounds; South Asian women are known to have an increased risk of cardiovascular disease compared to White women (Scottish Intercollegiate Guidelines Network 2017). Cannabis use was also noted amongst several of the women who died from ischaemic heart disease. While more evidence is required, emerging research suggests an association between cannabis use and an increased risk of premature cardiovascular disease (Jeffers, Glantz et al. 2024) further emphasising the need to complete a comprehensive risk assessment at booking.

Women who are older, obese, smoke or have diabetes or a family history may be at greater risk of heart disease (Knight, Bunch et al. 2019)

The recommendation to 'Think Aorta' has been repeatedly stated in MBRRACE-UK reports. Many of the women who died from aortic dissection presented with typical symptoms including severe chest pain radiating to the back, jaw, neck or shoulder, shortness of breath, dizziness and blurred vision. However, these symptoms were often attributed to other causes including gastritis, migraines, stress and labour. Only one of the women who died had a definitive diagnosis of aortic dissection at the time she presented with symptoms. She had previously had an aortic dissection and was one of two women who died who was known to have Marfan syndrome, which is associated with a high risk of aortic dissection in pregnancy (Regitz-Zagrosek, Roos-Hesselink et al. 2018). Notably, four (57%) of the women who died from aortic dissection had a family history of sudden death due to aortic dissection or cardiac disease. Consideration of the family history is important as it can indicate the possibility of a heritable aortopathy or other clinically relevant cardiac gene mutation.

A family history of sudden death of a young relative (aged less than 40) is important and may be an indication of inherited cardiac conditions (Knight, Bunch et al. 2019)

Two of the women who died from aortic dissection had a mutation in the *MYH11* gene, which is associated with an increased risk of familial thoracic aortic dissection (Takeda, Morita et al. 2015). For one of the women who died, this mutation was identified prior to her death but did not appear to be known to all those involved in her care. Pathology assessors re-emphasised the importance of retaining splenic samples from women who die from aortic dissections for potential genetic testing. In young women, an inherited aortopathy should be assumed as the underlying diagnosis until proven otherwise and, unless a non-heritable cause is identified, the family should be referred for consideration of genetic screening (Knight, Nair et al. 2016, Knight, Bunch et al. 2022). Tissue should also be retained from women who died from SADS for potential family screening as some genetic syndromes, such as inherited long QT syndrome, are known to underlie SADS.

Genetic counselling should state for women known to be carriers of any inherited condition, whether the associated genetic mutation is known or unknown, and whether they need a cardiovascular risk assessment in pregnancy. Anyone with a family history or genetic confirmation of aortopathy or channelopathy should be referred for cardiac assessment before pregnancy (Knight, Bunch et al. 2019)

4.3 The care of women with multiple disadvantages

This section contains the characteristics and lessons learned from the care of women who died due to accidents or homicide and those whose care was examined for the morbidity enquiry who were living in the most deprived areas and who did not die but experienced a perinatal loss or other morbidity.

4.3.1 The women who died

Accidental deaths

In 2021-23, 15 women died from accidental causes in the UK and Ireland, a mortality rate of 0.69 per 100,000 maternities (95% CI 0.39-1.14). Four women were undelivered at the time of their death and one had a resuscitative hysterotomy. Of the remaining 10 women, nine died between six weeks and one year after the end of pregnancy. Two thirds of the women (n=10) died as the result of road traffic accidents, two from crush injuries and three from other causes (fire, drowning and electrocution).

As in previous years (Knight, Bunch et al. 2019), most (53%) of the women who died from accidental deaths had at least one element of disadvantage. Nearly half of the women (47%) were living in the most deprived areas (IMD IV and V). Many had social risk factors including domestic abuse (33%), a history of abuse as a child (20%) and social service involvement (33%). Half (53%) had known mental health problems and 20% had known substance use.

For the 15 women whose care was reviewed, 53% were found to have received good care. Improvements to care were noted for seven women, and assessors felt that improvements to care may have made a difference to the outcome for three women (20%).

Deaths due to homicide

In 2021-23, 14 women died as the result of homicide in the UK, a mortality rate of 0.65 per 100,000 maternities (95% CI 0.35-1.08). Five women were still pregnant at the time of their death and one died on the day of delivery following a resuscitative hysterotomy. One woman was killed between one and 42 days after the end of pregnancy and seven were killed between six weeks and one year after the end of pregnancy.

All but one woman (n=13, 93%) were murdered by their partner or former partner. Of the women murdered by their partner, six (46%) had reported domestic abuse and information about domestic abuse was missing for two (14%). Six women (43%) were killed by stabbing, four by blunt force trauma (29%), three by strangulation (21%) and one by another method.

Of the 14 women who were murdered, sufficient information was available to review the care of 13. For these 13 women, assessors felt that seven (54%) received good care and identified improvements to care that may have made a difference to the outcome for five women (38%).

4.3.2 The women whose care was reviewed for the morbidity enquiry

A stratified random sample of women who were living in the most deprived areas was drawn from the MBRRACE-UK database of perinatal deaths. To compare the care these women received to a control population, women living in the least deprived areas were also sampled from the database of perinatal deaths and national birth registers and matched based on region, ethnic group and age range within five years. Of the 41 women identified from the two databases, records were received for 33 women. Only women who had identified elements of disadvantage, including but not limited to deprivation, are included in this section (n=17). Lessons from the care of other women included in the morbidity enquiry are discussed elsewhere in this report.

Of the 17 women with elements of disadvantage included in this section, most (n=10, 59%) were from the most deprived areas. The main elements of disadvantage were mental health conditions (n=12, 71%), financial need (n=5, 29%), and domestic abuse (n=4, 24%). Two women had recently arrived in the UK, one of whom did not speak or understand English. Two further women were born abroad and did not speak or understand English but it was not clear how long they had been in the UK prior to their pregnancy. Due to the nature of the sampling, all but one woman included in this section experienced a perinatal loss event.

Four of the 17 women in this section (24%) were thought to have received good care. For six women (35%), improvements in care were identified that would not have made a difference to their outcome and improvements in care that may have made a difference were noted for seven (41%).

4.3.3 Overview of care and lessons to be learned

Recognition of complex care needs

A young woman in her third pregnancy was living in a deprived area and was known to both mental health and social services prior to pregnancy. She booked late for antenatal care after several missed appointments. She disclosed multiple social risk factors at booking but was placed on a low-risk pathway based on her obstetric history. Continuity of care was challenging during her pregnancy and she missed multiple midwife appointments despite repeated attempts to contact her. A safeguarding referral to social services was made in the second trimester but not followed-up. She continued to see her GP throughout her pregnancy, but the GP was not aware of her missed appointments. She had a placental abruption and gave birth to a stillborn infant at 30 weeks' gestation. A bereavement midwife attempted to contact the woman but received no response. M

This woman had significant complexities relating to her mental health and social vulnerabilities. However, despite her significant history, she was referred for low-risk, midwifery-led care. Assessors felt that this may represent siloed thinking where the focus on a woman's obstetric history or physical health conceals other needs that may require specialist input early in pregnancy. They reiterated the need for a separate, urgent referral pathway for high-risk women as outlined in section 4.1. Assessors felt that this woman would have also benefited from a longer booking appointment in order to develop a coordinated care plan and address any accommodations that could be made to improve engagement. Multi-agency needs assessments, including safeguarding, are recommended for the care of women with complex social factors (National Institute for Health and Care Excellence 2010); however, it is clear from the review of the women in this section that integrated planning is highly varied in practice. While there were some examples of good care and high quality of support for women with multiple adversity, this was inconsistent depending on what services were available within that hospital or region. For instance, some women were offered vouchers for transport or free data for their phone, but these supports were not available in all places. Having robust systems in place to ensure equity of care in all regions is essential to improving outcomes.

There was also evidence of significant variability in the way that information relating to social risk factors was assessed and recorded within maternity notes. There is no current standard for how to discuss and record women's social risk factors and assessors felt that the 'tick box' nature of electronic maternity records may prevent any depth of understanding about women's personal circumstances. While this woman's social complexity was asked about and documented, this did not happen for many of the women whose care was reviewed. In many instances, women were either not asked about or did not disclose information about social risk factors such as substance use or domestic abuse to their maternity team. Assessors noted the difficulty clinicians face when relying on self-referral and women's willingness to disclose information that is often sensitive or stigmatised. This is particularly true at booking appointments when women have not yet developed a trusted relationship with their healthcare provider. There must be time to revisit conversations around social risk factors later in pregnancy when women may feel more comfortable sharing information.

NEW **National recommendation**

Update guidelines on the care of women with complex social factors to include clear guidance for a standardised assessment and documentation of social risk factors at booking appointments and at least once more later in pregnancy. In the absence of sufficient evidence to update guidance, commission research to explore the unique care needs of vulnerable populations.

Assessment and recording of deprivation

The majority of women who died from accidental deaths or homicide were living in the most deprived areas. This included 56% of the women who died in road traffic accidents, which mirrors national figures showing an association between road casualties and high deprivation (Department for Transport 2023). However, assessors noted that maternity records are not designed to assess and record information about deprivation including insecure housing, refugee status or financial need. This was particularly apparent in the care of women from the morbidity enquiry living in deprived areas where assessors were specifically asked to look for recording of social risk factors in the maternity notes. Only two women had documented housing insecurity, one of whom was also said to have no complex social factors or safeguarding needs. Both of these women

and three further women also had documented financial difficulties. Assessors thought that any standardised assessment of complex social factors should be extended to more consistently capture other elements of deprivation, including housing, financial difficulties and social or family support that may impact women's ability to engage in care.

Interagency working for complex women

The woman above missed 15 appointments with midwifery services. However, this information was not known to her GP, whom she was seeing regularly throughout her pregnancy. Additionally, while assessors commended the efforts made to follow-up missed appointments, they felt that this was not recognised as a potential 'red flag' given this woman's many social complexities. As such, they thought that there was a missed opportunity for earlier referral for safeguarding and social services involvement when a pattern of non-attendance was first seen during her booking appointment. There is a duty for all health-care professionals to share relevant information that may affect the care a woman receives or her outcome (Knight, Bunch et al. 2021). Interagency working and direct communication can help improve continuity of care and ensure that pertinent information is not missed.

A British born Asian woman in her early 30s experienced domestic abuse perpetrated by her new husband. A few weeks prior to becoming pregnant she reported her husband to the police and a Multi-Agency Risk Assessment Conference (MARAC) deemed her high-risk with an active alert. This alert was in her GP records but was not identified at her booking appointment. She did not disclose domestic abuse at booking and no safeguarding concerns were documented. It is not clear if her husband was in attendance. At 15 weeks' gestation she was admitted to hospital with palpitations and shortness of breath. Her MARAC alert was noted by emergency department staff and an abusive episode was witnessed while in hospital. The woman disclosed domestic abuse but did not want police involvement. A Domestic Abuse, Stalking and Honour Based Violence (DASH) risk assessment was completed but no further action was taken. She was discharged with contact details for support groups. The following day she was seen by a community midwife but there was no discussion of domestic abuse or safeguarding. One week later she was killed by her husband.

Domestic abuse was documented for nearly half of the women who were killed by their partner or a former partner. However, it was clear from the care of this woman and others, that disjointed services and limited communication between different healthcare providers and agencies meant that this information was not known to all those caring for her. This was true even in instances where there had been previous multi-agency involvement including Multi-Agency Risk Assessment Conferences (MARACs) or Multi-Agency Safeguarding Hub (MASH) referrals. This woman had a MARAC alert in place that was noted in her GP records but was not identified by the community midwife at booking. Another woman who was killed by her partner had a MARAC alert put in place during pregnancy for domestic abuse, but this was closed after it was discovered that the woman had miscarried. There was no follow-up by general adult safeguarding. Assessors stressed the importance of ensuring that women are continuously supported through interagency working and joined-up communication. Whenever safeguarding concerns are noted, there should be clear integrated care pathways for referral and escalation so that vulnerable women do not fall through the gaps (National Institute for Health and Care Excellence 2014).

NEW **National recommendation**

Develop guidance for information sharing within maternity services and across health services and other agencies in the event of safeguarding concerns. Ensure that codes for flagging domestic abuse are applied in women's records and are known to all those caring for her.

Assessors identified many examples in the care of the women included in this section where safeguarding issues should have been identified but were missed and emphasised the need to 'make every contact count'. When the above woman's MARAC alert was flagged in the emergency department, she initially denied domestic abuse until an abusive episode was witnessed. There was similar evidence of non-disclosure from other women who later disclosed domestic abuse or whose domestic abuse was known about to other services. Guidance from NICE recommends a one-to-one consultation in a secure environment and without the woman's partner on at least one occasion to facilitate discussion of sensitive issues, including domestic abuse (National Institute for Health and Care Excellence 2010). It is not clear if this always happened, especially when women were assessed by teleconsultation and it was not known if partners were listening. Assessors emphasised that domestic abuse and coercive control can be incredibly complex. Women experiencing domestic abuse may minimise their

partner's behaviour or deny any abuse out of fear that it will worsen their situation or lead to stigmatisation or child removal. It is essential that staff are trained to recognise and support women experiencing domestic abuse. This includes the recognition that some groups such as minority ethnic populations, people with disabilities or communication difficulties and LGBTQ+ people may face additional barriers in accessing support services (National Institute for Health and Care Excellence 2014).

Multidisciplinary team training message

'Make every contact count' - Maternity staff, or other frontline staff in contact with pregnant or recently pregnant women, should be trained to recognise the risks and indicators of domestic abuse including the increased risk in pregnancy and association with childhood adversity, mental health and substance use. Staff should know how to ask relevant questions and create a secure environment to facilitate disclosure of current or past domestic abuse. Training must also include guidance on how to respond to disclosures of domestic abuse in a sensitive manner that ensures people's safety and staff should be aware of local referral pathways for specialist services. Any training provided must be trauma-informed and culturally sensitive in order to recognise the complexities of coercive control including how certain ethnic and social characteristics may impact disclosure (National Institute for Health and Care Excellence 2016).

4.3.4 Recurring lessons to be learned

Women with multiple disadvantages have a higher number of antenatal appointments due to multiple social, mental health and medical comorbidities. As shown in the care of the first woman in this section, such schedules can be difficult to adhere to. After missing one appointment, women were often women discharged from services without the offer of another appointment, investigation into why this occurred or an understanding of multiple other appointments they had scheduled. Assessors re-emphasised a need to be proactive in follow-up when appointments are missed including attempting to facilitate alternative methods of engagement (Felker, Patel et al. 2024). They re-emphasised the need to consider all of a women's risk factors and complexities in order to provide appropriate, individualised care and better facilitate engagement.

Ensure maternity services deliver personalised care, which should include identifying and addressing the barriers to accessing specific aspects of care for each individual (Draper, Gallimore et al. 2023b, Draper, Gallimore et al. 2023a)

Ensure that guidance on care for women with complex social factors is updated to include a role for networked maternal medical care and postnatal follow-up to ensure that it is tailored to women's individual needs and that resources in particular target vulnerable women with medical and mental health comorbidities and social complexity (Knight, Bunch et al. 2023)

4.4 Improving mental health care

4.4.1 The women who died

Overall, 155 women died from psychiatric causes during pregnancy or in the year after the end of pregnancy in the UK and Ireland in 2021-23, a maternal mortality rate of 7.14 per 100,000 maternities (95% CI 6.06-8.36). Thirty-four women died during or up to six weeks after the end of pregnancy (1.57 per 100,000 maternities, 95% CI 1.09-2.19) and 121 died between six weeks and one year after the end of pregnancy (5.58 per 100,000 maternities, 95% CI 4.63-6.66).

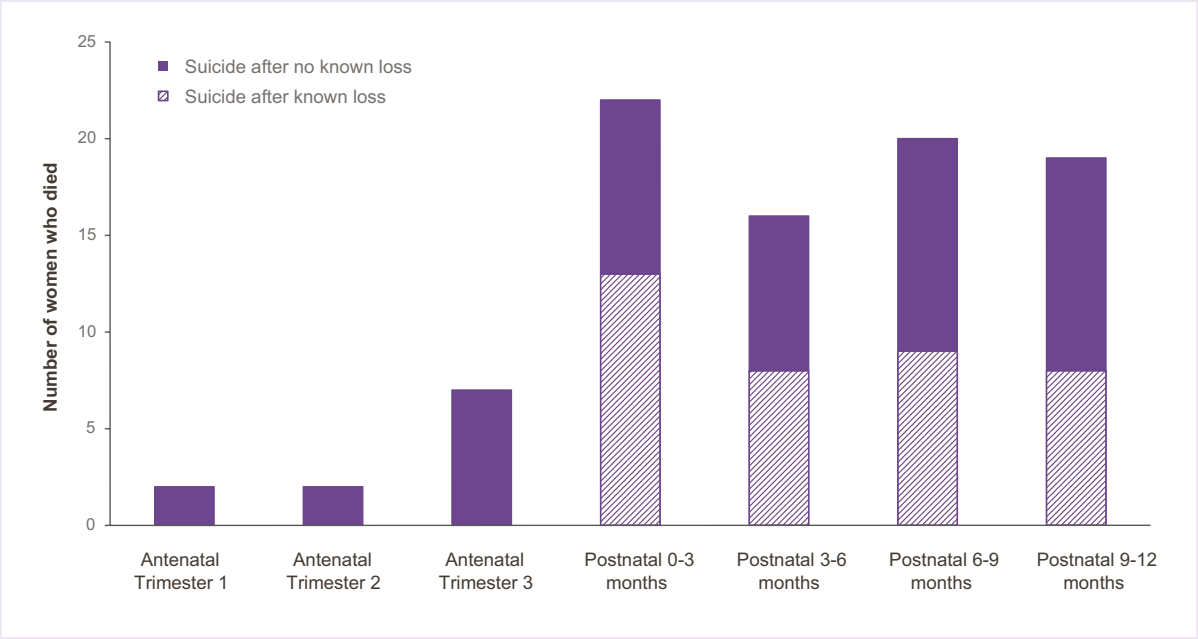
Deaths due to suicide

Eighty-eight women died by suicide in the UK and Ireland during pregnancy or up to one year after the end of pregnancy in 2021-23, a maternal mortality rate of 4.06 per 100,000 maternities (95% CI 3.25-5.00). This is statistically significantly higher than the rate of 2.64 per 100,000 maternities for 2017-19 (RR 1.54, 95% CI 1.10-2.17, p=0.009) but similar to the rate reported in the 2022 MBRRACE-UK report for deaths due to suicide in 2020. As in previous years, the majority of women who died by suicide, died violently. The commonest mode of suicide remained hanging (n=58, 66%). All other modes of suicide occurred at much lower proportions (<10%) (***Supplemental Table 6.3***).

As has been noted in previous reports, the majority of the women who died by suicide died in the postnatal period. Thirty-eight women had experienced a known loss (Figure 13); sixteen had an early pregnancy loss, including miscarriage, ectopic pregnancy or termination of pregnancy, five experienced a perinatal death and 17 had their infant taken into care

(*Supplemental Table 6.2*). An additional six women were known to social services with ongoing child protection proceedings or child in need plans and, of the 11 women who died by suicide while they were still pregnant, 8 had older children in care or were known to social services.

Figure 13: Number of women who died by suicide during pregnancy or up to one year after pregnancy, by timing of death and known loss, UK and Ireland 2021-23



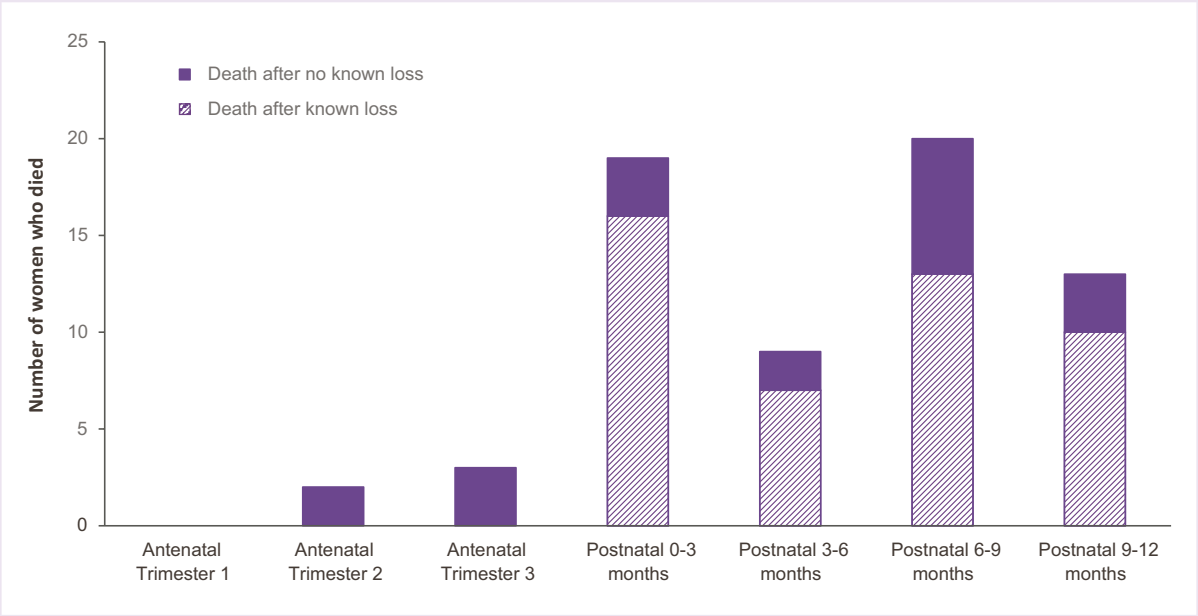
Deaths due to substance use

In 2021-23, 67 women died in relation to substance use in the UK and Ireland during pregnancy or up to one year after pregnancy, a maternal mortality rate of 3.09 per 100,000 maternities (95% CI 2.39-3.92). This is not statistically significantly different from rates of deaths associated with substance use in 2017-19 or 2020.

As for deaths due to suicide, the majority of deaths related to susbtance use occurred in the postnatal period and women with known loss events were overrepresented amongst the women who died (Figure 14). Of the 46 women who experienced a known loss event, the majority (n=27, 59%) had their child taken into care; four further women were known to social services and had ongoing care proceedings. Fourteen women (30%) experienced an early pregnancy loss with half undergoing a termination of pregnancy (*Supplemental Table 6.2*).

Sufficient information was available to assess the care of 83 women who died by suicide and all 67 of the women who died from substance use. Assessors identified improvements in care for the majority of women who died from psychiatric causes and felt that different care may have made a difference to the outcome for 53 women who died by suicide (64%) and 23 women who died from substance use (34%). Eleven percent of women who died from suicide and 28% of women who died from substance use were thought to have received good care on the basis of the information available.

Figure 14: Number of women who died from substance use during pregnancy or up to one year after pregnancy, by timing of death and known loss, UK and Ireland 2021-23



4.4.2 Overview of care and lessons to be learned

Leadership from the perinatal mental health team (PMHT)

A multiparous woman in her 30s had a history of severe depression, anxiety, eating disorder, post-traumatic stress disorder, substance use and previous suicide attempts. She had many complex social risk factors and was known to social services as her older children were under child in need plans. After her booking appointment, a referral was made to perinatal mental health services but it did not sufficiently convey the woman's significant mental health history or other risk factors. This referral was declined when she had a miscarriage. Further referrals to the primary care recovery service for trauma-focussed cognitive behavioural therapy were dependent on her remaining sober and were delayed. She was not under the care of secondary psychiatric services. In the months after her miscarriage she expressed suicidal ideations and feelings of social isolation that were exacerbated after her children were removed from her care. She died by suicide four months after her miscarriage.

Capacity of specialist perinatal mental health (PMH) services were expanded across England in 2019 (NHS England 2019), but, as has been apparent in past reports, many of the women included in this enquiry did not have input from a specialist perinatal mental health team (PMHT). For women who were referred to a PMHT, many had no further visits scheduled after a single missed appointment and others, such as this woman, had their referrals declined because they were no longer pregnant or had lost custody of their child. The restrictive referral criteria for specialist PMH assessment has been highlighted in previous reports (Knight, Bunch et al. 2021). Assessors noted that the role of the psychiatrist and PMHT should be in managing risk, not simply medical treatment. For high-risk women with complex circumstances, early referral and assessment is essential, even if the woman is considering a termination of pregnancy or they experience an early pregnancy loss or child removal. In instances where women do not meet the criteria for specialist PMHT care, clear leadership from specialist PMHTs is still necessary to ensure any future care is coordinated and women do not fall through the gaps.

NEW **National recommendation**

Ensure specialist perinatal mental health teams undertake a leadership role for the care of pregnant or recently pregnant women with mental health conditions even if women are not accepted for care under their services. This should include a risk assessment, provision of advice and guidance, oversight for joint care planning and support to ensure rapid onward referral into other appropriate mental health services.

This woman's social and mental health history were documented and her risk was appropriately recognised. Had she not miscarried and been cared for by a specialist PMHT, assessors felt her outcome may have been different. Instead, she was referred back into general mental health care services where she faced significant delays in treatment as this was contingent on participation in a drug rehabilitation programme for which there was a six-month waiting list. There was evidence of similar instances where excessive caution or delay in arranging a mental health assessment may have impacted women's care and outcomes. This woman had been referred to eight separate mental health services prior to, during and shortly after pregnancy and had escalating risks in the postnatal period. Repeated referrals should be considered a 'red flag' and prompt rapid review regardless of usual thresholds for access or practice (Knight, Bunch et al. 2020b). Despite the number of referrals made for this woman, is not clear if she was receiving or engaging with treatment at the time of her death. This was common amongst the women who died, who often had numerous services involved in their care, but little clarity over the roles and responsibilities of each. In instances where more than one mental health team is involved in a woman's care, it is important to develop an integrated care plan that clearly indicates the responsibility of each healthcare professional including a named individual to coordinate care (National Institute for Health and Care Excellence 2020) (Knight, Bunch et al. 2018); assessors felt this responsibility could lie with the PMHT.

Proactive care

A woman in her 30s with a diagnosis of emotionally unstable personality disorder, bipolar disorder, a history of multiple suicide attempts, medical comorbidities and known domestic abuse was referred to the perinatal mental health team (PMHT) in early pregnancy but did not meet their criteria. She presented to the emergency department in the second trimester in distress after a fight with her partner but left before being seen due to a long wait. There was no further referral to the PMHT or appropriate safeguarding for domestic abuse. She separated from her partner three months later in the third trimester. After she gave birth there was no discharge planning and there did not appear to be any plans in place for her safeguarding or mental health support. She died by suicide eight months postnatally after expressing both intent and a prior attempt.

This woman was one of 37 (24%) who died from psychiatric causes who had a diagnosis of emotionally unstable personality disorder or bipolar disorder, both of which are associated with significant risks during pregnancy and the postpartum period, particularly in the context of previous suicidal ideation. Despite this, she did not meet the threshold for review by specialist PMH services. Guidance from the Scottish Intercollegiate Guidelines Network (SIGN) and NICE recommend that women with complex mental illnesses receive multidisciplinary care in the perinatal period with a documented care plan and continuity of care across different settings (National Institute for Health and Care Excellence 2020, Scottish Intercollegiate Guidelines Network 2023). While this woman's diagnosis was known to the PMHT, it is unclear if her risk assessment and referral captured the complexity or extent of her psychiatric history including her previous suicide attempts. This also appeared to be the case when she was re-assessed after presentation to the emergency department at which point it was agreed that she did not require a referral for specialist PMH services. Assessors stressed the importance of lower thresholds for assessment during pregnancy and the early postpartum as these are incredibly vulnerable times for women with mental health disorders (Knight, Bunch et al. 2018, Knight, Bunch et al. 2021).

For this woman, it was documented in her maternity notes that her mental health appeared to improve during pregnancy and in the early postnatal period. Assessors noted that this 'honeymoon' phase in pregnancy where complex trauma becomes relatively stable is a period when preventative care planning can help build trust and make it easier to access care in future crises or when mental health declines. It was felt that there were missed opportunities to recognise this woman's stressors and red flags, including her relationship breakdown, and take a proactive approach to manage her risk in the immediate, short and long-term (Knight, Bunch et al. 2021). At discharge there was no forward planning for mental health support or safeguarding and, as a result, her care after pregnancy was disjointed with multiple GP contacts and referrals to different services that were either declined due to previous non-engagement or not followed-up. There was also no escalation or

sense of immediacy when her mental health continued to deteriorate. Guidance from SIGN and NICE stress the importance of coordinated planning of postnatal care for women with severe mental illness and emphasise the importance of immediate risk management and urgent mental health assessment for women who are at risk of suicide as this woman was (Scottish Intercollegiate Guidelines Network 2023).

Clinical message

'Recognise decline' – Deterioration of mental health in pregnancy or the postnatal period can be extremely rapid. It is important to recognise and act on 'red flags' including a significant change in mental state or the emergence of new symptoms, thoughts or acts of violent self-harm, or expressions of incompetency as a mother or estrangement from the infant. These symptoms must not be underestimated and should prompt early review, urgent assessment and intervention.

4.4.3 Recurring lessons to be learned

Assessors once again emphasised the need to recognise and act on 'red flag' symptoms first highlighted in the 2015 MBRRACE-UK report (Knight, Tuffnell et al. 2015). These include recent, significant changes in mental state or emergence of new symptoms, new thoughts or acts of violent self-harm and new and persistent expressions of incompetency as a mother or estrangement from the infant. The requirement for specialist assessment when women self-harm during pregnancy (Knight, Bunch et al. 2018) is also echoed in this year's enquiry.

Assessments should always include a review of previous history and always take into account the findings of recent presentations and escalating patterns of symptoms, their severity and any associated abnormal behavior (Knight, Tuffnell et al. 2015)

New expressions or acts of violent self-harm are 'red flag' symptoms and should always be regarded seriously (Knight, Tuffnell et al. 2015)

New and persistent expressions of incompetency as a mother or estrangement from the infant are 'red flag' symptoms and may be indicators of significant depressive disorder. In some cases, they may reflect psychotic thinking. In the presence of significant illness, such symptoms may be best addressed through inpatient mother and baby care (Knight, Tuffnell et al. 2015)

Both of the women included in this section of the report were cared for during the COVID-19 pandemic and were frequently assessed over telephone without face-to-face contact. The limitations of virtual consultations have been discussed in past MBRRACE-UK reports in relation to recognition of abnormal symptoms (Knight, Bunch et al. 2023, Felker, Patel et al. 2024) and mental health problems (Knight, Bunch et al. 2020b, Knight, Bunch et al. 2022). Multiple studies have shown that the pandemic led to increased rates of poor mental health amongst pregnant and postpartum women and exacerbated underlying mental health problems due to increased isolation and stress (Delanerolle, McCauley et al. 2023). Assessors emphasised the importance of face-to-face assessment for mental health problems, especially if there are repeated concerns.

Establish triage processes to ensure that women with mental health concerns can be appropriately assessed, including face-to-face if necessary, and access specialist perinatal mental health services in the context of changes to the normal processes of care... Perinatal mental health services are essential and face-to-face contact will be necessary in some circumstances. There is a clear role for involvement of the lead mental health obstetrician or midwife in triage and clinical review (Knight, Bunch et al. 2020b)

Almost all of the women who died from psychiatric causes had some element of disadvantage. Amongst the women who died from suicide, 24% were considered to have severe and multiple disadvantage; for women who died from substance use, this figure was 52%. Many of these women had a history of childhood trauma and several were care leavers or had a family history of suicide or substance use. There were also many women who had a history of trauma in adulthood, were living in unstable housing or who had interacted with the criminal justice system. Several women also had other stressors including relationship difficulties as noted above, older children with needs who required increased levels of support and bereavement due to the recent death of partners or family members, which in some instances were also by suicide or substance use.

The complexity of these women's situations were often complicated by the involvement of different agencies and increased numbers of appointments that can be overwhelming and result in non-attendance. As highlighted in numerous sections of this report, women with social and medical complexity require urgent, specialist care and interagency communication to fully appreciate and coordinate all aspects of care.

Recognise the importance of a trauma history in the assessment of risk. Involve specialist Perinatal Mental Health Teams where there is a history of significant involvement with secondary mental health services or significant risk, particularly if it is a first pregnancy (Knight, Bunch et al. 2022)

As discussed in past MBRRACE-UK reports (Knight, Bunch et al. 2021, Knight, Bunch et al. 2022), there was evidence from the review of care of women who died from psychiatric conditions and also those with multiple adversity (section 4.3) of declining mental health and escalating risky behaviour after child loss. This included early loss due to termination of pregnancy or miscarriage as well as perinatal death and removal or threatened removal of children. Women are more at risk following a perinatal loss event and require good communication and coordinated care.

Loss of a child, either by miscarriage, stillbirth and neonatal death, or by the child being taken into care increases vulnerability to mental illness for the mother and she should receive additional monitoring and support (Knight, Tuffnell et al. 2015)

4.5 Overall lessons for care

There were several themes that were consistent across this year's enquires where assessors felt there were examples of good care and of previous repeat recommendations that require improved implementation.

4.5.1 Pre-hospital and emergency care

A woman in her late 30s with a BMI >50 kg/m^2 was in the second trimester of pregnancy when she was struck by a car as a pedestrian. Paramedics arrived quickly and she was transferred by helicopter to a trauma centre where an obstetric team was pre-alerted to her arrival. She was peri-arrest upon arrival in the emergency department where she had a resuscitative hysterotomy. There were challenges securing her airway and difficulty gaining IV access due to her weight. She was transferred for CT and then moved to theatre for surgery but she died as a result of her injuries.

Assessors noted many instances of good practice in the care of this woman. Resuscitation protocols were followed appropriately by pre-hospital and emergency teams and included resuscitative hysterotomy, which can facilitate the return of spontaneous circulation in women >20 weeks' gestation (Chu, Johnston et al. 2020, Resuscitation Council UK 2021). This intervention was possible as the hospital was pre-alerted to her arrival and able to assemble a multidisciplinary team, including an obstetrician and anaesthetist, as is recommended (Chu, Johnston et al. 2020, Joint Royal Colleges Ambulance Liaison Committee (JRCALC) and Association of Ambulance Chief Executives (AACE) 2022). However, despite many instances of good care, assessors still noted delays in transfer of many women to hospital for definitive management and inconsistent on-scene management as highlighted in last year's report (Felker, Patel et al. 2024).

A woman in her 20s had moved to the UK in early pregnancy and lived in a deprived area. In the third trimester she presented to the emergency department with abdominal pain. An intrauterine death was confirmed by a consultant obstetrician and a diagnosis of placental abruption was made. In response to a deteriorating Maternity Early Warning Score (MEWS) a caesarean section was performed with involvement from senior anaesthetists and obstetricians. ***M***

This woman had several aspects of good care in the emergency department. She was appropriately assessed by an obstetrician as has been previously recommended for pregnant and postpartum women who present to the emergency department with medical problems (Knight, Bunch et al. 2018). She was also assessed with MEWS, which should be used to monitor pregnant women wherever they receive care (Knight, Bunch et al. 2022). However, this was not the case for all women whose care was reviewed, as assessors noted evidence of continued use of the National Early Warning Score (NEWS), which resulted in inaccurate assessment of women's conditions. There were also instances where women were denied imaging in the emergency department because they were pregnant despite evidence that most imaging modalities are safe during pregnancy (Felker, Patel et al. 2024).

> A woman in her 30s with no significant medical history was booked for consultant-led care and had an uneventful pregnancy and birth. Seven months after giving birth she presented to the emergency department with shortness of breath and a recent history of fatigue and lethargy. She had multiple investigations including an echocardiogram, CT pulmonary angiogram and CT. The resulting working diagnosis was multiorgan failure secondary to native aortic valve endocarditis. She was admitted to the ICU and received multidisciplinary care with input from specialist teams in the hospital and other centres before organ support was withdrawn and she died.

This woman's symptoms were thoroughly examined when she presented to the emergency department with ambiguous symptoms. Pulmonary embolism was ruled out as a possibility and a cardiac cause was considered and appropriately investigated by echocardiogram. This need for diagnostic curiosity has been emphasised in many past MBRRACE-UK reports (Knight, Nair et al. 2016, Knight, Bunch et al. 2020a, Felker, Patel et al. 2024). This woman is one of many included in this year's confidential enquiries who had appropriate multidisciplinary input into her care and review from senior specialists, which are repeated MBRRACE-UK recommendations.

5. References

Available as supplementary material at:

www.npeu.ox.ac.uk/mbrrace-uk/reports/maternal-reports/maternal-report-2021-2023

MBRRACE-UK

National Perinatal Epidemiology Unit (NPEU)
Nuffield Department of Population Health
University of Oxford
Old Road Campus
Oxford OX3 7LF

Tel: +44-1865-289715
Email: *mbrrace-uk@npeu.ox.ac.uk*
Web: *www.npeu.ox.ac.uk/mbrrace-uk*

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