

## CHAPTER 1

# Introduction and key findings 2000–2002

GWYNETH LEWIS on behalf of the Editorial Board

### Introduction

This Report marks the first 50 years of national triennial Reports on Confidential Enquiries into Maternal Deaths. During this time these Reports have aimed to save mothers' lives by underpinning good obstetric and maternity practice in the UK. Huge improvements have been made, as demonstrated in the individual chapters in this book as well as in Chapter 22, which gives an overview of the major changes made to the enquiry process in 1952 and developments up to 2002. The risk of a woman in the United Kingdom dying today of a pregnancy-related cause is extremely small and has been reduced, in some measure, by the impact these Reports have had on clinical practice over the past five decades. However, the additional new and wider public health focus, first seen in the last Report and expanded in this, shows that maternal mortality rates are significantly higher for the most disadvantaged women compared with these from the most advantaged. It has also been estimated that during 2000–02, the period of this Report, over 1,000 existing or newborn children lost their mothers and faced a consequently bleaker start in life. This message is reinforced by the choice of picture used for the cover of this Report.

A very high proportion of the women who died during 2000–02 were economically and socially disadvantaged and are described in this Report as 'vulnerable' or 'socially excluded'. These definitions encompass diverse groups of women who may face a number of similar or different problems. These groups included women living in extreme poverty and those with multiple social problems, women from some minority ethnic groups and those who did not speak English, homeless or travelling women and refugees and asylum seekers. There were also those who believed they had stigmatising conditions such as previous mental illness, being under age or HIV positive, or who misused drugs, alcohol or other substances and those who experienced domestic violence.

The challenges posed by the findings in this Report are therefore not just clinical but, as the findings in this chapter starkly demonstrate, are also around reconfiguring services that meet the needs of women from all groups in society, particularly the socially excluded. By doing so, not only should maternal health outcomes improve, for the greater benefit of all pregnant women, but the number of children growing up without a mother and facing a poor start in life will also be reduced. The recommendations made in this Report therefore offer an opportunity for all involved in planning services and caring for pregnant and recently delivered women to make a real and lasting difference to their lives and those of their families.

## Summary of key findings for 2000–02

### Mortality rates and main causes of death

- The maternal mortality rate for both *Indirect* and *Direct* causes of death shows a slight increase for this triennium as compared with the last Report, although this is not statistically significant.
- As with the previous Report, the overall maternal death rate for *Indirect* causes of death is higher than for deaths from *Direct* causes.
- The most common cause of *Direct* deaths was again thromboembolism, the rates for which remain largely unchanged since 1997–99. There have been increases in the mortality rates from haemorrhage and those associated with anaesthesia and no significant decreases in deaths from other causes. There was no under-reporting of these deaths.
- The most common cause of *Indirect* deaths and the largest cause of maternal deaths overall was psychiatric illness, although not all of these were reported to the Enquiry and many were identified from linkage with the Office for National Statistics (ONS), as discussed later in this chapter. Cardiac disease remains the second most common cause and most of these cases were reported to the Enquiry.

### Risk factors for maternal deaths

- **Social disadvantage:** Women living in families where both partners were unemployed, many of whom had features of social exclusion, were up to 20 times more likely to die than women from the more advantaged groups. In addition, single mothers were three times more likely to die than those in stable relationships.
- **Poor communities:** Women living in the most deprived areas of England had a 45% higher death rate compared with women living in the most affluent areas.
- **Minority ethnic groups:** Women from ethnic groups other than White were, on average, three times more likely to die than White women. Black African women, including asylum seekers and newly arrived refugees had a mortality rate seven times higher than White women and had major problems in accessing maternal health care.
- **Late booking or poor attendance:** 20% (50) of the women who died from *Direct* or *Indirect* causes booked for maternity care after 22 weeks of gestation or had missed over four routine antenatal visits.
- **Obesity:** 35% (78) of the all women who died were obese: 50% more than in the general population.
- **Domestic violence:** 14% (51) of all the women who died self-declared that they were subject to violence in the home.
- **Substance abuse:** 8% (31) of all the women who died were substance misusers.
- **Suboptimal clinical care:** 67% of the 261 women who died from *Direct* and *Indirect* causes were considered to have some form of suboptimal clinical care.

- **Lack of inter-professional and/or inter-agency communications:** In many cases, the care provided to the women who died was hampered by a lack of cross-disciplinary working. There were a number of cases in which crucial clinical information, which may have affected the outcome, was not passed from the general practitioner to the midwifery or obstetric services at booking or shared between consultants in other specialties, including staff in accident and emergency departments and the obstetric team. There were also cases where significant information, particularly regarding a risk of self-harm and child safety, were not shared between the health and social services.

## Maternal mortality rates

In the United Kingdom, maternal mortality rates can be calculated in two ways:

- through official death certification to the Registrars General (the Office for National Statistics and its equivalents), or
- through deaths reported to this Enquiry. The overall maternal death rate for the Enquiry is calculated from the number of deaths assessed as being due to *Direct* and *Indirect* deaths.

As described in the section on Aims and Methodology and in Chapter 21 Trends in reproductive epidemiology, the numbers of *Direct* and *Indirect* deaths identified by this Enquiry always exceeds those identified from an examination of the cause of death given on death certificates. The Office for National Statistics (ONS) death certificates are examined to select deaths where there is a mention anywhere on the certificate of a pregnancy-related condition, such as eclampsia. Women who die while pregnant but where no mention of the pregnancy is made on the certificate will not be identified in this way. In Scotland, however, there is a box on the certificate that can be ticked to identify that a woman was pregnant, or had recently given birth, at the time of her death.

The overall number of *Direct* and *Indirect* deaths identified by the Enquiry has always exceeded those officially reported. This is because a large proportion of women known to the Enquiry die of pre-existing medical conditions influenced by their pregnant or recently delivered state; for example, cardiac disorders, epilepsy, hormone-dependent malignancies and deaths from suicide, but these are excluded from the official statistics. Also excluded are women who require long-term intensive care and whose final cause of death is registered as a non-pregnancy-related condition, such as multiple organ failure, even though the initiating cause was an obstetric event. Conversely, the maternal deaths known to the Registrars General may include *Late* deaths, as it is not possible to identify from the death certificate when the delivery or termination occurred.

In 2000–02, 148 deaths in the UK were identified from death registrations as having a pregnancy-related condition mentioned on their death certificate. This Enquiry identified 106 *Direct* maternal deaths and 155 *Indirect* maternal deaths, suggesting that only 57% of maternal deaths mention the pregnancy at death registration. Work is currently being undertaken to assess the feasibility of identifying further deaths by linking women's death certificates with recent birth registrations.

The maternal mortality rates derived by both methods of estimation are shown in Table 1.1.

**Table 1.1** *Direct and Indirect* maternal deaths and mortality rates per 100,000 maternities as reported to the Registrars General (ONS) and to the Enquiry; United Kingdom 1985–2002

| Triennium | Maternal deaths known to Registrars General (ONS) |        | <i>Direct</i> deaths known to the Enquiry |      | <i>Indirect</i> deaths known to the Enquiry |      | Total <i>Direct</i> and <i>Indirect</i> deaths known to the Enquiry |      | Total maternities | 95% confidence intervals |
|-----------|---|--------|---|------|---|------|---|------|-------------------|--------------------------|
|           | <i>n</i>  | Rate   | <i>n</i>                                  | Rate | <i>n</i>                                    | Rate | <i>n</i>  | Rate | <i>n</i>          |                          |
| 1985–87   | 174   | 7.7    | 139                                       | 6.1  | 84  | 3.7  | 223   | 9.8  | 2,268,766         | 8.6–11.2                 |
| 1988–90   | 171   | 7.2    | 145                                       | 6.1  | 93  | 3.9  | 238   | 10.1 | 2,360,309         | 8.8–11.5                 |
| 1991–93   | 149   | 6.4*   | 128                                       | 5.5  | 100   | 4.3  | 228   | 9.8  | 2,315,204         | 8.6–11.2                 |
| 1994–96   | 175   | 8.0*** | 134                                       | 6.1  | 134   | 6.1  | 268   | 12.2 | 2,197,640         | 10.8–13.8                |
| 1997–99   | 142   | 6.7**  | 106                                       | 5.0  | 136   | 6.4  | 242   | 11.4 | 2,123,614         | 10.0–12.9                |
| 2000–02   | 148   | 7.4**  | 106                                       | 5.3  | 155   | 7.8  | 261   | 13.1 | 1,997,472         | 11.5–14.8                |

\* Final ONS revised figures for 1991–93; the rate available at the time for the publication of the 1991–93 Report was 6.0  
\*\* England and Wales figures for 1994 onwards now include underlying cause and mentions (ICD9 630–676)  
\*\*\* The rate for 1994–96 in the previous Report was 7.4  
Sources: Office for National Statistics; General Register Office – Scotland; General Records Office – Northern Ireland

## Cases known to the Enquiry 2000–02

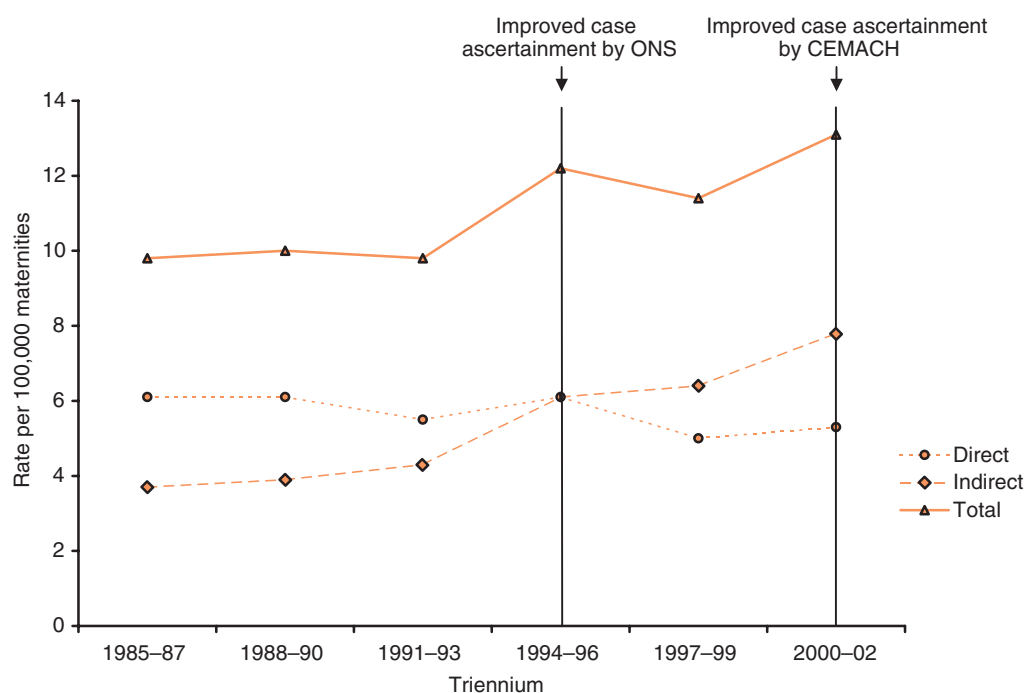
During this triennium 391 maternal deaths were reported to the Enquiry, a slight increase on the 378 cases reported in 1997–99. There were very limited data for 38 cases but it was still possible to code these deaths according to type. Complete data were available for all but two *Direct* deaths.

Of the 391 deaths, 106 were classified as *Direct* and 155 as *Indirect* deaths, representing 27% and 40% of reported cases, respectively. Thirty-six (9%) were classified as *Coincidental* and 94 (24%) as *Late*. The total number of *Direct* and *Indirect* maternal deaths reported to the Enquiry, 261, is higher than the 242 reported in the previous triennium. As was first seen in the last Report, the number of *Indirect* deaths now exceeds the number of *Direct* deaths, as shown in Table 1.2 and Figure 1.1. The overall maternal mortality rate for the United Kingdom for this triennium from deaths due to both *Direct* and *Indirect* causes is 13.1 maternal deaths per 100,000 maternities.

**Table 1.2** The number, type and maternal mortality rates notified to the Enquiry per 100,000 maternities; United Kingdom 1985–2002

| Type of death                           | Triennium   |      |             |        |             |      |             |      |             |      |             |      |
|---|-------------|------|-------------|--------|-------------|------|-------------|------|-------------|------|-------------|------|
|   | 1985–87     |      | 1988–90     |        | 1991–93     |      | 1994–96     |      | 1997–99     |      | 2000–02     |      |
|   | <i>n</i>    | Rate | <i>n</i>    | Rate   | <i>n</i>    | Rate | <i>n</i>    | Rate | <i>n</i>    | Rate | <i>n</i>    | Rate |
| <i>Direct</i>                           | 139         | 6.1  | 145         | 6.1    | 128         | 5.5  | 134         | 6.1  | 106         | 5.0  | 106         | 5.3  |
| <i>Indirect</i>                         | 84          | 3.7  | 93          | 3.9    | 100         | 4.3  | 134         | 6.1  | 136         | 6.4  | 155         | 7.8  |
| <i>Direct</i> and <i>Indirect</i> total | 223         | 9.8  | 238         | 10.1   | 228         | 9.8  | 268         | 12.2 | 242         | 11.4 | 261         | 13.1 |
| <i>Coincidental</i>                     | 26          | 1.1  | 39          | 1.7    | 46          | 2.0  | 36          | 1.6  | 29          | 1.4  | 36          | 1.8  |
| <i>Late</i>                             | 16*         | 0.7  | 48          | 2.0    | 46          | 2.0  | 72          | 3.3  | 107         | 5.0  | 94          | 4.7  |
| Total                                   | 265         | 11.7 | 339**       | 14.4** | 320         | 13.8 | 376         | 17.1 | 378         | 17.8 | 391         | 19.6 |
| 95% CI                                  | (10.3–13.2) |      | (12.9–16.0) |        | (12.4–15.4) |      | (15.4–18.9) |      | (16.1–19.7) |      | (17.7–21.6) |      |
| Total maternities                       | 2,268,766   |      | 2,360,309   |        | 2,315,204   |      | 2,197,640   |      | 2,123,614   |      | 1,997,472   |      |

\* *Late* deaths not routinely notified during this triennium;  
\*\* 14 cases with no information



**Figure 1.1** *Direct and Indirect* maternal mortality rates per 100,000 maternities and the effect of improved systems for case ascertainment; United Kingdom 1985–2002

As described in the earlier section on the definition of maternal mortality, Table 1.3 shows, for purposes of international comparison, the UK Maternal Mortality Ratio (MMR), as defined by the World Health Organization.<sup>1</sup> This is defined as the number of *Direct* and *Indirect* deaths per 100,000 live births. In the UK, maternal death rates have been calculated by using maternities, not just live births, after 24 weeks of gestation, as the denominator. The UK maternal death rate also includes causes of death, which, in the opinion of the Assessors, were related to pregnancy, such as suicide from postnatal mental illness, which are not internationally coded as being maternity related. Thus, the UK MMR is lower than the UK maternal mortality rate.

Table 1.4 gives the actual numbers of deaths and Table 1.5 shows the UK maternal death rates per million maternities by specific cause of death for the last six triennia.

**Table 1.3** UK maternal mortality ratio (MMR) 2000–02\* compared with UK maternal mortality rate calculated for this Report

| Type of death   | UK maternal mortality ratio* |       | UK maternal mortality rate** |      |           |
|-----------------|------------------------------|-------|------------------------------|------|-----------|
|                 | <i>n</i>                     | Ratio | <i>n</i>                     | Rate | 95% CI    |
| <i>Direct</i>   | 106                          | 5.3   | 106                          | 5.3  | 4.3–6.4   |
| <i>Indirect</i> | 136                          | 6.7   | 155                          | 7.8  | 6.6–9.1   |
| Total           | 242                          | 12.0  | 261                          | 13.1 | 11.5–14.8 |

\* International definition; the MMR is defined as the number of *Direct* and *Indirect* deaths (identified by ICD10 codes) per 100,000 live births. The denominator here used is the UK total live births for 2000–02 = 2,016,136. Source: ONS. In this calculation the number of *Indirect* deaths are those which are identified as maternal deaths according to ICD10 definitions only.

\*\* The UK maternal mortality rate is defined as the total number of *Direct* and *Indirect* deaths per 100,000 maternities over 24 weeks of gestation. The denominator here used is all maternities registered in the UK (estimated to be 24 weeks of gestation or more). UK 2000–02 = 1,997,472.

Source: ONS. The number of *Indirect* deaths are those deaths considered by the UK assessors to be indirectly related to pregnancy.

**Table 1.4** Number of maternal deaths reported to the Enquiry by cause; United Kingdom 1985–2002\*

| Chapter  | Cause   | 1985–87 | 1988–90 | 1991–93 | 1994–96 | 1997–99 | 2000–02 |
|--|---|---------|---------|---------|---------|---------|---------|
| <i>Direct deaths (occurring during pregnancy and up to and including 42 days inclusive after delivery)</i> |   |         |         |         |         |         |         |
| 2  | Thrombosis and thromboembolism                  | 32      | 33      | 35      | 48      | 35      | 30      |
| 3  | Hypertensive disease of pregnancy               | 27      | 27      | 20      | 20      | 15      | 14      |
| 4  | Haemorrhage                                     | 10      | 22      | 15      | 12      | 7       | 17      |
| 5  | Amniotic fluid embolism                         | 9       | 11      | 10      | 17      | 8       | 5       |
| 6  | Deaths in early pregnancy total                 | 22      | 24      | 18      | 15      | 17      | 15      |
|  | Ectopic   | 16      | 15      | 8       | 12      | 13      | 11      |
|  | Spontaneous miscarriage                         | 5       | 6       | 3       | 2       | 2       | 1       |
|  | Legal termination                               | 1       | 3       | 5       | 1       | 2       | 3       |
|  | Other   | 0       | 0       | 2       | 0       | 0       | 0       |
| 7  | Genital tract sepsis                            | 6**     | 7**     | 9**     | 14***   | 14***   | 11***   |
| 8  | Other <i>Direct</i> total                       | 27      | 17      | 14      | 7       | 7       | 8       |
|  | Genital tract trauma                            | 6       | 3       | 4       | 5       | 2       | 1       |
|  | Fatty liver                                     | 6       | 5       | 2       | 2       | 4       | 3       |
|  | Other   | 15      | 9       | 8       | 0       | 1       | 4       |
| 9  | Anaesthetic                                     | 6       | 4       | 8       | 1       | 3       | 6       |
| Total number of <i>Direct</i> deaths   |   | 139     | 145     | 128     | 134     | 106     | 106     |
| <i>Indirect deaths (up to and including 42 days after delivery)</i>  |   |         |         |         |         |         |         |
| 10   | Cardiac   | 22      | 18      | 37      | 39      | 35      | 44      |
| 11   | Psychiatric                                     | N/A     | N/A     | N/A     | 9       | 15      | 16      |
| 12   | Other <i>Indirect</i>                           | 62      | 75      | 63      | 86      | 75      | 90      |
| 13   | <i>Indirect</i> malignancies                    | N/A     | N/A     | N/A     | N/A     | 11      | 5       |
| Total number of <i>Indirect</i> deaths   |   | 84      | 93      | 100     | 134     | 136     | 155     |
| 14   | <i>Coincidental</i> deaths                      | 26      | 39      | 46      | 36      | 29      | 36      |
| 15   | <i>Late deaths (42–365 days after delivery)</i> |         |         |         |         |         |         |
|  | <i>Direct</i>                                   | N/A     | 13      | 10      | 4       | 7       | 4       |
|  | <i>Indirect</i>                                 | N/A     | 10      | 23      | 32      | 39      | 45      |
|  | <i>Coincidental</i>                             | N/A     | 25      | 13      | 36      | 61      | 45      |
| Total number of <i>Late</i> deaths   |   | 16      | 48      | 46      | 72      | 107     | 94      |

N/A = Not available;  
\* deaths reported to the Enquiry only and excluding other deaths identified by ONS;  
\*\* Excluding early pregnancy deaths due to sepsis;  
\*\*\* Including early pregnancy deaths due to sepsis

## Overall findings 2000–02

- There was an increase in the combined overall maternal mortality rates (*Direct* and *Indirect* deaths) known both to the Registrars General and to this Enquiry. The maternal mortality rate for this triennium, derived from the CEMD data, is 13.1 compared with the 11.4 deaths per 100,000 maternities described in the last Report. There are four factors that could explain this rise:
  - the introduction of the CEMACH Regional Managers and a greater awareness among health professionals in general to report such cases that may not be obviously linked to pregnancy; this appears to have led to a further improvement in case ascertainment, particularly for *Indirect* deaths, which has had the effect of increasing the *Indirect* mortality rate from 6.4 per 100,000 maternities in the last Report to 7.8 in this one
  - the increase in numbers of newly arrived refugees or asylum seekers who did not seek care

**Table 1.5** Mortality rates by major cause of maternal death per million maternities; United Kingdom 1985–2002

| Chapter | Cause                                   | Rate per million maternities |         |         |         |         |         |
|---------|---|------------------------------|---------|---------|---------|---------|---------|
|         |   | 1985–87                      | 1988–90 | 1991–93 | 1994–96 | 1997–99 | 2000–02 |
| 2       | Thrombosis and thromboembolism          | 14.1                         | 14.0    | 15.1    | 21.8    | 16.5    | 15.0    |
| 3       | Hypertensive disease of pregnancy       | 11.9                         | 11.4    | 8.6     | 9.1     | 7.1     | 7.0     |
| 4       | Haemorrhage                             | 4.4                          | 9.3     | 6.5     | 5.5     | 3.3     | 8.5     |
| 5       | Amniotic fluid embolism                 | 4.0                          | 4.7     | 4.3     | 7.7     | 3.8     | 2.5     |
| 6       | Deaths in early pregnancy               | 7.9*                         | 7.6*    | 5.2*    | 6.8     | 8.0     | 7.5     |
| 7       | Genital tract sepsis                    | 4.4                          | 5.5     | 6.4     | 6.4*    | 6.6*    | 5.5*    |
| 8       | Total uterine trauma/other              | 11.9                         | 7.2     | 6.0     | 3.2     | 3.3     | 4.0     |
|         | <i>Direct</i>                           |                              |         |         |         |         |         |
|         | Genital tract trauma                    | 2.6                          | 1.3     | 1.7     | 2.3     | 1.0     | 0.5     |
|         | Other <i>Direct</i>                     | 9.3                          | 5.9     | 4.3     | 0.9     | 2.3     | 3.5     |
| 9       | Anaesthetic                             | 2.6                          | 1.7     | 3.5     | 0.5     | 1.4     | 3.0     |
| 10      | Cardiac <i>Indirect</i>                 | 9.7                          | 7.6     | 15.9    | 17.7    | 16.5    | 22.0    |
| 11      | Psychiatric <i>Indirect</i> **          | –                            | –       | –       | 4.1     | 7.1     | 8.0     |
| 12      | Other <i>Indirect</i>                   | 27.3                         | 31.0    | 27.0    | 39.1    | 35.3    | 45.6    |
| 13      | <i>Indirect</i> malignancies            | –                            | –       | –       | –       | 5.1     | 2.5     |
| 2–13    | Total <i>Direct</i> and <i>Indirect</i> | 98.3                         | 100.1   | 98.1    | 121.9   | 114.0   | 131.1   |
| 14      | <i>Coincidental (Fortuitous)</i>        | 11.3                         | 16.5    | 19.9    | 16.4    | 10.8    | 18.0    |
| 15      | <i>Late</i>                             | 7.1                          | 20.3    | 19.9    | 32.8    | 50.3    | 47.0    |

\* Including sepsis in early pregnancy;  
\*\* until 1993–96 counted as *Coincidental* and note that these are only for suicides which occur during the first 6 weeks. A further explanation of actual death rates from suicide can be found in the text. This table excludes cases identified by ONS but not notified to the Enquiry.

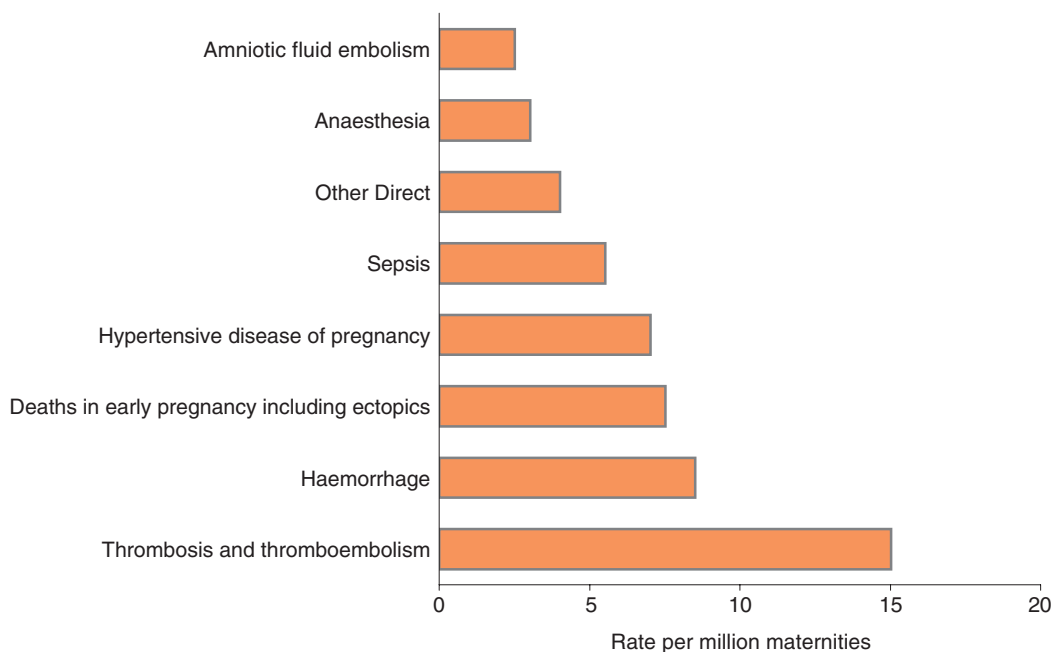
- numbers increasing by chance; this is likely since the increase in the maternal mortality rate is not statistically significant
- an increase in the numbers of pregnant women who received substandard care.
- The *Direct* maternal mortality rate, 5.3 deaths per 100,000 maternities, is also higher than the last triennium, but still lower than in any of the other three preceding triennia for which UK data have been collected. By removing the number of *Direct* deaths of recently arrived refugees or asylum seekers this figure is reduced to 5.1 per 100,000 maternities, which is similar to the rate in the last Report.

### Specific causes of death

Figure 1.2 shows the major causes of maternal deaths reported to the Enquiry by rate per million maternities. The rate for suicide includes deaths reported to the Enquiry that occurred after the first 6 weeks following delivery, as this is a more accurate reflection of the disease profile of severe puerperal illness. Figure 1.3 gives a breakdown of the main causes of the other *Indirect* deaths.

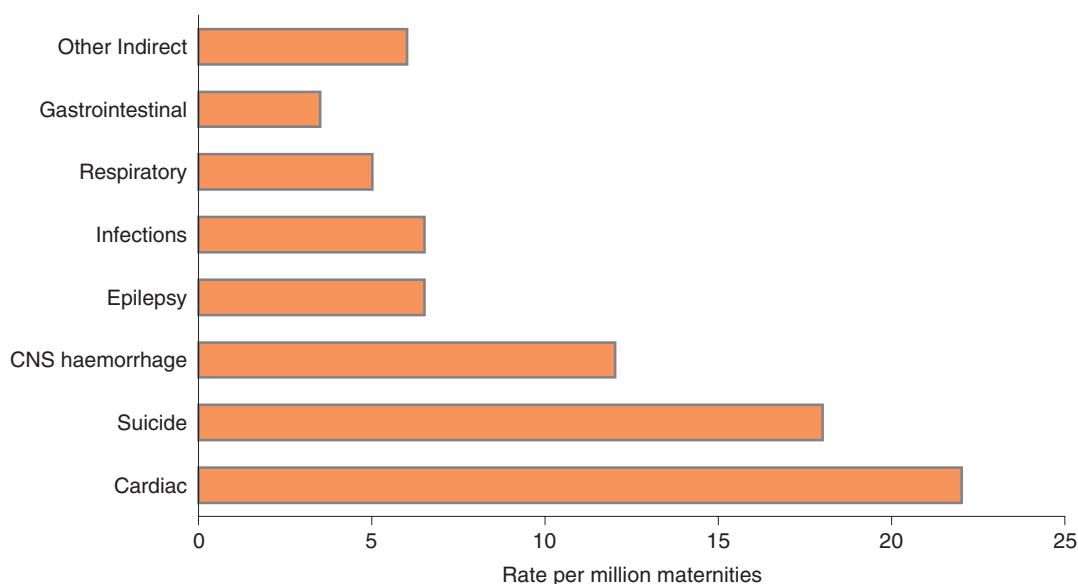
### The ONS birth and maternal death linkage study

In 2001, at the request of this Enquiry, ONS undertook a pilot study to test the feasibility of matching death records of women of fertile age living in England and Wales with birth registrations up to 1 year previously. The aim was to identify deaths of all women

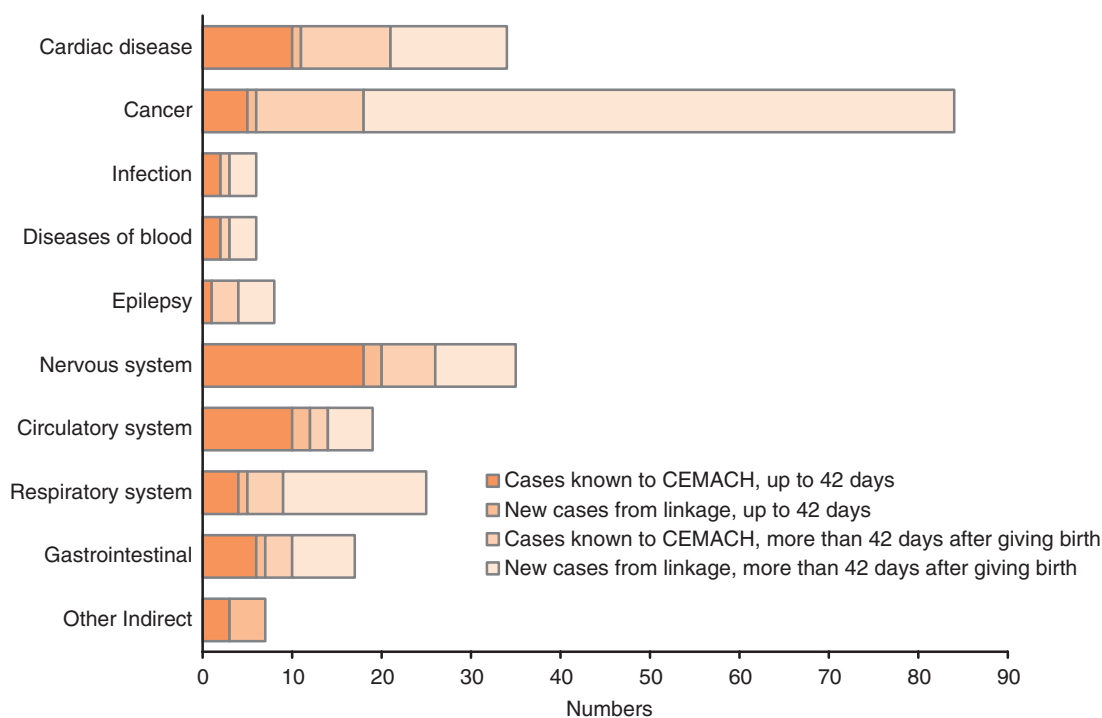


**Figure 1.2** Mortality rates per million maternities of leading causes of *Direct* deaths as reported to the Enquiry; United Kingdom 2000–02

in England and Wales who died within 1 year of giving birth and to see how many additional cases would be found. The methodology was reproduced for this triennia and yet again shows that the majority of these deaths occurred some months after delivery. Over 90% (211) of the extra 230 deaths identified through the survey occurred after the first six weeks following delivery and are classified as *Late* deaths. It is not surprising that these deaths were not reported since, by the time they died, these women would have lost contact with their maternity health professional, the person who reports these



**Figure 1.3** Maternal mortality rate from leading causes of *Indirect* deaths per million maternities as reported to the Enquiry; United Kingdom 2000–02

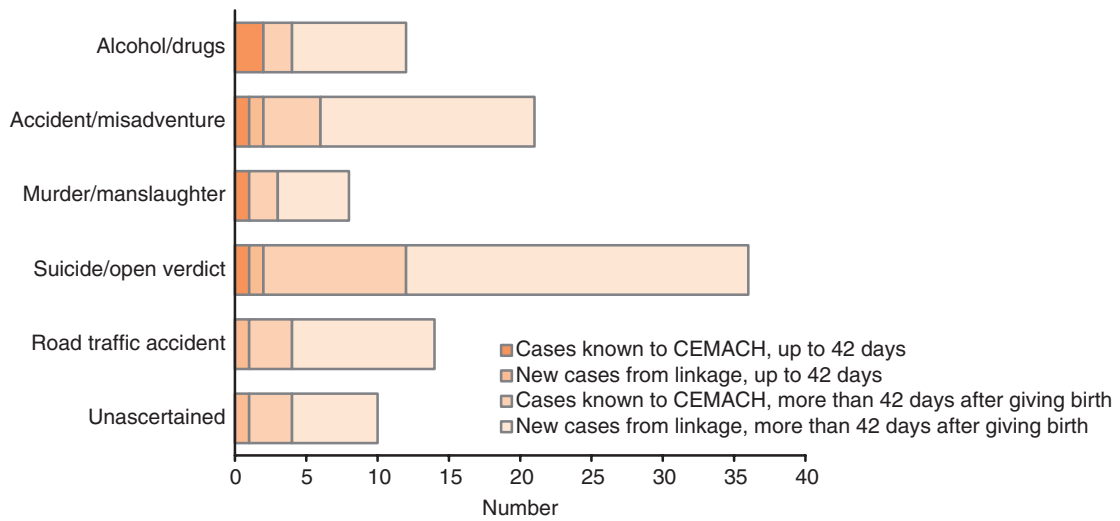


**Figure 1.4** Numbers of maternal deaths, excluding psychiatric and accidental causes, identified by ONS record linkage from *Coincidental* or *Indirect* causes: England and Wales 2000–02

cases. The vast majority of these *Late* deaths were due to *Coincidental Late* causes, mainly cancer as shown in Figure 1.4. However, a significant number were due to psychiatric causes and are discussed in the following paragraph.

### Suicide is the leading cause of maternal death

As in the last Report, the majority of women who committed suicide after childbirth but within 1 year of delivery were not known to the Enquiry. In all, around 50 women in England and Wales were known to have died of suicide or whose deaths were recorded under an open verdict; only 18 of these were known to the Enquiry. The other 32 deaths all took place some months after delivery. Further, another 14 women had verdicts of deaths due to accidental causes or misadventure and another ten died from drugs and/or alcohol and, in both categories, some of these too would have probably been self-inflicted. All of these groups of women would have not been in contact with the maternity healthcare professionals who would have automatically reported these cases, but they may have been in touch with their general practitioner or local psychiatric services. Figure 1.5 shows the additional cases identified for England and Wales from the record linkage study and Figure 1.6 demonstrates the effect that these additional cases have on the overall UK maternal mortality rate if suicides after 42 days after delivery are included. It is important to note that many women who die as a result of puerperal psychosis do so following the first 6 weeks of delivery, the timeframe usually taken to define a maternal death. Although these cases are classed as *Late Indirect* deaths, they are still counted in the overall maternal mortality rate from suicide. Deaths from psychiatric causes, including suicide drug misuse, are discussed in Chapter 11 Deaths from psychiatric causes.

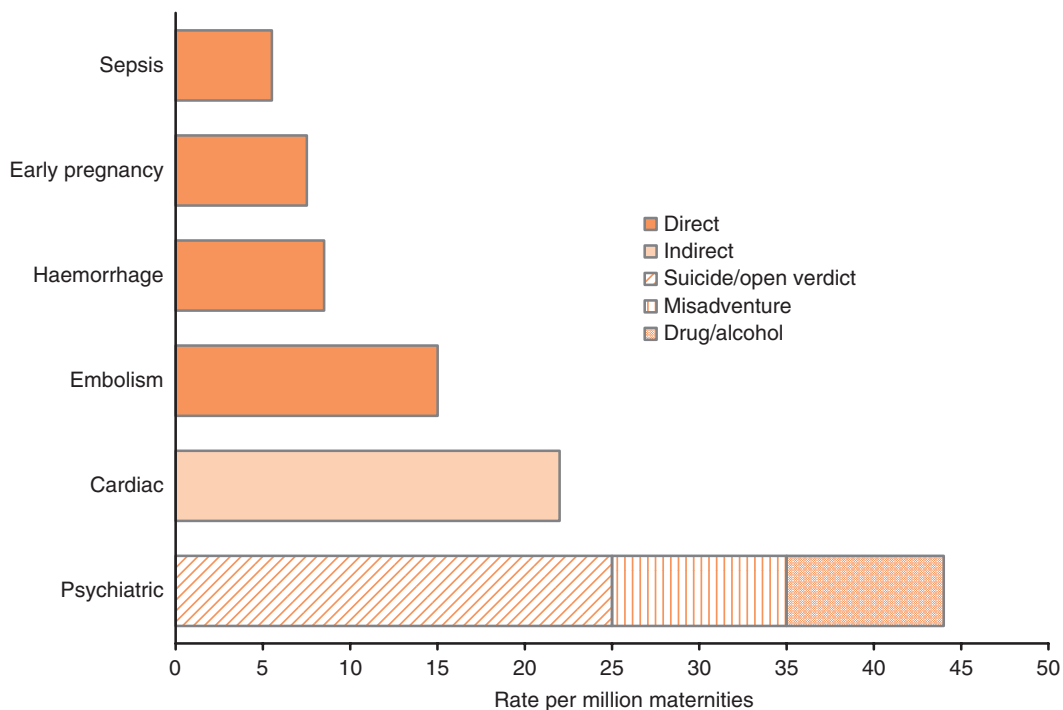


**Figure 1.5** Number of maternal deaths identified by ONS record linkage from psychiatric, accidental, violent or unascertained causes; England and Wales 2000–02

Such is the importance that these Enquiries place on learning lessons from deaths from psychiatric causes that CEMACH has now introduced a system of Regional Psychiatric Assessors to enable better and more detailed case assessment.

### The children left behind

In the 2000–02 triennium, at least 543 known existing children lost their mother to a reported maternal death. In addition, 209 singleton pregnancies resulted in a live birth and of the ten twin pregnancies and one triplet pregnancy there were 20 live births. This



**Figure 1.6** Maternal mortality rate per million maternities from leading causes of death as identified by ONS linkage study for England and Wales; 2000–02

**Table 1.6** Numbers of maternal deaths by gestation, type of death and the fetal/neonatal outcome; United Kingdom 2000–02

|  | Undelivered<br>> 24 weeks* | Undelivered<br>< 24 weeks | Live birth** | Stillbirth** | Early neonatal<br>death** | Total |
|--|----------------------------|---------------------------|--------------|--------------|---------------------------|-------|
| <i>Direct</i>  | 27                         | 1                         | 64           | 8            | 6                         | 106   |
| <i>Indirect</i>                                      | 34                         | 24                        | 67           | 21           | 9                         | 155   |
| Subtotal <i>Direct</i> and<br><i>Indirect</i> deaths | 61                         | 25                        | 131          | 29           | 15                        | 261   |
| <i>Coincidental</i>                                  | 17                         | 12                        | 6            | 1            | 0                         | 36    |
| <i>Late Direct</i>                                   | 0                          | 0                         | 3            | 1            | 0                         | 4     |
| <i>Late Indirect</i>                                 | 4                          | 0                         | 39           | 0            | 2                         | 45    |
| <i>Late Coincidental</i>                             | 3                          | 0                         | 40           | 1            | 1                         | 45    |
| Total  | 85                         | 37                        | 219          | 32           | 18                        | 391   |

\* includes ectopic pregnancies, miscarriages and termination of pregnancy  
\*\* twins and higher order pregnancies counted as one birth event

gives a total of 229 live babies born to women known to this Enquiry who subsequently died. In all, nearly 800 existing and living newborn children lost their mothers during this triennium. The actual number of children who lost their mothers will undoubtedly be higher, as many of the women who comprise the 230 additional *Late* maternal deaths, not notified to this Enquiry but captured through the ONS record linkage study, will also have had existing children as well as their newborn baby. A perhaps conservative estimate is that over 1,100 children lost their mothers within a few months of pregnancy or giving birth.

### Deaths before delivery

As shown in Table 1.6, 86 women died of *Direct* or *Indirect* causes before delivery, 33% of all such maternal deaths. In this group, the main causes of *Direct* deaths were ectopic pregnancy and pulmonary thromboembolism. There were a wide variety of causes of *Indirect* deaths among undelivered women, with deaths from cardiac disease and malignancies among the largest groups.

## Delivery of care

### Antenatal care

Table 1.7 shows the type of antenatal care received by the women described in this Report. In 37% of cases, care was shared between the GP, community or clinic midwife and the obstetrician – so-called traditional ‘shared care’. In many of these cases the woman saw the obstetric staff only once or twice during her antenatal period. For *Direct* and *Indirect* deaths, 61 women (16%), mainly perceived to have been at higher risk of complications, in most instances due to underlying or pre-existing disease, had care provided by the obstetric unit, although they too were often seen at the hospital clinic by the midwife. Sixty-three (16%) women had community-based shared care between midwives and/or GPs, going to the hospital only for scans and other tests. Seventeen percent of women who died from *Direct* or *Indirect* causes did not see an obstetrician until their final admission. In 25 cases, the woman received community-based midwifery-only care, a roughly equal number to the women whose deaths were

**Table 1.7** Maternal deaths by type of antenatal care; United Kingdom 2000–02

| Type of antenatal care                           | Classification of death |              |                         |                  |           | Total (n)  | Overall (%) |
|--|-------------------------|--------------|-------------------------|------------------|-----------|------------|-------------|
|  | Direct (n)              | Indirect (n) | Direct and Indirect (%) | Coincidental (n) | Late (n)  |            |             |
| Consultant-led unit only                         | 18                      | 26           | 17                      | 1                | 16        | 61         | 16          |
| Traditional 'shared care'                        | 32                      | 62           | 36                      | 11               | 41        | 146        | 37          |
| Midwife/GP*                                      | 9                       | 13           | 8                       | 4                | 12        | 38         | 10          |
| Midwife only                                     | 7                       | 9            | 6                       | 2                | 7         | 25         | 6           |
| Concealed pregnancy                              | 2                       | 2            | 2                       | 1                | 0         | 5          | 1           |
| No antenatal care                                | 4                       | 5            | 3                       | 3                | 1         | 13         | 3           |
| Late booker/poor attender                        | 11                      | 27           | 15                      | 4                | 9         | 51         | 13          |
| Death before booking or after miscarriage or TOP | 22                      | 7            | 11                      | 8                | 5         | 42         | 11          |
| Not stated                                       | 1                       | 4            | 2                       | 2                | 3         | 10         | 3           |
| <b>Total</b>                                     | <b>106</b>              | <b>155</b>   | <b>100</b>              | <b>36</b>        | <b>94</b> | <b>391</b> | <b>100</b>  |

\* See text

recorded in the last Report but a substantial rise from the eight cases in the 1994–96 Report.

The characteristics of the 25 women who received midwifery-led care are shown in Table 1.8. In ten cases, the women had no known risk factors or significant past medical or psychiatric history, and were appropriate for low-risk midwifery-led care. In these cases, the midwifery-led care appeared excellent, with problems detected early and appropriate transfers made for specialist care. However, in 15 cases (60% of women receiving midwifery-led care) risk factors were clearly present and the women should have been referred for obstetric or multidisciplinary care either at booking or as soon as potential problems became apparent. Several women with known domestic violence, previously involving social services support, also elected for midwifery-led care but failed to access social service or other local support networks and advice. In two cases of midwifery-led care, the woman declined to be referred to the obstetricians and the midwife providing care, in very difficult circumstances, was supported throughout by her local supervisor of midwives and through regular contact with the local obstetric team.

Eighteen (47%) of the women who had joint midwifery- and GP-led care were also at higher risk of developing a significant medical, obstetric or puerperal mental health problem and should have been referred, at least for assessment, to the local multidisciplinary medical, obstetric or perinatal mental health team.

**Table 1.8** Characteristics of women receiving midwifery only or joint midwifery and GP care; United Kingdom 2000–02

| Characteristic  | Midwifery-led care | Joint GP/midwifery care |
|---|--------------------|-------------------------|
| No known risk factors of past history: appropriate care (n) | 10                 | 20                      |
| Severe domestic violence and known to social services (n)   | 4                  | 2                       |
| Severe previous or concurrent mental illness (n)            | 4                  | 6                       |
| Known pre-existing cardiac disease (n)                      | 3                  | 2                       |
| Obstetric complications with no/late referral (n)           | 1                  | 4                       |
| Significant concurrent medical disorder (n)                 | 3                  | 4                       |
| Total women with one or more characteristic (n)             | 16                 | 22                      |
| Total all women (n)   | 25                 | 38                      |
| Overall inappropriate antenatal care (%)                    | 60                 | 47                      |

**Table 1.9** Maternal deaths by place of delivery over 24 weeks of completed gestation; United Kingdom 2000–02

| Type of death       | Consultant unit | Midwife-led unit | A&E       | ICU      | Hospital other | Home     | Total      |
|---------------------|-----------------|------------------|-----------|----------|----------------|----------|------------|
| <i>Direct</i>       | 74              |                  | 1         |          |                | 3        | 78         |
| <i>Indirect</i>     | 78              | 1                | 14        | 1        | 3              |          | 97         |
| <i>Coincidental</i> | 6               |                  |           |          | 1              |          | 7          |
| <i>Late</i>         | 89              | 2                |           |          |                | 3        | 94         |
| <b>Total</b>        | <b>247</b>      | <b>3</b>         | <b>15</b> | <b>1</b> | <b>4</b>       | <b>6</b> | <b>276</b> |

A&E = accident and emergency department; ICU = intensive care unit

### Place of delivery

The place of delivery for women dying of all causes of death is shown in Table 1.9.

Two women who delivered at home died of postpartum haemorrhage. In both cases they had not sought any care during pregnancy, had delivered and died on their own, and were found later by their relatives. One baby survived. Another woman who died of a coincidental cause some months after delivery had also not sought any antenatal care and delivered at home on the toilet; the baby drowned. There were no other instances where the circumstances of the home birth or delivery in a midwifery-led unit had a direct bearing on the eventual outcome. The 13 women who delivered in accident and emergency departments or elsewhere in the hospital were either brought in undergoing cardiopulmonary resuscitation, had collapsed or had a precipitate delivery.

### Type of delivery

Table 1.10 shows the type of delivery for all maternal deaths occurring after 24 weeks of completed gestation.

The types of caesarean section were classified according to the definitions from the Royal College of Obstetrics and Gynaecology (RCOG) and these are given in Box 1.1.

**Table 1.10** Number of maternal deaths by mode of delivery; United Kingdom 2000–02

| Type of delivery        | <i>Direct</i> | <i>Indirect</i> | <i>Coincidental</i> | <i>Late</i> | <b>Total</b> |
|-------------------------|---------------|-----------------|---------------------|-------------|--------------|
| Spontaneous vaginal     | 19            | 36              | 3                   | 53          | 111          |
| Induced vaginal         | 2             | 4               | 1                   | 7           | 14           |
| Ventouse                | 2             | 3               |                     | 2           | 7            |
| Forceps                 | 3             | 3               |                     | 3           | 9            |
| Vaginal breech          | 2             | 1               |                     |             | 3            |
| Caesarean section       |               |                 |                     |             |              |
| Emergency               | 24            | 13              |                     | 9           | 46           |
| Urgent                  | 2             | 5               |                     | 5           | 12           |
| Elective                | 15            | 14              | 3                   | 15          | 47           |
| Perimortem              | 5             | 14              |                     |             | 19           |
| Postmortem              | 4             | 4               |                     |             | 8            |
| Caesarean section total | 50            | 50              | 3                   | 29          | 132          |
| <b>Total delivered</b>  | <b>78</b>     | <b>97</b>       | <b>7</b>            | <b>94</b>   | <b>276</b>   |

**Box 1.1 RCOG Definition of type of caesarean section**

| Type       | Definition  |
|------------|---|
| Emergency  | Immediate threat to life of woman or fetus                                  |
| Urgent     | Maternal or fetal compromise which is not immediately life threatening      |
| Scheduled  | Needing early delivery but no maternal or fetal compromise                  |
| Elective   | At a time to suit the patient and the maternity team                        |
| Perimortem | Carried out in extremis while the mother is undergoing active resuscitation |
| Postmortem | Carried out after the death of the mother in order to try to save the fetus |

**Caesarean section**

Previous Reports have sometimes included a specific chapter on deaths after caesarean section. The balance of maternal and fetal risks between caesarean section and vaginal delivery is a controversial topic. The 2004 guideline on caesarean section from the National Collaborating Centre for Women’s and Children’s Health on behalf of the National Institute of Clinical Excellence (NICE) does not support planned caesarean sections without clear clinical indications.<sup>2</sup> Others have argued that, within the agenda of maternal choice in maternity care, this is a legitimate option. The risk of maternal death is one of the factors included in estimates of risk–benefit and death rates calculated in previous Reports which have been used to inform this debate.

However, in considering these deaths, it is almost impossible to disentangle the consequences of caesarean section from the indication for the operation. True, there are occasional deaths from anaesthesia or haemorrhage that result directly from the procedure. There are also deaths that may well have been made more likely by the method of delivery, for example from pulmonary embolism. There were several cases in this triennium in which the caesarean section itself may well have contributed to the fatal outcome but, in these cases, the caesarean section itself was undertaken as a possible life-saving measure for the mother and/or her baby. For the large majority of deaths that followed caesarean section, however, there were serious prenatal complications or illness that, in many cases, precipitated the caesarean section. Perimortem caesarean section is the starkest example of this.

Because of these difficulties of interpretation, the authors of this Report decided not to include a separate chapter on caesarean section because of the undue weight this might place on the findings presented here. The caveats discussed here mean that **the simple mortality rates calculated according to method of delivery, shown in Table 1.11, should be interpreted with caution and require further study and interpretation before any meaningful conclusion can be drawn.** It is important to note that, during this triennium, no women died from the direct effects of anaesthesia for a caesarean section undertaken at her request and for which there was no clinical indication.

Table 1.11 was calculated by using Hospital Episode Statistics (HES) data to estimate the overall number of caesarean sections that took place in the United Kingdom between 2000 and 2002. Unfortunately, information on the RCOG classification of the denominator of type of caesarean section is not available. An assumption has been made that

**Table 1.11** Estimated case fatality rates per 100,000 maternities over 24 weeks of gestation and relative risk by type of delivery for *Direct* and *Indirect* deaths; United Kingdom 2000–02

| Type of delivery       | Total number (000s) | Delivered <i>Direct</i> and <i>Indirect</i> deaths (n) | Death rate per 100,000 maternities | 95% CI for death rate | Relative risk (RR) | 95% CI for RR |
|------------------------|---------------------|--|------------------------------------|-----------------------|--------------------|---------------|
| Vaginal                | 1571                | 75   | 48                                 | 3.8–6.0               | 1.0                | –             |
| All Caesarean section  | 426                 | 73   | 172                                | 13.4–21.6             | 3.7                | 2.6–5.0       |
| Emergency and urgent   | 212                 | 44   | 208                                | 15.1–27.9             | 4.3                | 3.0–6.3       |
| Scheduled and elective | 214                 | 29   | 136                                | 9.1–19.5              | 2.8                | 1.9–4.4       |

Source: Derived from the Department of Health Hospital Episode Statistics data for 2000–02

the relative proportion of each type is identical to the previous triennium. This means that the estimates are even less secure.

Further, from the reports available to this Enquiry, there were problems in identifying the correct coding of deaths according to type. For example only seven cases were recorded as urgent and 35 were classified as an emergency. No caesarean sections were classified as scheduled, yet 29 were classified as being elective procedures. In this Report, all the elective caesarean sections were undertaken for clinical reasons but did not need to be performed urgently. These categories have therefore been combined in Table 1.11, which estimates the crude relative risk of the type of caesarean section against all vaginal deliveries where the relative risk of maternal death is taken to be one. Women who had already died or who were undergoing active cardiopulmonary resuscitation are excluded from this table, as the indication for the procedure in their case was a maternal death.

Such is the difficulty in interpreting the data available to the Enquiry that it is recommended urgent further research, in the form of a prospective study, be undertaken in this area. This will help to estimate more robustly what, if any, is the degree of increased risk associated with all types of caesarean section but particularly for those undertaken without urgent or immediate need to save the life of the mother or baby.

Table 1.12 shows the fetal outcomes for peri- or postmortem caesarean sections carried out either while the mother was undergoing active cardiopulmonary resuscitation or after her death had been confirmed. No babies survived a postmortem caesarean section but eight of nineteen babies survived a perimortem caesarean section, including five undertaken in an accident and emergency department. These findings yet again show that, in this and all previous triennia, no baby has survived a postmortem caesarean section. On the other hand, the eight babies who survived a perimortem section represent a significant increase compared to previous Reports. These findings underscore the futility of attempting a postmortem section but indicate that, with improved

**Table 1.12** Outcomes of peri- or postmortem caesarean sections by place of delivery; United Kingdom 2000–02

|                      | A&E | Delivery room or operating theatre | ICU or hospital other | Total |
|----------------------|-----|------------------------------------|-----------------------|-------|
| Live birth           | 1   | 4                                  | 3                     | 8     |
| Still birth          | 12  | 3                                  | 0                     | 15    |
| Early neonatal death | 2   | 1                                  | 1                     | 4     |
| Total                | 15  | 8                                  | 4                     | 27    |

resuscitation techniques, more babies are surviving perimortem caesarean sections, particularly where the woman has collapsed in an already well-staffed and equipped delivery room or operating theatre.

## Risk factors for maternal deaths

### Access to care

#### Poor attendance

Table 1.13 shows that 19% of the women who died of *Direct* or *Indirect* causes did not receive optimum antenatal care, in that they booked late (after 22 weeks of gestation), did not attend for antenatal care at all or were described as poor attenders at the antenatal clinic. As with the 20% of such women identified in the last Report, in the vast majority of cases these women were not actively followed up when they failed to attend the clinic. A disproportionate number of these women came from non-White ethnic groups.

#### Characteristics of women who booked late or who were poor attenders at antenatal clinic.

From Table 1.13 it can be seen that, if *Late* deaths are used as a control, with 11% of these women overall attending for antenatal care less than optimally advised, women who died of *Direct*, *Indirect* or *Coincidental* causes were twice as likely to book late or to be poor attenders for antenatal care. Further analysis by the type of *Late* death (*Direct*, *Indirect* or *Coincidental*) shows no variation in their attendance patterns by type of death for this group of women.

The predominant characteristics of women who booked late or who were poor attenders at clinic are shown in Table 1.14. Virtually all of the women who died from *Direct* or *Indirect* causes were socially excluded. By contrast, an average of eight percent of women who died from *Coincidental* or *Late* causes appeared to be socially excluded.

It can be seen from Table 1.14 that the majority of women who died and who were homeless, refugees or asylum seekers, known to social services or who had previous children in care, were very poor attenders for care. Further, the majority of women

**Table 1.13** Antenatal attendance by type of death; United Kingdom 2000–02

|   | Total deaths | Late booker > 22 weeks | Late booker > 28 weeks | Poor attender at ANC | No antenatal care at all* | Total of late, non or poor attenders (n) | Percentage of all deaths (%) |
|---|--------------|------------------------|------------------------|----------------------|---------------------------|--|------------------------------|
| <i>Direct</i> (n)                           | 106          | 6                      | 2                      | 4                    | 6                         | 18                                       | 18                           |
| <i>Indirect</i> (n)                         | 155          | 7                      | 8                      | 10                   | 7                         | 32                                       | 22                           |
| Total <i>Direct</i> and <i>Indirect</i> (n) | 261          | 13                     | 10                     | 14                   | 13                        | 50                                       | 19                           |
| Total <i>Direct</i> and <i>Indirect</i> (%) |              | 5                      | 4                      | 5                    | 5                         | 19                                       | 19                           |
| <i>Coincidental</i> (n)                     | 36           | 1                      | 1                      | 2                    | 4                         | 8  | 22                           |
| <i>Late</i> (n)                             | 94           | 2                      | 1                      | 6                    | 1                         | 10                                       | 11                           |
| Total (n)                                   | 391          | 16                     | 12                     | 22                   | 18                        | 68                                       | 17                           |

\* excluding early deaths; ANC = antenatal clinic

**Table 1.14** Analysis of women who were late bookers (more than 22 weeks of gestation) or poor or non-attenders by predominant characteristics\*; United Kingdom 2000–02

| Predominant characteristics                              | Direct | Indirect | Coincidental | Late | All | Total number of women in this group | Characteristic for all women in this group (%) |
|--|--------|----------|--------------|------|-----|-------------------------------------|--|
| Homeless/constant change of address                      | 2      | 2        |              | 1    | 5   | 5                                   | 100  |
| Children in care   | 2      | 3        | 1            | 1    | 7   | 8                                   | 88   |
| Refugee/asylum seeker                                    | 5      | 4        |              | 2    | 11  | 14                                  | 79   |
| Known to social services                                 | 4      | 5        | 2            | 3    | 14  | 19                                  | 74   |
| Domestic violence  | 12     | 9        | 11           | 7    | 39  | 55                                  | 71   |
| Little/no English  | 4      | 5        |              |      | 9   | 15                                  | 60   |
| Substance misuse   | 4      | 5        | 2            | 3    | 14  | 32                                  | 45   |
| Extreme poverty  | 4      | 5        |              | 2    | 11  | 25                                  | 44   |
| Past or ongoing severe psychiatric illness               | 3      | 6        |              | 3    | 12  | 60                                  | 20   |
| <b>Ethnic Group (for England only see later section)</b> |        |          |              |      |     |                                     |  |
| Indian/Pakistani   | 4      | 5        |              | 1    | 10  | 17                                  | 59   |
| Black African  | 7      | 6        |              | 1    | 17  | 30                                  | 57   |
| Black Caribbean  |        | 4        | 1            | 1    | 6   | 13                                  | 46   |
| Asian/other  |        | 1        |              |      | 1   | 4                                   | 25   |
| White  | 10     | 10       | 6            | 4    | 30  | 151                                 | 20   |

\* many had more than one characteristic

experiencing domestic violence found it hard to keep in touch with antenatal services, as did almost 50% of the women whose lives were characterised by extreme poverty or substance misuse.

More than 50% of the women who died and who came from ethnic groups other than White or Asian also found it difficult to book at the appropriate time or attended clinics rarely.

HES data show that, in general, women from non-White ethnic groups are twice as likely to book later than 20 weeks of gestation. Late bookers constitute about 11% of the White pregnant population and 20% of the non-White pregnant population. In this Report, 40% of the women from the non-White groups who died from *Direct* causes and 24% of those women who died from *Indirect* causes had not booked by 24 weeks of gestation.

*Women who concealed their pregnancies or who did not attend for any care and were unknown to the antenatal maternity services*

Five women who actively concealed their pregnancies and a further 12 women who did not attend for any antenatal care at all died. The major characteristics of these women are shown in Table 1.15. Four of the five women who concealed their pregnancies were known to social services and three had had their previous children taken into care. Being previously known to social services and having other children in care was the highest risk factor for poor attendance (56%). Fifty percent of the women who did not seek care at all also suffered from partner violence. The lessons to be drawn from the deaths in this group of women are discussed in more detail in Chapter 11 Deaths from psychiatric causes.

All of the women who concealed their pregnancies were White, whereas five of the eleven women who did not attend for antenatal care were from non-White ethnic minority groups. Three were refugees or asylum seekers who did not speak English.

**Table 1.15** Characteristics of women who concealed their pregnancies or who did not attend for antenatal care; United Kingdom 2000–02

|   | Concealed | Did not attend | Total (n) | All deaths (%) |
|---|-----------|----------------|-----------|----------------|
| <b>Type of death</b>  |           |                |           |                |
| <i>Direct</i>   | 2         | 4              | 6         | 6              |
| <i>Indirect</i>   | 1         | 5              | 6         | 4              |
| <i>Coincidental</i>   | 2         | 2              | 4         | 11             |
| <i>Late</i>   | 0         | 1              | 1         | 0.3            |
| Total   | 5         | 12             | 17        | 4              |
| <b>Predominant characteristics (most had had more than one)</b> |           |                |           |                |
| Domestic violence   | 3         | 5              | 8         | 50             |
| Little/no English   | 1         | 3              | 4         | 24             |
| Substance misuse  | 1         | 4              | 5         | 31             |
| Extreme poverty   | 4         | 4              | 8         | 50             |
| Refugee/asylum seeker   | 1         | 3              | 4         | 24             |
| Homeless/constant change of address                             | 2         | 2              | 4         | 24             |
| Grande multipara (more than 4 previous births)                  | 2         | 0              | 2         | 12             |
| Always concealed pregnancies                                    | 2         | 0              | 2         | 12             |
| Previous children in care                                       | 3         | 3              | 6         | 36             |
| Known to social services  | 4         | 5              | 9         | 56             |
| Ethnic group other than White                                   | 0         | 5              | 5         | 31             |

## Substandard care

Substandard care was difficult to evaluate in some of the cases in this Report, owing to the lack of key data from some records and case notes. While it is clear that many of the cases received less than optimum care, it has not always been possible to quantify these with certainty. Box 1.2 gives the definitions of substandard care used in this Report for those cases it was possible to completely assess.

### Box 1.2 Definitions of substandard care used in this Report

|              |   |
|--------------|---|
| <b>Major</b> | Contributed significantly to the death of the mother i.e. different management would reasonably have been expected to alter the outcome     |
| <b>Minor</b> | It was a relevant contributory factor. Different management might have made a difference but the mother's survival was unlikely in any case |

Despite the limitations, the assessors classified 67% of *Direct* deaths as having some form of substandard care, as shown in Table 1.16. This compares with 60% in the last Report. Forty-seven percent of *Direct* deaths had major substandard care in which different treatment may have affected the outcome. Forty-one percent of cardiac deaths were associated with some degree of substandard care, as were 62% of psychiatric deaths and 28% of deaths from *Other Indirect* causes. These figures are shown in Table 1.17 and are all increased from the last Report. By contrast, only about 10% of both *Coincidental* and *Late* deaths had substandard care with 7% in each category being classified as major. The concerns about the care of these cases were a lack of liaison and communication between the health and social services in providing support for vulnerable young girls and in lack of multidisciplinary or coordinated care.

**Table 1.16** Numbers and percentage of *Direct* deaths assessed as having substandard care; United Kingdom 2000–02

| Cause of death and chapter number | Major substandard care (n) | Minor substandard care (n) | Total cases in chapter (n) | Overall substandard care |     |
|-----------------------------------|----------------------------|----------------------------|----------------------------|--------------------------|-----|
|                                   |                            |                            |                            | (n)                      | (%) |
| 2. Thrombosis                     | 12                         | 5                          | 30                         | 17                       | 57  |
| 3. Hypertension                   | 6                          | 1                          | 14                         | 7                        | 50  |
| 4. Haemorrhage                    | 10                         | 2                          | 17                         | 12                       | 71  |
| 5. Amniotic fluid embolism        | 0                          | 3                          | 5                          | 3                        | 60  |
| 6. Early pregnancy                | 10                         | 0                          | 15                         | 10                       | 67  |
| 7. Sepsis                         | 2                          | 8                          | 13                         | 10                       | 77  |
| 8. Other <i>Direct</i>            | 4                          | 2                          | 8                          | 6                        | 75  |
| 9. Anaesthetic                    | 6                          | 0                          | 6                          | 6                        | 100 |
| Total                             | 50                         | 21                         | 106                        | 71                       | 67  |

The specific cases and lessons to be learned are discussed in the relevant chapters of this Report and lessons are highlighted and reflected in the recommendations.

With the introduction of the new CEMACH Regional Managers it is anticipated that more complete case notes will be available for the next Report, thus enabling a greater degree of accuracy in the assessment of these cases.

Table 1.18 gives the percentage change of cases with substandard care compared with the last Report. The increase, particularly in the proportion of cases of *Indirect* deaths with substandard care, is worrying and requires more detailed consideration and assessment in future Reports. Several assessors were concerned that, in their opinion, there appeared to have been an increase in some healthcare professionals failing to identify and manage common medical conditions or potential emergencies outside their immediate area of expertise. This message is repeated in several chapters in this Report.

Overall, many of the main causes of substandard care remain unchanged from previous Reports and while they are discussed in more detail in the individual chapters in this Report, they are also summarised below. Some are due to problems in the system of healthcare delivery, such as lack of intensive care beds or problems with blood supplies, but in the main the faults lie at the professional level within facilities. The four bullet

**Table 1.17** Numbers and percentage of *Indirect* deaths assessed as having substandard care; United Kingdom 2000–02

| Cause of death and chapter number | Major substandard care (n) | Minor substandard care (n) | Total cases in chapter (n) | Overall substandard care |     |
|-----------------------------------|----------------------------|----------------------------|----------------------------|--------------------------|-----|
|                                   |                            |                            |                            | (n)                      | (%) |
| 10. Cardiac                       | 9                          | 9                          | 44                         | 18                       | 41  |
| 11. Psychiatric*                  | 5                          | 5                          | 16                         | 10                       | 62  |
| 12. Other <i>Indirect</i>         | 15                         | 10                         | 90                         | 25                       | 28  |
| 13. Cancer**                      | 2                          | 1                          | 5                          | 3                        | 60  |
| Total                             | 31                         | 25                         | 155                        | 56                       | 36  |

\* Only includes deaths from suicide and drug overdose classified as *Indirect*  
\*\* Only includes deaths from cancer classified as *Indirect*

**Table 1.18** Percentage change in cases of *Direct* and *Indirect* deaths associated with substandard care; United Kingdom 1997–2002

|                     | 1997–99 (%) | 2000–02 (%) |
|---------------------|-------------|-------------|
| <i>Direct</i>       |             |             |
| Major               | 50          | 47          |
| Minor               | 10          | 20          |
| Total               | 60          | 67          |
| <i>Indirect</i>     |             |             |
| Major               | 13          | 20          |
| Minor               | 9           | 16          |
| Total               | 22          | 36          |
| <i>Coincidental</i> | 10          | 10          |
| <i>Late</i>         | 10          | 10          |

points in bold are new findings relating to this Report:

- **failure of some obstetric and midwifery staff to recognise and act on medical conditions outside their immediate experience**
- **failure of accident and emergency staff to recognise the severity of the illness in sick pregnant women and to ask for obstetric or midwifery assessment**
- **lack of active follow-up of women who were known not to attend for antenatal care, particularly for those women with known high risk conditions**
- **failure of GPs and other medical specialists to pass on relevant past or current medical information in referral letters or by telephone to the booking clinics or to maternity health care staff during pregnancy**
- lack of communication and teamwork, both within the obstetric and midwifery teams and in multidisciplinary team working
- failure to appreciate the severity of the illness, suboptimal treatment or to call for senior assistance
- wrong diagnoses or treatment
- failure of junior staff or general practitioners to diagnose or refer the case to a senior colleague or hospital
- failure of consultants to attend and inappropriate delegation of responsibility
- lack of immediate access to intensive care or high dependency beds or to blood supplies
- in some units, the continuing lack of a clear policy for the prevention or treatment of conditions such as pulmonary embolism, eclampsia or massive haemorrhage.

### Care in accident and emergency departments

While, in some cases, the standard of care or resuscitation that women received from accident and emergency departments was excellent, regrettably 14 women with significant obstetric or medical problems in pregnancy were mismanaged by the staff of the

departments they attended. A number of other women had more minor incidences of substandard care. Concerns over the lack of appropriate diagnosis and care in some accident and emergency departments has been a growing trend over the previous two Reports but is now significant enough to warrant a separate section as a possible risk factor for maternal deaths. Many of the lessons from these cases are discussed in the relevant chapters of this Report but the overall lessons to be learned are drawn together here. Examples of poor care include:

An obviously pregnant woman who could not speak English was taken by her friends to the local accident and emergency department with a history of what seemed like fits; an unequivocal symptom of an obstetric emergency. She was seen by the triage nurse who, despite recording a raised blood pressure, assessed her as not to be an urgent case and placed her in a side ward. She was not reviewed again and was found dead some hours later.

A woman with abdominal pain that proved to be an ectopic pregnancy was classed as a low priority by another triage nurse. She, too, waited for several hours without seeing a doctor and collapsed and died.

A woman with a suspected pulmonary embolism in pregnancy was left on a trolley in the accident and emergency department for more than 24 hours and was then discharged, having been shown how to inject herself with low-molecular-weight heparin. She was neither admitted nor seen by or referred to an obstetrician.

### **Box 1.3 Accident and emergency department recommendations**

- All pregnant women attending accident and emergency departments should be seen quickly, by a doctor, and those with anything other than very minor physical injuries should be seen in conjunction with an obstetrician or senior midwife. If these are not available on site then arrangements should be made with the local maternity unit to discuss these cases.
- The care of pregnant women with medical conditions requiring treatment, and particularly hospital admission, should be discussed and planned in conjunction with the local obstetric team.
- All women of childbearing age who present with unexplained abdominal pain should have ectopic pregnancy excluded as part of their diagnostic work up. Dipstick testing for hCG is now quick, easy, and sensitive.
- Clinicians and staff in primary care and accident and emergency departments, in particular, need to be aware of atypical clinical presentations of ectopic pregnancy and especially of the way in which it may mimic gastrointestinal disease.
- Individual obstetric units should develop protocols for the management of pregnant women who are acutely ill/collapsed for non-obstetric reasons. This must involve liaison with emergency services and accident and emergency departments regarding the most appropriate site (accident and emergency departments, local delivery suite or another hospital) to ensure women receive speedy resuscitation.

The general failings in accident and emergency departments can be summarised as:

- failure by the triage nurses to recognise warning symptoms of obstetric emergencies, including ectopic pregnancies, resulting in a few women being assessed as low risk and not being seen by any medical staff before they collapsed and died
- failure by junior accident and emergency staff and senior medical staff to recognise the warning symptoms of obstetric emergencies, including ectopic pregnancies, resulting in failure of accident and emergency department senior staff and other consultants to involve the obstetric department over planning care for very sick women; pregnant women were discharged home or admitted and treated, sometimes for a week or longer, without their obstetrician or midwife ever being informed
- excessively long waits for clearly ill pregnant women to be seen by medical staff or be admitted.

As a result of the current findings, the recommendations made in previous Reports have been strengthened; restated here and given in Box 1.3. CEMACH is also appointing an assessor for accident and emergency departments to be part of this Enquiry.

## Ethnicity

As ONS data for the ethnic group of the mother are confined to country of birth, it is not possible to calculate directly the maternal death rates by ethnic group, as many mothers will be second- third or more generation women born in the UK. Ethnic group information is now being collected as part of the HES system for England, but it is not complete for the years covered by this Report. There was 67% HES coverage of births by ethnic group for the period 2000–02.

Using the 2000–02 distribution by ethnic group as a best estimate for the period covered by this Report leads to the estimates of maternal death rates by ethnic group for England only. Unlike the last Report where the specific coding was often incomplete and the ONS codes for Black African, Black Caribbean, Black Other and Black Mixed were grouped together, in this Report the category Black African has been separated out, as these women have by far the greatest risk of maternal death. Table 1.19 shows the estimated rate of maternal death by major ethnic group classifications for 2000–02.

**Table 1.19** Number and estimated rates of maternal deaths by type and ethnic group: *England only* 2000–02

| Ethnic group     | Estimated number of maternities | Direct deaths* (n) | Indirect deaths* (n) | Total Direct and Indirect deaths (n) | Estimated rate per 100,000 maternities | 95% CI for death rate | Relative risk | 95% CI for RR |
|------------------|---------------------------------|--------------------|----------------------|--------------------------------------|--|-----------------------|---------------|---------------|
| White            | 1,407,352                       | 58                 | 93                   | 151                                  | 10.7                                   | 9.1–12.6              | 1.0           |               |
| Black African    | 41,615                          | 13                 | 17                   | 30                                   | 72.1                                   | 48.6–102.9            | 6.7           | 4.5–9.9       |
| Black Caribbean  | 50,463                          | 7                  | 6                    | 13                                   | 25.8                                   | 13.7–44.1             | 2.4           | 1.4–4.2       |
| Pakistani        | 81,052                          | 7                  | 3                    | 10                                   | 12.3                                   | 5.9–22.7              | 1.2           | 0.6–2.2       |
| Indian           | 45,157                          | 2                  | 5                    | 7                                    | 15.5                                   | 6.2–31.9              | 1.4           | 0.7–3.1       |
| Bangladeshi      | 35,626                          | 3                  | 5                    | 8                                    | 22.5                                   | 9.7–44.2              | 2.1           | 1.0–4.3       |
| Asian and Others | 70,136                          | 3                  | 1                    | 4                                    | 5.7                                    | 1.6–14.6              | 0.5           | 0.2–1.4       |
| Non white        | 231,971                         | 35                 | 37                   | 72                                   | 31.0                                   | 24.3–39.1             | 2.9           | 2.2–3.9       |
| Total            | 1,639,323                       | 93                 | 130                  | 223                                  | 13.6                                   | 11.9–15.5             |               |               |

\* includes 10 Black African refugee/asylum-seeking women; excluding these women gives a maternal deaths rate for Black African women in England of 48 per 100,000 maternities

As Table 1.19 shows, there was a statistically increased risk of maternal mortality for women from the Black African and Black Caribbean ethnic groups. Of these, by far the largest proportion of deaths was in Black African women. These women are seven times more likely to die than White women and three times more likely to die than Black Caribbean or other Black women and those of Bangladeshi origin. Excluding deaths from Black African refugees and asylum seekers reduces the overall risk to four-fold, still the highest risk group in terms of ethnicity for maternal death. These are discussed further below. While rates for women from India, Bangladesh and Pakistan appear to be slightly increased when compared with the rates for White women, these are not statistically significant.

These findings need to be interpreted with some caution, owing to the small numbers involved and coding difficulties. However, from the other data available to this Enquiry, the relative risk of death among all groups of women appears to be related to their health-seeking behaviour, with women who did not access care, from whatever ethnic background, being at most risk. Cultural differences also appeared to have played a part.

### Asylum seekers and recent immigrants

Fourteen women were recently arrived in the UK, of whom ten could be classified as refugees or asylum seekers. Of these, only three were known to be pregnant on arrival. Among this group there were seven *Direct* deaths, five *Indirect* deaths and two *Late* deaths. Four of these women did not access antenatal care at all, five booked after 28 weeks of gestation and another two were very poor attenders for care. Eight did not speak English and only three received timely and appropriate care. Of the women who had little or no access to antenatal care, all but one presented late with an acute obstetric emergency which, in the main, was treated appropriately. However, in two cases care was substandard.

### Translation

Fifteen women did not speak English and only two had access to translation services. In the other cases, family members were used as interpreters. Several of these were the woman's own children, who may have been the only family members who could speak English, having learned it at school. As with the last Report, the use of family members as translators causes concern because:

- the woman may be too shy to seek help for intimate concerns
- it is not clear how much correct information was conveyed to the woman, as the person who was interpreting did not have a good grasp of the language or may have withheld information in those cases where the woman's pre-existing medical condition meant she was at significant risk
- in some cases, the translator was a perpetrator of domestic violence against his partner, thus not enabling her to ask for advice or help
- it is not appropriate for a child to translate intimate details about his or her mother and unfair on both the woman and child.

### National Statistics Socio-Economic Classification

From 2001, the National Statistics Socio-Economic Classification (NS SEC) has replaced social class in all official statistics in the United Kingdom. To calculate the NS SEC, the occupational code of either the husband or partner of the woman was classified into the three-class version of NS SEC. Single mothers were identified as having no partner.

The United Kingdom maternity denominators have been derived by using a 10% sample of live births for England and Wales coded by NS SEC (based on father's occupation) and 100% of live births coded by NS SEC from Scotland and Northern Ireland. Similar maternity denominators for single mothers were derived using sole registration live births data. The proportions for NS SEC and single mothers were then applied to the 2000–02 UK maternity total (1,997,472).

The results, for the cases for which information was available, are shown in Table 1.20. A true comparison with the findings in the previous Report 1997–99 is not possible. However, women in the lower NS SEC categories still have a higher risk of maternal death. Women from the 'Not Classified' group appear to have almost a 20 times greater risk of dying of *Direct* and *Indirect* causes compared with women in 'Managerial and Professional occupations'. The "Not Classified" group includes all those who were described as unemployed. Single mothers have a three times greater risk of maternal death than women with a husband or partner. Although not directly statistically comparable with the last Report, findings by NS SEC are remarkably similar to those calculated using the old social class definitions given in the last Report. This inequality could be seen for all causes of maternal death apart from suicide, which showed little gradient.

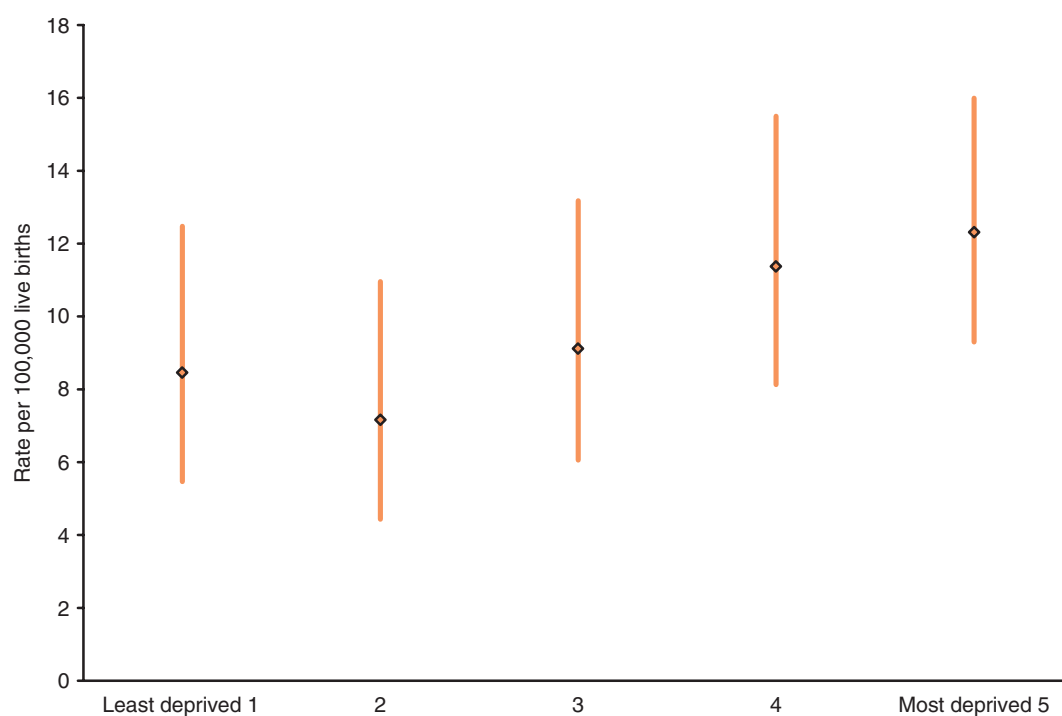
### Deprivation classification

For the first time, maternal deaths that occurred to residents of England have been analysed using the 2004 English Indices of Multiple Deprivation. This is a measure of multiple deprivation that is experienced by individuals living in an area (for further details, see: [www.odpm.gov.uk/stellent/groups/odpm\\_urbanpolicy/documents/page/odpm\\_urbpol\\_](http://www.odpm.gov.uk/stellent/groups/odpm_urbanpolicy/documents/page/odpm_urbpol_)

**Table 1.20** Maternal deaths by National Statistics Socio-Economic Classification (NS SEC); United Kingdom 2000–02

| NS SEC  | <i>Direct</i> deaths (n) | <i>Indirect</i> deaths (n) | Total (n) | Maternal mortality rate* | 95% CI    |
|---|--------------------------|----------------------------|-----------|--------------------------|-----------|
| <b><i>Based on husband's/partner's occupation</i></b> |                          |                            |           |                          |           |
| Managerial and professional occupations               | 10                       | 18                         | 28        | 4.1                      | 2.7–5.9   |
| Intermediate occupations                              | 11                       | 18                         | 29        | 8.3                      | 5.5–11.8  |
| Routine and manual occupations                        | 27                       | 24                         | 51        | 7.0                      | 5.2–9.2   |
| Not classified**                                      | 24                       | 41                         | 65        | 76.7                     | 59.2–97.7 |
| Total   | 72                       | 101                        | 173       | 9.3                      | 7.9–10.7  |
| <b><i>Single mothers</i></b>                          |                          |                            |           |                          |           |
| Total   | 90                       | 126                        | 216       | 10.8                     | 9.4–12.3  |

\* per 100,000 maternities  
 \*\* includes the following pseudo code definitions: Inadequately described conditions; Retired; Students; Independent means; Permanently sick; Full-time care of the home and/or dependent relatives, voluntary workers; No previous job; Unemployed person with no other information



**Figure 1.7** Maternal death rates and 95% confidence intervals by deprivation quintiles; England 2000–2002

029534.pdf). There were 187 maternal deaths in England and 170 of these had a valid postcode at the time of death. A deprivation score was assigned to each woman using the postcode. The scores were then grouped into quintiles.

Figure 1.7 shows the maternal (*Direct* and *Indirect*) mortality rate in England by deprivation quintiles. This shows that there is a strong correlation between deprivation and maternal deaths. Women living in the most deprived areas of England had a 45% higher death rate compared with women living in the most affluent areas.

### Domestic violence

Fifty-one (13%) of the 391 women whose deaths were assessed had either self-reported a history of domestic violence to a healthcare professional caring for them or the abuse was already known to health and social services. Domestic violence was fatal for 12 women. Thirty-two of the other 39 deaths where the women were known to have suffered violence were due to either *Direct* or *Indirect* causes. Among *Coincidental* and *Late* deaths, 6% and 10%, respectively, were in women known to be subject to domestic violence. This percentage is undoubtedly an underestimate of the true prevalence of violence among this group of women, as in none of the 391 cases was a history of violence actively sought through routine questioning as part of the social or family history at booking.

Seven of the nine girls or young women aged less than 18 years who died were in violent, dependent relationships and four had been sexually abused in the past. Three of the girls who had suffered sexual abuse were aged 16 years or under. Five of these women were living in or had recently lived in refuges.

The characteristics of domestic violence in relation to pregnancy are discussed in more detail in Chapter 14 but, as in the last Report, one of the major findings was that 64%

**Table 1.21** Deaths in women known to be suffering domestic violence (DV) and who were delivered or 22 weeks pregnant or more; United Kingdom 2000–02

|                     | Total deaths in women with DV (n) | Late booker > 22 weeks (n) | Poor attender at ANC (n) | No antenatal care at all (n) | Total of late or non attenders (n) | Total poor or non-attendance in women with known DV (%) |
|---------------------|-----------------------------------|----------------------------|--------------------------|------------------------------|------------------------------------|---|
| <i>Direct</i>       | 13                                | 4                          | 4                        | 2                            | 10                                 | 77  |
| <i>Indirect</i>     | 12                                | 3                          | 2                        | 1                            | 6                                  | 50  |
| Murdered            | 11                                | 4                          | 3                        | 3                            | 10                                 | 90  |
| <i>Other</i>        |                                   |                            |                          |                              |                                    |   |
| <i>Coincidental</i> | 2                                 | 1                          |                          |                              | 1                                  | 50  |
| <i>Late</i>         | 9                                 | 1                          | 4                        |                              | 5                                  | 55  |
| Total               | 51                                | 13                         | 13                       | 6                            | 32                                 | 64  |

of women in abusive relationships found it difficult to access or maintain contact with antenatal care services. Table 1.21 shows more detailed characteristics of this. This table also shows that the rates for late booking, poor or no attendance at all were even higher among women who were murdered or who died of *Direct* causes.

### Substance misuse

Thirty-one women died during 2000–02 whose deaths were known to be associated with problem drug and/or alcohol use, although this may not have been the final cause of their death. Their deaths and the lessons to be drawn from these are discussed in Chapter 11B Drug and/or alcohol misuse in pregnancy.

Fifteen of these women were known by maternity services to have a drug and/or alcohol problem. Only three women were managed within integrated multidisciplinary services according to best practice guidelines. The remainder appeared to have been managed within mainstream services. In three cases, it was recorded that a specialist midwife contributed to care with inputs that ranged from regular support to a single consultation. These women also attended addiction and/or social services but did so in parallel with no inter-agency liaison. Some other women attending mainstream services were also referred to addiction services.

### Obesity

Seventy-eight women (35%) who died from *Direct* or *Indirect* causes were classified by the assessors as obese with a body mass index (BMI) of 30 or more and, of these, over 20 were morbidly obese (BMI 35 or greater). Thirty-five percent of women who died from *Direct* causes were obese as were 26% of those who died from *Indirect* deaths. On average, 29% of women who suffered a *Direct* or *Indirect* maternal death were obese. This compares with 23% of the general female population of childbearing age in England as described in Chapter 21 Trends in reproductive epidemiology.

Several of these women were so obese that they required special equipment to help at their delivery and, in a few cases, caesarean sections had to be performed on normal beds, as the weight of the woman exceeded the maximum weight for the operating table. This is discussed more in Chapter 18 Midwifery practice.

**Table 1.22** Maternal mortality rate for multiple births; United Kingdom 1997–2002

|           | Maternities (n) | Direct and Indirect deaths |                              |           |
|-----------|-----------------|----------------------------|------------------------------|-----------|
|           |                 | (n)                        | Rate per 100,000 maternities | 95% CI    |
| Singleton |                 |                            |                              |           |
| 1997–99   | 2,093,965       | 234                        | 11.2                         | 9.8–12.7  |
| 2000–02   | 1,967,834       | 255                        | 13.0                         | 11.5–14.6 |
| Multiple  |                 |                            |                              |           |
| 1997–99   | 30,578          | 8                          | 26.2                         | 13.3–51.6 |
| 2000–02   | 29,638          | 6                          | 20.2                         | 9.3–44.2  |

### Multiple pregnancies

Eleven women had multiple pregnancies: ten sets of twins and one set of triplets. Five deaths were due to *Direct* causes, three were *Coincidental* and three *Late*. One of the three *Late* deaths was *Indirect*. In the previous Report, eight of the eleven deaths associated with multiple pregnancy were considered to be directly or indirectly associated with pregnancy. Table 1.22 shows that these differences are compatible with random variation, but this may be a consequence of the small numbers of women with multiple pregnancies.

### Infertility

Eight women were known to have undergone in vitro fertilisation (IVF) for infertility, four resulting in a multiple pregnancy. Each of these deaths was from a different cause. Five were from *Direct* and three were from *Indirect* causes of deaths. Thus, all eight deaths were considered to be directly or indirectly associated with pregnancy. Figures from the Human Fertilisation and Embryology Authority (HFEA), which are published on a financial year basis, show that for the three financial years April 1999 to April 2002, there were 21,424 IVF maternities. Using these data as a proxy for January 2000 to December 2002, the period of this Report, gives an estimated maternal mortality rate of 37.3 per 100,000 IVF maternities with 95% confidence limits from 18.9 to 73.7 per 100,000 IVF maternities. The estimated rate for the last Report was 48.4 per 100,000 maternities, with 95% confidence limits from 26.3 to 89.1 per 100,000 maternities. Thus, no difference was detected between the mortality rates for women undergoing IVF in the two triennia but, in both triennia, the rates were well above the overall rates of *Direct* and *Indirect* maternal deaths and those for singleton pregnancies.

### Age

Maternal mortality is closely related to maternal age, as shown in Table 1.23 and Figure 1.8. For more robust analysis, the rates have been calculated for all maternal deaths by age between the years 1985 and 2002. In this triennium, the youngest woman was 15 years and the oldest 54 years of age.

### Parity

While there is a strong association between maternal deaths and age, the association with parity is now much less clear. This may be due to the smaller number and proportion

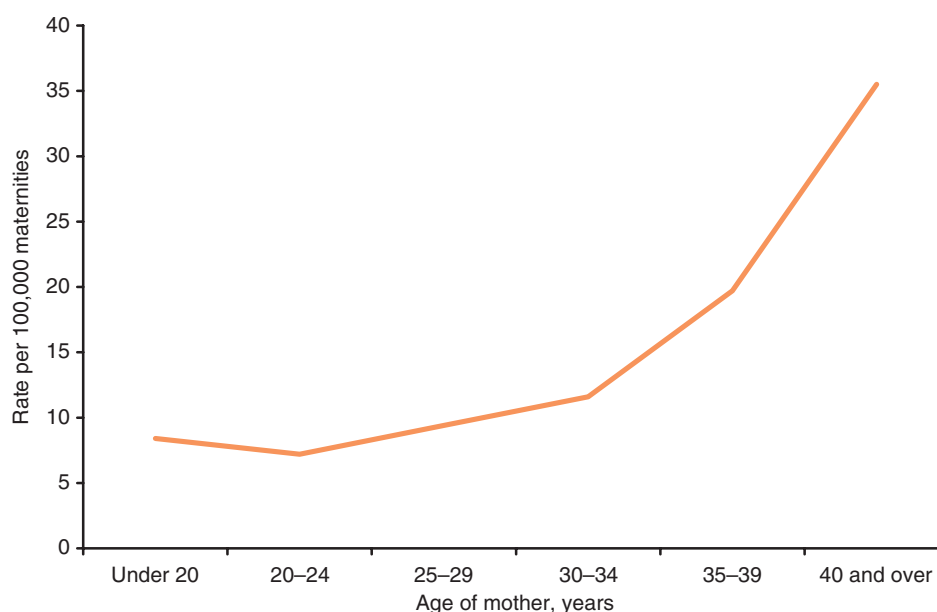
**Table 1.23** Total number of *Direct* and *Indirect* deaths by maternal age; United Kingdom 1985–2002, and rate per 100,000 maternities\*

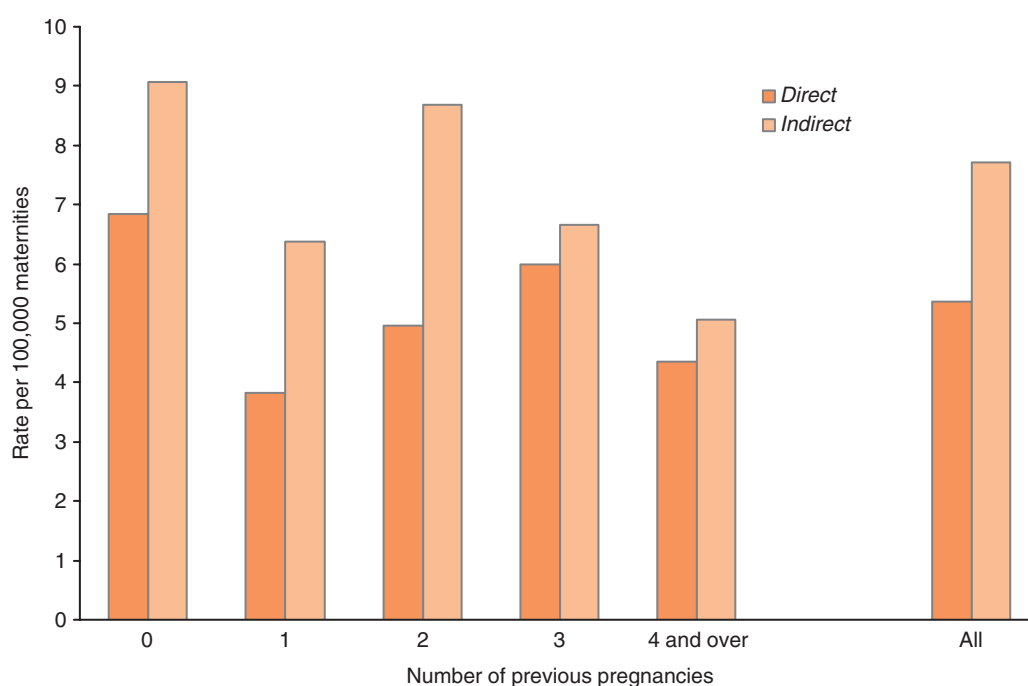
| Age (years) | 1985–87 | 1988–90 | 1991–93 | 1994–96 | 1997–99 | 2000–02 | Overall 1985–2002 |      |           |
|-------------|---------|---------|---------|---------|---------|---------|-------------------|------|-----------|
|             |         |         |         |         |         |         | Total             | Rate | 95% CI    |
| < 20        | 15      | 17      | 7       | 15      | 19      | 16      | 89                | 8.6  | 6.9–10.6  |
| 20–24       | 47      | 38      | 30      | 40      | 34      | 30      | 219               | 7.3  | 6.4–8.3   |
| 25–29       | 53      | 74      | 87      | 71      | 60      | 70      | 415               | 8.6  | 8.5–10.4  |
| 30–34       | 60      | 57      | 61      | 70      | 66      | 79      | 393               | 11.7 | 10.6–13.0 |
| 35–39       | 35      | 31      | 35      | 53      | 50      | 47      | 251               | 19.6 | 17.4–22.2 |
| 40+         | 13      | 18      | 7       | 11      | 13      | 19      | 81                | 35.5 | 28.5–44.1 |
| Not stated  | 0       | 0       | 1       | 8       | 0       | 0       | 12                |      |           |
| Total       | 223     | 238     | 228     | 268     | 242     | 261     | 1460              | 11.0 | 10.5–11.6 |

of women having four or more children in the 21st century. The apparent relationship reported in the last Report, suggesting that increasing death rates with increasing parity were sustained, was based on an incorrect analysis. The figures for the current triennium and for each of the three previous triennia show that the lowest maternal death rates occur for women who have had one previous maternity. Over the whole 12-year period, the mortality rate for women with one previous maternity has been about three-quarters of the overall rate. The rates for women whose parity is three or more have been about one-third higher than the overall rate during this period, but these rates are based on very small numbers and vary considerably between triennia. The findings for 2000–02 are shown in Figure 1.9.

### Marital status

Fifty percent of the women who had a *Direct* or *Indirect* maternal death in 2000–02 were known to be married at the time of death and a further 32% were living in a stable relationship. Of the 18% of deaths that occurred in women who did not have a partner,

**Figure 1.8** Maternal mortality rate, *Direct* and *Indirect* deaths, by maternal age; United Kingdom 1985–02



**Figure 1.9** Maternal mortality rates by parity; United Kingdom 2000–02

more than 50% were in women who lived alone and appeared to be unsupported by their families.

## The healthcare workers who helped report cases

It is easy to forget, when reviewing these sad events, that every healthcare worker who knew or was involved in providing care for these women would have been affected by their death. The individual comments made by many professionals in the course of this Enquiry bear this out. Many had never come across a maternal death before in the course of their career and all hope they would not do so again. A very few had to manage more than one in their Trust, due entirely to the play of chance, and the impact of several deaths in a short period of time was immensely distressing for them.

These are rare events that have a huge and long-lasting impact on the staff involved. Many professionals in this triennium reported having changed local protocols or personal practice as a result, particularly in relation to deaths from *Indirect* causes, and others say that they have learned valuable personal lessons as well:

“She taught me the true meaning of maternal choice.”

“I never really understood the importance of “just being there” before. Holding the hand of such a brave woman was a true privilege.”

“I have struggled to cope with the death of X and her baby. I have learnt only that sometimes things go wrong unexpectedly. My care of X was good and I do not feel I could have done anything differently. But this thought does not make me feel any better.”

Sadly, other health professionals appeared to have taken the blame for events outside their control. For example:

“I did my best but it just wasn’t good enough. I am wondering if I am in the right job.”

“I decided as a result to give up my career. I was not suitable for the job and she died as a result. I blame myself constantly. I did not have the necessary knowledge and I am now looking for less stressful work.”

In both of these cases, but particularly the latter, the Assessors were greatly saddened, as they considered the care these professionals had provided was exemplary and that the failings in the system were totally outside the control of these workers. Nevertheless, these and others have reported taking unwarranted blame and feeling guilt without being offered support and counselling to help them come to terms with their own reactions. Chapter 9 Anaesthesia also reports that:

“Supportive counselling of anaesthetic personnel involved in a maternal death is essential. It should be remembered that such an event represents a tragedy not only for the mother’s family but also for the anaesthetist involved who commonly assumes full responsibility for the death.”

Some staff who cared for women who declined help or who had to watch a woman bleed to death while refusing blood products, also reported significant personal distress. These findings have the following recommendation in Box 1.4.

Sadly, there were other comments from healthcare professionals that showed how very little they had learnt from these circumstances.

“It went well. I just followed my usual practice.”

“It was a normal uneventful delivery.”

The first comment relates to a member of staff working without reference to the Trust protocol for the management of an obstetric condition. The second relates to the death of a woman who arrested and died during an emergency caesarean section requiring massive amounts of blood during which the baby also died.

The Assessors were also concerned by the apparently culturally dismissive or insensitive remarks made by a very few professionals during the course of the reviews. This extended even to the appalling standard of some autopsies for women from the more vulnerable communities:

“The system, having let her down in life, let her down in death as well.”

#### **Box 1.4 Recommendation: Staff support**

Trusts must make provision for the prompt offer of support and/or counselling for all staff who have cared for a woman who has died.

## Discussion and conclusions

The stark findings in this chapter on risk factors for maternal deaths highlight yet again that a disproportionate number of women who died were from the vulnerable and more excluded groups of our society. The findings also show that these women were less likely to access or continue to remain in contact with maternity services.

Excluded women also tend to have a multiplicity of problems in conjunction with their pregnancies.

Sir Donald Acheson highlighted good maternal health as one of the five key areas for action in his influential 1998 report on reducing health inequalities.<sup>3</sup> Care for mother and baby throughout pregnancy and the early postnatal period can have a marked effect on achieving a good start to family life, to the child's healthy development and on their resilience to problems encountered later in childhood.

It is also known that those who are likely to suffer poorer maternal or child outcomes, not just associated with death, are often the more excluded women in our country. Women and girls from the most vulnerable groups of society are not only embarking on pregnancy from possibly poorer overall general health but are also more likely to delay seeking care when pregnant, and/or fail to attend clinics regularly. Some, such as teenage or minority ethnic parents and drug users may feel that the current services are inappropriate for them or take little notice of their particular needs or concerns. Others, who fear that they have stigmatising conditions such as being victims of partner abuse, obese women and those who smoke often seek care later, possibly because they are concerned about judgmental attitudes from the healthcare staff.

A 2002 survey of patterns of booking for antenatal care in nine maternity units in England and Wales found that first-time mothers at high obstetric risk were 13% more likely to fail to book for antenatal care by ten weeks of gestation than the low-risk reference group.<sup>4</sup> Further, they were 34% more likely to not have 'booked' for antenatal care by 18 weeks of gestation. High obstetric risk included coexisting medical illness, previous poor psychiatric history, obesity, substance misuse and teenage motherhood. The following characteristics were also associated with failure to book early: maternal age, smoking status, ethnicity, the planned pattern of antenatal care and planned place of delivery. These associations were exacerbated between the clinical and sociodemographic characteristics for women who had failed to book by 18 weeks of gestation. The study also found that women from ethnic minority groups were up to five times as likely to fail to initiate care by 18 weeks, the numbers increasing if the woman had previous children. Although the findings are not directly comparable with this Report, this study adds value to these findings, in that it shows that women who were already at higher risk of obstetric or medical complication were more likely to book late and thus more likely to suffer adverse health outcomes.

Once women have sought care, many vulnerable women found it difficult to maintain access to the services. Again, they tended to be the socially excluded, with an over-representation of women from ethnic minority groups. A 2001 study of the socio-demographic determinants of the number of antenatal visits has shown that women from minority ethnic groups make 9% fewer antenatal visits than women of white British origin. As with women who 'book' late, other factors included social deprivation,

pre-existing disease, psychiatric ill health and substance misuse and domestic violence.

In order to address the findings in this Report, there is an urgent need to identify and then provide services that help overcome the barriers that prevented many of the women who died from seeking care or maintaining contact with the maternity services.

Women should have their consultation in a medium or language with which they are comfortable, without the need for a relative interpreting. Women may also need to be put in touch with voluntary organisations that provide the sort of social network that will assist and support them while they are pregnant. The midwife must know to whom to go to get them the help they need.

It is vital that modern maternity services ensure that women from all groups of society have easy and equal access to the full range of high quality antenatal, intrapartum and postnatal services to ensure the needs of the most vulnerable are treated with equal importance. This means enabling every woman to seek care she feels happy with early in pregnancy and to continue to maintain regular contact throughout her pregnancy.

High-quality maternity care does not just include providing a supportive clinical environment to ensure a healthy pregnancy that is progressing well but also provides a gateway to other services that will help to achieve the best possible start to family life. These services include not only birth and parenting classes but also the provision of multidisciplinary support for women with particular medical, social or psychiatric needs and for those from the more vulnerable groups of our society.

Antenatal care must therefore be inclusive and flexible enough to meet the needs of all women. The needs of those from the most vulnerable and less articulate groups in society are of equal, if not more, importance and may need to be met through different patterns and places of care than have been traditionally provided. When required, care should be integrated with social services support and education services for women and their partners. Supportive midwifery and obstetric care should be based on providing good clinical and psychological outcomes, but also recognise the equal importance of helping the parents prepare for parenthood.

## References

1. The Millennium Development Goals can be found on the World Health Organization website, at [www.who.int/reproductive-health](http://www.who.int/reproductive-health).
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4. Kupek E, Petrou S, Vause S, Maresh M. Clinical, provider and sociodemographic predictors of late initiation of antenatal care in England and Wales. *BJOG* 2002;109:265–74.
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## Key recommendations

### Research

In order to address the findings in this Report, there is an urgent need to identify and then provide services which to help overcome the barriers that prevented many of the women who died from seeking care or maintaining contact with the maternity services.

It is recommended that a prospective study be undertaken to help to estimate more robustly what, if any, is the degree of increased risk of maternal deaths associated with caesarean section particularly for those undertaken without a clinical indication.

Further research is required on the incidence of postpartum haemorrhage in relation to previous caesarean section.

### Service provision

Current patterns of antenatal care services are not meeting the needs of the women most at risk of maternal death. Services should be flexible enough to meet the needs of all women including the vulnerable and hard to reach. The needs of those from the most excluded and less articulate groups in society are of equal if not more importance. Asylum seekers and refugees are a particularly vulnerable group and services need to respond to their needs.

Many of the women in this Report found it difficult to access or maintain access with the services, and follow-up for those who failed to attend was poor. Services should be such that all women are motivated to attend throughout their pregnancy.

Women who fail to attend for care should be actively followed up. In general, this was not the case in this Report, despite a number of women already being known to be at high risk from obstetric, medical or psychiatric conditions.

When planning new methods of service provision it is helpful to involve the women, or representative from their communities, who might have difficulties in accessing and continuing to use the service. Where this has been done, antenatal clinic attendances have significantly improved. Such flexibility may require imaginative solutions in terms of the timing and setting for antenatal clinics, and the provision of outreach services.

The importance of seeking antenatal care early in pregnancy should be part of health education and promotion materials prepared for all groups in society.

Multidisciplinary care, provided through well-understood clinical and local social services networks, should be available for all women with pre-existing medical, psychological or social problems that may require specialist advice in pregnancy.

Women with complex pregnancies and who receive care from a number of specialists or agencies should receive the support and advocacy of a known midwife

throughout their pregnancy. Their midwives will help with promoting the normal aspects of pregnancy and birth as well as supporting and advocating for the women through the variety of services they are being offered.

Interpreters should be provided for women who do not speak English. The use of family members, including children and partners as interpreters, should be avoided if at all possible.

### Individual practitioners

General practitioners and other specialists should ensure that all relevant information is passed on the maternity or obstetric team in referral letters to booking clinics or at any other opportunity.

At booking, a risk and needs assessment should take place to ensure that every woman will be offered the type of care that most suits her own particular requirements. Some women in this Report were offered midwifery-led care which did not meet their more complex needs.

Healthcare professionals who work with disadvantaged clients need to be able to understand a woman's social and cultural background, act as an advocate for women, overcome their own personal and social prejudices and practise in a reflective manner.

All healthcare professionals should consider whether there are unrecognised but inherent prejudices within their own organisations, in terms of providing an equal service to all users.