



# City Research Online

## City St George's, University of London

**Citation:** Brigante, L., Morelli, A., Jokinen, M., Plachcinski, R. & Rowe, R. (2022). Impact of the COVID-19 pandemic on midwifery-led service provision in the United Kingdom in 2020-21: Findings of three national surveys. *Midwifery*, 112, 103390. doi: 10.1016/j.midw.2022.103390

This is the published version of the paper.

This version of the publication may differ from the final published version. To cite this item please consult the publisher's version.

**Permanent repository link:** <https://openaccess.city.ac.uk/id/eprint/28366/>

**Link to published version:** <https://doi.org/10.1016/j.midw.2022.103390>

**Copyright and Reuse:** Copyright and Moral Rights remain with the author(s) and/or copyright holders. Copies of full items can be used for personal research or study, educational, or not-for-profit purposes without prior permission or charge, unless otherwise indicated, provided that the authors, title and full bibliographic details are credited, a hyperlink and/or URL is given for the original metadata page and the content is not changed in any way. For full details of reuse please refer to [City Research Online policy](#).



# Impact of the COVID-19 pandemic on midwifery-led service provision in the United Kingdom in 2020-21: Findings of three national surveys



Lia Brigante<sup>a</sup>, Alessandra Morelli<sup>b</sup>, Mervi Jokinen<sup>a</sup>, Rachel Plachcinski<sup>c</sup>, Rachel Rowe<sup>b,\*</sup>

<sup>a</sup> Royal College of Midwives, London, United Kingdom

<sup>b</sup> National Perinatal Epidemiology Unit, Nuffield Department of Population Health, University of Oxford, United Kingdom

<sup>c</sup> Lay member, UK Midwifery Study System Steering Group, United Kingdom

## ARTICLE INFO

### Article history:

Received 22 November 2021

Revised 24 May 2022

Accepted 31 May 2022

### Keywords:

COVID-19  
Birth centres  
Midwifery  
Home birth  
United kingdom

## ABSTRACT

**Background:** The COVID-19 pandemic required all healthcare systems to adapt quickly. There is some evidence about the impact of the pandemic on United Kingdom maternity services overall, but little is known about the impact on midwifery-led services, including midwifery units and home birth services. **Objective:** To describe changes to midwifery-led service provision in the United Kingdom and the Channel Islands during the COVID-19 pandemic.

**Design:** Three national surveys were circulated using the United Kingdom Midwifery Study System (UK-MidSS) and the Royal College of Midwives (RCM) Heads and Directors of Midwifery Network. The UK-MidSS surveys took place in wave 1 (April to June 2020) and in wave 2 (February to March 2021). The RCM survey was conducted in April 2020.

**Findings:** The response rate to the UKMidSS surveys was 84% in wave 1 and 70% in wave 2, while 48% of Heads and Directors of Midwifery responded to the RCM survey. Around 60% of midwifery units reported being open as usual in wave 1, with the remainder affected by closures. Fewer unit closures (15%) were reported in the wave 2 survey. Around 40% of services reported some reduction in home birth services in wave 1, compared with 15% in wave 2. The apparent impact of the pandemic varied widely across the four nations of the United Kingdom and within the English regions.

**Conclusions:** The pandemic led to increased centralisation of maternity care and the disruption of midwifery-led services, especially in the first wave. Further research should focus on the reasons behind closures, the regional variation and the impact on maternity care experience and outcomes.

© 2022 The Author(s). Published by Elsevier Ltd.

This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

## Introduction

Coronavirus disease 2019 (COVID-19), a new emergent coronavirus caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), was declared by the World Health Organization (WHO) as a public health emergency of international concern on 30<sup>th</sup> January 2020 (World Health Organization, 2020a). As such, health care systems had to quickly adapt to respond to a new and unexpected disease which required immediate action while minimising disruption to routine care provision.

Evidence about the effects of COVID-19 emerging during the first wave of the pandemic indicated that pregnant women were

not more susceptible to the disease compared to the general population and that most did not have a severe illness and recovered well, with more than two thirds being asymptomatic (Khalil et al., 2020; Knight et al., 2020; Maraschini et al., 2020; Yang et al., 2020; Vousden et al., 2021). The WHO's living systematic review, reporting in September 2020, concluded that pregnant women with COVID-19 infection were at increased risk of admission to an intensive care unit (ICU), increased risk of preterm birth and that their babies also had an increased risk of admission for neonatal care. Vertical transmission of Sars-Cov-2 is rare (Gale et al., 2021) and available evidence indicates that neonatal infection is not increased by vaginal birth, breastfeeding or contact with the mother (Chen et al., 2020; Walker et al., 2020; Wang et al., 2020).

Evidence about care in labour, mode of birth and immediate postnatal care during the pandemic supports vaginal birth, unless caesarean birth is indicated for obstetric reasons; delayed cord clamping; breastfeeding, skin to skin care; and the avoid-

\* Corresponding author at: UK Midwifery Study System (UKMidSS), National Perinatal Epidemiology Unit, Nuffield Department of Population Health, University of Oxford, Old Road Campus, Oxford OX3 7LF, United Kingdom.

E-mail address: [rachel.rowe@npeu.ox.ac.uk](mailto:rachel.rowe@npeu.ox.ac.uk) (R. Rowe).

ance of separation of mother and baby (Walker et al., 2020; World Health Organization, 2020b). In terms of neonatal outcomes for babies who tested positive for COVID-19 or who were born to a mother who had tested positive, studies have shown reassuring results and a relatively low frequency of spontaneous preterm birth (Knight et al., 2020; Parazzini et al., 2020; Wang et al., 2020; Gale et al., 2021). The current evidence, therefore, indicates overall a good outcome for both mother and babies in most cases, although more recent evidence relating to newer variants in unvaccinated women gives more cause for concern (Vousden et al., 2021).

In the United Kingdom (UK), most women give birth in an obstetric unit, but about 14% give birth in alongside midwifery units (AMU) or freestanding midwifery units (FMU) (Walsh et al., 2018), and just over 2% give birth at home (Office for National Statistics, 2022). Women with straightforward pregnancies who are at low risk of complications are encouraged to plan birth in a midwifery unit rather than in a hospital obstetric unit (NICE, 2014), because this is associated with a reduced risk of intervention for the mother with no increase in adverse perinatal outcomes (Brocklehurst et al., 2011; Scarf et al., 2018).

Several changes affected the provision of maternity services in the UK from the start of the COVID-19 outbreak (Jardine et al., 2021), against a background of changing guidance from the Royal Colleges and National Health Service (NHS) England, developed on the basis of emerging evidence and consensus about best practice (Brigante et al., 2020). Routine antenatal and postnatal care were recommended to continue, with some virtual consultations where possible to minimise the risk of transmission (Royal College of Obstetricians & Gynaecologists and Royal College of Midwives, 2020). For intrapartum care, NHS England stressed that FMUs and home births could help reduce pressure on hospital services by keeping women out of hospital (NHS England, 2020). Centralisation of maternity services in hospital-based obstetric units was discouraged, with community-based care and community births for healthy women/people and newborns recommended (International Confederation of Midwives, 2020; Royal College of Midwives, 2020). However, emerging anecdotal evidence during the pandemic indicated that effective provision of these midwifery-led services was partly influenced by the local context, including variation in staff shortages and increased pressure on ambulance services. To reduce the potential impact of any midwifery staff shortages on maternal and neonatal outcomes it was recommended that redeployment of midwives should take place only within maternity services rather than to different clinical areas (Royal College of Midwives, 2020).

This paper reports the results of three national surveys that aimed to quantify the impact of the COVID-19 pandemic on the provision of maternity services across the UK and the Channel Islands during the first and second waves of the pandemic (March–June 2020 and September 2020–April 2021), with a particular focus on midwifery units and community-based services.

## Methods

### Study design

We carried out national surveys of practice and service provision. Two surveys were carried out using the UK Midwifery Study System (UKMidSS), a research infrastructure and network of midwife 'reporters' in all UK midwifery units who contribute data to national observational research studies and surveys of practice (Rowe et al., 2016; Glenister et al., 2020). The UKMidSS surveys were designed by RR and AM, with input from MJ and RP, and other members of the UKMidSS Steering Group. Using a different survey instrument, but covering many of the same topics, the third survey was carried out by the Royal College of Midwives (RCM) and collected data from the RCM Heads of Midwifery (HoMs) and

Directors of Midwifery (DoMs) Network, including all senior service managers from the four countries of the UK and the Channel Islands. It was designed by LB and other RCM officers, including MJ. The UKMidSS and RCM surveys were designed and delivered separately, but are reported here together as they covered related and complementary topics.

### Data collection

In the first UKMidSS survey, described below as the 'UKMidSS Wave 1' survey, UKMidSS reporters in all 202 participating FMUs and AMUs were invited to take part in a short survey sent out by email on 1st April 2020. Reminders to complete the survey were sent to non-responders twice a month, as part of routine UKMidSS reminders. Responses were received between 1st April and 22nd June 2020.

The survey asked UKMidSS reporters to describe the impact of COVID-19 on the unit for which they were responding by selecting one or more of the following six response options:

- The midwifery unit is closed to admissions
- The midwifery unit has been closed/merged with the obstetric unit to provide COVID positive and COVID negative areas
- Community midwives have been redeployed to work in the hospital/obstetric unit
- Women are actively being encouraged to plan birth at home or in a community setting
- Home birth services are being scaled back/cancelled
- Other (please give detail below)

Respondents were invited to give any additional information about the impact of COVID-19 or elaborate on their answers in a free text box.

A repeat UKMidSS survey, described below as the 'UKMidSS Wave 2' survey, was circulated on 1st February 2021, to capture the impact of the second wave of the pandemic, to all reporters in the 201 FMUs and AMUs taking part in UKMidSS studies at the time. Reminders were sent to non-responders twice a month as before. Responses were received between 1st February and 31st March 2021. In addition to the six response options used in the first survey, four additional response options were included:

- A birth partner can be with the woman when she attends for an early labour assessment
- A birth partner can be with the woman when she is in established labour
- A birth partner can visit the woman during her postnatal stay
- A birth partner can remain with the woman throughout her postnatal stay

For the RCM survey, all the 153 HoMs and DoMs were invited to take part in rapid repeat surveys via the RCM forum distribution list, conducted during the weeks beginning 20<sup>th</sup> April, 11<sup>th</sup> May and 26<sup>th</sup> October 2020. The RCM surveys were developed and administered using the Advantage Survey Monkey platform and the links to each survey stayed open only for a week in order to capture rapid changes in service provision. The findings reported here are from the survey distributed in the week beginning 20th April for comparability with the first UKMidSS survey, and because the findings of that week's survey were representative of the other surveys carried out by the RCM. The RCM survey included open and closed questions about midwifery staffing and shortages, the provision of homebirth and midwifery-led settings (including reasons for any closures), waterbirth, antenatal and postnatal care, and any reports of freebirthing (choosing to give birth without a midwife in attendance). The RCM survey was not repeated in wave 2 of the pandemic, as at that point HoMs and DoMs were also reporting through other mechanisms (e.g. to NHS England).

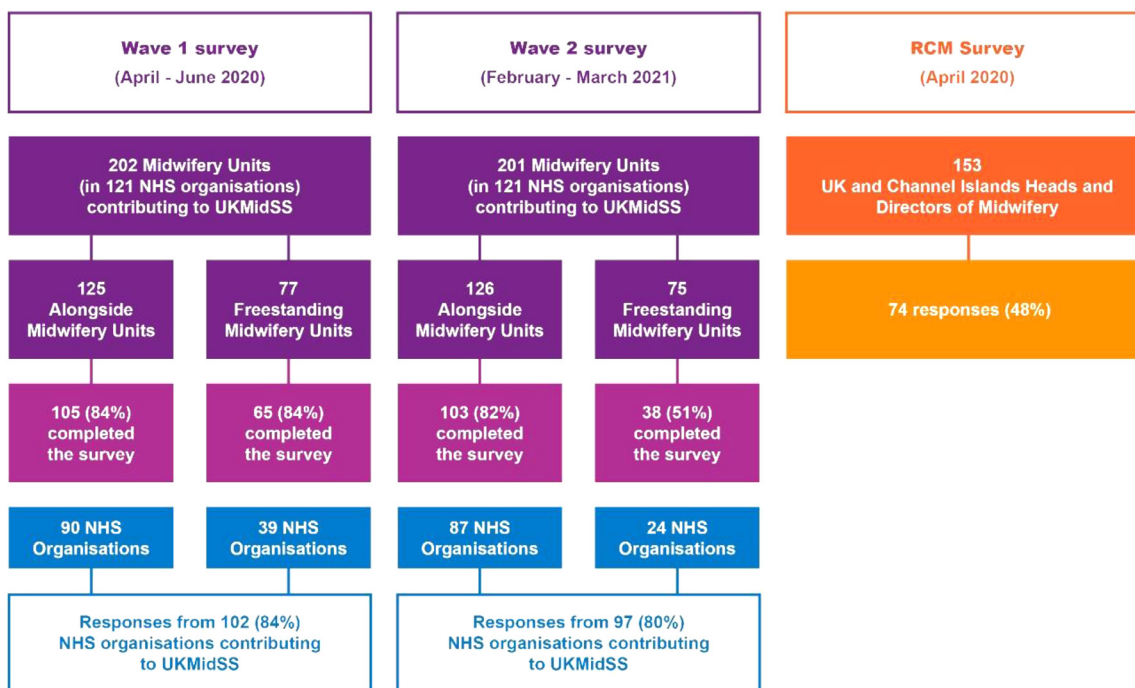


Fig. 1. Survey response.

Analysis

For the UKMidSS surveys, response rates for each survey wave were calculated using the number of responding units as the numerator and the total number of units participating in UKMidSS at the time of the survey as the denominator, overall and for AMUs and FMUs separately. Descriptive analysis was conducted, tabulating frequencies and percentages. Responses from the devolved nations of the UK (Scotland, Wales and Northern Ireland) and the NHS regions of England (North East and Yorkshire, North West, Midlands, East of England, London, South West and South East), and from different types of unit (AMU vs FMU) were compared using the Chi square test. McNemar’s test was used to determine if there were differences in proportions between wave 1 and wave 2. For the UKMidSS surveys, where two or more units responded from within the same NHS organisation responses were not necessarily the same so all analyses were carried out at unit level. For questions about home birth services, responses from units in NHS organisations with different configurations of care (AMU only, AMU and FMU, FMU only) were compared using frequencies and percentages and the Chi square test. We used the statistical software package Stata 16 (StataCorp, 2019).

For the RCM survey, which in contrast to the UKMidSS surveys was carried out at the level of NHS organisation (NHS Trust or Health Board), descriptive analysis was conducted using the analysis function of the Survey Monkey platform to capture frequencies and percentages. Not all respondents answered all questions in the survey; percentages for each question were calculated using the total number of responses to that question as the denominator. Free-text from the RCM survey open-ended questions was used in two ways. First, simple analysis of the free text was carried out by LB. Following familiarisation with the data, the text was inductively coded and codes grouped under overarching ‘themes’, which

were reviewed by MJ and others involved in the RCM survey. These themes are presented below as context for the other findings. Findings from the quantitative questions in the UKMidSS and RCM surveys were also mapped against the free text themes by LB to identify where responses might help explain or shed light on these.

Ethical approval

As surveys of practice, in line with the Healthcare Quality Improvement Partnership’s guide for clinical audit, research and service review (Healthcare Quality Improvement Partnership, 2011), these surveys were not subject to the Department of Health’s UK Policy Framework for Health and Social Care Research (HRA, 2020) and therefore research ethics approval was not required.

Service user involvement

For the UKMidSS surveys, the study design and results were overseen by the UKMidSS Steering Group which includes two lay members who represent the views and experiences of maternity service users. There was no involvement of service users in the development of the RCM survey.

Results

Response

For the UKMidSS Wave 1 survey, responses were received from 170 of the 202 units (84%) contributing to UKMidSS, of which 105 (62%) were AMUs and 65 (38%) FMUs (Fig. 1). The units responding represented 102 (84%) of the 121 NHS Trusts or Health Boards (NHS organisations) contributing to UKMidSS. Of these, 63 NHS organisations had one midwifery unit, and 39 had two or more mid-

**Table 1**  
UKMidSS Wave 1 survey results.

	AMU		FMU		Total		P value*
	n=105		n=65		n=170		
	n	%	n	%	n	%	
<b>Midwifery unit status</b>							
Open	63	60.0	44	67.7	107	62.9	0.31**
Closed	4	3.8	21	32.3	25	14.7	
Merged with labour ward	38	36.2	0	0.0	38	22.4	
<b>Home birth services scaled back/cancelled</b>							
No	48	45.7	47	72.3	95	55.9	0.001
Yes	57	54.3	18	27.7	75	44.1	
<b>Women actively encouraged to plan birth at home/in community</b>							
No	95	90.5	46	70.8	141	82.9	0.001
Yes	10	9.5	19	29.2	29	17.1	
<b>Community midwives redeployed to labour ward</b>							
No	86	81.9	55	84.6	141	82.9	0.65
Yes	19	18.1	10	15.4	29	17.1	

\*Chi square or Fisher's exact test as appropriate

\*\*calculated on open vs closed or merged status

wifery units. The response rate did not differ between AMUs and FMUs (84%).

For the UKMidSS Wave 2 survey, responses were received from 141 of the 201 eligible units (70%), of which 103 (73%) were AMUs and 38 (27%) FMUs. The units responding represented 97 NHS organisations (80%) contributing to UKMidSS, of which 68 had one midwifery unit and 29 had two or more midwifery units. Responses to the Wave 2 survey were received from 82% of AMUs and 51% of FMUs (Fig. 1).

For the RCM survey, a total of 74 complete responses were received from the HoM and DoMs network. There are 153 HoMs and DoMs in the RCM network, however, some of these work for the same NHS organisation (where there are multiple sites each with their own HoM/DoM). Based on the number of HoMs/DoMs invited to take part through the network the response rate was 48% and responses came from across all nations of the UK and the Channel Islands (Fig. 1).

## Findings

### Midwifery unit closures

In the UKMidSS Wave 1 survey almost two thirds (63%) of midwifery units reported being open to admissions as usual, with 25 units (15%) completely closed to admissions (Table 1). Approaching one third of FMUs (32%) reported being closed to admissions at some point because of the pandemic, compared with only four AMUs (4%), but a further 38 AMUs (36%) were merged with the obstetric unit to create a separate area for women with suspected or confirmed COVID-19.

Northern Ireland (43%), the Midlands (20%) and Scotland (20%) reported the highest proportion of units closed to admissions (Supplementary data file, Fig. 1). Overall, the region reporting the lowest impact on midwifery unit provision was the South West, with 92% of units reported to be open as usual.

In the RCM survey, 68% of responding HoMs and DoMs reported that their midwifery units continued to be open (Table 2). For those 19 (32%) organisations that reported the closure of midwifery units, 'requisition' was described as the main reason in 17 (71%) organisations, with most units reporting more than one factor. Respondents reported in free text comments that where midwifery units were requisitioned as separate COVID-19 triage or care units, often as a decision made at NHS Trust or Board level, this was because their facilities suited for this purpose, including having single rooms, piped oxygen and a separate entrance.

**Table 2**  
RCM survey results (wave 1).

	Heads/Directors of Midwifery	
	n=74	
	n	%*
<b>Midwifery unit status</b>		
Open	40	67.8
Closed	19	32.2
Missing	15	
<b>Home birth services status</b>		
Offered as normal	33	47.0
Discontinued	30	43.0
Restricted	5	7.0
Scaled up	1	1.5
Awaiting guidance	1	1.5
Missing	4	

\*Percentage calculated excluding missing

In the UKMidSS Wave 2 survey, 120 units (85%) reported being open as usual (Table 3) ( $p < 0.001$  for comparison with Wave 1) (Fig. 2). Compared with the Wave 1 survey, fewer FMUs reported being closed (6 units, 16%) and fewer AMUs were merged with the labour ward (12 units, 12%).

### Home birth services

In the UKMidSS Wave 1 survey almost half (44%) of units reported that home birth services had been scaled back or cancelled at some point (Table 1). Free text comments indicated that in some units respondents perceived that this change was introduced or being considered to reduce the pressure on the local ambulance service. Compared with AMUs, respondents from FMUs were less likely to report home birth services being scaled back (28% vs 54%). We also compared responses from units in NHS organisations with different configurations of care (Table 4). Almost 60% of units in organisations with only AMUs reported that home birth services had been scaled back or cancelled, compared with 36% of units in organisations with both AMUs and FMUs, and 25% of units in organisations with only FMUs (Table 4).

The regions/nations most affected by home birth service discontinuation were London (79%), the Midlands (60%) and the North West (58%), with the South West (23%) and Wales (0%) the least affected (Supplementary data, Fig. 2).

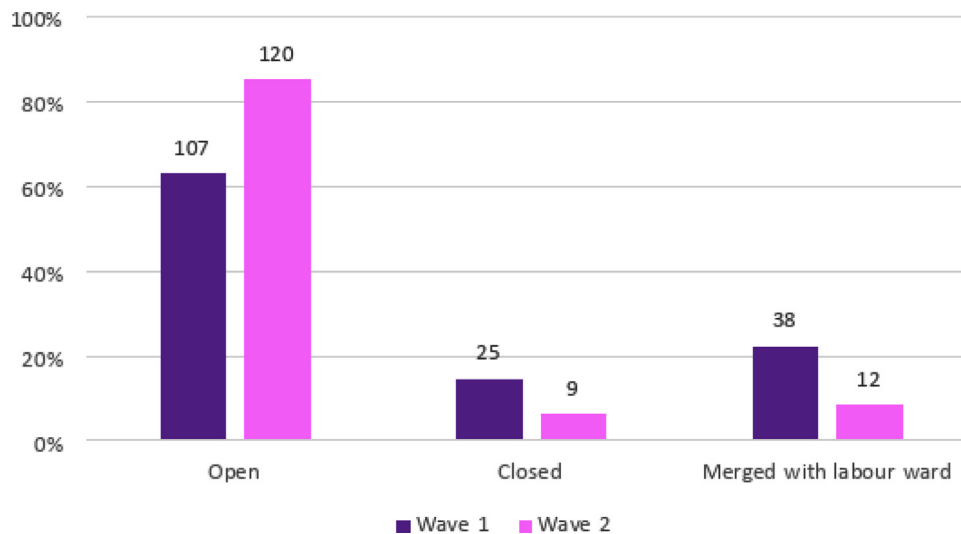
Only 29 units (17%) reported that women were being actively encouraged to give birth at home or in an FMU during the pan-

**Table 3**  
UKMidSS Wave 2 survey results.

	AMU		FMU		Total		P value*
	n=103		n=38		n=141		
	n	%	n	%	n	%	
<b>Midwifery unit status</b>							
Open	88	85.5	32	84.2	120	85.1	0.856**
Closed	3	2.9	6	15.8	9	6.4	
Merged with labour ward	12	11.6	0	0.0	12	8.5	
<b>Home birth services scaled back/cancelled</b>							
No	84	81.6	36	94.7	120	85.1	0.062
Yes	19	18.4	2	5.3	21	14.9	
<b>Women actively encouraged to plan birth at home/in community</b>							
No	87	84.5	22	57.9	109	77.3	0.001
Yes	16	15.5	16	42.1	32	22.7	
<b>Community midwives redeployed to labour ward</b>							
No	99	96.1	36	94.7	135	95.7	0.661
Yes	4	3.9	2	5.3	6	4.3	
<b>A birth partner can be with the woman for early labour assessment</b>							
No	45	43.7	14	36.8	59	41.8	0.465
Yes	58	56.3	24	63.2	82	58.2	
<b>A birth partner can be with the woman when she is in established labour</b>							
No	2	1.9	5	13.2	7	5.0	0.016
Yes	101	98.1	33	86.8	134	95.0	
<b>A birth partner can visit the woman during her postnatal stay</b>							
No	36	35.0	24	63.2	60	42.5	0.003
Yes	67	65.0	14	36.8	81	57.5	
<b>A birth partner can remain with the woman throughout her postnatal stay</b>							
No	84	81.6	24	63.2	108	76.6	0.022
Yes	19	18.4	14	36.8	33	23.4	

\* Chi square or Fisher's exact test as appropriate.

\*\*calculated on open vs closed or merged status.



**Fig. 2.** Midwifery unit status reported in Wave 1 and Wave 2 surveys.

**Table 4**  
Home birth services in NHS organisations with different configurations of care (UKMidSS Wave 1 survey).

	Organisations with AMU only		Organisations with AMU & FMU		Organisations with FMU only		All organisations		p-value*
	n(units)=72		n(units)=70		n(units)=28		n(units)=170		
	n	%	n	%	n	%	n	%	
<b>Home birth services scaled back/cancelled</b>									
No	29	40.3	45	64.3	21	75.0	95	55.9	0.001
Yes	43	59.7	25	35.7	7	25.0	75	44.1	
<b>Women actively encouraged to plan birth at home/in community</b>									
No	66	91.7	58	82.9	17	60.7	141	82.9	0.001
Yes	6	8.3	12	17.1	11	39.3	29	17.1	

\*Chi square or Fisher's exact test as appropriate

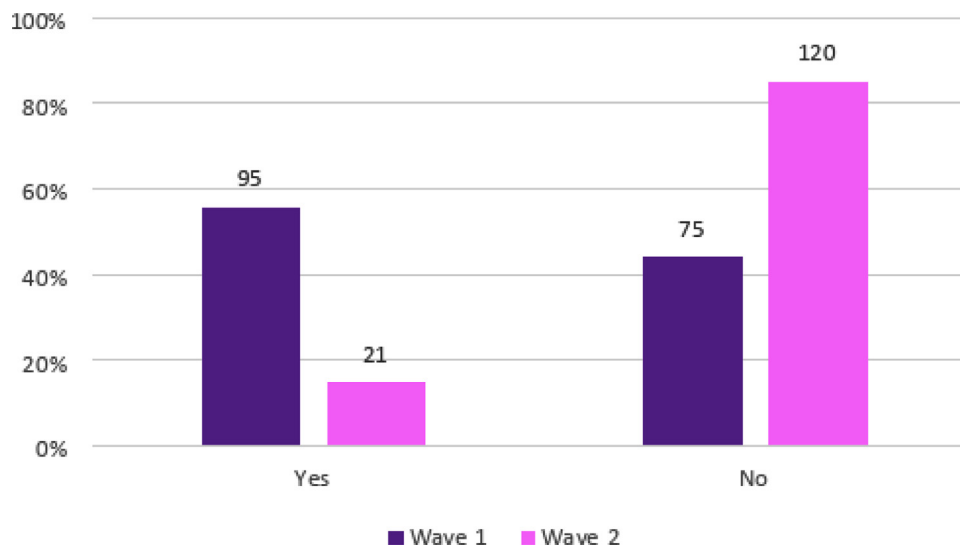


Fig. 3. Home birth services scaled back or cancelled (UKMidSS Wave 1 and Wave 2 surveys).

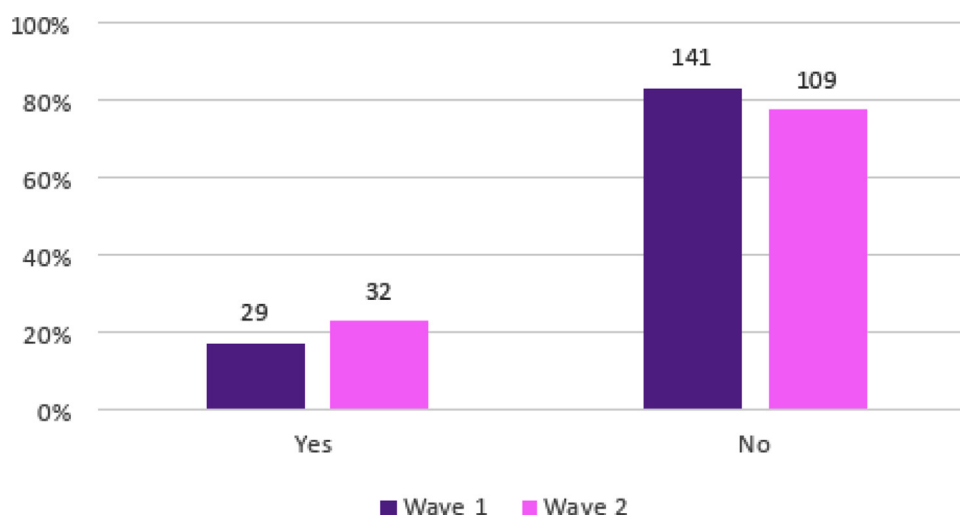


Fig. 4. Women encouraged to give birth at home or in community setting (UKMidSS Wave 1 and Wave 2 surveys).

demic, but responses to this question varied between AMUs (9%) and FMUs (29%) (Table 1) and in units in NHS organisations with different configurations of care (Table 4). The regions/nations where women were more encouraged to birth at home were the South West (46%), Wales (30%) and Scotland (25%) (Supplementary data, Fig. 3).

Responses to the RCM Survey indicated that home birth services continued as normal in 33 NHS organisations (49%) and had been suspended in 30 NHS organisations (43%), with a small number of services (5, 7%) providing a restricted home birth service for multiparous women only (Table 2). Only one trust indicated they had scaled up their homebirth service. Free text comments showed that the most common reasons for the suspension of home birth services were acute midwifery staff shortages, and concerns about capacity and response timings of the ambulance service to provide transfers if and when required. Many of those who responded expressed a concern about the ability of the service to respond safely to the perceived increase in interest for home births from women, at a time of significant midwifery shortages.

The UKMidSS Wave 2 survey indicated a substantial increase in the number of home birth services maintained, compared with the Wave 1 survey ( $p < 0.001$ ), with only 15% of services scaled back or

cancelled (Fig. 3). Services in some parts of the country reported being unaffected by home birth service discontinuation (Supplementary data file, Fig. 2).

Compared with the Wave 1 survey, a similar number of units (32, 23%) in the Wave 2 survey reported that women were actively encouraged to give birth at home or in a community setting (Tables 1 and 3, Fig. 4 and Supplementary data file, Fig. 3).

#### Staff redeployment and shortages

In the UKMidSS Wave 1 survey, 29 units (17%) reported that some community midwifery staff were being redeployed to provide intrapartum care in hospital, with no significant difference between AMUs and FMUs (Table 1). London (50%) and the South East (20%) were the most affected (Supplementary file, Fig. 4). In contrast, in the wave 2 survey only 6 units (4%) reported redeployment of community staff to the obstetric unit (Table 2 and Fig. 4) ( $p < 0.001$  comparing wave 1 vs wave 2) (Fig. 5).

In the RCM Survey, HoMs and DoMs were asked for a current estimate of the percentage shortages in their midwifery workforce. The responses ranged from 2 – 40%, with a median of 16% (Mean 18; SD 12.16)

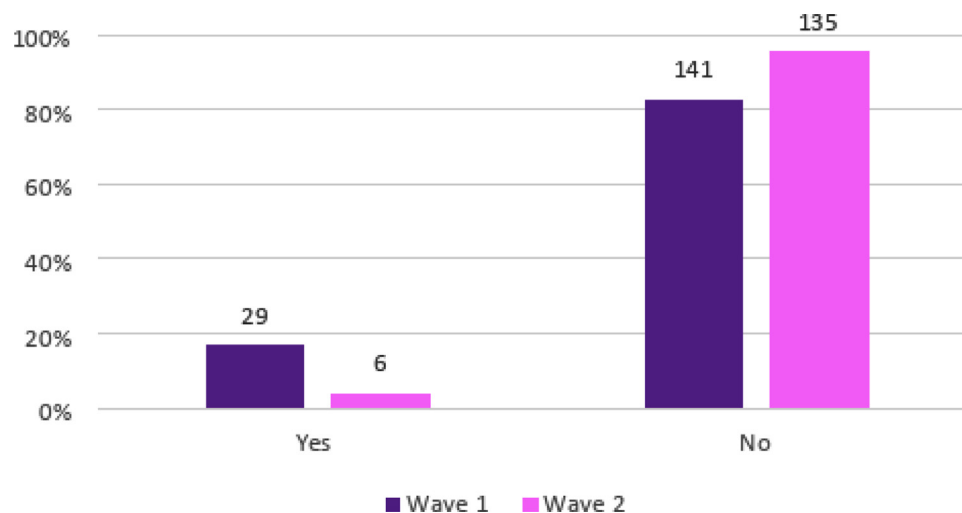


Fig. 5. Community midwives redeployed to the labour ward (UKMidSS Wave 1 and Wave 2 surveys).

### Partners and visiting

In the UKMidSS Wave 2 survey, response options were added to capture impact on visiting for partners during early labour, established labour and in the immediate postnatal period.

Overall, 82 units (60%) reported that the woman's birth partner could be with her when she attended for early labour assessment (Table 3). Almost all units (134, 95%) reported that the partner could accompany the woman in established labour, but fewer FMUs reported this compared with AMUs (87% vs 98%,  $p=0.016$ ).

Just over half of units (81, 57%) reported that partners were able to visit during the postnatal stay, but this was less common in AMUs compared with FMUs (65% vs 81%,  $p=0.003$ ).

Only a quarter of units (33, 23%) reported that partners were able to remain with the woman throughout their postnatal stay, and this was also less common in AMUs compared with FMUs (18% vs 37%,  $p=0.022$ ). There were wide regional differences with regards to partner visiting (Supplementary data file, Figs. 5 & 6).

### Other changes affecting services

In the UKMidSS Wave 1 survey, 14% of respondents added information about other changes in their services as a result of the pandemic. The most common of these was the suspension of water births. The RCM survey results showed that most services continued to provide water birth as an option, with 63 (85%) reporting that they were providing water birth as an option as normal for asymptomatic women.

UKMidSS respondents also commonly reported a reduced schedule of antenatal and postnatal visits. Findings from the RCM survey showed that most maternity services (61, 82%), reduced both antenatal and postnatal face-to-face visits, replacing them with virtual appointments delivered on multiple online platforms.

The RCM survey included an open-ended question asking about any other concerns with regard to service provision, which was answered by 33 HoMs and DoMs. Three main interrelated 'themes' were identified from responses to this question: Midwives' safety and wellbeing; Demand for home birth; and Staffing shortages.

#### Theme 1: Midwives' safety and wellbeing

The first theme related to midwives' safety and wellbeing, particularly with regards to care provided in the community, issues with personal protective equipment (PPE) supply in the community, and the management of staff concerns and anxiety.

*"(We are) concerned about the risk of cross contamination from and to community midwives who are expected to don and doff when*

*attending homebirths, BBA's [born before arrival] and unplanned homebirths. There is no national guidance on this process and no national position on suspending home birth services."*

*"The safety of the midwives seems to be overlooked. The country is in lockdown and yet midwives are expected to continue and provide care when we have no control over that environment [women's homes]. All the reports/updated guidance refers to the safety of the women and their babies which is of course important, however the midwives and support workers safety is paramount. They are working through extremely challenging times."*

#### Theme 2: Demand for homebirth

The second key theme identified was the challenge of maintaining home birth services against a background of increasing demand from women, and significant midwifery shortages.

*"We are noticing a significant increase in women choosing a home birth. The main reason for this appears to be that they don't want to come into hospital in case they catch COVID-19"*

*"Requests for home birth (are) increasing and (we are) unable to provide cover for this given current staffing. Promotion of home births is being advocated by doulas and charities advising safest method of birth at this time."*

#### Theme 3: Staffing shortages

The final theme from these responses was about staff shortages and implications for skill mix, particularly due to the number of midwives able to work from home but unable to provide public-facing care due to their personal health circumstances or because they were temporarily isolating.

*"The numbers of staff not at work does not give a true reflection of staffing shortfalls as we have a large number of staff who are non patient facing but want to remain in work."*

*"The information requirements regarding staffing absence does not illustrate the picture in relation to safe services, it's a complex picture based on skill mix, geography and percentage within one team rather than the workforce overall."*

## Discussion

The results from these three national surveys, carried out using two well-established networks, show that the COVID-19 pandemic had a significant impact on the provision of midwifery-led services in the UK, especially during the first wave of the pandemic in March-May 2020. While the impact appeared reduced in



the second wave in early 2021, there was still some disruption to midwifery-led services, and in both waves there was significant regional variation. The three surveys did not capture whether service provision returned to normal between the first and second waves of the pandemic. However, some other evidence about maternity care during the pandemic suggests that service reconfiguration and disruption to service provision may have continued between the two waves (Harrison et al., 2021; Silverio et al., 2021).

In the first wave, around a third of midwifery units were either closed to admissions at some point or merged with the obstetric unit to create a separate 'COVID positive' area. Heads and Directors of Midwifery reported that AMUs merged with the obstetric unit were often 'requisitioned' because of a decision made at NHS Trust or Board level. When FMUs were closed, respondents reported that this was often because of staff shortages in the FMU itself or in the obstetric unit in the same organisation. Redeployment of midwifery unit staff to cover staff shortages was common, affecting 17% of units. Home birth services were also scaled back or cancelled in 44% of units overall, with some NHS regions, such as London, reporting this to be as high as 79%. In other areas, such as the South West of England and Wales, home birth services were less affected.

Our surveys provide more evidence that in the UK, the reconfiguration of maternity services during the pandemic was driven towards centralised, hospital-based care (Berg et al., 2021). At the beginning of the pandemic there was a strong focus on infection control and trying to reduce infection rates especially among staff, including those who may have been worried about becoming infected when attending home births (Berg et al., 2021). Decisions to centralise care in hospitals with obstetric units may also reflect the widespread belief that hospitals are the safest place to give birth (Coxon et al., 2017), and that birth outside a hospital, in a midwifery unit or at home, is as an 'alternative' option, 'outside' the norm (Yuill et al., 2020). This is despite evidence, for example, that for women who are healthy with straightforward pregnancies, planning birth in a midwifery unit is as safe as planning birth in a hospital obstetric unit or labour ward (Brocklehurst et al., 2011; Scarf et al., 2018).

National guidance for maternity services during the pandemic recommended a staged approach when reconfiguration of services required staff redeployment due to shortages, or resulted in an inability to provide all birth options. RCM/RCOG guidance about the provision of midwifery-led settings and home birth during the pandemic (Brigante et al., 2020) was informed by a rapid review, conducted by the RCM Professorial Group and highlighted the need for maintaining community care (Renfrew et al., 2020). The recommended three-phase approach to reconfiguration of maternity services took into account midwifery staffing shortages and capacity in the ambulance service. Evaluation of any reconfiguration was recommended throughout, with appropriate communication to staff, involvement of service users and local Maternity Voices' Partnerships and swift de-escalation where necessary (Brigante et al., 2020). Beyond the UK, the International Confederation of Midwives recommended maintaining home birth and midwifery-led units during the pandemic, in those countries where health systems routinely provide community-based care with appropriate midwifery support, emergency equipment and transfer (International Confederation Midwives, 2020).

Our surveys cannot provide any evidence about the extent to which the recommended 'staged approach' was used. Comments submitted by senior midwifery managers in response to the RCM survey highlighted the need to maintain a safe service against a background of sometimes unpredictable staffing shortages. Reports in the media (Summers, 2020) also cited concerns about staffing shortages and ambulance capacity, but the extent to which these were concerns about anticipated or actual shortages is un-

known. We are not aware of any regional-level data about midwifery shortages or ambulance capacity during the pandemic that could help us determine the extent to which centralisation, closures of units and scaling back of home birth services were justified in any given region. COVID-19 infection rates also varied in different regions and nations of the UK at different times during the pandemic with, for example, London having higher rates and the South West having lower rates in the first wave (Davenport et al., 2020; Challen et al., 2021).

We found significant variation between regions/countries in the degree to which services were centralised and, for home birth services, we also found variation between NHS organisations with different configurations of care (i.e. with AMUs only, a combination of AMUs and FMUs, or FMUs only). It is possible that this variation reflects the severity of the impact of the pandemic, in terms of infection rates and consequent pressure on maternity services, in different parts of the country. However, home birth rates in the UK also vary by region, with the South West of England and Wales typically having higher home births than other parts of the UK (Office for National Statistics, 2019), so the regional differences we found may reflect a stronger pre-existing commitment to birth at home or in community settings in those areas. Respondents from FMUs were also less likely to report home birth services being scaled back or cancelled, compared with respondents from AMUs, and were more likely to report that women were being actively encouraged to give birth at home or in a community setting. These observed differences between responses from AMUs and FMUs with respect to home birth were largely explained by responses from AMUs in NHS organisations without FMUs, which were more likely to report scaling back of home birth services compared with units in organisations with FMUs. Around one third of FMUs were closed during the first wave of the pandemic and a similar number reported the scaling back or cancellation of home birth services, but our findings may be indicative of an overall stronger commitment to the maintenance of home birth and community services during the pandemic in NHS organisations with FMUs. This explanation also finds some support from a cross-national study comparing maternity service responses to the pandemic in the UK and the Netherlands, which found that in the Netherlands, which has a longstanding tradition of support for home birth, there was an explicit policy to encourage women to give birth at home, even when testing positive with COVID-19 (Berg et al., 2021).

Improvements in service provision were noted in the second wave of the pandemic in early 2021, with fewer units closed (6% vs 15%), fewer units reporting redeployment of community midwives (4% vs 17%) and fewer home birth services scaled back/cancelled (15% vs 44%). Again, our findings cannot illuminate whether this was because the impact of the pandemic on staffing and capacity was less severe in the second wave, or whether services were more prepared and therefore more able to adapt. Despite some overall improvement, in the second wave of the pandemic there continued to be significant impacts on whether partners could attend early labour assessment (not permitted in 40% of units), be with the woman during labour (not possible in 5% of units) or visit during the woman's postnatal stay (not possible in 43% of units). National guidance supporting the reintroduction of access for partners, visitors and other companions for pregnant women had been published in September 2020 (Royal College of Obstetricians and Gynaecologists, Royal College of Midwives, The Society and College of Radiographers, NHS England, 2020). Our findings support other work showing that there was significant variation in access for partners and other birth companions throughout the pandemic (Iacobucci, 2020; Thomson et al., 2022), with many organisations not 'getting the balance right' between access and restrictions (Lalor et al., 2021), and there is anecdotal evidence of restrictions continuing into 2022 in some areas (Birthrights, 2022).

Where midwifery-led services were scaled back or withdrawn completely during the pandemic, the inevitable consequences for women and their partners were reduced choice and a likely poorer overall experience of care (Sanders and Baylock, 2021). The UK vision for maternity services is to provide personalised, safe, and woman-centred care to women and their families and to ensure continuity of carer for women (NHS England, 2016). The World Health Organization also explicitly recognizes a “positive childbirth experience as a significant end point for all women undergoing labour” and emphasizes that care should not only be centred on meeting the needs of the mother and newborn, but also her partner and significant close people (World Health Organization, 2020c). In the context of a global pandemic some disruption to routine health services, including maternity, is perhaps inevitable; particularly considering that the UK has experienced one of the highest mortality rates in Europe because of COVID-19 (Iacobucci, 2021). It has been argued however that the response from some organisations was disproportionate and inconsistent, and that women’s individual needs and circumstances were insufficiently taken into account, especially with regards to birth place options and companionship from birth partners (Birthrights, 2020). A UK survey found that changes to service provision generated barriers in accessing care, resulting in anxieties for women about ‘being alone’ in labour, women being unable to access birthing pools or experiencing delays with planned inductions (Karavadra et al., 2020). The removal of many aspects of women and family-centred care had unintended consequences including a lack of essential clinical care, confusion over advice and distress and emotional trauma for women (Sanders and Baylock, 2021). Women described virtual consultations as impersonal and said that they made it harder to disclose information about their mental health (Karavadra et al., 2020). There is some evidence that overall rates of perinatal mental health disorders increased internationally during the pandemic, including anxiety and depression, with links to the modification of maternity services (Fan et al., 2021). We were unable to assess any impact of the changes we observed on outcomes for women and babies, but in terms of interventions and outcomes, in England one study has reported evidence of increased rates of obstetric intervention, including induction and Caesarean section, but little evidence of impact on adverse outcomes (Gurol-Urganci et al., 2022). The impact on maternity staff was also beyond the scope of the surveys reported here, but is important to consider (Horsch et al., 2020).

#### Strengths and limitations

These surveys provide the first systematically collected evidence focusing on the impact of the COVID-19 pandemic on community and midwifery-led service provision. The timing of our surveys captured the initial response to the pandemic, including the peak of the first wave in the UK, and the subsequent response to the second wave early in 2021. The surveys benefited from being conducted through well-established networks. For the UKMidSS surveys, using a well-established research network of midwife reporters resulted in high response rates, which enhances the generalizability of the findings. The RCM survey used the active HoMs and DoMs network, providing important contextual information not available in the UKMidSS surveys. The two UKMidSS surveys, carried out in the first and second wave of the pandemic, enabled us to compare service response at the two time points and also enabled regional comparisons.

Limitations include the fact that the surveys had differing response rates and data collection tools, with the first UKMidSS survey being open for a relatively long period of time, between April and June 2020, while the RCM survey was only open for a week. Overall however the findings of the surveys were consistent, show-

ing that changes to service provision were likely to have been in place for at least a few months.

Any changes to policies around birth partners were only captured by the UKMidSS Wave 2 survey, so we did not have any wave 1 data to compare with. Neither the UKMidSS surveys nor the RCM survey asked about service user involvement in service changes.

#### Conclusions

The findings from these three national surveys document how the pandemic led to the centralisation of UK maternity care and the disruption of midwifery-led service provision, especially during the first wave of the pandemic in April-June 2020. There was significant regional variation in this disruption, and some suggestion that in NHS organisations with a stronger pre-existing commitment to community provision there was less centralisation. It was also apparent that in the second wave midwifery-led services were maintained to a greater extent. Further research should focus on the impact of this disruption on women’s and families’ experience of maternity care, the potential effect of service reconfiguration on maternal and neonatal outcomes and explore the ways in which services that did and did not preserve their midwifery-led services during the pandemic managed things differently. Further research should also focus on the impact of staff shortages on midwifery-led services and how those impacted on women’s choice and outcomes.

#### Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

#### Ethical approval

As surveys of practice research ethics approval was not required.

#### Funding

No funding.

#### Authors’ contribution

LB: Conceptualization (RCM survey); Methodology (RCM survey); Data curation (RCM survey); Formal analysis (RCM survey); Project administration (RCM survey); Writing - original draft; Writing - review & editing. AM: Conceptualization (UKMidSS surveys); Methodology (UKMidSS surveys); Data curation (UKMidSS surveys); Formal analysis (UKMidSS surveys); Project administration (UKMidSS surveys); Visualization; Writing - original draft; Writing - review & editing. MJ: Conceptualization; Writing - review & editing. RP: Conceptualization; Writing - review & editing. RR: Conceptualization; Methodology; Supervision; Project administration; Visualization; Writing - review & editing.

#### Declaration of Competing Interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

#### Acknowledgments

We would like to thank the UKMidSS reporters who contributed to the survey responses, the UKMidSS Steering Group for overseeing the design and the results of the survey, and Richard Welsh for

programming support. We also would like to thank the RCM HoMs and DoMs network that contributed to the survey responses and the RCM Expert Clinical Advisory Group, which contributed to the design and review of the RCM survey.

## Supplementary materials

Supplementary material associated with this article can be found, in the online version, at [doi:10.1016/j.midw.2022.103390](https://doi.org/10.1016/j.midw.2022.103390).

## References

- Berg, L.V.D., Balaam, M.C., Nowland, R., Moncrieff, G., Topalidou, A., Thompson, S., Thomson, G., Jonge, A.D., Downe, S., 2021. The United Kingdom and the Netherlands maternity care responses to COVID-19: an organisational comparison. *Au-thorea* doi:10.22541/au.163821302.20595565/v1.
- Birthrights, 2020. Human rights implications of changes to maternity services during the COVID-19 pandemic. Available at <https://www.birthrights.org.uk/wp-content/uploads/2020/07/Birthrights-COVID-19-Human-Rights-Committee-Briefing-July-2020.pdf>.
- Birthrights, 2022. Where are we with visiting restrictions in maternity services now? [https://www.birthrights.org.uk/2022/01/18/where-are-we-with-visiting-restrictions-in-maternity-services-now/?utm\\_source=rss&utm\\_medium=rss&utm\\_campaign=where-are-we-with-visiting-restrictions-in-maternity-services-now](https://www.birthrights.org.uk/2022/01/18/where-are-we-with-visiting-restrictions-in-maternity-services-now/?utm_source=rss&utm_medium=rss&utm_campaign=where-are-we-with-visiting-restrictions-in-maternity-services-now).
- Brigante, L., Jokinen, M., Ross-Davie, M., Harlev-Lam, B., Morris, E., O'Brien, P., Jardine, J., Relph, S., Powell, A., 2020. RCM/RCOG Guidance for provision of midwife-led settings and home birth in the evolving coronavirus (COVID-19) pandemic. Available from <https://www.rcog.org.uk/globalassets/documents/guidelines/2020-07-10-guidance-for-provision-of-midwife-led.pdf>.
- Brocklehurst, P., Hardy, P., Hollowell, J., Linsell, L., Macfarlane, A., McCourt, C., Marlow, N., Miller, A., Newburn, M., Petrou, S., Puddicombe, D., Redshaw, M., Rowe, R., Sandall, J., Silverton, L., Stewart, M., 2011. Perinatal and maternal outcomes by planned place of birth for healthy women with low risk pregnancies: the birthplace in England national prospective cohort study. *BMJ* 343, d7400.
- Challen, R., Tsaneva-Atanasova, K., Pitt, M., Edwards, T., Gompels, L., Lacasa, L., Brooks-Pollock, E., Danon, L., 2021. Estimates of regional infectivity of COVID-19 in the United Kingdom following imposition of social distancing measures. *Philos. Trans. R. Soc. B* 376 (1829), 20200280. doi:10.1098/rstb.2020.0280.
- Chen, H., Guo, J., Wang, C., Luo, F., Yu, X., Zhang, W., Li, J., Zhao, D., Xu, D., Gong, Q., Liao, J., Yang, H., Hou, W., Zhang, Y., 2020. Clinical characteristics and intrauterine vertical transmission potential of COVID-19 infection in nine pregnant women: a retrospective review of medical records. *Lancet* 395 (10226), 809–815. doi:10.1016/S0140-6736(20)30360-3.
- Coxon, K., Chisholm, A., Malouf, R., Rowe, R., Hollowell, J., 2017. What influences birth place preferences, choices and decision-making amongst healthy women with straightforward pregnancies in the UK? A qualitative evidence synthesis using a 'best fit' framework approach. *BMC Pregn. Childbirth* 17 (1), 103. doi:10.1186/s12884-017-1279-7.
- Davenport, A., Farquharson, C., Rasul, I., Sibieta, L., Stoye, G., 2020. *The Geography of the COVID-19 Crisis in England*. Institute for Fiscal Studies, London Available from.
- Fan, S., Guan, J., Cao, L., Wang, M., Zhao, H., Chen, L., Yan, L., 2021. Psychological effects caused by COVID-19 pandemic on pregnant women: a systematic review with meta-analysis. *Asian J. Psychiatry* 56, 102533. doi:10.1016/j.ajp.2020.102533.
- Gale, C., Quigley, M.A., Placzek, A., Knight, M., Ladhani, S., Draper, E.S., Sharkey, D., Doherty, C., Mactier, H., Kurinczuk, J.J., 2021. Characteristics and outcomes of neonatal SARS-CoV-2 infection in the UK: a prospective national cohort study using active surveillance. *Lancet Child Adolesc. Health* 5 (2), 113–121.
- Glenister, C., Burns, E., Rowe, R., 2020. Local guidelines for admission to UK midwifery units compared with national guidance: a national survey using the UK midwifery study system (UKMidSS). *PLoS ONE* 15 (10), e0239311.
- Guroi-Urganci, I., Waite, L., Webster, K., Jardine, J., Carroll, F., Dunn, G., Frémeaux, A., Harris, T., Hawdon, J., Muller, P., van der Meulen, J., Khalil, A., 2022. Obstetric interventions and pregnancy outcomes during the COVID-19 pandemic in England: a nationwide cohort study. *PLOS Med.* 19 (1), e1003884. doi:10.1371/journal.pmed.1003884.
- Harrison, S., Alderdice, F., McLeish, J., Quigley, M.A., 2021. *You and Your Baby: A National survey of health and care during the 2020 Covid-19 pandemic*. National Perinatal Epidemiology Unit, University of Oxford, Oxford.
- Health Research Authority, 2020. UK policy framework for health and social care research. Available at: <https://www.hra.nhs.uk/planning-and-improving-research/policies-standards-legislation/uk-policy-framework-health-social-care-research/>.
- Healthcare Quality Improvement Partnership, 2011. *A Guide for Clinical Audit, Research and Service Review: an Educational Toolkit Designed to help Staff Differentiate between Clinical Audit, Research and Service Review Activities*. HQIP, London Available at.
- Horsch, A., Lalor, J., Downe, S., 2020. Moral and mental health challenges faced by maternity staff during the COVID-19 pandemic. *Psychol. Trauma* 12 (S1), S141–S142. doi:10.1037/tra0000629.
- Iacobucci, G., 2020. Partners' access to scans and birth is a postcode lottery, data show. *BMJ* 371, m3876. doi:10.1136/bmj.m3876.
- Iacobucci, G., 2021. COVID-19: UK had one of Europe's highest excess death rates in under 65s last year. *BMJ* 372. doi:10.1136/bmj.n799.
- International Confederation of Midwives, 2020. *Rights in childbirth must be upheld during the coronavirus pandemic*. Position statement.
- Jardine, J., Relph, S., Magee, L., von Dadelszen, P., Morris, E., Ross-Davie, M., Draycott, T., Khalil, A., 2021. Maternity services in the UK during the coronavirus disease 2019 pandemic: a national survey of modifications to standard care. *BJOG* 128 (5), 880–889. doi:10.1111/1471-0528.16547.
- Karavadra, B., Stockl, A., Prosser-Snelling, E., Simpson, P., Morris, E., 2020. Women's perceptions of COVID-19 and their healthcare experiences: a qualitative thematic analysis of a national survey of pregnant women in the United Kingdom. *BMC Pregn. Childbirth* 20 (1), 600. doi:10.1186/s12884-020-03283-2.
- Khalil, A., Kalafat, E., Benlioglu, C., O'Brien, P., Morris, E., Draycott, T., Thangarati-nam, S., Le Doare, K., Heath, P., Ladhani, S., von Dadelszen, P., Magee, L.A., 2020. SARS-CoV-2 infection in pregnancy: a systematic review and meta-analysis of clinical features and pregnancy outcomes. *eClinicalMedicine* 25. doi:10.1016/j.eclinm.2020.100446.
- Knight, M., Bunch, K., Vousden, N., Morris, E., Simpson, N., Gale, C., O'Brien, P., Quigley, M., Brocklehurst, P., Kurinczuk, J.J., 2020. Characteristics and outcomes of pregnant women admitted to hospital with confirmed SARS-CoV-2 infection in UK: national population based cohort study. *BMJ* 369, m2107. doi:10.1136/bmj.m2107.
- Lalor, J., Ayers, S., Celleja Agius, J., Downe, S., Gouni, O., Hartmann, K., Nieuwenhuijze, M., Oosterman, M., Turner, J., Karlsdottir, S., Horsch, A., 2021. Balancing restrictions and access to maternity care for women and birthing partners during the COVID-19 pandemic: the psychosocial impact of suboptimal care. *BJOG* 128 (11), 1720–1725. doi:10.1111/1471-0528.16844.
- Maraschini, A., Corsi, E., Salvatore, M.A., Donati, S., 2020. Coronavirus and birth in Italy: results of a national population-based cohort study. *Annali dell'Istituto Superiore di Sanità* 56 (3), 378–389. doi:10.4415/ann\_20\_03\_17.
- NHS England, 2016. *National maternity review. Better Births; Improving Outcomes of Maternity Services in England*. NHS England, London.
- NHS England, 2020. *Specialty guides for patient management during the coronavirus pandemic clinical guide for the temporary reorganisation of intrapartum maternity care during the coronavirus pandemic 9 April Version 1*. [online]. Available at: <https://www.england.nhs.uk/coronavirus/wp-content/uploads/sites/52/2020/04/C0241-specialty-guide-intrapartum-maternity-care-9-april-2020.pdf>.
- NICE, 2014. *Intrapartum care for healthy women and babies*. National Institute for Health and Care Excellence. Available at: <https://www.nice.org.uk/guidance/cg190>.
- Office for National Statistics, 2019. *Birth characteristics in England and Wales: 2017*. Available at: <https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/livebirths/bulletins/birthcharacteristicsinenglandandwales/2017>.
- Office for National Statistics, 2022. *Birth characteristics in England and Wales: 2020*. Available at: <https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/livebirths/bulletins/birthcharacteristicsinenglandandwales/2020>.
- Parazzini, F., Bortolus, R., Mauri, P.A., Favilli, A., Gerli, S., Ferrazzi, E., 2020. Delivery in pregnant women infected with SARS-CoV-2: a fast review. *Int. J. Gynecol. Obstet.* 150 (1), 41–46. doi:10.1002/ijgo.13166.
- Renfrew, M.J., Cheyne, H., Hunter, B., Downe, S., Sandall, J., Spiby, H., Dykes, F., Lavender, T., Page, L., 2020. Optimising maternity services and maternal and newborn outcomes in a pandemic: a rapid analytic scoping review. *Royal College of Midwives*. <https://www.rcm.org.uk/media/3869/rapid-review-optimising-maternity-services-for-rcm-v4-8-april.pdf>.
- Rowe, R.E., Kurinczuk, J.J., Hollowell, J., Knight, M., 2016. The UK Midwifery Study System (UKMidSS): a programme of work to establish a research infrastructure to carry out national studies of uncommon conditions and events in midwifery units. *BMC Pregn. Childbirth* 16 (1), 77. doi:10.1186/s12884-016-0868-1.
- Royal College of Obstetricians & Gynaecologists and Royal College of Midwives, 2020. *Information for healthcare professionals Guidance for antenatal and postnatal services in the evolving coronavirus (COVID-19) pandemic*. [online]. Available at: <https://www.rcm.org.uk/media/3837/guidance-for-antenatal-and-postnatal-services-in-the-evolving-coronavirus-pandemic-rcm-and-rcog.pdf>.
- Royal College of Midwives, 2020. *RCM position statement: deployment of midwifery staff*. [online]. Available at: [https://www.rcm.org.uk/media/3906/rcm-position-statement\\_update240420.pdf](https://www.rcm.org.uk/media/3906/rcm-position-statement_update240420.pdf).
- Royal College of Obstetricians and Gynaecologists, Royal College of Midwives, The Society and College of Radiographers, NHS England, 2020. *Framework to assist NHS trusts to reintroduce access for partners, visitors and other supporters of pregnant women in English maternity services*. <http://allcatsrgrey.org.uk/wp/download/midwifery/par001599-framework-for-the-reintroduction-of-visitors-throughout-maternity-services-sep-2020.pdf>.
- Sanders, J., Blaylock, R., 2021. *Anxious and traumatised? users' experiences of maternity care in the UK during the COVID-19 pandemic*. *Midwifery*, 103069 doi:10.1016/j.midw.2021.103069.
- Scarf, V.L., Rossiter, C., Vedam, S., Dahlen, H.G., Ellwood, D., Forster, D., Foureur, M.J., McLachlan, H., Oats, J., Sibbritt, D., Thornton, C., Homer, C.S.E., 2018. Maternal and perinatal outcomes by planned place of birth among women with low-risk pregnancies in high-income countries: a systematic review and meta-analysis. *Midwifery* 62, 240–255. doi:10.1016/j.midw.2018.03.024.

- Silverio, S.A., De Backer, K., Easter, A., von Dadelszen, P., Magee, L.A., Sandall, J., 2021. Women's experiences of maternity service reconfiguration during the COVID-19 pandemic: a qualitative investigation. *Midwifery* 102, 103116. doi:[10.1016/j.midw.2021.103116](https://doi.org/10.1016/j.midw.2021.103116).
- StataCorp, 2019. Stata statistical software: release 16. College Station, TX: StataCorp LLC.
- Summers, H., 2020. Expectant mothers turn to freebirthing after home births cancelled. *The Guardian*. Guardian News and Media Limited, Manchester.
- Thomson, G., Balaam, M.-C., Nowland, R., Crossland, N., Moncrieff, G., Heys, S., Sarian, A., Cull, J., Topalidou, A., Downe, S., 2022. Companionship for women/birthing people using antenatal and intrapartum care in England during COVID-19: a mixed-methods analysis of national and organisational responses and perspectives. *BMJ Open* 12 (1), e051965. doi:[10.1136/bmjopen-2021-051965](https://doi.org/10.1136/bmjopen-2021-051965).
- Vousden, N., Bunch, K., Morris, E., Simpson, N., Gale, C., O'Brien, P., Quigley, M., Brocklehurst, P., Kurinczuk, J.J., Knight, M., 2021. The incidence, characteristics and outcomes of pregnant women hospitalized with symptomatic and asymptomatic SARS-CoV-2 infection in the UK from March to September 2020: a national cohort study using the UK Obstetric Surveillance System (UKOSS). *PLoS ONE* 16 (5), e0251123. doi:[10.1371/journal.pone.0251123](https://doi.org/10.1371/journal.pone.0251123).
- Walker, K., O'Donoghue, K., Grace, N., Dorling, J., Comeau, J., Li, W., Thornton, J., 2020. Maternal transmission of SARS-COV-2 to the neonate, and possible routes for such transmission: a systematic review and critical analysis. *BJOG* 127 (11), 1324–1336. doi:[10.1111/1471-0528.16362](https://doi.org/10.1111/1471-0528.16362).
- Walsh, D., Spiby, H., Grigg, C.P., Dodwell, M., McCourt, C., Culley, L., Bishop, S., Wilkinson, J., Coleby, D., Pacanowski, L., Thornton, J., Byers, S., 2018. Mapping midwifery and obstetric units in England. *Midwifery* 56, 9–16. doi:[10.1016/j.midw.2017.09.009](https://doi.org/10.1016/j.midw.2017.09.009).
- Wang, C., Zhou, Y.-H., Yang, H.-X., Poon, L.C., 2020. Intrauterine vertical transmission of SARS-CoV-2: what we know so far. *Ultrasound Obstet. Gynecol.* 55 (6), 724–725. doi:[10.1002/uog.22045](https://doi.org/10.1002/uog.22045).
- WHO, 2020a. WHO recommendations on antenatal care for a positive pregnancy experience. Available at <https://www.who.int/publications/i/item/9789241549912>.
- World Health Organization, 2020b. Clinical Management of Severe Acute Respiratory Infection (SARI) when COVID-19 Disease is Suspected. Interim Guidance 13 March 2020. World Health Organization, Geneva [online]. Available at.
- World Health Organization, 2020c. 2019-nCoV outbreak is an emergency of international concern [Available from: <https://www.euro.who.int/en/health-topics/health-emergencies/international-health-regulations/news/news/2020/2/2019-ncov-outbreak-is-an-emergency-of-international-concern>].
- Yang, Z., Wang, M., Zhu, Z., Liu, Y., 2020. Coronavirus disease 2019 (COVID-19) and pregnancy: a systematic review. *J. Mater.-Fetal Neonat. Med.* 1–4. doi:[10.1080/14767058.2020.1759541](https://doi.org/10.1080/14767058.2020.1759541).
- Yuill C., McCourt C., and Rocca-Ihenacho, L., 2020. 'Pop-up' birth centers? Considering COVID-19 responses and place of birth in England. *Medical Anthropology Quarterly Rapid Response Blog Series*, Accessed March 2022. <http://medanthquarterly.org/?p=514>.