The Role of Midwifery and Other International Insights for Maternity Care and in the United States: An Analysis of Four Countries

Abstract

BACKGROUND: The United States (US) spends more on health care than any other high resource country. Despite this, their maternal and newborn outcomes are worse than all other countries with similar levels of economic development. Our purpose was to describe maternal and newborn outcomes and organization of care in four high resource countries (Australia, Canada, the Netherlands, and United Kingdom) with consistently better outcomes and lower health care costs, and to identify opportunities for emulation and improvement in the US.

METHOD: We examined resources that described health care organization and financing, provider types, birth settings, national, clinical guidelines, health care policies, surveillance data, and information for consumers. We conducted interviews with country stakeholders representing the disciplines of obstetrics, midwifery, pediatrics, neonatology, epidemiology, sociology, political science, public health, and health services. The results of the analysis were compared and contrasted with the US maternity system.

RESULTS: The four countries had lower rates of maternal mortality, low birth weight, and newborn and infant death than the United States. Five commonalities were identified: 1) affordable/ accessible health care, 2) a maternity workforce that emphasized midwifery care and interprofessional collaboration, 3) respectful care and maternal autonomy, 4) evidence-based guidelines on place of birth, and 5) national data collections systems.

CONCLUSIONS: The findings reveal marked differences in the other countries compared to the United States. It is critical to consider the evidence for improved

maternal and newborn outcomes with different models of care and to examine US cultural and structural failures that are leading to unacceptable and substandard maternal and infant outcomes.

KEYWORDS: maternal and newborn outcomes, international health systems, midwifery

Introduction & Background

The United States (US) spends more on health care than any other high resource country.[1] Despite this, the US maternal mortality rate is more than double that of other countries with similar levels of economic development.[2-4] Severe maternal morbidity affects an estimated 15.8/1000 US births per year.[5] Unlike other similar Organization for Economic Cooperation and Development (OECD) countries, maternal mortality is not decreasing and there are marked racial inequities.[6] Black and Indigenous women in the United States are far more likely to die as a result of pregnancy than are white women.[7] Women living in economically deprived circumstances, rural settings, and those with health conditions such as obesity, diabetes, and hypertension are also at higher risk.[8] Neonatal and infant outcomes are also poor.[1]

The concept of "too much too soon and too little too late," proposed by Miller and colleagues, suggests an imbalance of both resources and evidence translation in maternity care.[9] In high resource countries, including the US, there is often over-medicalization of uncomplicated birth leading to suboptimal outcomes, and this varies markedly across and within states and regions. One strategy to promoting optimal outcomes is understanding how resources are allocated so that all women and newborns receive timely, respectful high-quality care.[10]

Poor outcomes in the United States raise questions about the effectiveness of the maternity care system when compared to other high resource countries.[2] In response, this paper was commissioned by the US National Academies of Sciences, Engineering, and Medicine (NASEM) to inform their 2020 study on US birth settings and outcomes.[11] Our purpose was to describe maternal and newborn outcomes and organization of care in four high resource countries with consistently better outcomes

and lower health care costs, and to identify opportunities for emulation and improvement in the US.

Methods

We examined outcome and cost-effectiveness data on birth settings that could provide comparisons based on country population and resources.[12-26] We chose to explore in-depth Australia, Canada, the Netherlands, and the United Kingdom because they are high resource countries and had relatively robust data on birth settings and outcomes from their vital statistics systems. Box 1 provides the methodological steps in our process. We present the synthesis of our findings on the four countries and compare those to the US context in the discussion section.

(Box 1*)*

Results

Table 1 provides a comparison by country of types of providers, birth settings and selected outcomes. We used OECD Health Data unless otherwise noted.[1]

(Table 1 references 27-40)

The online supplemental appendix provides country profiles from desk-based research that describes their health care funding, types of providers and educational preparation, paid pregnancy leave, and an overview of health systems compiled by the Commonwealth Fund.[41]

Relative to the US, the four comparison countries had lower rates of maternal mortality, low birth weight, and newborn and infant death. Among countries with available rates of severe maternal morbidity (Australia and England), the US rate was higher for this measure. The comparison countries had greater proportions of publicly funded maternity care, higher combined rates of births in midwife-led birth

centers and at home, and a greater proportion of midwife-attended birth for all women.

Common Factors across the Four Countries

The following summarizes our synthesis of the commonalities we identified across the four countries that might be associated with better outcomes when compared to the United States. These were categorized into five factors described below.

1) Affordable and accessible health care

All four countries had universal access to maternity care, (i.e. women are neither without coverage prior to becoming pregnant, nor dropped from health care coverage after they have given birth). This was most often cited by the stakeholders as a reason for their good outcomes.

Accessibility also reflected a commitment to integration of care across providers and systems, such as the capacity to transfer seamlessly across birth settings and coordinate care for women in remote settings. Several national clinical guidelines described how to manage transfer of care across providers and/or settings, for example:[42]

> *... base any decisions about transfer of care on clinical findings and discuss the options with the woman and her birth companion(s) to ensure that her wishes are respected … when arranging transfer of care, the midwife contact[s] the ambulance service (if appropriate) and the coordinating midwife in the obstetric unit*.

A Canadian maternal health services professor noted that health care accessibility was enhanced by integrating services that address challenges faced by remote communities and with Indigenous populations. This included telemedicine, preventative planning, effective communication among local providers, and transport.

2) The maternity workforce and the impact of midwifery and interprofessional collaboration

Three of the four countries had workforce models in which midwives were primary maternity caregivers across most birth settings. Table 2 provides a comparison of obstetricians and midwives across the four countries and with the United States.

(Table 2 [references 43-51])

In Australia (in the public system), the Netherlands and the UK, women having an uncomplicated vaginal birth usually have a midwife as the primary accoucheur (person in charge of the care). In Australian private settings there is always a midwife present, but the obstetrician is usually the primary accoucheur. Three of the four countries subsidize at least part of maternity providers' education.

A UK neonatologist believed that effective integration across the care pathway leads to favorable maternal and newborn outcomes: "*Integration between maternal, newborn, and infant care (midwife, health visitor, and GP) are important for ensuring safe high-quality care continuum*." (A health visitor is a registered nurse or midwife who has gained additional training and qualification as a specialist in community public health for children). Current UK maternity policy includes continuity of midwife care as key to responding to current evidence of impact on reduction of preterm births, stillbirths, and improved women's experience.[52-54]

The UK, Canada, and Australia have guidelines that describe the importance of midwifery and integration within the healthcare system.[55-57] The Australian Pregnancy Care Guidelines were explicit about the role of the midwife and the evidence for continuity saying:[57]

Midwives are the primary providers of care for the woman; this may be through a team of midwives being responsible for care of a small number of women (team midwifery) or a woman receiving care from one midwife or his/her practice partner (caseload midwifery) … the benefits of midwifery continuity of care when providing maternity services are well documented.

Dutch midwife stakeholders described the independence of midwifery as a strength in the Netherlands: "*The strength of midwifery profession in the Netherlands means midwives are independent and have a degree of power and good balance with obstetricians."*

Midwifery was not part of the national healthcare scheme in Canada when it began to achieve formal recognition in 1993 and is still being established in some provinces. Midwifery is formally recognized in 10 out of 13 provinces and territories. Stakeholders noted that where midwives are well integrated, and midwifery education programs well-established (Ontario, British Columbia, Quebec, Alberta), rates of uptake of midwifery care have increased to 20-25%.[39] Examples of how midwifery has made differences in numerous at-risk communities, and especially in caring for Indigenous populations were provided.

… effective transfer/integration and growing strength of midwifery has been crucial to increasing the safety of home birth.

Health care access was in part, dependent upon effective collaboration, as reflected in the Australian Pregnancy Care Guidelines.[56]

Collaboration also involves working within established clinical networks and systems to facilitate timely referral and transfer to appropriate services when required … collaborative networks within these systems are critical for enabling access to safe effective quality services.

3) Respectful care and maternal autonomy

Most stakeholders commented that a strength of their health care systems was that they were based on respectful care, as described in this UK national guideline.

> *Providers, senior staff and all health care professionals should ensure that in all birth settings there is a culture of respect for each woman as an individual undergoing a significant and emotionally intense life experience, so that the woman is in control, is listened to and is cared for with compassion, and that appropriate informed consent is sought.*[42]

The Australian Medical Association notes that the physician should continue to provide support, even if a woman chooses care that is not recommended.[57]

> *The doctor must respect the woman's informed decision, even if it is not consistent with the doctor's advice and continue to provide patient support. In the event that the doctor cannot in good faith continue to care for the patient, they have a duty to make timely arrangements for that patient's ongoing care*.

One of the Australian midwifery stakeholders did not believe respectful care was universal or that women were always trusted to make their own decisions. She thought this was likely associated with higher levels of cesarean births within certain institutions and rising rates of freebirth, or birth at home without a health professional.[58] One of the Dutch obstetricians noted there may be room for improvement in this aspect of the model, "*The Netherlands has good (medical) outcomes, but is less good on influence, autonomy, and co-creation with women.*"

A Canadian obstetrician highly regarded for his expertise in medical ethics articulated the importance of respecting the woman's choice in her care.

[In] much of Canada, women choosing a path that involves greater risk are treated in a manner that respects their autonomy. If a woman has been adequately informed of the risks, it is accepted by the obstetrical [and midwifery] and legal professions that she is responsible … this allows clinicians to preserve the therapeutic alliance with the woman and explore the safest options for care…

4) Evidence-based guidelines on place of birth

Three countries had publicly available national evidence-based clinical practice guidelines. These documents were developed by multidisciplinary teams (obstetricians, midwives, pediatricians, other health care professionals, and sometimes service users) who systematically reviewed current evidence to make practice recommendations.[42;56;98] Australia has national guidelines for antenatal care but did not have evidenced-based guidelines about place of birth that were agreed upon by all parties.

The UK recommends that all women have access to all four choices of birth setting (obstetric unit, alongside midwifery unit, freestanding midwifery unit and home).[42]These recommendations were followed by a detailed review of statistical findings from England's extensive Birthplace study.[13] Canadian national obstetric, family physician, and midwifery professional associations also have statements supporting women's choice of and access to maternity care in three settings - hospital, birth center, and home.[60-62] The Royal Australian and New Zealand College of Obstetricians and Gynaecology supports choice but does not support homebirth in contrast to the Australian College of Midwives.[62-63] The Netherlands had the highest rate of birth at home of the four countries. "*Every pregnant woman has the choice to give birth at home, in a birth center or in hospital, assisted by a maternity care*

professional. This choice should not be influenced by out-of-pocket expenses associated with certain choices.[59]

5) Data collection strategies and reporting

Perinatal data collection systems varied across countries. The Netherlands has a nationwide mandatory perinatal registry and a perinatal audit that examines perinatal morbidity and mortality outcomes, similar to UK confidential enquiries. The confidential nature of the audit was perceived, in part, to hamper potential improvements at the individual level. UK stakeholders referred to a 60-year history of comprehensive surveillance. The *Mothers and Babies: Reducing Risk through Audits and Confidential Enquiries across the UK* (MBRRACE-UK) program is situated in UK's National Perinatal Epidemiology Unit at the University of Oxford.[64] A UK neonatologist and maternal and child population health professor, with a lead role in the conduct of maternal mortality and morbidity enquiries, articulated the importance of using routinely collected data to understand gaps in service provision and to improve care. Canadian stakeholders identified several provincial and national data collection schemes, but also noted that detail available on outcomes by birth setting varied by province. The Ontario based BORN registry was cited as a strong example of provincial data collection.[65] The Australian Institute of Health and Welfare (AIHW), managed by the federal government, tracks perinatal data and provides reports for clinicians, policymakers, and consumers.[66]

Innovative Strategies

We asked the stakeholders to provide examples of innovative strategies in their countries that might be informative to the United States. Most noted their strong perinatal data collection systems and national initiatives to collectively improve maternal and newborn outcomes. Canadian stakeholders pointed to efforts to

increase access to midwives caring for Indigenous populations and rural and remote communities. With broad support from the First Nations Inuit Health Branch (FNIHB) /Indigenous Services Canada, the National Aboriginal Council of Midwives (NACM) was established in 2008 to restore and renew Indigenous midwifery. NACM has actively expanded educational and practice pathways for midwives who are Indigenous to the population served, and cultural competency preparation for maternity health professionals. Enhancing surgical skills for non-obstetricians and telehealth were also mentioned as ways to improve care for remote communities.

As countries described their initiatives, it was clear that most had an interdisciplinary approach to collective vision and action. Of all the statements we reviewed, perhaps the strongest example was England's 5-year visionary statement titled, *Better Births: Improving Outcomes of Maternity Services in England – A Five Year Forward View for Maternity Care*.[55]

In addition to the innovations mentioned above, several stakeholders noted that consumers had access to evidenced-based, public health websites that helped them to make informed decisions about their birth. These had various funding schemes from government subsidy to private foundations. More details about these strategies and resources can be found in the country profiles in the online appendices.

Discussion

We discuss the findings in terms of the US context, current evidence, and suggest recommendations on how they could be used in shaping future US health care practice and policy. Stakeholders attributed their country outcomes to affordable and accessible health care, in particular maternity care. This reflects the findings of an extensive case study analysis of four countries with two decades of sustained decrease in maternal mortality.[67] The United States is the closest it has ever been in

providing universal health care coverage. The Patient Protection and Affordable Care Act (ACA)[68] means that pregnancy is no longer considered a pre-existing condition and has enabled millions of people to access health care coverage.[68-69] However, most insurance is still tied to employer plans, and those who are on ACA subsidized plans have high deductibles for pregnancy.[70] Medicaid only reimburses half of what private insurers pay for pregnancy. In addition, women on Medicaid experience a high rate of "churn" during insurance transitions before and after pregnancy. A study released in 2017 revealed that 55% of women who had obtained Medicaid coverage by the time of birth experienced a coverage gap in the following 6 months.[71] Although more research will need to be conducted on ACA's impact, there are indications that it is improving access and has potential to improve maternal and infant health outcomes, especially for African Americans.[72-73]

At public policy and legislative levels, each of the countries mandated that all people had health care supported by various strategies of taxation, public funding, and self-funding. Describing these strategies in-depth, the cost effectiveness of each, or the role of malpractice liability was beyond the scope of this paper. At least one stakeholder believed supporting women's autonomy and choice helped to diminish liability risk.

Three of the four countries had models in which midwives were the primary maternity providers for most women (Australia, Netherlands, UK). In the three decades since midwifery was formally recognized in Canada, midwives are making rapid advances in providing care and are now surpassing US midwives in the proportion of births attended. The stakeholders in the comparison countries suggest they have found an appropriate balance of roles between midwives and obstetricians.

A recent US study suggests that the level of integration of midwifery within state health systems is associated with improved maternal and newborn health outcomes.[74] Greater midwifery integration was associated with significantly higher rates of spontaneous vaginal birth, vaginal birth after cesarean, breastfeeding, and significantly lower rates of cesarean, preterm birth, low birth weight infants, and neonatal death. More collaborative environments also correlated with density of midwives and access to care across birth settings, as well as decreased cesarean rates and other birth interventions.[75-76]

Effective collaboration has been identified as critical to US obstetric/midwifery practice models with improved outcomes.[77-78] Key factors for successful collaboration were integration of care, mutual trust and respect, regulation for the full scope of midwifery practice, and interprofessional education. There is a growing maternity workforce crisis in the United States; over half of US counties do not have a maternity provider.[79-82] The evidence supports that the majority of pregnant individuals are best served by midwifery care within a system that provides referrals to medical colleagues to care for those who need more specialized care. This ratio (mostly midwives with obstetricians as indicated) was found in the four countries we examined. Rightsizing the US workforce is likely a critical step to resolve this crisis and will require the cost of and time to complete health education.

Our findings suggest that respectful care and maternal autonomy provide a context for understanding the differences between the countries we examined and the United States. Several systematic reviews of why women do not access maternity care, in high- and low-income countries, demonstrated that lack of respectful care may be a key reason.[83-85] Their findings suggest that women are

more likely to access care if it is deemed positive, reflects their cultural values and beliefs, is accessible, affordable, flexible, and treats them as an individual.

Several studies from Australia provide insight on how lack of autonomy and respect may influence women's choices to give birth with an unregulated birth worker. Women described traumatizing, inflexible, mainstream maternity care in the past, leading them to choose alternative strategies to meet their needs and avoid a repeat of past trauma.[58;86-87] These findings suggest that even though most of the Australian stakeholders believed autonomy and respect were important components in their health care system, it likely was not the experience of every woman. The value of respect and autonomy is a key message of the US Black Mamas Matter Alliance. They call for philosophical and practical shifts in health care for Black mothers, including how they are treated.[88]

The four countries employed evidence-based guidelines which addressed many aspects of maternity care, including places of birth. Integration of care across birth settings was considered essential for successful maternity systems. Our findings suggest that when integrated systems are in place, care is provided by competent providers, and there is seamless transfer of care across settings and provider, then place of birth should be the choice of the woman. When these are developed nationally by multidisciplinary teams, they are more likely to have greater impact.

Transfer of care from home or birth center to hospital in the United States has been a source of dissatisfaction, or even trauma, for women, and may be leading to delays in decisions to seek assistance.[89] Midwives and physicians have been found to struggle with interprofessional consultations around planned home birth and those tensions are greatest during transfer from home to hospital.[90] The tensions reflect differing perceptions of safety and risk, and an understanding of each other's' scope

of practice, roles, and expectations. An excellent resource to ameliorate this tension is the *Transfer from Planned Home Birth to Hospital Guidelines* published by multidisciplinary delegates at Home Birth Summit.[91]

The recent *Strong Start for Mothers and Newborns Initiative*, funded by the Center for Medicare and Medicaid Innovation, has demonstrated exceptional promise for consideration of future strategies on providing integrated care models and place of birth.[92] Birth centers (n=45) using a midwifery-led model of care enrolled a diverse sample of 6,424 Medicaid beneficiaries in 19 states.[93] Their outcomes were better when compared to similar, carefully matched women in an adjusted analysis receiving typical Medicaid care: low birth weight 3.2% vs 8.2%; preterm birth rate 4.4% vs 9.9%; and total cesarean rate 8.7% vs 21.8%. Although there were racial inequities in their findings, they were less pronounced than for women who received typical care, and none were found in rates of breastfeeding or experience of care. Costs for women in Strong Start birth centers were $2, 010 less than the comparison group.[94]

The four countries we examined use national data collection and reporting, with strategies for using the data to improve outcomes. However, we noted that there were inconsistencies, in particular across specific metrics. This was especially true in perinatal statistics which are influenced by the measured week of fetal death and varied by country.[95] Tracking provider type at birth was not consistent, which is important in understanding the impact of various team members on care throughout the childbearing year. The Birthplace[13] and Strong Start[93] studies were robust and should be considered models for going forward.

In the countries studied, we found the word “midwife” had a standard meaning for the public. This is not true in the United States. There are three types of midwives

with nationally recognized credentials in the United States; each have different types of educational preparation and regulation.[96] In the 2018 national vital statistic birth data, CNMs attended 357,297 births, 30,222 were attended by "other" midwives, and an additional 32,185 were attended by "other," a third of which were home births that may have involved midwives in states where midwifery practice is constrained.[97] Accurate reporting of those percentages is currently not possible and CNM-attended hospital births may be underreported when they are not accurately reported on the birth certificate.[98] These issues are confusing for the public and for accurate reporting.

The UK outlines their continued comprehensive work in confidential enquiries in the publication, *Beyond maternal death: improving the quality of maternal care through national studies of 'near miss' maternal morbidity*.[99] This extensive examination supports a commitment to assuring high quality, evidence-based, integrated care, strong communication, and the involvement of patients and families in the development of future health services. Although there are increased efforts to increase use of perinatal quality data, the fact that the United States has, in 2020 reported a national maternal mortality rate for the first time since 2007 typifies the difficulties with the current US system.[7, 100-102] Future US data collection should not only be uniform across the 50 states, it should also be consistent and robust in gathering information of health inequities in order to develop strategies to address them.

A range of solutions could be proposed, but these need to be culturally, politically, and economically aligned to the realistic norms and expectations of US service users, providers, and systems. We acknowledge the limitations of comparing different countries with different approaches to health care delivery. Although Table 1

379 presents best available methods for health systems comparison research, it reflects
380 the challenges of comparing country-level data.[103] Notes are provided at the bottom
381 of the table that describe not only sources, but also the differences in
382 operationalizing these measures. For example, comparing stillbirth rates is difficult
383 since definitions varied across countries (e.g. some countries count deaths after 20
384 weeks as stillbirths while others at 22 or 24 weeks). We noted different definitions
385 when applicable.

386 There are also reporting challenges in systems where national data are based
387 on regional/state reports and in some cases more nuanced data may be available
388 from, for example, England, Wales, and Scotland rather than the United Kingdom
389 (UK) as a whole. Similar issues exist in Canada and Australia. Identifying the
390 attendant with responsibility for the birth is also challenging, especially in US birth
391 certificate data. Noting these limitations, we have attempted to be as transparent as
392 possible about the sources and context of the data presented.

393 There are excellent examples of interdisciplinary efforts to improve maternity
394 care in the United States. These include the *California Maternal Quality Care*
395 *Collaborative*, which has shown how a statewide collective effort in data collection
396 and reviews can contribute to evidence-based care bundles to decrease morbidity
397 and mortality and decreasing cesarean delivery rates compared to the rest of the
398 United States. [104-108] The National Partnership for Women & Families *Blueprint for*
399 *Advancing High-Value Maternity Care Through Physiologic Childbearing* is a
400 roadmap to improve maternity services and outcomes in the United States and
401 reflects much of what we found in the four countries we examined.[109] The Alliance
402 for Innovation on Maternal Health (AIM) is a US quality improvement initiative
403 founded on data and safety principles to eliminate preventable maternal mortality

and is open to all US hospitals.[110] The *Listening to Mothers in California* 2018 report provides an example of exploring women's experiences at the state level, including access to midwifery care and choice of place of birth.[111] The US Consortium on Safe Labor is contributing to the growing evidence that women cared for in centers with midwives, in addition to obstetricians and nurses, are less likely to receive oxytocin in labor or to have a cesarean delivery.[75-76] All of these programs can be easily adapted into quality improvement programs on the local and state level. However, more traction would be gained if there was a collective effort to adopt a national strategy to improve care and outcomes, such as we observed in the four countries.

The recommendations in Table 3 provide an update to what we proposed to NASEM, based on our examination of the four countries and gaps identified in the US maternity health care system.

Table 3 (references 112-113)

Conclusions

We believe through our examination of four countries with similarities to the United States that we have uncovered commonalities that can be lessons for the United States. Although these were not universally adopted by NASEM in their final study on birth settings, their report clearly indicated the importance of respectful maternity care with informed choice.[11] In addition, they recommended development of midwifery-led maternity units for low risk women, greater collaboration of maternity care providers, development of values-based care and high-value payment models, integration of home and birth center settings into a regulated care system, improved maternity care access, and future research on sustainable models for safe, effective, and adequately resourced maternity care, including underserved rural and urban areas.

As we were submitting this manuscript the world was in the throes of the 2020 Covid-19 pandemic. Interestingly, this pandemic markedly exposed the lack of maternity care integration and paucity of community birth options in the United States. It clearly ripped the band aid off of the health insurance patchwork when insurance tied to employment imploded. Many US women began seeking childbirth care at home or in a birth center because of fear of exposure, and because many hospitals were denying the presence of birth companions.[114-115] At the same time, hospitals had to reconfigure their beds, and this impacted many maternity units. A pandemic is not the best time to alter birth plans or hospital maternity units, but this situation may make the discourse about the value of integrating care across birth settings in the United States more pronounced. As we move beyond the pandemic it will be essential to examine how countries managed care in the crisis and how mothers and babies fared.

In closing, it is critical to consider the evidence for improved outcomes and reduced interventions with different models of care, such as midwifery-led continuity of care models.[10] This is relevant for all countries, not just the United States. It is also important to examine our cultural and structural failures in our less than optimal maternal and optimal outcomes. It is our hope that our recommendations will be taken up seriously across federal and state institutions to improve outcomes in the United States for all mothers and infants.

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Box 1. Methodological Approach

A very rapid scoping exercise was undertaken June 2019 at the request of NASEM for their study on birth settings in the United States. Each of the co-authors was asked to provide data relevant to their country (Australia, Canada, the Netherlands, United Kingdom), and to nominate other key stakeholders who could provide data on the project aims. No specific sample size was set: the intent was rather to ensure that enough data were collected to answer the questions posed in Table 1, from a range of professional and policy level perspectives. Some respondents agreed to on-line interviews, using an interview guide based on the study questions. Others provided written responses to the questions. Co-authors and responding stakeholders were also asked to provide links to data bases that could provide additional evidence and information. All data collection was undertaken in English.

The informants who contributed to the data set included all co-authors (n= 11 (USA = 2, UK = 4, Canada = 1, Australia = 3, Netherlands = 1) including midwives, physicians, and academics with specific kinds of knowledge of their country maternity services (in terms routinely collected statistics, and of refugee and asylum seeking women, for example) provided data relevant to their professional or policy perspective, for their country, and supplied links to relevant databases, including databases of routine statistics. Co-authors also had experience at national level in their various countries, in professional organizations and policy positions. One co-author also provided a detailed written account in direct response to the project questions. In addition, 8 stakeholder interviews were carried out, including people with medical, midwifery, and policy backgrounds. As well as providing additional professional and policy insights, these generated additional links to databases and relevant documents (Netherlands = 3; Canada =4; UK = 1). In total, links to more than 50 databases and policy documents were supplied.

All resulting data were logged on an excel file, by the source, against the study questions. Interviews were not transcribed in full and analyzed thematically using Atlas.ti software program (Version 8, Berlin, Germany), since the purpose of the data collection was deductive (to answer the pre-determined questions) and so only data relevant to these questions were logged, in notation form. Ethical approval was obtained from the University of Central Lancashire, UK.

The US co-authors (N=2) and 1 Canadian with extensive US midwifery research, knowledge, and policy/clinical experience, compared the findings to the US healthcare system.

Discussion Questions for Country Stakeholders

1. Could you describe the nature of your role or stake in quality maternal and newborn care and health outcomes in your country. (Consider – is such a role unique to that country?)
2. In your opinion, what do you believe are the most important factors that lead to or hinder quality maternal and newborn care and health outcomes in your country?
3. What systems are there in your country to monitor maternal and perinatal health? How timely and accurate are those systems? How are the results of that surveillance system built into the policies that govern and the management systems that implement maternal and newborn care in your country? How are processes and outcomes monitored in different birth settings in your country? Are there any measures you would like to add to your current system?
4. How is maternity care financed in your country and how does that impact the process of care here? How would you improve that if you could?
5. In your country do you believe there are innovative approaches, particularly related to birth settings, that improve outcomes directly, or by affecting social determinants of health or some other factor?
6. Is there anything else you would like to share with us?

Table 1. Country Comparison Data

	Year	USA	Australia	Canada	Netherlands	UK
Live births (000)	2017	3,885.5	[27] 305.7	376.6	[28] 163.8	754.4
Crude birth rate [29] (per 1,000 pop.)	2017	[30] 11.8	12.0	10.0	10.1	11.8
Fertility rate – Children per women (age15-49)	2017	1.77	1.74	1.5	1.62	1.74
GDP per capita US$	2018	62,503	54,095	48,261	56,444	45,637
Health Expenditure as % GDP	2018	16.9	9.3	10.7	9.9	9.8
Health Expenditures Per Capita US$	2018	10,586	5005	4974	5288	4070
Infant mortality (per 1,000 births)	2017	5.8	3.3	4.5	3.6	3.9
Neonatal mortality (per 1,000 births)	2017	3.9	2.4	3.5	2.7	2.8
Perinatal mortality (per 1,000 births) (includes stillbirths)	2017	5.9	8.1	5.8	[28] 4.8	6.3
Fetal death rate/stillbirth (per 1,000 births)	2017	[1;31] 6.1	[1;32] 7.0	[33] 8.3	[28] 2.7	[34] 4.3
Maternal mortality (per 100,000 births)	2017-18	[7] 17.4	[1;35] 8.5	6.6	[36] [a] 5	6.5
% Preterm births [37]	2014	9.56	8.60	8.15	7.44	7.05
% Low birth weight	2017	8.3	[27] 6.7	6.5	6.0	6.9
% Severe maternal morbidity	2008-13	[5] 1.6	[5] 0.8	n/a	n/a	[5] 0.5
% Cesarean births	2017	32.0	[27] 34.6	27.7	16.6	27.3
% Births delivered by OB [b]	2017	[c] 90.0	[d]	n/a	30.0	[5, 38] 39.1
% Births delivered by MW [b]	2017	10.0	[d]	[39] 10.8	70.0	[5, 38] 51.3

% Births delivered by FP/GP [b]	2017	[b] n/a	[c]	n/a	n/a	[5, 38] 9.5
% Births in hospitals	2017	98.4	97.0	97.9	[28] 71.5	[40]84
% Births in birth centers [e]	2017	0.5	[27]1.8	n/a	[28] 15.1	[40]14
% Births at home	2017	1.0	0.3	[33] 2.1	[28] 12.7	[34]2.1
% Private funded birth care [30]	2017	49.1	26.0	<8	[f]	5.0
% Public funded birth care [30]	2017	43.0	74.0	>92	[f]	95

Sources: Data from OECD Health Data (2018) unless otherwise noted.[1] This is updated on a yearly basis. The reported rates from OECD may differ from rates reported in individual country reports because of differing time periods or definitions. We rely on them because of their emphasis on maintaining comparable methods across country measures.

a Note that maternal mortality data reporting varies by source. We used CIA data for the Netherlands which consistent with their national statistics data , although is about 33% lower than the cases reported to the maternal mortality audit committee of the Dutch Organization of Obstetrics (NVOG).

b OB=obstetrician; MW=midwife; FP/GP=family physician/general practitioner

c U.S. birth certificate data only record physicians as MD or DO; they do not designate specialty such as obstetrician or family medicine.

d Almost all Australian vaginal births are attended by a midwife and 10% will have continuity of care by a midwife who attends the birth. However, Australian data do not provide identification of the responsible clinician at the birth (Australian stakeholder).

e Birth centers can be freestanding or in-hospital – countries differ somewhat in staffing and policies.

f Dutch births are covered by a basic universal insurance plan. If the birth takes place in a hospital or birth center without medical indication (i.e. referral by doctor or midwife) an additional personal contribution must be paid (Dutch stakeholder).

n/a = not available

Table 2. Numbers of obstetricians and midwives by country

	USA [43-44]	**Australia** [45-46]	**Canada** [47-48]	**Netherlands** [49]	**UK** [50-51]
Live births/year	3,885,500	305,000	376,600	163,800	754,000
Obstetricians (OB)[a]	35,586	1,742	2,213	931	2,600
Midwives (MW)[a]	12,436[b]	14,280[c]	1,740	3,221	21,500
Total providers	48,022	16,022[a]	3,953[a]	3,752	24,100
MW/OB Ratio	0.34/1	8.19/1	0.79/1	3.46/1	8.27/1

[a] Licensed/registered midwives and obstetricians; these number do not reflect GP/FP physicians, who were not included because of lack of data. In 2018 there were 43,500 FPs in Canada (CMA, 2018).[47] It is estimated that approximately 11% of FPs in Canada attend birth and are responsible for 30% of all births. FPs provide approximately 50% of prenatal care, but not all attend birth (Personal communication, Professor Michael Klein, University of British Columbia, July 21, 2019). It is also important to note that in Canada the majority of women giving birth in hospital will have an obstetrical nurse similar to the United States. There are also obstetrical nurses in the Netherlands who assist the MW or OB during the birth.[b] There are 3 types of midwifery certifications in the United States. Certified Nurse-Midwives (CNM; n=12,331) and Certified Midwives (CM; n=105) are certified by the American Midwifery Certification Board (AMCB, 2019).[43] Certified Professional Midwives (CPM) are certified by the North American Registry of Midwives. Their numbers are not publicly available and are not included in the total USA MW figures above. [d] These numbers reflect a calculation of FTEs. Total number of registered midwives is 21,149. This calculation was not available in the other countries.[45] [c] This number reflects full time equivalent for Australia only.

Table 3. Recommendations based on study findings.

1. **Access to affordable and appropriate health care**. The United States is at a unique moment in time with a growing national call by many for universal health care coverage. Although, this paper specifically addressed maternity care, primary care (including other services as needed) must be accessible to women before and after the childbearing year. It is critical if the United States is serious about improving maternal and newborn outcomes.
    a. Recommendations should be made to work with national multidisciplinary leaders, service users, and Congress to assure universal health care access.
    b. Until universal access is available, work at state level must assure that women have the health coverage they need.
    c. Recommend establishment of models of continuity of care within women's neighborhoods for easy access, and in which they are known by their provider.

2. **Right-sizing the maternity workforce so that #1 above can be achieved**. No one profession or discipline can solve the current U.S. maternal health care crisis. It must be done collectively and must include women in the process. Minimally it would require:
    a. All maternity professional organizations and public stakeholder groups working together to explore solutions to the workforce.
    b. Working with Congress to derive funding strategies for education and incentives for maternity providers to work in areas with minimal access.
    c. Assuring that the midwifery workforce is prepared in the numbers required to meet the demand and reflect the competencies and standards as outlined by the International Confederation of Midwives.[112]
    d. Address system and cultural barriers to midwifery care access.[111]
    e. Recommend a national registry of midwives to achieve licensing consistency and improved access across state boundaries.[113]

3. **Assure that women receive respectful maternity care based on their needs and values and that respects their autonomy**. This must be a national ethos and will require a culture shift. However, it is a mandate of the World Health Organization (2018). Steps toward this would include:

a. Assure that diverse women are involved at every level of policy making about their health care. Especially critical is that women do not make birth choices that are potentially harmful because respectful care is not available to them.
b. Interdisciplinary and interactive strategies for health professionals to incorporate these values into their practice should be mandated in all education programs as core competencies.

4. **Evidence-based, interdisciplinary national practice guidelines**. Care practices grounded upon best available evidence, coupled with the woman's input about what is right for her, could help the United States begin to balance the problems of overuse or underuse of interventions in maternity care. This includes place of birth. Minimally this would include:
   a. Establishment of a multidisciplinary taskforce, similar to those used by NICE, to develop national evidence-based guidelines for maternal and newborn care.
   b. These guidelines would include the evidence about the importance respectful maternity care and the woman's autonomy.
   c. These guidelines would include evidence about birth settings and providers.
   d. These guidelines should provide the structure to develop a nationally accessible public information site presenting evidence to assist women and families to make the best decisions about their maternity care and provider, and place of birth.

5. **Invest in consistent, coherent national data collection and reporting schemes**. Collecting maternal, perinatal, and newborn data, including who attends the birth in 50 different states, is currently chaotic and undermines the capacity to use data effectively to analyse outcomes or to make systemic improvements. Minimally, it would include the following.
   a. A national birth certificate that identifies contributions of obstetricians, family physicians, other physicians, CNMs, CMs, CPMs, and other midwives.
   b. A national multidisciplinary Maternal and Morbidity Review with state representation, including yearly report of findings.

Online Supplemental Appendix: Country Profiles

AUSTRALIA

Funding of health services: All Australians who are nationals or who have permanent residency are eligible for free health care through a national health insurance scheme known as Medicare, which was commenced in the 1980s and is paid for through taxation.

Provision of pregnancy care services: Pregnancy services are provided through antenatal clinics with midwives and/or doctors, midwifery group practices, caseload midwifery services, Aboriginal Health Services and birth centers depending on availability. General practitioners also provide pregnancy care, especially in rural areas. In the metropolitan areas GP care is usually as a shared care model with the public hospital. In rural areas, GP obstetricians play a greater role in providing pregnancy care, attending labor and birth and providing postnatal care.

Labor and birth services in public hospitals are provided in obstetric units and birth centers – mostly alongside the hospital, but some are free-standing. There are up to 16 publicly-funded homebirth programs across the country where women can plan to give birth at home with midwives from the local hospital. Postnatal services in public hospitals are provided in the hospital initially (average length of stay is less than 3 days – shorter for women after a normal birth or in a midwifery continuity of care program) and then at home with home visits from midwives up to 7-10 days postpartum.

Approximately 25% of women in Australia access private maternity services – the bulk of these choose private obstetricians for antenatal care and give birth in private hospitals. A small number of women choose private midwifery services and give birth at home or in hospital under the care of the private practicing midwife is she has hospital visiting rights to continue care. Private care is subsidized through Medicare and covered by personal private health insurance. There is currently no professional indemnity insurance for private practicing midwives providing homebirth services. Private midwives providing homebirth services are currently covered by a national exemption to the regulation that requires all registered practitioners to have professional indemnity insurance.

Regulation of Providers: Health care providers are regulated through the Australian Health Practitioners Regulatory Agency (AHPRA). Midwives are regulated by the Nursing and Midwifery Board of Australia. Doctors are regulated through the Medical Board of Australia, supported by AHPRA. There are around 27,000 midwives on the register, with an estimate of 15,000 in active practice (AHPRA, 2019). Obstetricians are required to be Fellows of the Australian and New Zealand College of Obstetricians and Gynaecologists. In 2016, there were 1,742 obstetricians and gynecologists employed in Australia, of whom 61.1% worked in the private sector; many also work in the public sector too. Annual continuing development is required for all annual licensing of midwives, nurses and doctors.

Education of Maternity Providers: Midwives are educated through university either as a three-year direct entry program (Bachelor of Midwifery); a 1-2 year graduate program after nursing (Graduate Diploma or Masters) or a four-year double degree (nursing and midwifery). Obstetricians undertake a six-year Fellowship after a medical degree – either at undergraduate or postgraduate level. Midwives are not required to have additional training or education to work in a birth center or hospital labour ward. Midwives who provide publicly funded homebirth services receive mentoring within the programs before they are able to attend homebirths.

Private practicing midwives are required to have additional years of experience and undertake a course on prescribing medications before they can access Medicare rebates for the provision of private services. There are 600 endorsed midwives in 2020 who can do this.

Practice Guidelines: Australia has interdisciplinary, evidenced-based national guidelines for *Pregnancy Care* (Australian Government Department of Health, 2019; https://beta.health.gov.au/resources/publications/pregnancy-care-guidelines). These are primarily for antenatal care. Intrapartum care guidelines tend to be at either jurisdictional level (State-wide) or are hospital-specific.

Pregnancy Leave: Total 18 available weeks for mother at 42.3% average payment rate; paid paternity leave not available (OECD, 2019).

National Data Monitoring & Reporting Websites:

- Australia's Mothers and Babies

https://www.aihw.gov.au/reports-data/population-groups/mothers-babies/overview

- *State of New South Wales*

http://www.healthstats.nsw.gov.au/
http://www.healthstats.nsw.gov.au/Indicatorgroup/indicatorViewList?code=mum+mab&topic=topic_mab&name=Mothers%20and%20babiesTopic

- *State of Victoria*

https://bettersafercare.vic.gov.au/about-us/about-scv/councils/ccopmm
https://bettersafercare.vic.gov.au/about-us/about-scv/councils/ccopmm/reports#goto-victorias-mothers,-babies-and-children-reports

Health Systems Description (The Commonwealth Fund, 2019).

Intergovernmental collaboration and decision-making at the federal level occur through the Council of Australian Governments (COAG), with representation from the prime minister and from the first ministers of each state. The COAG focuses on the highest-priority issues, such as major funding discussions and the interchange of roles and responsibilities between governments. The COAG Health Council is responsible for more-detailed policy issues and is supported by the Australian Health Ministers' Advisory Council (www.coaghealthcouncil.gov.au/).

The federal Department of Health oversees national policies and programs such as the MBS and PBS. Payments through these schemes are administered by the Department of Human Services. The PBAC provides advice to the Minister for Health on the cost-effectiveness of new pharmaceuticals (but not routinely on delisting).

Several national agencies and the state governments are responsible for the quality and safety of care (see below). The Australian Institute of Health and Welfare and the Australian Bureau of Statistics (ABS) are the major providers of health data.

Regulatory oversight is provided by a number of agencies, such as the Therapeutic Goods Administration, which oversees supply, imports, exports, manufacturing, and advertisement; the Australian Health Practitioner Regulation Agency, which ensures registration and accreditation of the workforce in partnership with National Boards; and the Australian Prudential Regulation Authority, for private health insurance. The Australian Competition and Consumer Commission promotes competition among private health insurers. Beginning in July 2016, the Australian

eHealth Commission will take over responsibility from the National eHealth Transition Authority for matters relating to electronic health data.

The state governments operate their own departments of health and have devolved the management of hospitals to the Local Hospital Networks (LHNs). The LHNs are responsible for working collaboratively with Primary Health Networks (PHNs). There are patient–consumer organizations and groups operating at the national and the state level.

CANADA

Funding of health services: The 1984 Canada Health Act. The Canada Health Act affirms that the Canadian health care system is non-profit, administered at the provincial/territory level, comprehensive, universal, portable, and accessible. It is paid through taxation and public funds.

Provision of pregnancy care services: Maternity care is provided by a mix of public and private insurance. The majority of births in Canada are attended by physicians (90%). Midwifery became regulated in 1993 and attend an average of 10% of births in 8 out of 10 provinces and 1 territory (2.8 to 22%) (CAM, 2019). All obstetricians and family physicians who provide intrapartum care, attend births in hospitals.

Registered midwives are publicly funded to provide comprehensive maternal-newborn care as primary maternity care providers. Models of care differ across provinces, but in most midwives work in small teams or solo to care for women in midwife-led, community-based office practices. All midwives offer choice of place of birth and attend births in all available settings. Home birth is considered a core component of standard practice, and in several provinces, to maintain registration, midwives must provide continuity of care to clients and attend a minimum number of births in both home and hospital setting.

Regulation of Providers: Midwives are licensed in the province/territory through the Canadian Midwifery Regulators Council (CMRC). There are 1,740 registered midwives (Canadian Association of Midwives, 2019). Physicians are licensed through the province/territory medical regulatory authority. The number of obstetricians in Canada for 2018 was 2,213 (Canadian Medical Association). Approximately 50% of births in the provinces are attended by family physicians and some have enhanced surgical skills. Over the past two decades there has been a reduction in the number of family physicians providing maternity care from 68 % to 15% (Dines, 2008).

Education of Maternity Providers: Maternity providers are educated in a variety of ways. Obstetricians complete basic medical education and then 4-5 years in obstetric and gynecologic specialization. Family physicians complete basic medical education and then 2 years in family practice specialization, with an optional maternity clinic once a week, and shared intrapartum rotations. Most obstetricians and family physicians do not have formal didactic or clinical preparation in attending birth at home or in birth centers. Midwives are prepared at university-based programs in 4-year programs including 3 years of continuity care model clinical placements 3-4 days a week of antenatal clinic and intrapartum and postpartum care

Practice Guidelines: Canada has interdisciplinary, evidenced-based national guidelines for *Family-Centred Maternity and Newborn Care* (Public Health Agency of Canada, 2017; https://www.canada.ca/en/public-health/services/maternity-newborn-care-guidelines.html).

Pregnancy Leave: Total 52 available weeks for mother at 100% average payment rate; paid paternity leave 35 weeks at 54.9% average payment rate (OECD, 2019).

National Data Monitoring & Reporting/Innovative Websites:

- Canadian Institute for Health Information, https://www.cihi.ca/en/about-cihi
- Born Ontario: Better Outcomes Registry & Network, https://www.bornontario.ca/
- Smart Mom. https://www.smartmomcanada.ca/About.aspx
- *Optimal Birth BC*. University of British Columbia (BC) Ministry of Health, the

Northern Health Authority, the First Nations Health Authority, and Perinatal Services BC. 2020. https://optimalbirthbc.ca/aboutus/.
- Dialogue and Shared Decisions: Advancing Person-Centered Care. https://www.birthplacelab.org/shared-decision-making-tool/
- Munro S, Hui A, Salmons V et al. SmartMom Text Messaging for Prenatal Education: A Qualitative Focus Group Study to Explore Canadian Women's Perceptions. *JMIR public health and surveillance* 2017;3:e7. https://doi.org/10.2196/publichealth.6949.
- Vedam S, Broten C, Jahng N et al. *Dialogue and Shared Decisions: An Interprofessional Course on Collaborative Leadership in Maternity Care.* International Normal Labour and Birth Research Conference, June 2018 (Ann Arbor, Michigan). https://www.birthplacelab.org/shared-decision-making-tool/.

Health Systems Description (The Commonwealth Fund, 2019).

Because of the high level of decentralization, provinces have primary jurisdiction over administration and governance of their health systems. The federal ministry of health, Health Canada, plays a role in the following: promoting overall health; funding and delivery of certain health services for First Nations and Inuit; food and drug safety; and medical device and technology review. The Public Health Agency of Canada is responsible for public health, emergency preparedness and response, and infectious and chronic disease control and prevention.

At the national level, several intergovernmental nonprofit organizations aim to improve governance by monitoring and reporting on health system performance; disseminating best practices in patient safety (the Canadian Patient Safety Institute); providing information to the public on health and health care and standardizing health data collection (the Canadian Institute for Health Information); and providing funding and support for provincial health information systems (Canada Health Infoway). The Canadian Agency for Drugs and Technologies in Health oversees the national health technology assessment process, which produces information about the clinical effectiveness, cost-effectiveness, and broader impact of drugs, medical technologies, and health systems. The agency's Common Drug Review reviews the clinical effectiveness and cost-effectiveness of drugs and provides common, nonbinding formulary recommendations to the publicly funded provincial drug plans (except in Quebec) to support greater consistency in access and evidence-based resource allocation.

Nongovernmental organizations with important roles in system governance include professional organizations such as the Canadian Medical Association; provincial regulatory colleges, which are responsible for licensing professions and developing and enforcing standards of practice; and Accreditation Canada (see below). Most providers are self-governing under provincial and territorial law; they are registered with professional associations that ensure that education, training, and quality-of-care standards are met. The professional associations for physicians are also responsible for negotiating fee schedules with the provincial ministries of health. Most provinces have an ombudsperson providing patient advocacy.

THE NETHERLANDS

Funding of health services: Statutory health insurance system, with universally mandated private insurance paid by the individual. Most maternity care is covered by basic health insurance. If women have no medical indication and want to give birth in a hospital, they pay an out of pocket fee of approximately €358. The government regulates and subsidizes insurance. Approximately 84% of the population purchase additional private insurance (Commonwealth Fund, 2019).

Provision of pregnancy care services: Maternity care in the Netherlands is organised in two echelons, midwife-led care and obstetrician-led care, with professionals in these echelons working alongside and complementary to each other. About 89% of pregnant women start with a first antenatal visit to the community midwife. At the start of the delivery about 50 % of pregnant women are under responsibility of a midwife. Usually, primary care midwives take care of postnatal care of all women after childbirth, irrespective of the place of birth. In hospitals, more than 70% of births are assisted by clinical midwives.

Regulation of Providers: There is a register for health care professionals which describes type of care that can be provided by each professional (https://english.bigregister.nl/). In 2016 3,221 midwives were working in the Netherlands (28% as clinical midwives, the others in primary care and 931 obstetricians.

Education of Maternity Providers: The primary entry to practice qualification for midwifery in the Netherlands is a four-year midwifery degree, at higher professional education". On graduation midwives can choose to work as a primary care midwife providing full scope of practice care for women experiencing an uncomplicated pregnancy. Alternatively, midwives can choose to work within the hospital system as a clinical midwife under the responsibility of the obstetrician. Obstetricians receive six years of basic medical education and six years of specialization. The quality of the obstetric training is monitored by the Dutch Organisation of Obstetricians and Gynaecologists (NVOG): https://www.nvog.nl/de-vago/opleiding/boeg/.

Practice Guidelines: These are created by professional organizations. There is an "obstetric indication list" which describes indications for consultation or referral. The tendency now is to make regional protocols, which leads to more variations in these guidelines throughout the country.

Pregnancy Leave: Total 16 available weeks for mother at 100% average payment rate; paid paternity leave not available (OECD, 2019).

National Data Monitoring & Reporting/Innovative Websites:

- Dutch Perinatal Registry

http://ghdx.healthdata.org/organizations/netherlands-perinatal-registry-prn

- Euro Peristat

https://www.europeristat.com/reports/national-perinatal-health-reports.html

- Standard Measures for Pregnancy & Childbirth

https://www.ichom.org/portfolio/pregnancy-and-childbirth/

- Geboortezorg (2019). https://www.ziekenhuischeck.nl/behandelingen/geboortezorg/.
- Integrale Geboortezorg: Integrity Birth Care Care Standard. (2016).

https://www.nvog.nl/wp-content/uploads/2019/04/Integrale-Geboortezorg-2016.pdf

- Dutch Association of Hospitals. Birthcare: CAESAREAN SECTION AND EPIDURAL

https://www.ziekenhuischeck.nl/behandelingen/geboortezorg/.

- *Childbirth Network*. Amsterdam, the Netherlands 2020. https://www.childbirthnetwork.nl/.

Health Systems Description (The Commonwealth Fund, 2019).

Since 2006, the Ministry of Health's role has been to safeguard health care from a distance rather than managing it directly. It is responsible for the preconditions pertaining to access, quality, and cost in the health system, has overall responsibility for setting priorities, and may, when necessary, introduce legislation to set strategic priorities.

A number of arm's-length agencies are responsible for setting operational priorities. At the national level, the Health Council advises government on evidence-based medicine, health care, public health, and environmental protection. The National Health Care Institute advises government on the components of the statutory benefits package and has various tasks relating to quality of care, professions and training, and the insurance system (e.g., risk adjustment). The Medicines Evaluation Board oversees the efficacy, safety, and quality of medicines. Decisions about the benefits package rest with the health minister. The Dutch Health Care Authority (*Nederlandse Zorgautoriteit*) has primary responsibility for ensuring that the health insurance, health care purchasing, and care delivery markets all function appropriately—for example, by designing and managing the diagnosis treatment combination system and setting prices for 30 percent of diagnosis treatment combinations.

Meanwhile, the Dutch Competition Authority (*Autoriteit Consument en Markt*) enforces antitrust laws among both insurers and providers. The Health Care Inspectorate supervises the quality, safety, and accessibility of care. Self-regulation by medical doctors is also an important aspect of the Dutch system. Private insurers are tasked with increasing health system efficiency and cost control through prudent purchasing of health services.

The patient movement consists of a wide range of organizations, some for specific diseases and some functioning as umbrella organizations. The patient umbrella organization *Nederlandse Patiënten Consumenten Federatie* conducts a range of activities to promote transparency. Health information technology is not centralized in one body. The Union of Providers for Health Care Communication (*De Vereniging van Zorgaanbieders voor Zorgcommunicatie*) is responsible for the exchange of data via an information technology (IT) infrastructure.

UNITED KINGDOM

Funding of health services: The UK's National Health Service is tax funded and universally accessible to the population, free at the point of use for the vast majority of services including all maternity and newborn care. Maternity care is free for all women who are deemed to be 'ordinarily resident' in the UK.

Provision of pregnancy care services: Pregnancy services are provided through NHS hospital 'trusts' who employ midwives, doctors and nurses who work in community and hospital settings. All women have a midwife and some women have a doctor when needed. Antenatal care is primarily provided by midwives in antenatal clinics in the hospital or community settings and sometimes shared with GPs. Women may choose to give birth at home, in a midwife led unit or an obstetric unit. Postnatal care is provided by midwives in hospital and community settings normally for 1 week but up to 6 weeks if clinically indicated. Health visitors initiate care around 10 days.

Regulation of Providers: Regulation of the health service is partly on a UK-wide basis for example health professional bodies (General Medical Council and Nursing and Midwifery Council). There are 36,916 midwives on the register in 2019 and around 21,500 in practice. There are around 2,600 consultant obstetricians and 1,000 trust doctors and 1,800 trainees. Annual continuing development is required for all annual licensing of midwives, nurses and doctors. (https://www.nmc.org.uk/globalassets/sitedocuments/other-publications/nmc-register-data-march-19.pdf; https://www.rcm.org.uk/media/2373/state-of-maternity-services-report-2018-england.pdf)

Education of Maternity Providers: Midwives are educated through university either as a three-year direct entry program or an 18-month program after nursing (50% of this time is spent in clinical practice). Midwives are trained to full scope of practice at point of registration and additional training is required to prescribe. Obstetricians have 4-5 years of basic medical education with 3 years of specialist training.

Practice Guidelines: The UK has interdisciplinary, evidenced-based national guidelines for *Antenatal and Intrapartum and Postnatal Care* and a range of other conditions (NICE, 2017) https://www.nice.org.uk/guidance/cg62; (NICE, 2019) https://www.nice.org.uk/guidance/cg190.

Pregnancy Leave: Total 39 weeks available for mother at 30.9% average payment rate; paid paternity leave not available (OECD, 2019).

National Data Monitoring & Reporting/Innovative Websites:

- Better Births: Improving outcomes of maternity services in England – A Five Year Forward View for Maternity Care

https://www.england.nhs.uk/publication/better-births-improving-outcomes-of-maternity-services-in-england-a-five-year-forward-view-for-maternity-care/

- MBBRACE-UK: Mothers and Babies: Reducing Risk through Audits and Confidential Enquiries across UK.

https://www.npeu.ox.ac.uk/mbrrace-uk

- National Maternity Data Viewer

https://www.england.nhs.uk/mat-transformation/national-maternity-data-viewer/

- National Maternity Audit

https://maternityaudit.org.uk

- *NHS Choices web site*, (https://www.nhs.uk/conditions/pregnancy-and-baby/) "*Which?*" (https://www.which.co.uk/). London, United Kingdom.National Health System 2020.

Health Systems Description (The Commonwealth Fund, 2019).

The Department of Health and the Secretary of State for Health are ultimately responsible for the health system as a whole. The Health and Social Care Act 2012 transferred important functions to National Health Service (NHS) England, including overall budgetary control, supervision of Clinical Commissioning Groups (CCGs), and, along with Monitor (now NHS Improvement), responsibility for setting diagnosis-related group (DRG) rates for the provision of NHS services. NHS England also commissions some specialized low-volume services, national immunization and screening programs, and primary care. It is responsible for setting the strategic direction of health information technology, including the development of online services to book appointments, the setting of quality standards for electronic medical record-keeping and prescribing, and the IT infrastructure of the NHS.

The National Institute for Health and Clinical Excellence (NICE) sets guidelines for clinically effective treatments and appraises new health technologies for their efficacy and cost-effectiveness. The Care Quality Commission (CQC) ensures basic standards of safety and quality through provider registration and monitors care standards achieved. It can require closure of services if serious quality concerns are identified.

NHS Improvement licenses all providers of NHS-funded care and may investigate potential breaches of NHS cooperation and competition rules, as well as mergers involving NHS foundation trusts. Where such mergers are found to be prima facie undesirable, they are referred to the Office of Fair Trading and the Competition Commission.

Healthwatch England promotes patient interests nationally. In each community, local Healthwatches support people who make complaints about services; quality concerns may be reported to Healthwatch England, which can then recommend that the CQC take action. In addition, local NHS bodies, including general practices, hospital trusts, and CCGs, are expected to support their own patient engagement groups and initiatives. The Department of Health owns NHS Choices, the primary website for public information about health conditions, the location and quality of health services, and other information. The website, which also offers a platform for user feedback, received 27 million visits a month in 2012–2013.