EUROPEAN PERINATAL HEALTH REPORT

Core indicators of the health and care of pregnant women and babies in Europe from 2015 to 2019

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EURO PERISTAT

PHIRI Population Health Information Research Infrastructure

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EXECUTIVE SUMMARY

A NEW REPORT ON PERINATAL HEALTH IN EUROPE BY THE EURO-PERISTAT NETWORK

Why monitor perinatal indicators in Europe?

The burden of perinatal mortality and morbidity remains a major public health concern in Europe. This is because of the large number of individuals concerned – about five million women giving birth to five million babies in Europe every year – and the high psychological, social, and financial costs of maternal and perinatal mortality and morbidity. Good perinatal outcomes set the stage for a positive lifelong trajectory of physical and mental health for new parents and their babies. In contrast, perinatal complications can have persistent negative effects, including disabling neurodevelopmental impairments resulting from very preterm birth, severe fetal growth restriction, or hypoxic ischemic encephalopathy;[1,2] accumulating evidence links poor newborn health to a broader range of childhood and adult health problems, including chronic diseases.[3] For the mother, poor pregnancy-related outcomes can have long lasting effects on mental health and be associated with morbidity in later life.[4] This health burden is greater among disadvantaged families, who face higher risks of perinatal morbidity, leading to the transmission of social and health inequalities across generations.[5]

Because the countries of Europe share comparable standards of living and generally well-developed healthcare systems, but are very diverse in their health policies and practices, examining differences in perinatal indicators can shed light on the policies and practices that counteract health risks and optimise the health of parents and babies. These indicators may also allow countries to benchmark their performance and identify areas where progress is needed.

Euro-Peristat: monitoring and evaluation perinatal health in Europe

Euro-Peristat aims to produce comparable data and analysis of the health and care of newborn babies and mothers using national data systems. All 27 European Union (EU) Member States, Iceland, Norway, Switzerland, and the United Kingdom (UK) are represented. Participants are clinicians, statisticians, and epidemiologists who work with routine data from birth registers, hospital discharge registers, civil registration systems, and cause of death databases. Perinatal health indicators cover mortality, morbidity and healthcare practices during pregnancy, birth, and the postpartum period.

The Euro-Peristat project was initially funded by the European Commission as part of the Health Monitoring Programme and received continued support through the Public Health Programme. It has issued 4 previous reports, on births in 2000 (published in 2003), 2005 (2008), 2010 (2013) and 2015 (2018).[6-9] The current report was supported by the Horizon 2020 Population Health Information Research Infrastructure (PHIRI) project (www.phiri.eu). PHIRI aims to foster the exchange and use of population data in Europe, with an immediate focus on the COVID-19 pandemic. It includes four use-cases, including one on perinatal health which is carried out by the Euro-Peristat Network. Results related to the pandemic year 2020 are being analysed and will be presented in reports in 2023.

EU funding contributes to the coordination of the network and central data processing. However, participating institutions cover the costs of national data preparation, checking, and interpretation. Appendix A presents the contributors to this report, while Appendix B lists the data sources and main data providers.

The new Euro-Peristat data collection protocol: many benefits and a few drawbacks

For this report, Euro-Peristat used a federated analytic framework for data collection and transfer.[10] This protocol is based on a common data model with detailed specifications of included indicators, their definitions, and formats. This model, determined by a consensus process, includes 26 variables to construct the core indicators and carry out analyses for the PHIRI project, which were used in the testing phase and for this report. The model also includes 17 variables needed to produce the Euro-Peristat recommended indicators for a future expanded phase. For implementation, each data hub (country data provider) reformats and exports data fulfilling eligibility criteria into this common model and then runs open-source R scripts to generate aggregate, anonymised output tables. These tables are transferred to the central hub (Inserm) for compilation and analysis. Results of the consensus process, the common data model, and R scripts are available at https://zenodo.org/record/6483177.

This updated protocol permits better harmonisation of data by using individual-level records, without the need to share personal data since these are not transferred from the institution with the authorisation to hold and analyse them. It also simplifies production of the indicators once it is instituted and facilitates the rapid production of multiple data tables. However, this protocol also has limitations. Data providers must be authorised holders of the data and all data items need to be available in one place, either in the original registers or following linkage of registers. This linkage process may not be possible or be very time consuming when data are held in different institutions. Therefore, some countries were not able to participate in compiling this report in the given time frame (3 of 31 countries), while others could not provide the full set of indicators because some items could not be included in the common data model. A few countries provided aggregate data separately on the indicators that they could not provide in the common data model, allowing them to include some data in the report.

The perinatal indicators included in this report

This edition of Euro-Peristat's European Perinatal Health Report includes data for the years 2015 to 2019 for 9 of the network's 10 core indicators.[11] These core indicators, defined as essential measures of perinatal health for which comparable data are available in Europe, were selected by the Euro-Peristat Scientific Committee based on a Delphi consensus process and updated on three occasions.[12] They consist of three mortality indicators (C1-C3: stillbirth, neonatal, and infant mortality), two indicators describing the birthweight and gestational age distribution (C4-

C5), three indicators of population characteristics (C7-C9: multiple pregnancy, maternal age, and parity), and mode of delivery (C10) as an assessment of clinical practices.

One core indicator, maternal mortality (C6), is not included in this report because the new data collection protocol is not readily adaptable for the recording of very rare events, such as maternal death. Furthermore, routine data on maternal deaths have major shortcomings, making them unreliable for recording maternal mortality consistently.[13,14] Enhanced ascertainment systems are needed and new data have recently been published from eight European countries with these systems.[15] This report also does not include the 20 Euro-Peristat recommended indicators. Their absence is also explained by the new data collection protocol which we first tested on the core indicators. Our ambition is to extend this new approach to the full set of Euro-Peristat indicators, which have recently been reviewed and updated.

In an important advance over prior reports, we present the core indicators for a succession of years, that is, all years 2015-2019. Previous reports presented data for one year only. This allows us to address more fully the changes in perinatal health and system performance over time in one report. Having data for several years allows better assessment of changes over time for larger countries and a better assessment of perinatal health indicators in smaller countries with fewer births per year.

The European Perinatal Health Report: format, presentation of summary measures and terminology

The format of this report differs from that utilised previously: we present fact sheets for each of the 9 included indicators. This new format aims to facilitate rapid production of the report and to allow flexibility for updates and production of new fact sheets.

We report principally on the year 2019 as well as on changes over the period 2015 to 2019, with data for all years available in an Excel data file on the Euro-Peristat website (www.europeristat.com). As in previous reports, we provide median values and information about the range of values (interquartile and overall). To assess Europe-wide changes between 2015 and 2019, we also estimate pooled risk ratios of the average annual change in rates using meta-analysis techniques for some indicators. These statistical techniques integrate information about the variability in population sizes and are interpretable as the association in an average country in Europe. Finally, we present maps that illustrate geographic patterns in the distribution of the indicators, with countries classified based on the geometrical interval classification method.

In comparing perinatal indicators between European countries, it is important to factor in differences in the annual numbers of births. This number ranges from over 700,000 total births in Germany, the UK and France to fewer than 10,000 in Cyprus, Iceland and Malta, as shown in the Summary table of key indicators in 2019. In countries with fewer births, there is a larger random variation in indicators from year to year, especially for uncommon outcomes such as stillbirth and neonatal mortality.

A final comment concerns terminology. Throughout this document we use the terms 'women' and 'mothers', however we acknowledge that it is not only people who identify as women who access perinatal services and that our recommendations apply broadly to all pregnant individuals.

HIGHLIGHTS OF PERINATAL HEALTH INDICATORS FROM 2015 TO 2019

Rates and changes over time in stillbirth and neonatal mortality rates

Stillbirth rates

In the European countries contributing data to Euro-Peristat, the median stillbirth rate at or after 24 weeks of gestation in 2019 was 3.2 per 1000 births, with an interquartile range (IQR) of 2.8 to 3.9 per 1000 births and a range of 1.8 to 4.7 per 1000 births (see Summary table of key indicators in 2019). Stillbirth rates are lower when a 28-week threshold is applied (median 2.5 per 1000 births with an IQR of 2.2 to 3.0 per 1000 births). While international comparisons use a 28-week threshold to allow meaningful comparisons in the light of wide differences in the recording of extremely preterm births, Euro-Peristat judges that a threshold of 24 weeks can be used in European countries.[16] This rate makes it possible to more fully measure of the burden of stillbirth. Euro-Peristat calculates stillbirth rates without terminations of pregnancy, when this is possible, because European countries differ considerably in their policies and practices for congenital condition screening. These can influence the availability and timing of terminations and have a considerable impact on the stillbirth rate in some countries.[17]

There is wide variation between countries in stillbirth rates. In some countries, for example in Belgium, terminations of pregnancy cannot be identified and removed from the data which can explain Belgium's higher rates compared to the other countries. Some variation is also explained by random fluctuation in small countries; for instance, Estonia had a very low rate in 2019, but had rates close to the median in previous years. Similarly, Cyprus had the highest rate in 2019, but one of the lowest in 2015. A country-by-country analysis of changes over time presented in Fact Sheet C1 (see Figures C1.3 and C1.4 in the fact sheet C1) finds a slight overall decline, estimated at 1% per year, but many countries showed no change or even slight increases in stillbirth, such as in Belgium and Germany. This is in contrast with previous Euro-Peristat reports where more marked and widespread reductions were observed.[11,18]

Summary table of key indicators in 2019

Country	Total births	Stillbirth per 1000 total births		Neonatal mortality per 1000 live births		Preterm birth	Caesarean section
	N	>=24 weeks	>=28 weeks	>=22 weeks	>=24 weeks	% of live births	% of total births
Austria	84 429	2.7	2.2	1.7	1.3	7.4	30.0
Belgium	117 663	4.4	3.2	2.6	2.1	8.1	21.5
Croatia	36 635	4.0	3.2	3.0	2.2	6.5	26.2
Cyprus	9 799	4.7	3.2	2.0	1.7	11.3	53.1
Czech Republic	112 633	3.2	2.7	1.6	1.3	6.9	24.5
Denmark	60 779	2.2	1.9	1.6	1.1	5.9	20.3
Estonia	13 900	1.8	1.7	0.9	0.8	5.7	19.4
Finland	45 866	2.4	2.0	1.4	1.2	5.3	17.9
France	714 335	3.6	2.8	--	--	6.9	20.9
Germany	763 946	3.4	2.7	--	--	8.1	31.8
Hungary	89 573	4.3	3.7	2.2	2.0	8.3	41.5
Iceland	4 452	3.2	2.5	0.5	0.5	6.6	16.6
Ireland	59 592	4.0	2.9	*2.3*	--	6.8	34.8
Italy	422 184	2.7	2.2	1.7	--	7.5	33.0
Latvia	18 703	3.7	3.2	2.3	1.8	5.6	22.5
Lithuania	24 796	4.0	3.3	2.4	2.1	5.3	20.9
Luxembourg	7 208	3.2	2.0	--	--	7.0	30.4
Malta	4 455	3.2	2.5	4.3	3.8	7.4	31.9
Netherlands	164 291	3.1	2.3	3.0	2.1	6.5	17.4
Norway	55 214	2.5	2.0	1.2	1.1	6.1	16.4
Poland	374 978	2.9	2.3	2.7	2.2	7.2	44.4
Portugal	87 319	2.9	2.3	--	--	8.0	--
Slovakia	57 401	4.2	3.5	--	--	7.2	30.1
Slovenia	19 256	2.0	1.4	0.7	0.6	7.2	21.9
Spain	361 749	3.0	2.5	2.1	--	7.1	25.7
Sweden	116 082	3.0	2.5	1.3	1.0	5.4	18.2
Switzerland	86 368	2.8	2.3	2.4	1.4	6.8	--
UK: MBRRACE	717 654	3.3	2.5	2.2	1.7	7.8	--
UK: England and Wales[1]	641 808	3.5	2.6	2.7	1.4	7.8	--
UK: Northern Ireland[1]	22 641	3.5	2.7	3.3	2.8	7.5	32.7
UK: Scotland[1]	48 876	3.3	2.7	1.7	1.4	8.6	35.5
UK: Wales[1]	28 994	4.2	3.1	--	--	8.0	28.3
Median		**3.2**	**2.5**	**2.1**	**1.5**	**6.9**	**26.0**
Interquartile range		**2.8-3.8**	**2.2-2.9**	**1.5-2.4**	**1.1-2.1**	**6.4-7.4**	**20.7-32.1**
Range		**1.8-4.7**	**1.4-3.7**	**0.5-4.3**	**0.5-3.8**	**5.3-11.3**	**16.4-53.1**

NOTE: (1) When data are available for the UK, UK countires are not included in the calculation of summary statistics.

Neonatal mortality rates

For neonatal mortality (deaths in the first 28 days following live birth) calculated using a threshold of 24 weeks of gestation, the median rate was 1.5 per 1000 live births (1.1 to 2.1 per 1000 live births). Fewer countries were able to provide this indicator because our data protocol required all data to be in the same source, as explained above. The majority of neonatal deaths occurred in the early neonatal period (0-6 days after birth; median 71.4%, IQR 65.8% to 81.4%) About half occurred among babies with extremely low birth weight (51.3% less than 1000 grams) or who were born extremely preterm (47.3% before 28 weeks of gestation). Over this period, the neonatal mortality rate decreased in many of the countries (see Figures C2.4, C2.5, C2.6, and C2.7 in Fact Sheet C2), but overall changes were less pronounced than between 2010 and 2015 and rates for many countries did not change, with some even increasing.

Variations and evolutions in the birth weight and gestational age distributions

Euro-Peristat collects data on the full distribution of birth weight and gestational age at delivery because risks of mortality and morbidity are elevated at both extremes. Low birth weight and preterm birth are two major pregnancy complications that raise risks of stillbirth, infant, mortality and lifelong health and developmental problems. Both post-term birth (42 weeks of gestation and over) and macrosomia (4500 grams or more) are associated with adverse birth outcomes.

Low and high birth weight

The median percentage of births with birth weight less than 2500 grams in 2019 was 6.1% with an IQR from 4.5% to 7.1% and an overall range from 4.0% to 10.1%. When mapped, low birth weight has a strong north to south geographic gradient (see Map C4.1 in Fact Sheet C4). This suggests that physiological differences between populations should be considered when interpreting differences in this indicator. Very low birth weight (less than 1500 grams) occurred in about 1% of live births (range 0.6% to 1.3%). High birth weight (4500 grams or more) was also low, but more variable (range 0.2% to 4.8%) and also had a strong geographic gradient from north to south (see Map C4.2 in Fact Sheet C4).

In most countries, the percentage of babies with low birth weight decreased slightly, about 1% per year, from 2015 to 2019, with decreases in all but four countries (see Figure C4.3 in Fact Sheet C4). In contrast, the percentage of babies born with high birth weight was stable on average, but this reflected slight decreases in about half of countries and slight increases in the other half (see Figure C4.4 in Fact Sheet C4). These changes over time could reflect changes in the gestational age distribution (fewer preterm births will reduce the low birth weight rate, whereas inducing term births at earlier gestations will lower the percentage of babies with very high birth weight). These changes can also reflect increases in birth weight for a given gestational age, potentially reflecting less growth restriction as well as greater overall weight gain. Finally, changes or differences in birth weight may also be related to differences in body mass index in the pregnant populations. Euro-Peristat is validating a new indicator that will measure small for gestational age and large for gestational age births[19] and that will be published in a future fact sheet.

Preterm and post-term births

Preterm birth (between 22 weeks+ 0 days and 36 weeks+ 6 days of gestation) among live births varied from 5.3% to 11.3%, with a median of 6.9% in 2019 and IQR of 6.1% to 7.5%. When rates were displayed on a map, the lowest rates were found in Nordic and Baltic countries (see Map C5 in Fact Sheet C5), but the strong north/south gradient observed for low birth weight was not observed. Preterm birth rates tended to decrease across Europe from 2015 to 2019 (see Figures C5.5 and C5.6 in Fact Sheet C5), with an estimated annual decrease of 1% and all but four countries showing decreases. Differences between countries are evident across the entire gestational age distribution and early term (37-38 weeks of gestation) births varied between 17.0% and 42.8%, (median 22.6%, IQR 19.1% to 26.2%). Post-term (at or after 42 weeks) births were generally uncommon (less than 1% in most countries), but there were some exceptions (>4% in Sweden and Norway). Early term and preterm birth differences may also be influenced by differences in obstetrical practices between countries, including the timing and rates of caesarean sections.

Changes in the childbearing characteristics

The Euro-Peristat core indicators include three population characteristics that may contribute to increased pregnancy risk: multiple pregnancy, maternal age, and parity.

Multiple pregnancies

Multiple pregnancies face higher risks of neonatal and maternal mortality and morbidity. For the child, these relate principally to high risks of being born before term and lower birth weights. In the fact sheet on preterm birth, data are presented on multiplicity (see Figure C5.3 in Fact Sheet C5), illustrating preterm birth rates for multiples in the range of 45% to 60% in comparison to around 5% for singletons. Monitoring rates of twin and higher order pregnancies is important because of these higher risks and also because a portion of these pregnancies is due to assisted reproductive technologies (ART). In addition, multiple pregnancies occur more often in older mothers. Differences in these risk factors contribute to the wide variation in twin pregnancy rates in the European countries, with a range from 11.9 to 23.6 per 1000 women having a live birth or stillbirth. The median rate is 15.8 per 1000 women, with an IQR of 13.2 to 17.5. In the period covered by this report, rates decreased in most countries with a median change between 2015 and 2019 of -1.1 per 1000 women (IQR from -1.8 to 0.1). One reason for this decrease could be increasingly widespread adoption of single embryo transfer to limit multiple pregnancies from ART. These decreases in multiple pregnancy rates could contribute to better newborn and maternal outcomes.

Maternal age at birth

Women who give birth at younger and older ages are both more likely to have poorer pregnancy outcomes. In Europe, there are relatively few teenage mothers; the median percentage of women aged under 20 years old giving birth in 2019 was 1.7% in 2019 with an IQR of 1.1% to 2.4% and this continues to decline. Highest percentages (>3%) were observed in Malta, Wales, and Slovakia. In contrast, the percentage of women in Europe giving birth at older ages continues to rise. The median increase in the percentage of mothers aged 35 years and older between 2015 and 2019 was 2.6% (IQR 1.6% to 3.7%), with a median over 20.0% for births to women aged 35 years and older and 4.0% for women aged 40 years and older in 2019. Countries with higher percentages of childbearing women 35 years and older are Luxembourg (31.6%), Portugal (33.2%), Italy (34.4%), Ireland (39.4%), and Spain (40.0%). In these countries, over 5% of all deliveries occur among women 40 years of age and over, with highs over 7% in Italy, Portugal, and Spain. Given the markedly higher risks of pregnancy complications among women aged over 35 and in particular those aged over 40, these demographic changes are likely to require modification to healthcare provision to ensure safety and good outcomes.

The percentage of pregnant women who were having their first birth ranged from less than a third (31.2%) to more than half of all women (53.3%) giving birth in individual countries. First births have higher risks of some adverse outcomes (growth restriction, pregnancy-induced hypertension, for example) and are more likely to be delivered by caesarean section. Therefore, parity (the number of deliveries a woman less experienced) should be considered when comparing national maternal and newborn outcomes. In general, the percentage of primiparous women among women giving birth in Europe is decreasing or remaining constant (median difference between 2015 and 2019 is -0.3% with an IQR of -2.3% to 0.6%). In the context of the relatively low fertility and delayed childbearing in most parts of Europe, the higher risks associated with primiparity, especially among women at older ages, are pertinent for public health policies and interventions.

Mode of delivery

The median caesarean section rate in countries providing data on this indicator was 26.0% in 2019 with an IQR of 20.7% to 32.1% and a range from 16.4% to 53.1%, while the median instrumental vaginal delivery rate was 6.1% (IQR 3.5% to 9.8%), with a range from 1.4% to 13.8%. When placed on a map, there are geographic clusters, with lower caesarean section rates in northern Europe and higher rates in southern and central Europe (see Map C10 in Fact Sheet C10). A few countries, notably Portugal and England, could not provide data due to not having sources of data on health services linked to routine databases that collect information on perinatal outcomes.

Trends over time in caesarean section contrasted markedly. Twelve countries had decreasing caesarean section rates, whereas nine countries had increases and others were stable. These changing rates should be assessed in light of changes in the childbearing population, but these relationships are likely to be complex. For instance, as shown above, Italy and Spain experienced marked increases in the percentage of childbearing women over 40 years of age, but reduced caesarean section rates over this period. These decreases may also be easier to achieve in countries where rates had been high, but the rate in 2015 does not clearly correlate with rates of change over the period.

ACTION POINTS AND QUESTIONS RAISED BY THIS REPORT

Some good news, some warning signals, and shared incentives to improve perinatal health

The levels and changes over time in perinatal indicators in Europe from 2015 to 2019 show some good news – declining preterm birth rates overall, lower multiple birth rates, as well as levelling and even declining caesarean section rates in some countries. Stillbirth and neonatal mortality rates also continued to decline, on average, however, the extent of these gains appears to be slowing compared to previous decades and in some countries, these indicators are stagnating or potentially increasing. The marked and continuing increase in maternal age at childbirth may contribute to this slowing of mortality indicators, but does not appear to be an obstacle to continued progress in some countries.

Comparing perinatal indicators between the countries of Europe calls attention to striking disparities in health outcomes and use of healthcare interventions, with the highest levels of most indicators being at least double the lowest levels. These cross-country comparisons of indicator levels and their changes over time allow each individual country to take stock and assess where improvements are possible. These results can also shape policies in Europe by illustrating the benefits for the health of babies and their parents of setting common European goals. Improving performance in all countries to the level of the first quartile (25th percentile) of observed values would lead to an estimated 3000 fewer stillbirths and 50 000 fewer preterm births in Europe, a significant decline in the health burden of these outcomes. The report also calls attention to the potential for reducing unwarranted variation in caesarean sections. If all countries were able to attain a caesarean section rate of 20.7%, the 25th percentile, about 450 000 fewer women in Europe would have this procedure every year.

The progress in many countries should provide encouragement to others with unfavourable changes in indicators over time. The experiences of other countries can be of use, such as the perinatal audits instituted in the Netherlands or the UK to identify areas where changes are needed. Evidence-based interventions include improvements to the organisation of health services, better monitoring of fetal growth restriction, and quality initiatives in maternity and neonatal units. Finally, public health promotion and prevention can target tobacco use and healthy weight gain. How countries can maintain safety for women having children at older ages is a critical challenge throughout Europe.

Trends from 2015-2019 in light of the COVID-19 Epidemic: where to now?

This report ends with data in 2019, making it possible to take stock of trends and levels of perinatal health before the onset of COVID-19 pandemic and associated societal mitigation measures that changed everyone's lives so dramatically in 2020 and 2021. We have collected data on 2020, which are currently being analysed and will be made available shortly. The story of how COVID-19 affected perinatal outcomes in Europe is complex and requires an understanding of how perinatal health and interventions were changing in the years before the pandemic.

This is critical because underlying trends determine our expectations about what "should" have happened in 2020 and 2021 and whether what did happen differed from these expectations. Based on the trend data reported in this report, we would have expected indicators to improve in some countries, while elsewhere, expectations might be for continued unchanging or potentially worsening outcomes. The published literature on the effects of the COVID-19 pandemic on population perinatal indicators is inconclusive. Some studies report worrying increases in stillbirth rates, others find unexpected decreases in preterm birth rates and many detect no changes at all.[20,21] This conflicting literature shows the importance of seeking to understand how COVID-19 may have affected countries differently because of the manifestation of the pandemic (viral incidence or mitigation strategies), but also because of policies and practices affecting the care and health of newborn babies and their parents. Changes in fertility in some, but not all, countries during the first strict lockdown in 2020 are a final reason to carefully disentangle the possible effects of the pandemic.[22] Changes to the number and the characteristics of pregnant women potentially affect rates of the indicators in the autumn of 2020. To fully characterise these changes, however, data from 2021 are required and these are only just becoming available in many countries.

A better European perinatal information system is possible and urgently needed

COVID-19 laid bare the gaps in European perinatal health information systems and illustrated the vital importance of continuous public health monitoring for maternal and child health to support national, European, and global policy. In addition to the lack of a sustainable mechanism to bring together population birth data in a rapid and efficient manner, problems identified by the Euro-Peristat Network included timeliness, with lags of one or even two years before data became available, disruptions to the day-to-day functioning of information systems, and difficulties adding new codes or linking data sources to identify infection.[23]

This report underscores the value and feasibility of regular comparisons of reliable perinatal health indicators. It goes beyond previous reports by the Euro-Peristat Network in showing that having continuous annual data is possible. This was facilitated by the new data collection protocol that simplified the production of data tables, while simultaneously improving harmonisation of data. However, this approach also revealed the limits of some data systems because not all data were available in one source. This was particularly true for neonatal and infant mortality, as data on infant deaths are not routinely linked to birth data in some countries. Another indicator that could not be provided by several countries is the caesarean section rate when this is recorded in health service data that are not linked to birth outcomes. As pointed out in previous Euro-Peristat work, the inability to associate these key indicators with other perinatal health data is a major limit for surveillance and evaluation of outcomes.[24]

This protocol was only tested on Euro-Peristat's core indicators and expanding the protocol to include the full set of recommended indicators is important, as these include other major determinants of perinatal health likely to contribute to changes across time, such as maternal body mass index, smoking, and use of sub-fertility procedures, along with additional measures of neonatal and maternal morbidity. They also include elements of health care and organisation including the timing of the start of antenatal care and the size and level of care of maternity hospitals, which are critical indicators of healthcare quality.

While Euro-Peristat has continued to operate as a research network for over 20 years, there is no sustainable structure to support its work. This has led to uncertainty about how to institutionalise the data collection, compilation and analysis, and reporting processes. Given the baseline work done to develop and test this protocol and the recognition of the importance of these data, action among national and European stakeholders is urgently needed to make data collection and analysis sustainable.

A final crucial message is that national action underpins effective European action. Harmonising and compiling high quality data is only possible when these are produced nationally. This new protocol provides a clearly measurable quality benchmark for European perinatal health information systems: at a minimum, all countries should be able to adhere to the standards set out by the Euro-Peristat common data model. This target could also be adopted by other countries, regions or healthcare institutions. Because the common data model (including specifications for constituting it and all codes needed to create the indicators and aggregate tables) is freely available, it offers the opportunity for others to benefit from this collective work within the network over 20 years and make optimal use of comparisons with European data.

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FACT SHEET: C1

STILLBIRTH IN EUROPE, 2015-2019

KEY POINTS

- In the 32 countries providing data, although stillbirth rates were generally low, there were nonetheless wide differences between countries. Rates at or after 24 weeks of gestation ranged from 1.8 to 4.7 per 1000 total births, a more than two-fold difference, but differed less at or after 28 weeks, from 2.0 to 3.0 per 1000 total births in most countries.
- From 2015 to 2019, in most countries, stillbirth rates at or after 24 weeks of gestation either decreased or remained relatively stable (median -0.1 per 1000 total births, interquartile range (IQR) -0.3, 0.0).
- Differences between countries could reflect their population characteristics, such as maternal age at childbearing, or healthcare factors.
- Given the differences between countries in both rates and changes over time, further research is urgently needed to understand differences in stillbirth rates and how they change in order to promote evidence-based policies and practices to reduce rates further.

INTRODUCTION

Stillbirth is a key indicator of reproductive health and the quality of maternity care and represents a high health burden,[1] accounting for more than half of all deaths occurring in the perinatal period, defined as beginning at 22 weeks of gestation.[2] Compared to other perinatal health outcomes, inadequate attention has been given to stillbirths in maternal and child health policies, leading to wide gaps in knowledge about how best to prevent stillbirths and insufficient acknowledgement of the suffering of bereaved parents.[3]

The causes of fetal death are multiple, including congenital conditions, fetal growth restriction, abruption associated with placental pathologies, preterm birth, and other maternal complications of pregnancy, as well as infections. Despite this, between 30% and 50% of fetal deaths remain unexplained.[4,5]

The principal modifiable risk factors for stillbirth include obesity and overweight and smoking.[6] Older women and women having their first birth face a higher risk of stillbirth, as do women with multiple pregnancies. Because fetal growth restriction accounts for a high proportion of fetal deaths, better detection and management of this complication might be an effective preventive strategy. Audits of fetal deaths have also drawn attention to the contribution of suboptimal care to their occurrence.[7] Social factors can also affect the risk of stillbirth. As a result, women with less favourable socioeconomic circumstances can have stillbirth rates that are twice as high as those for women in more favourable socioeconomic circumstances,[8] though precise mechanisms can be difficult to pinpoint due to the confounding of multiple risk factors.

METHODS

Definition

For this report, stillbirth is reported, using two gestational age thresholds, as fetal deaths at or after 24 and 28 completed weeks of gestation (or weighing 500g or more if gestational age was not available). Stillbirth rates for each year are reported per 1000 live births and stillbirths in that year. To improve comparability between countries, terminations of pregnancy are not included in the calculation of stillbirth rates.

Some countries could not provide data using the Euro-Peristat definition above but supplied data using slightly different inclusion criteria, as detailed in Table C1.

Table C1: Ability of European countries to provide stillbirth data according to the criteria used and ability to exclude terminations of pregnancy from stillbirth statistics

Inclusion criteria	Terminations of pregnancy not included* (or able to exclude)	Unable to exclude terminations of pregnancy
Euro-Peristat criteria: ≥22 weeks of gestation† or ≥500 grams if gestational age is missing	Croatia, Denmark, Estonia, Finland, France, Iceland, Italy‡, Latvia, Lithuania, Luxembourg, Malta, Norway, Portugal, Slovakia, Sweden, Switzerland, UK (MBRRACE, Scotland)	Cyprus§, the Netherlands§
Other criteria		
≥ 500 grams	Austria, Czech Republic, Germany, Poland, Slovenia, Spain	Belgium
≥ 24 weeks	Hungary, Ireland, UK (England and Wales, Northern Ireland)	

*Or terminations of pregnancy rare after 22 weeks of gestation, so would not impact stillbirth rates
†Results for stillbirths at or after 22 weeks of gestation reported in online data tables only
‡180 days or more for stillbirths and <180 days for spontaneous abortions, combined for this report
§Terminations very rare after ≥24 weeks of gestation

Additionally, Euro-Peristat collects data for all fetal deaths starting at 22 weeks of gestation, distinguishing between spontaneous stillbirths and terminations of pregnancy (when possible), and by gestational age, birth weight, and pregnancy type (singletons, multiples).

Data availability

32 countries provided data on stillbirth, including the United Kingdom (MBRRACE-UK) and its constituents (England [combined with Wales], Northern Ireland, Scotland, and Wales [separately and combined with England]). Results for the United Kingdom and its constituents are presented separately in figures, with MBRRACE-UK data used for reporting of statistics (medians and interquartile ranges [IQR]) and pooled analyses to avoid duplicate data. Poland did not provide data for 2015-2017 and was therefore not included in the analysis of trends from 2015 to 2019.

Data were collected primarily from medical birth registers, perinatal databases, or civil registration systems by a representative of each country and then transferred to the coordinating team as anonymous, aggregated data.

Additional methodological considerations

Because different thresholds for birth weight and/or gestational age are used for reporting stillbirths, common definitions are necessary when comparing countries, with the World Health Organization utilising a gestational age cutoff of 28 completed weeks.[9] However, using this later cutoff excludes earlier fetal deaths and previous work by Euro-Peristat has shown that a lower cutoff of 24 weeks of gestation is reliable and feasible.[10] Therefore, results are reported using both the threshold of 24 weeks of gestation and 28 weeks of gestation for comparability with other data sources. Though results starting at 22 weeks are highly variable and not adequate for comparisons, these data were compiled and are available in online tables. Additionally, an advantage of using a gestational age threshold rather than a birth weight threshold is that, due to the association between fetal growth restriction and stillbirth, more fetal deaths will be excluded if a birth weight cutoff is used.[11]

Stillbirth rates are also impacted by the differences between countries in policies and practices related to terminations of pregnancy and how they are recorded. The timing of screening for congenital conditions varies between countries. Differences in recording include whether or not these terminations are registered as fetal deaths or are recorded in the same data system and in a way which distinguishes terminations of pregnancy from spontaneous fetal deaths. Countries also vary in their legislation regarding the upper gestational age limit at which terminations of pregnancy are permissible, although in many countries it is not allowed at or after 22 weeks of gestation.[12]

Data in this report may differ from other sources, as some countries (Italy, United Kingdom and constituents) provided data pooled from multiple sources, such as official fetal death registers and hospital discharge records, in order to provide data about stillbirths from 22 weeks of gestation onward. Finally, because fetal deaths are rare, in the countries with the fewest births (Cyprus, Estonia, Iceland, Luxembourg, and Malta), results, particularly for changes over time, should be interpreted with caution, as they may be attributable to random fluctuations, although having data for a five year period increases the capacity for monitoring trends.

In most countries, information on gestational age was missing for less than 4% of stillbirths. In 2019, exceptions were the Czech Republic (6.2%), Portugal (6.1%), Spain (12.0%), and Wales (6.9%). Data for England and Wales combined were derived from a different, more complete source. Because stillbirths with missing data are not included when a gestational age or birth weight limit is imposed, rates in countries with substantial missing data are likely to be underestimated should be interpreted with caution. Further, differences between countries in which stillbirths may be more likely to be missing due to reporting policies are important when making comparisons.

RESULTS

Stillbirth rates in Europe in 2019

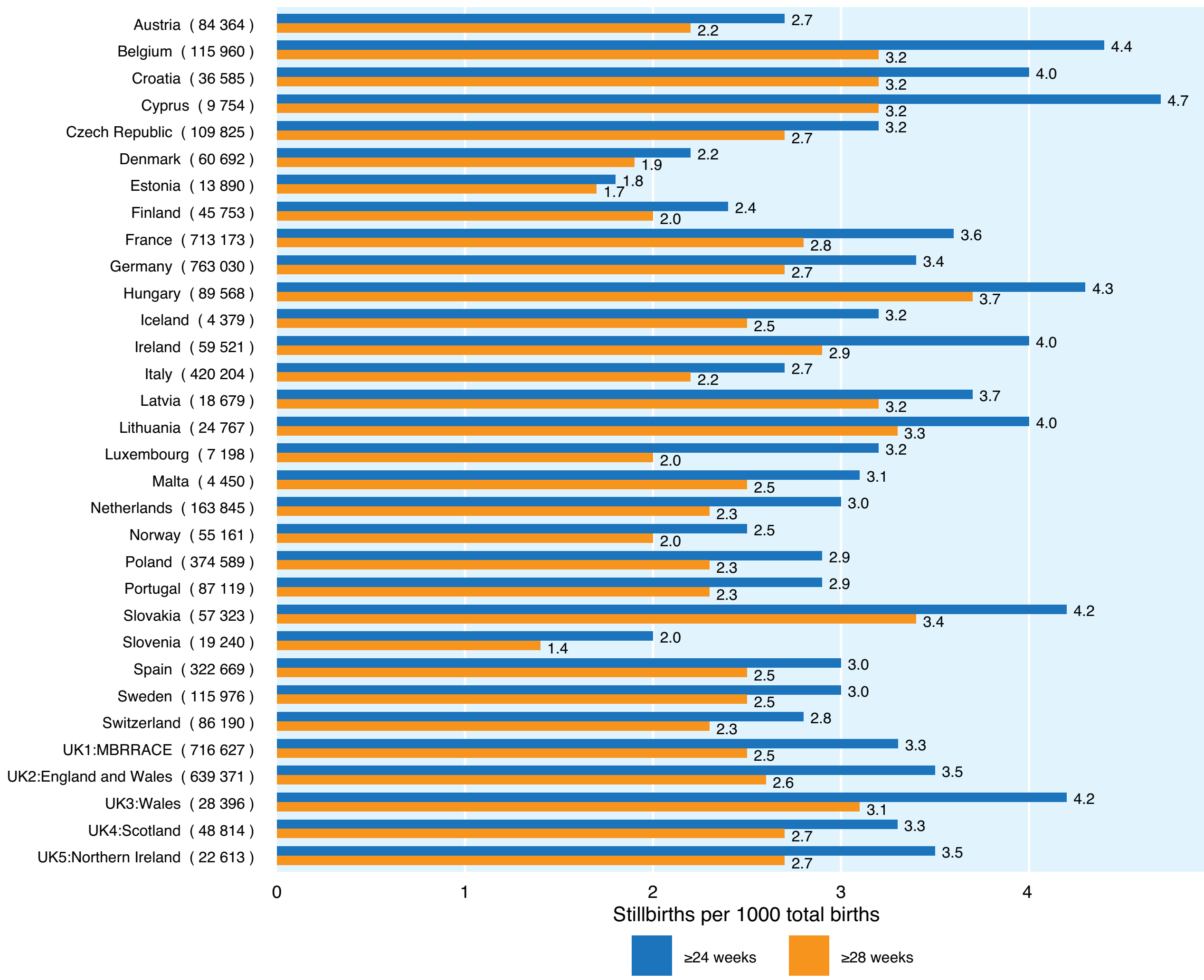
At or after 24 weeks of gestation

In the 32 countries providing data, stillbirth rates at or after 24 weeks of gestation ranged from 2.0 or fewer deaths per 1000 total births (1.8 in Estonia; 2.0 in Slovenia) to more than 4.0 per 1000 total births (4.7 in Cyprus; 4.4 in Belgium; 4.3 in Hungary; 4.2 in Slovakia and Wales; Figure C1.1). Some countries which had high rates for 2015 in the previous report (over 3.5 per 1000 total births in Bulgaria and Romania) did not provide data for this report.

At or after 28 weeks of gestation

The countries with highest and lowest stillbirth rates using the 28 week threshold were generally the same as those using the 24 week threshold, ranging from 2.0 or fewer deaths per 1000 (1.4 in Slovenia; 1.7 in Estonia; 1.9 in Denmark) to more than 3.0 per 1000 (3.7 in Hungary; 3.4 in Slovakia; 3.3 in Lithuania; 3.2 in Latvia, Belgium, Cyprus, Croatia; 3.1 in Wales; Figure C1.1).

Figure C1.1: Stillbirths rates at or after 24 and 28 weeks of gestation per 1000 stillbirths and live births in Europe in 2019

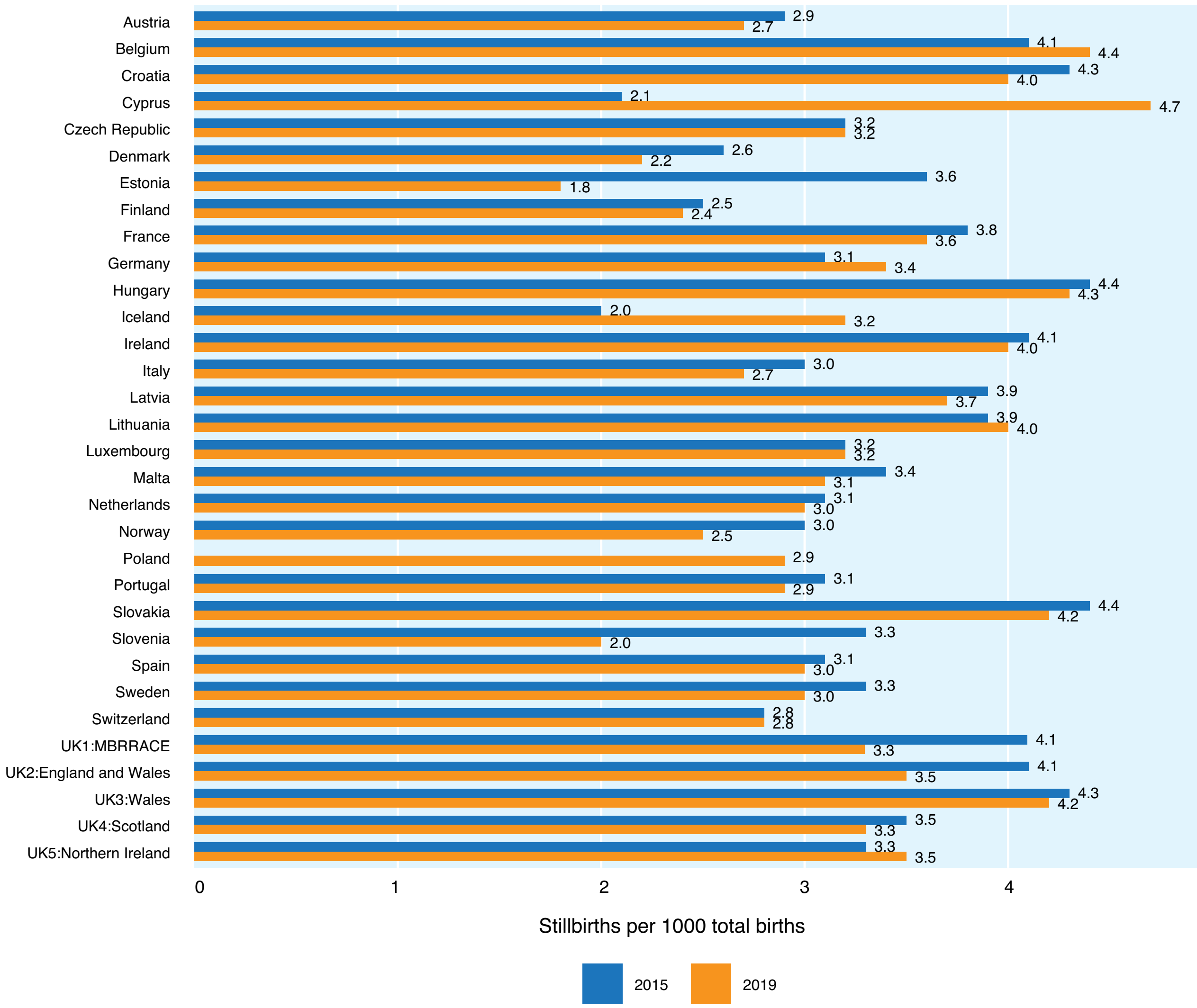


Note: Total number of stillbirths and live births at or after 24 weeks of gestation in parentheses after country name.

Changes in stillbirth rates in Europe, 2015-2019

Stillbirths at or after 24 weeks of gestation either decreased slightly or fluctuated around the same level for most countries when comparing 2019 to 2015 (median difference -0.1 per 1000, IQR -0.3, 0.0; Figure C1.2). Figure C1.3 provides the full picture of changes in stillbirth rates over this period, illustrating greater fluctuation in countries with a smaller number of births (Cyprus and Iceland, for instance) as well as varying trends, with some countries experiencing declines and others with stable or even increasing rates (Figure C1.3).

Figure C1.2: Stillbirth rates at or after 24 weeks of gestation per 1000 stillbirths and live births in Europe in 2015 and 2019



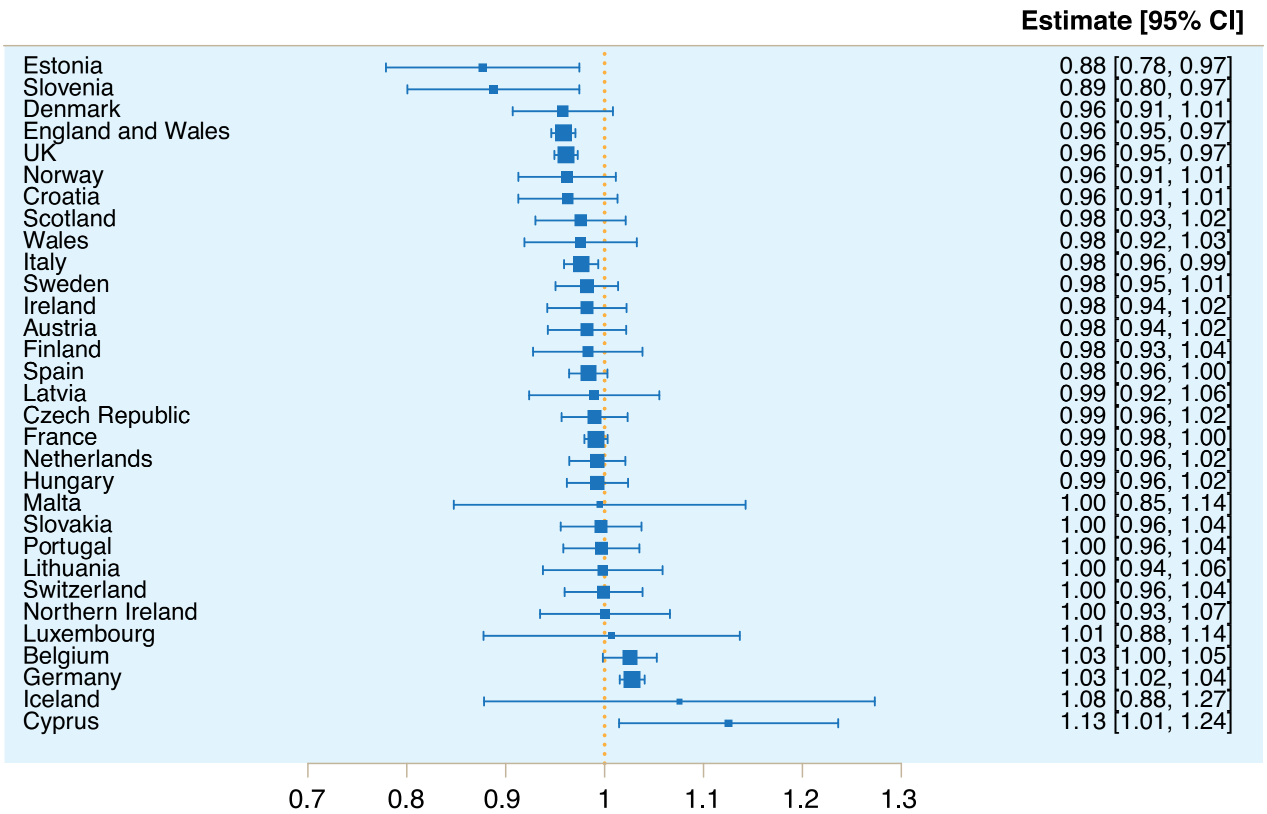
NOTE: Poland did not provide data for 2015-2017.

Figure C1.3: Stillbirth rates at or after 24 weeks of gestation per 1000 stillbirths and live births in Europe by year from 2015 and 2019

NOTE: Countries are sorted by the average rate from 2015 to 2019. Poland did not provide data for 2015-2017.

The pooled measure of average yearly percentage change in stillbirth rates at or after 24 weeks of gestation across Europe from 2015 to 2019 was 0.99 (95% confidence interval 0.98, 1.00; based on random effects model; Figure C1.4), indicating that overall stillbirth rates in Europe decreased slightly. However, changes in stillbirth rates differed across countries (I^2=60.0%; p<0.01).

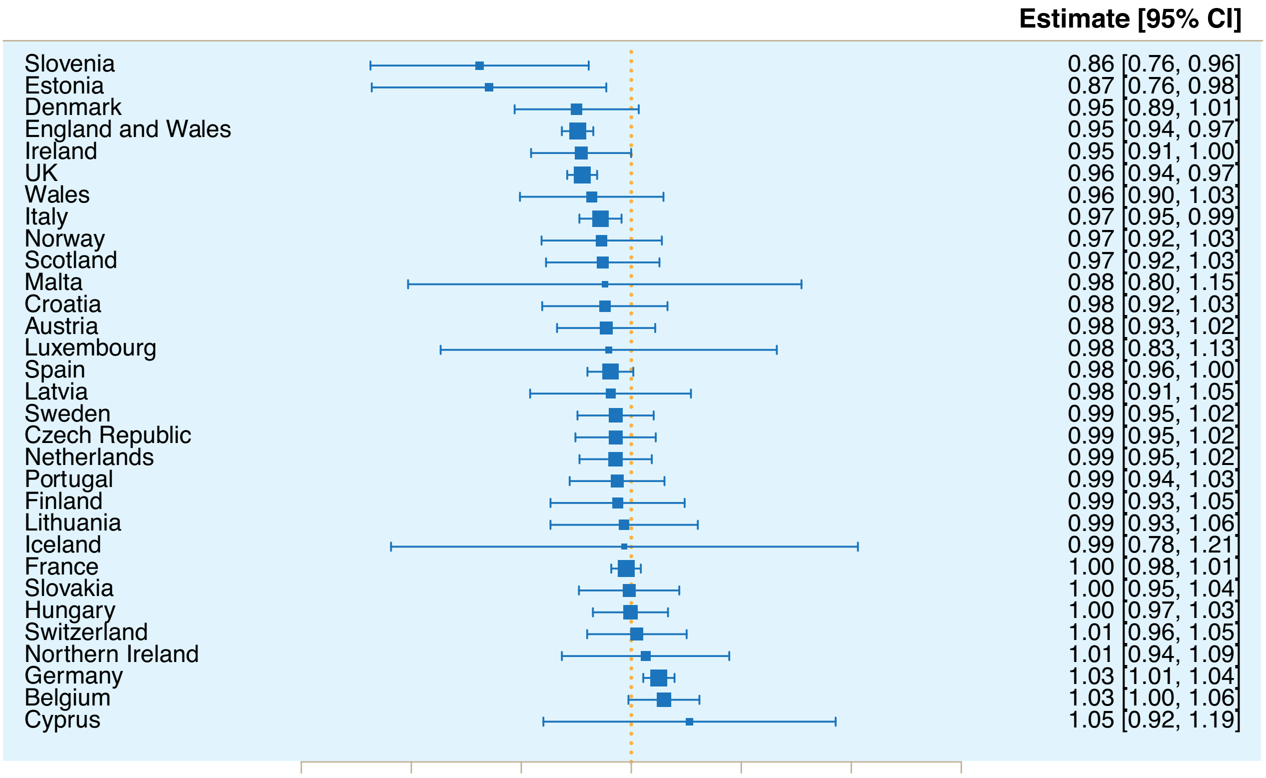
Figure C1.4: Change in stillbirth rates at or after 24 weeks of gestation per 1000 stillbirths and live births in Europe from 2015 to 2019 (yearly change and 95% confidence interval)



NOTE: This graph presents the average yearly percentage change in the stillbirth rate for each country (for example, 0.98 is equal to an average 2% annual reduction and 1.02 is equal to a 2% increase). CI: confidence interval.

Stillbirth rates at or after 28 weeks of gestation across Europe from 2015 to 2019 also decreased slightly (pooled effect 0.99, 95% confidence interval 0.97, 1.00; based on random effects model; Figure C1.5), with differences in changes also noted across countries (I^2=56.9%; p<0.01).

Figure C1.5: Change in stillbirth rates at or after 28 weeks of gestation per 1000 stillbirths and live births in Europe from 2015 to 2019 (yearly change and 95% confidence interval)



NOTE: This graph presents the average yearly percentage change in the stillbirth rate for each country (for example, 0.98 is equal to an average 2% annual reduction and 1.02 is equal to a 2% increase). CI: confidence interval.

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FACT SHEET: C2

NEONATAL MORTALITY IN EUROPE, 2015-2019

KEY POINTS

- In 25 countries contributing data, neonatal mortality rates varied widely. Rates for births at or after 22 weeks of gestation ranged from 0.5 to 4.3 per 1000 live births, with a median of 2.0 per 1000 live births and an interquartile (IQR) from 1.4 to 2.3 per 1000 live births. Rates for births at 24 or more weeks of gestation range from 0.5 to 3.8 per 1000 live births, with a median of 1.5 per 1000 live births and an IQR from 1.1 to 2.1 per 1000 live births.
- From 2015 to 2019, neonatal mortality rates at 24 weeks of gestation tended to decrease or fluctuate around the same level (median difference between 2015 and 2019 of -0.1 per 1000 live births [IQR: -0.4, 0.1]).
- The majority of neonatal deaths occurred in the early neonatal period (0-6 days after birth; median 71.4%, IQR 65.8%, 81.4%) and among babies with extremely low birth weight (51.3% had a weight less than 1000g) or born extremely preterm (47.3% were born before 28 weeks of gestation).

INTRODUCTION

The neonatal mortality rate is a key indicator of health and the quality of maternity care during pregnancy and childbirth. Neonatal deaths are defined as those occurring between 0 and 27 days after live birth, and are subdivided into early (0 to 6 days) and late (7 to 27 days) deaths. The principal causes of neonatal death in high-income countries are congenital conditions and complications associated with very preterm birth (see Fact Sheet C5 on preterm birth). Neonatal mortality rates are 4 to 6 times higher in multiples compared to singletons in part because they are more often born at very low gestational ages.[1]

Neonatal deaths can also be associated with suboptimal care, including factors related to health care and the healthcare system. For instance, for very preterm births, mortality is lower when birth takes place in a maternity ward with on-site neonatal intensive care units.[2] Women with uncomplicated pregnancies do not usually need these specialized hospitals for better outcomes. On the other hand, audits can find suboptimal care contributing to neonatal deaths in any setting. As congenital conditions are potentially an important cause of neonatal death, mortality rates can reflect policies and practices in screening for congenital conditions, with mortality rates attributed to congenital conditions being higher in some countries where termination of pregnancy is not legal.[3] Differences in neonatal mortality rates between countries may also reflect differences between European countries in policies related to the resuscitation of babies at the limit of viability.[4] Another factor affecting differences in neonatal mortality rates is the completeness of recording of live births at extremely early gestational ages.[5]

Previous Euro-Peristat reports have shown declining neonatal mortality rates in most countries, with steeper decreases than for stillbirth rates.[6,7] Over the past few years, several country-level studies have alerted to potentially stagnating rates, raising questions about how to continue mortality reductions and whether some population risk factors, including older age at childbearing and higher rates of obesity, may be responsible for these trends in some countries.[8,9] There has also been an increase in babies reported as live born at earlier gestations, as more care is now provided at 22 weeks onwards, which may also contribute to the stagnation of mortality rates and potentially mask improvements at later gestations.[10]

METHODS

Definition

For this report, neonatal death is defined as a death in the neonatal period (day 0 to 27) following a live birth at or after 22 weeks (or for birth weight of at least 500g where gestational age was missing). We also report data using a lower gestational age threshold of 24 weeks. The neonatal mortality rate is calculated as the number of neonatal deaths per 1000 live births. Because of the data collection protocol based on births in each year, neonatal deaths are those that occurred to babies born in that year (cohort neonatal death rate). Neonatal deaths are further classified as early (0-6 days after live birth) or late (7-27 days after live birth).

Data availability

25 countries provided data on neonatal deaths, including the United Kingdom (MBRRACE-UK) and its constituents (England and Wales [combined], Northern Ireland, Scotland and Wales). Results for the United Kingdom and its constituents are presented separately in figures, with MBRRACE-UK data used for reporting of statistics (medians and interquartile ranges [IQR]) and pooled analyses to avoid duplicate data.

The data collection protocol required birth and death data to be available in one data source. However, many countries do not routinely link data on neonatal deaths with data on births. Countries who did not provide data for this reason include France, Germany, Latvia, Lithuania, Luxembourg, Portugal, and Slovakia. Some countries without linked data provided aggregate data separately: Spain reported overall aggregate data after 22 weeks of gestation. Hungary and Italy reported deaths, but not by gestational age. Thus, these countries are excluded from some analyses. Ireland reported only early neonatal deaths.

Data were collected primarily from medical birth registers, perinatal databases, or civil registration systems by a representative of each country and then transferred to the coordinating team as anonymous, aggregate data.

Among neonatal deaths, missing data for the gestational age at delivery was low (less than 3.5%), except in Denmark (16.0%). Because births with missing data are not included when a gestational age or birthweight limit is imposed, rates for countries with substantial missing data are likely to be underestimated and should be interpreted with caution.

Additional methodological considerations

While this report focuses on the cohort neonatal mortality rate, other data sources report annual neonatal mortality rates, computed as the ratio of neonatal deaths occurring in a year to live births in the same year, and Euro-Peristat has reported annual rates in the past. Though these rates will be similar, some differences may be noted when comparing different data sources, in particular in smaller countries or within subgroups given the rarity of neonatal deaths and potential for random fluctuations.

Because of differences in criteria for birth registration (for example, inclusion or exclusion of births less than 500g), what is recorded as a neonatal death or fetal death may vary between countries, complicating comparisons at earlier gestational ages. Furthermore, policies and practices of active management of births at 22 and 23 weeks of gestation differ across Europe.[4] For this reason, Euro-Peristat also reports neonatal death at or after 24 weeks of gestation.[11] Additionally, in countries where termination of pregnancy is not legal or is difficult to access (Malta, Poland or until recently in Ireland and Northern Ireland), higher neonatal mortality rates may be expected due to deaths from lethal congenital conditions.

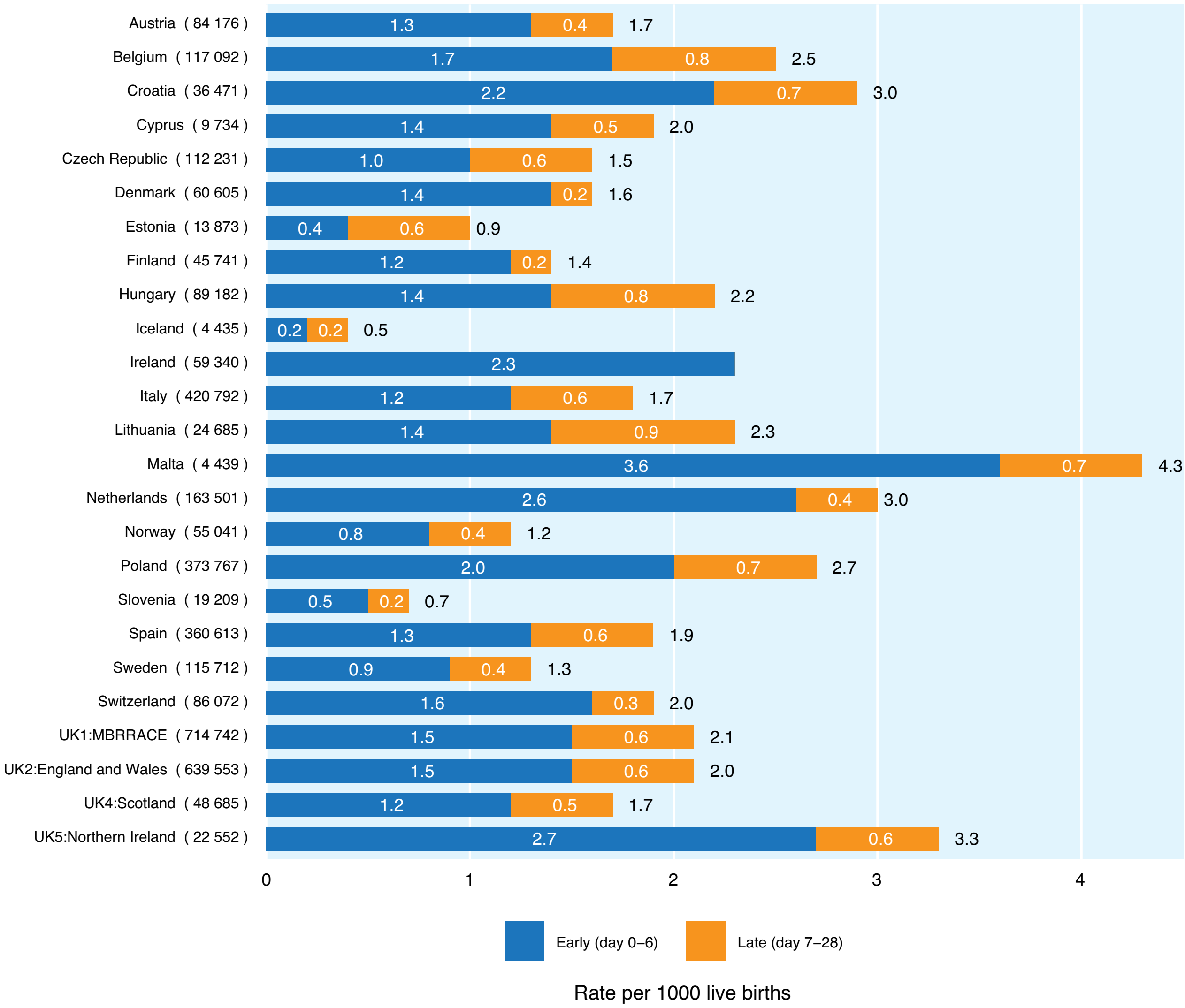
Neonatal deaths are rare events. Therefore, in countries with a small number of births each year, such as Cyprus, Estonia, Iceland, Luxembourg, and Malta, year-to-year random fluctuations are naturally greater.

RESULTS

Neonatal mortality in Europe in 2019

In the 25 countries providing data (Figure C2.1), neonatal death rates at or after 22 weeks of gestation ranged from less than 1.0 per 1000 in Iceland (0.5), Slovenia (0.7), and Estonia (0.9) to 3.0 or more per 1000 in Malta (4.3), Northern Ireland (3.3), Croatia (3.0), and the Netherlands (3.0). Some countries which had high neonatal mortality rates in the previous report (more than 3.0 per 1000 for Bulgaria and Romania) did not provide data for this report. The majority of neonatal deaths were early neonatal deaths (median 71.4%, IQR 65.8%, 81.4%).

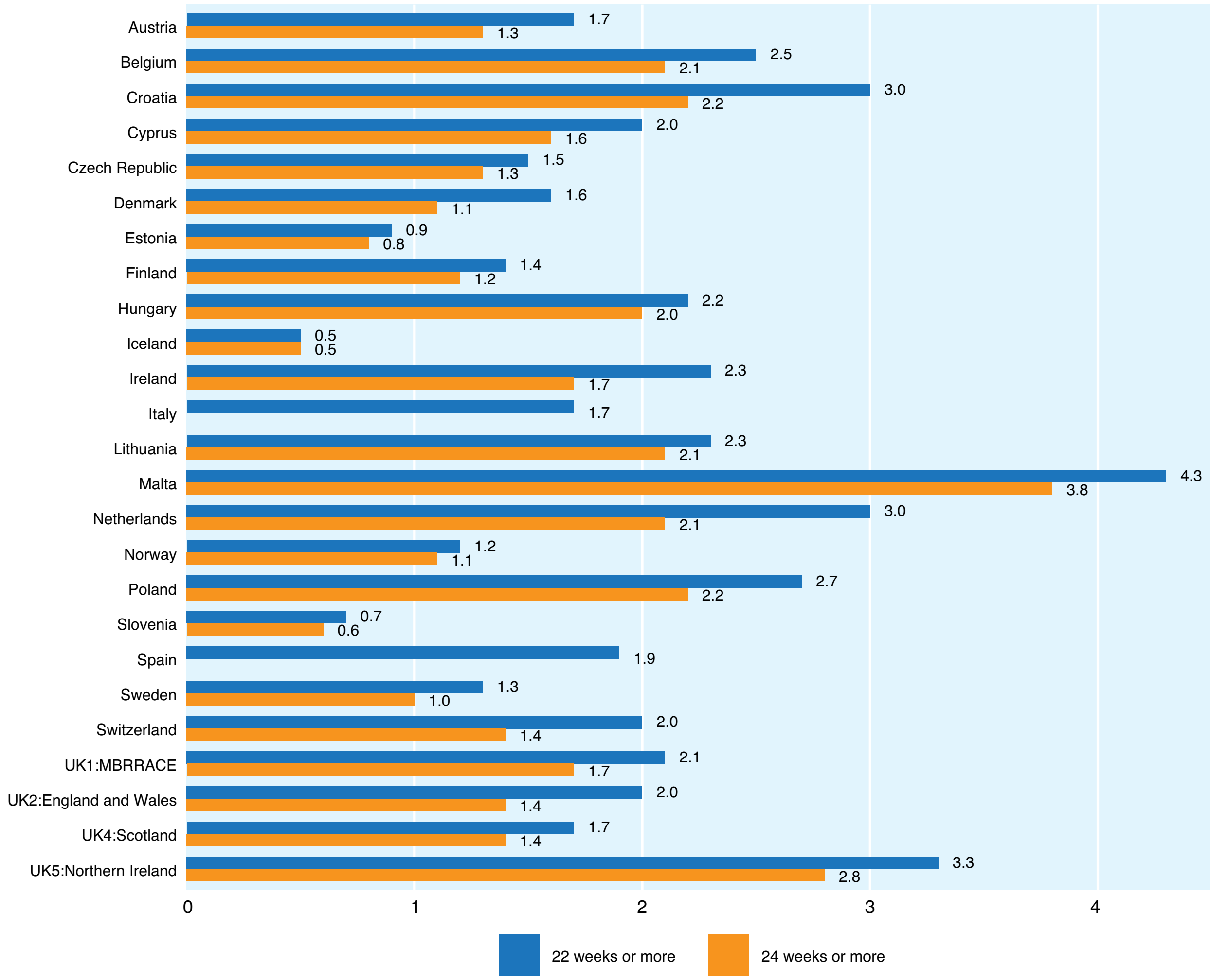
Figure C2.1: Early and late neonatal mortality rates at or after 22 weeks of gestation per 1000 live births in Europe in 2019



NOTE: The total rate (reported at end of bar) may differ from the sum of early and late neonatal mortality because of rounding; Ireland only reported neonatal mortality rates in the early neonatal period (0-6 days after live birth). Total number of live births in parentheses after country name.

The countries with highest and lowest neonatal mortality rates after excluding births before 24 weeks of gestation were generally similar to those at or after 22 weeks (Figure C2.2). For these 23 countries, neonatal death rates ranged from less than 1.0 per 1000 in Iceland (0.5), Slovenia (0.6) and Estonia (0.8) to more than 2.0 per 1000 in Malta (3.8), Northern Ireland (2.8), Croatia (2.2), Poland (2.2), Belgium (2.1), Lithuania (2.1), and the Netherlands (2.1).

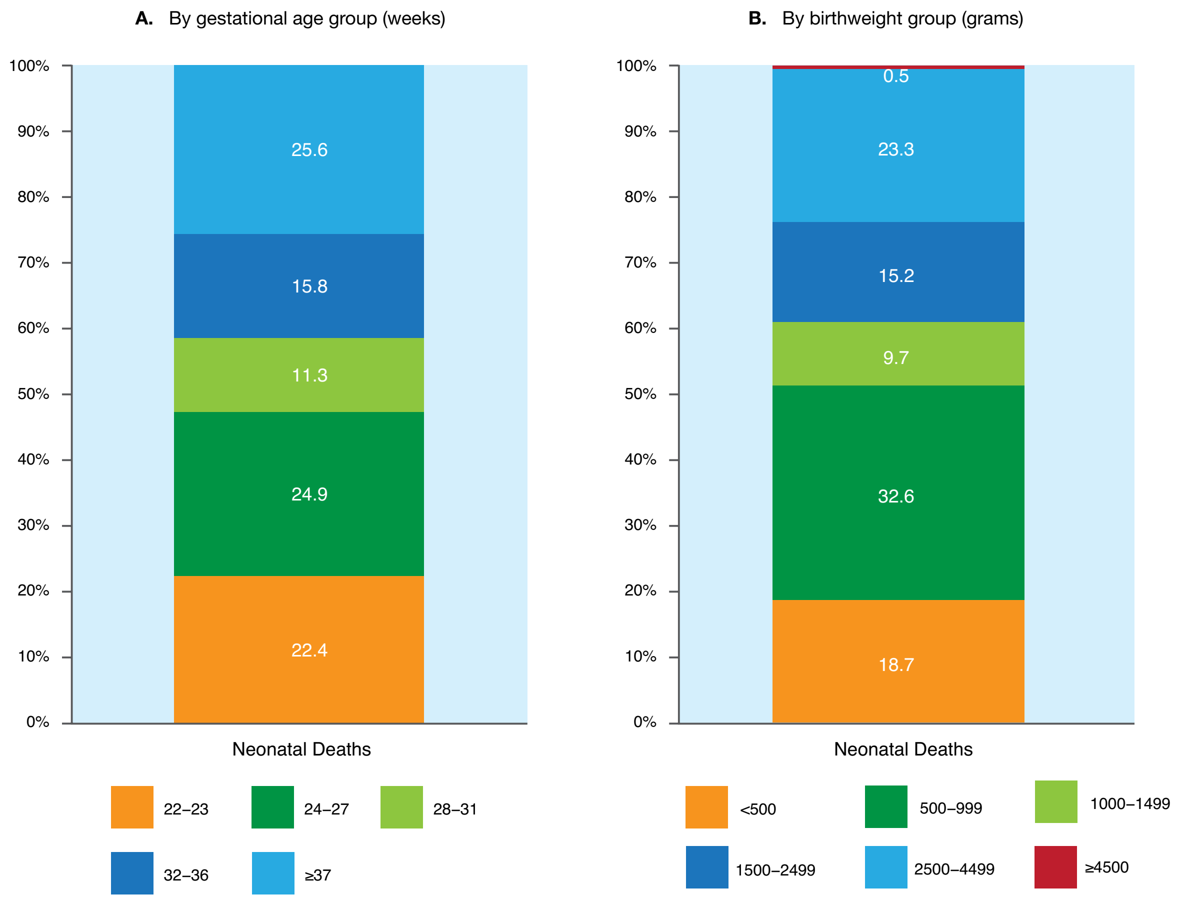
Figure C2.2: Neonatal mortality rates at or after 22 weeks and 24 weeks of gestation per 1000 live births in Europe in 2019



NOTE: Spain and Italy did not provide data by gestational age and neonatal deaths at or after 24 weeks cannot be computed; Ireland only reported neonatal mortality rates in the early neonatal period (0-6 days after live birth).

In the 22 countries for which neonatal deaths could be examined by gestational age and birth weight, deaths tended to be concentrated in births before 28 weeks of gestation (47.3%; Figure C2.3a) and with birth weight less than 1000g (51.3%; Figure C2.3b).

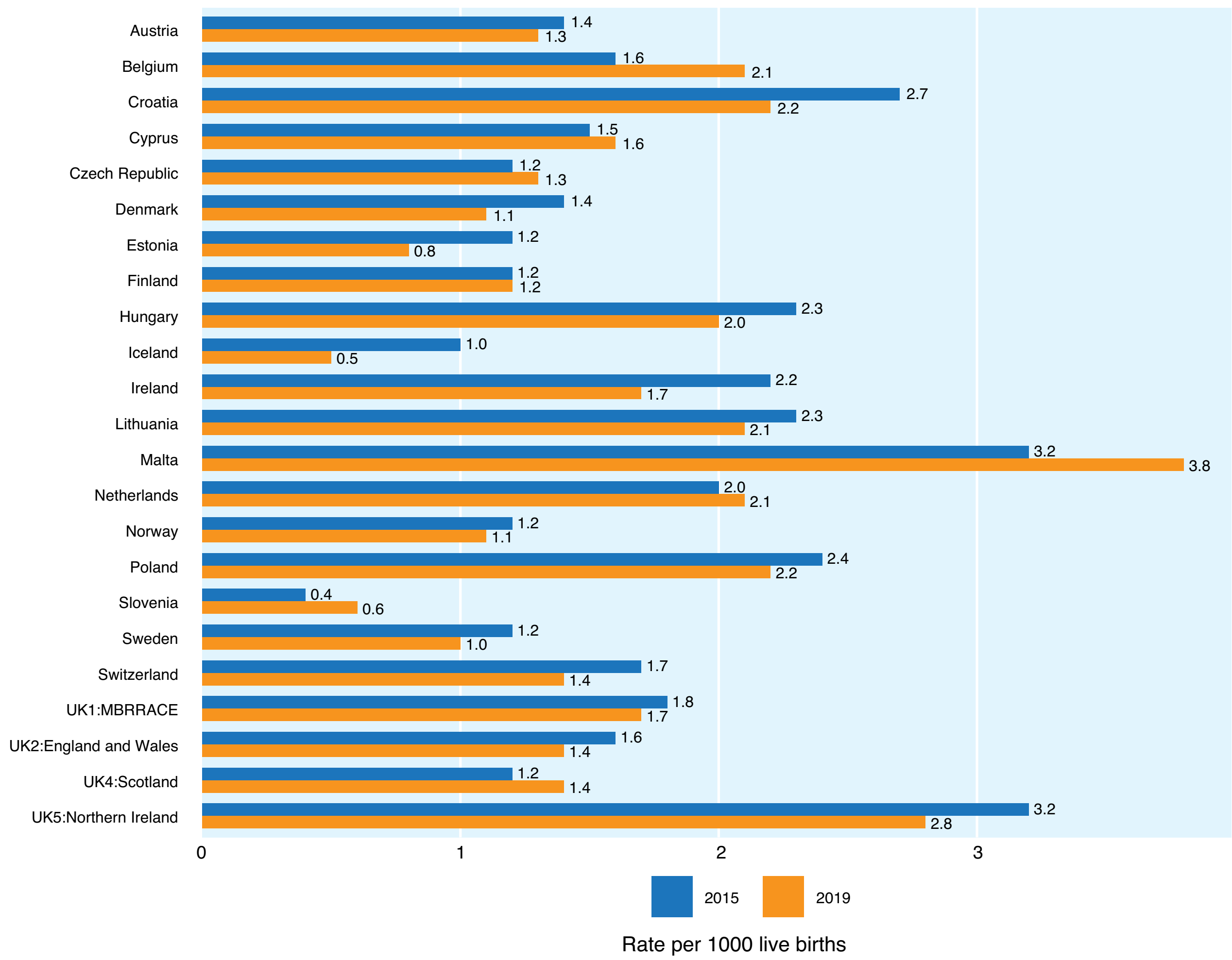
Figure C2.3a and b: Distribution (%) of neonatal deaths at or after 22 weeks of gestation by gestational age at delivery (A) and birth weight (B) in Europe in 2019



Changes in neonatal mortality rates in Europe, 2015-2019

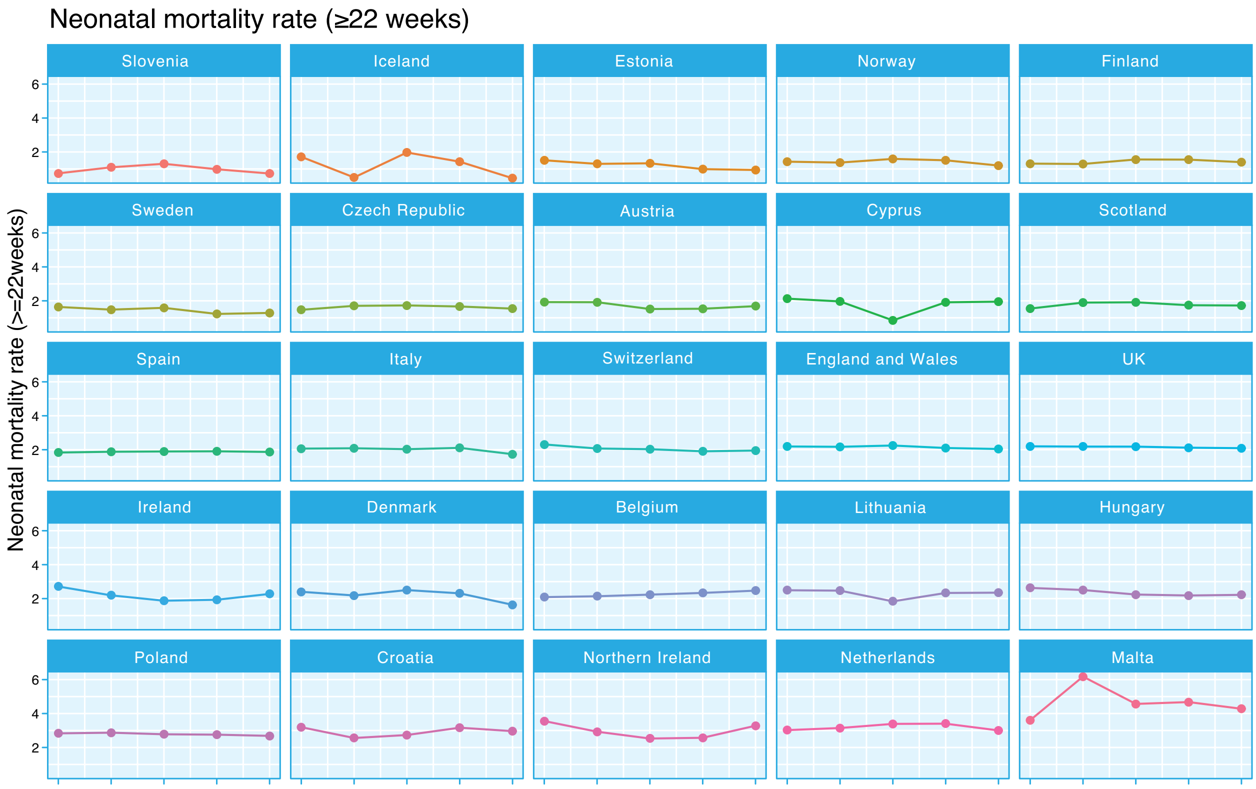
Neonatal mortality rates at or after 24 weeks generally either decreased or fluctuated about a similar level (median difference between 2015 and 2019 of -0.1 per 1000 live births, IQR -0.4, 0.1 per 1000 live births), though increases were found in Malta (0.7) and Belgium (0.5; Figure C2.4). High year-to-year variation in smaller countries can be seen in Figure C2.5, which presents annual rates.

Figure C2.4: Neonatal mortality rates at or after 24 weeks of gestation per 1000 live births in Europe in 2015 and 2019



NOTE: Ireland only reported neonatal mortality rates in the early neonatal period (0-6 days after live birth).

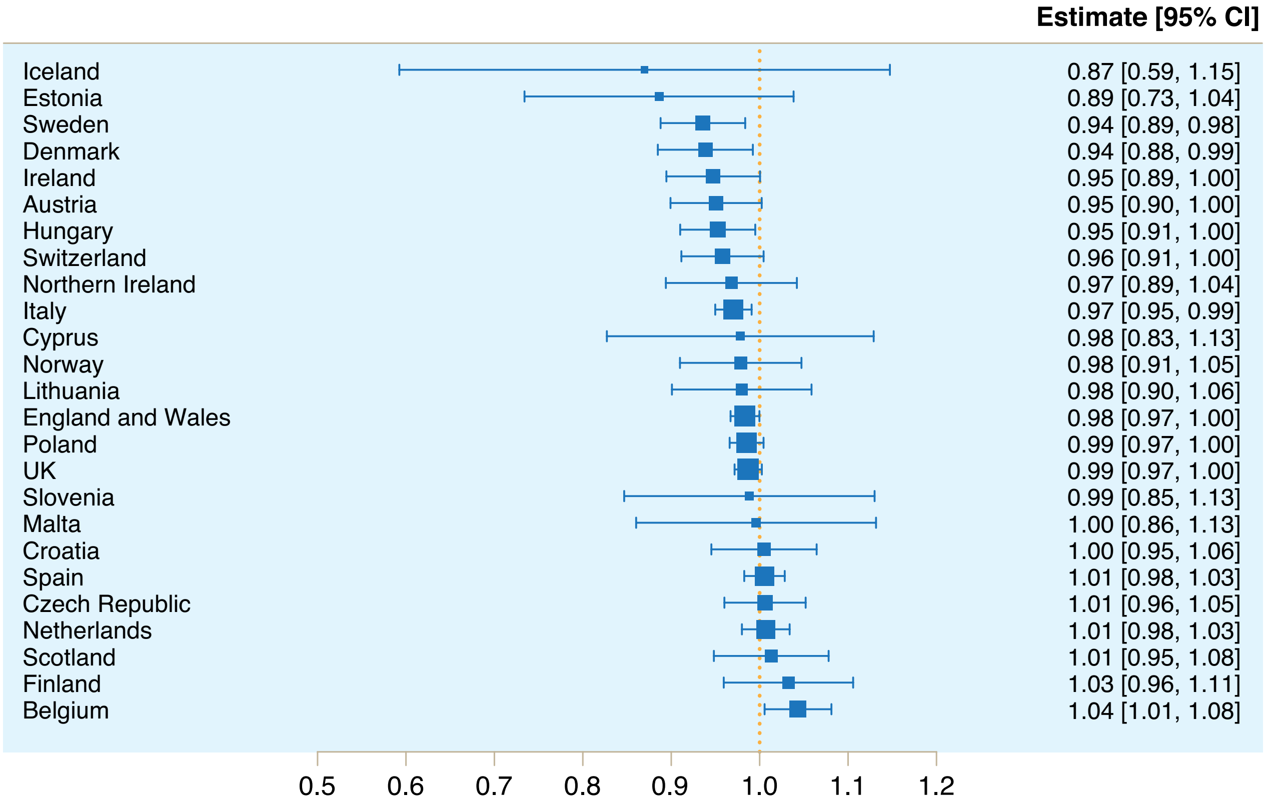
Figure C2.5 Neonatal mortality rates at or after 22 weeks of gestation per 1000 live births in Europe by year from 2015 to 2019



NOTE: Countries are sorted by the average rate from 2015 to 2019. Ireland only reported neonatal mortality rates in the early neonatal period (0-6 days after live birth).

The pooled measure of annual change in neonatal mortality rates at or after 22 weeks of gestation in Europe as a whole from 2015 to 2019 was 0.98 (95% confidence interval 0.97, 1.00; based on a random effects model; Figure C2.6) and indicates that overall neonatal mortality rates in Europe decreased slightly. There was moderate heterogeneity in changes in rates between countries (I^2=52.5%; p=0.02).

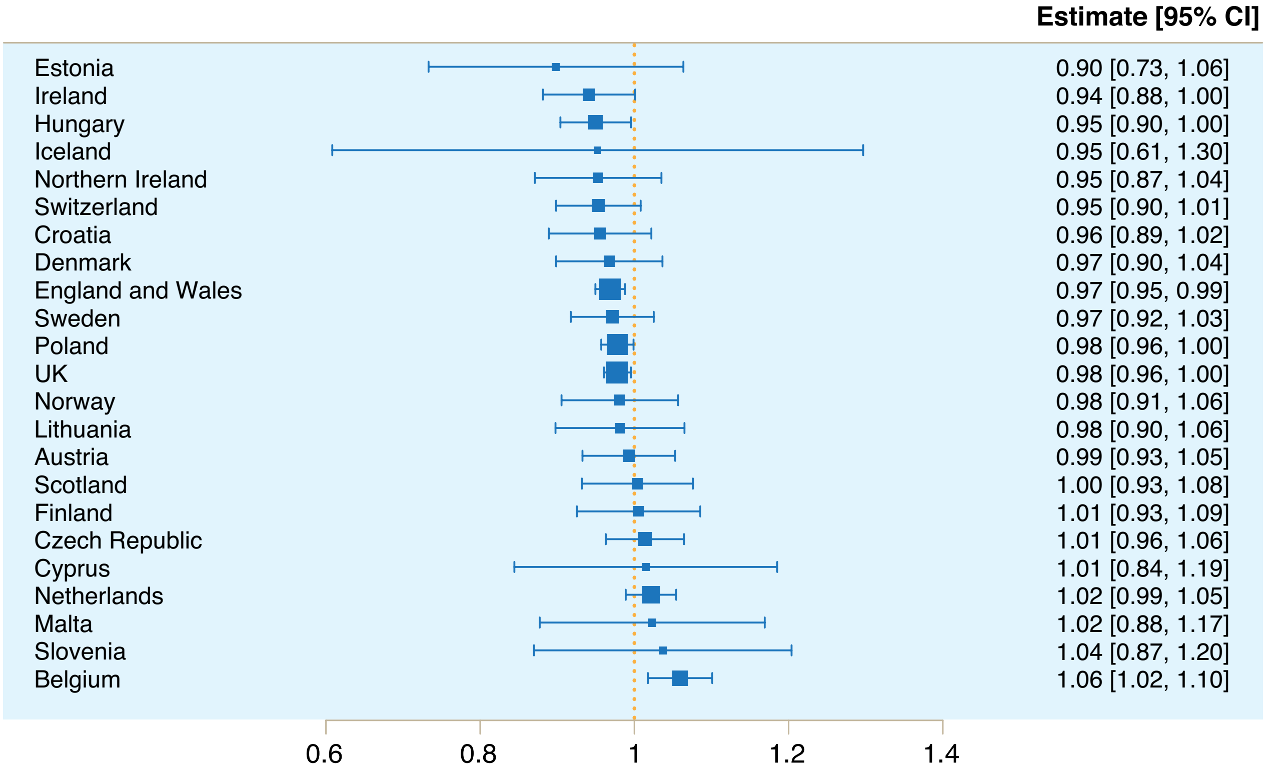
Figure C2.6: Change in neonatal mortality rates at or after 22 weeks of gestation per 1000 live births in Europe from 2015 to 2019 (yearly change and 95% confidence interval)



NOTE: This graph presents the average yearly percentage change in the neonatal mortality rate for each country (for example, 0.98 is equal to an average 2% annual reduction and 1.02 is equal to a 2% increase). Ireland only reported neonatal mortality rates in the early neonatal period (0-6 days after live birth). CI: confidence interval.

Figure C2.7 shows annual changes over time in neonatal mortality rates at or after 24 weeks of gestation. Overall there were slight decreases over this period, with a pooled effect of 0.99 (95% confidence interval 0.97, 1.00) based on a random effects model with moderate heterogeneity (I^2=46.2%; p=0.08).

Figure C2.7: Change in neonatal mortality rates at or after 24 weeks of gestation per 1000 live births in Europe from 2015 to 2019 (yearly change and 95% confidence interval)



NOTE: This graph presents the average yearly percentage change in neonatal mortality rate for each country (for example, 0.98 is equal to an average 2% annual reduction and 1.02 is equal to a 2% increase). Spain and Italy did not provide data by gestational age and neonatal deaths at or after 24 weeks cannot be computed. Ireland only reported neonatal mortality rates in the early neonatal period (0-6 days after live birth). CI: confidence interval.

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FACT SHEET: C3

INFANT MORTALITY IN EUROPE, 2015-2019

KEY POINTS

- In the countries reporting data, infant mortality rates at or after 22 weeks of gestation were 3.5 or more per 1000 live births in Belgium, Poland, Hungary, and Croatia compared with under 2.0 per 1000 live births in Iceland, Estonia, Sweden, and Norway. The median rate was 2.6 per 1000 live births, with an interquartile range (IQR) of 2.1 to 3.2 per 1000 live births.
- For births occurring at 24 weeks of gestation or more, the median rate was 2.1 per 1000 live births with an IQR from 1.7 to 2.4 per 1000 live births.
- In most countries, infant mortality at or after 22 weeks of gestation decreased or fluctuated about the same level over the time period studied (median difference between 2015 and 2019 -0.2 per 1000, IQR -0.5, 0.0).
- About two thirds of infant deaths occurred in babies born either preterm or with a low birthweight, with 64.8% born before 37 weeks and 68.7% weighing less than 2500g.
- Almost half of the Euro-Peristat Network countries were unable to provide data for this indicator as it was constructed as a cohort rate. This means constructing death rates occurring to babies born in a given year. This shows that many countries are still unable to link birth and death registrations. Ideally this linkage should be conducted routinely to ensure accurate reporting and support the evaluation of health outcomes and policies and practices.

INTRODUCTION

The infant mortality rate, which relates deaths in the first year of life to births, is a key measure of a population's health. While it includes causes of death that are not related to the perinatal period, it is essential for capturing the longer-term consequences of perinatal morbidity. This is particularly true for very preterm or very low birthweight children who remain at higher risk of death over the first year of life and beyond. Furthermore, developments in neonatal care for high-risk babies can influence the proportions of infant deaths occurring before and after the neonatal period. This affects comparisons of mortality over time and between countries.[1]

Even among term babies, perinatal conditions and congenital conditions account for a large proportion of infant deaths.[2] Other principal causes of infant mortality are sudden infant death syndrome and accidents and other causes. When comparing between countries, variations in the infant mortality relate to both differences in preterm birth rates as well as the levels of infant mortality among term babies.[3,4] Post-neonatal mortality rates are more highly correlated with social factors than the neonatal mortality rate (from 0 to 27 days after birth).[5] Infant mortality is therefore a good measure of the health impact of social inequality as well as an important indicator of health and healthcare quality. Other population characteristics, such as rising maternal age (see Fact Sheet C8 on maternal age at delivery) or maternal body weight,[6] as well as environmental factors, such as air pollution,[7] affect infant mortality rates. Given stagnating or possibly rising infant mortality rates in some European countries,[8,9] understanding the reasons for differing rates and trends in Europe is a priority.

METHODS

Definition

In this report, infant death is defined as deaths 0-364 days after live birth at or after 22 or 24 completed weeks of gestation (or for birth weight of at least 500g where gestational age was missing). The infant mortality rate is calculated as the number of deaths per 1000 live births among babies born in a given year and known as the birth cohort infant mortality rate.

Data availability

18 countries provided data on infant mortality (England and Wales combined). Other countries did not provide data because they do not routinely link data on infant deaths with birth data in one data source, which was required for the Euro-Peristat data collection protocol. Hungary, Italy, and Spain provided overall aggregate data separately.

Data were collected primarily from medical birth registers, perinatal databases, or civil registration systems by a representative of each country and then transferred to the coordinating team as anonymous, aggregate data.

Missing data for gestational age at delivery was minimal (less than 3.5%). Because births with missing data are not included when a gestational age or birthweight limit is imposed, rates in countries with substantial missing data are likely to be underestimated and should be interpreted with caution. Further, differences between countries in which cases may be more likely to be missing due to reporting policies are important when making comparisons.

Additional methodological considerations

Countries differ in the registration of live births and stillbirths and ability to link birth and death records. Although most countries providing data do not have gestational age or birthweight limits for recording live births, criteria can differ. For Norway, live births and stillbirths are registered from 16 weeks, but births before 22 weeks of gestation with birth weight less than 500 grams are considered spontaneous abortions. In many countries, deaths are recorded in general death registries which generally lack birth characteristics required to apply the Euro-Peristat inclusion criteria, with linkage of this data necessary for more complete analysis.[10] Because of differences in registration criteria, countries differ in what would be recorded as a neonatal death or fetal death, complicating comparisons at earlier gestational ages.[11] Thus, Euro-Peristat reports infant death at or after 24 weeks of gestation as well.

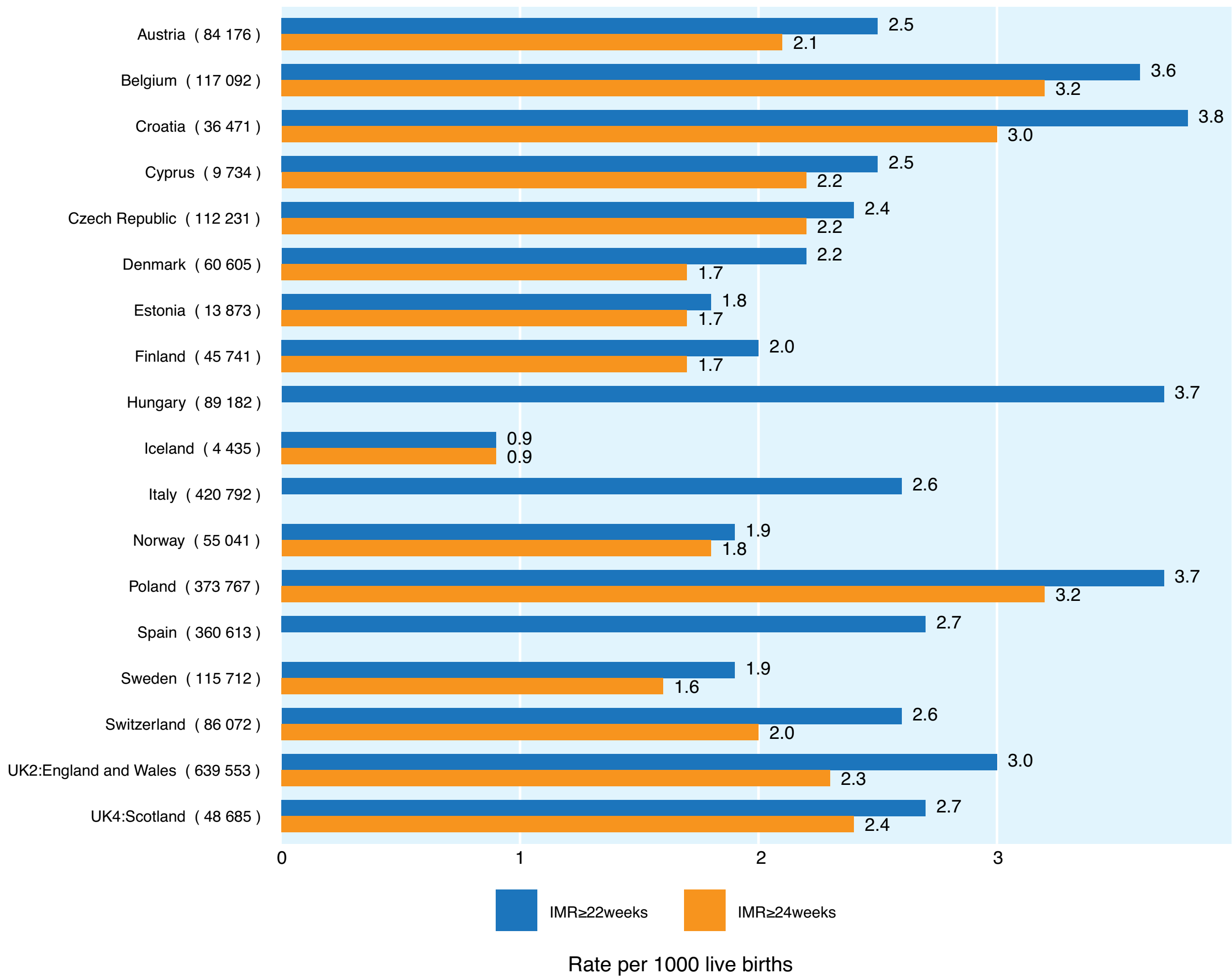
While this report focuses on the cohort infant mortality rate because of the way our data were collected, previous Euro-Peristat reports and other data sources report annual infant mortality rates, that is, the number infant deaths after live births occurring during the same calendar year. Though these rates will be similar, some differences may be noted when comparing different data sources, in particular in smaller countries (Cyprus, Estonia, Iceland, Luxembourg, and Malta) or within subgroups given the rarity of infant deaths and potential for random fluctuations.

RESULTS

Infant mortality in Europe in 2019

In the 18 countries providing data (Figure C3.1), infant mortality rates at or after 22 weeks of gestation ranged from less than 2.0 per 1000 in Iceland (0.9), Estonia (1.8), Sweden (1.9), and Norway (1.9) to more than 3.5 in Croatia (3.8), Poland (3.7), Hungary (3.7), and Belgium (3.6). Many countries with the highest rates in the previous report did not provide data for this report (Bulgaria 7.6 per 1000; Romania 7.1 per 1000; Malta 5.2 per 1000; Northern Ireland 5.1 per 1000).

Figure C3.1: Infant mortality rates at or after 22 and 24 weeks of gestation per 1000 live births in Europe in 2019

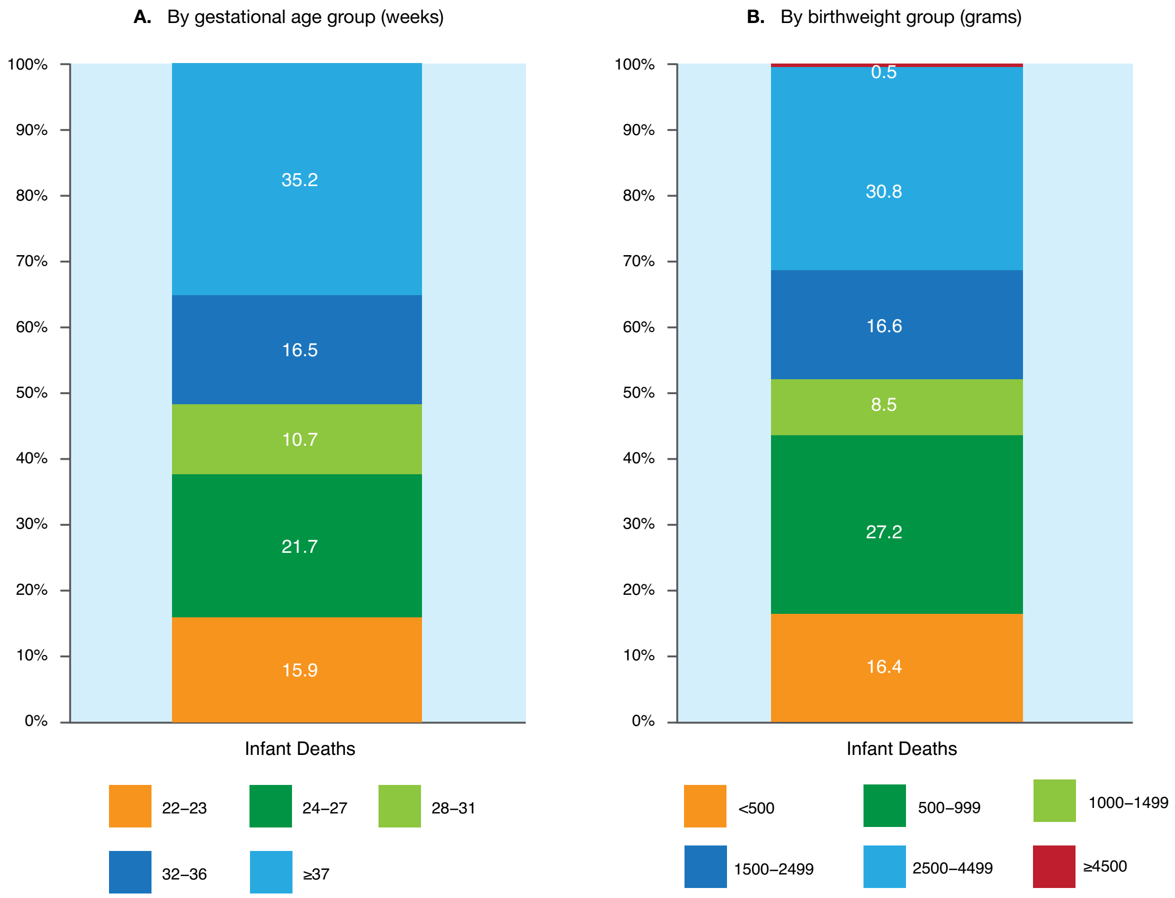


NOTE: Spain, Italy, and Hungary only reported overall aggregate data after 22 weeks of gestation. The total number of live births is given in parentheses after country name.

The countries with the lowest and highest infant mortality rates after excluding births before 24 weeks of gestation were generally similar to those at or after 22 weeks (Figure C3.1), with the lowest rates (per 1000) found in Iceland (0.9), Sweden (1.6), Denmark (1.7), Estonia (1.7), Finland (1.7), and Norway (1.8) and the highest in Belgium (3.2), Poland (3.2), and Croatia (3.0).

Figure C3.2a and b: Distribution (%) of infant deaths at or after 22 weeks of gestation by gestational age at delivery (A) and birth weight (B) in Europe in 2019

Of infant deaths at or after 22 weeks of gestation, the majority occurred in infants born either preterm (64.8% before 37 weeks; Figure C3.2a) or with low birth weight (68.7% less than 2500g; Figure C3.2b).



Changes in infant mortality in Europe, 2015-2019

In most countries, infant mortality rates at or after 22 weeks of gestation decreased or fluctuated about the same level (median difference between 2015 and 2019 of -0.2 per 1000, interquartile range -0.5, 0.0; Figure C3.3). High year-to-year variation was noted in smaller countries, as can be seen in Figure C3.4 which presents rates by year.

Figure C3.3: Infant mortality rates at or after 22 weeks of gestation per 1000 live births in Europe in 2015 and 2019

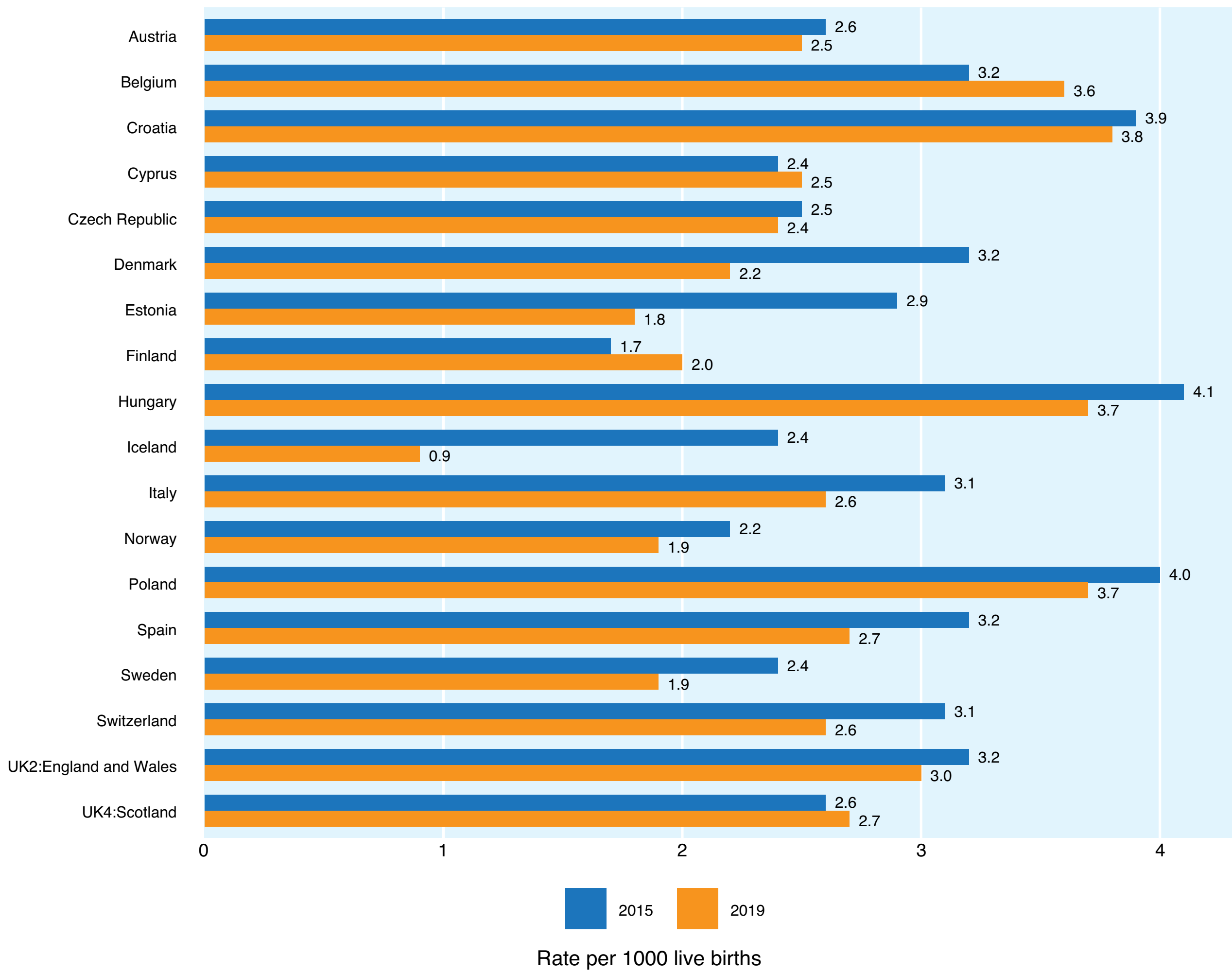
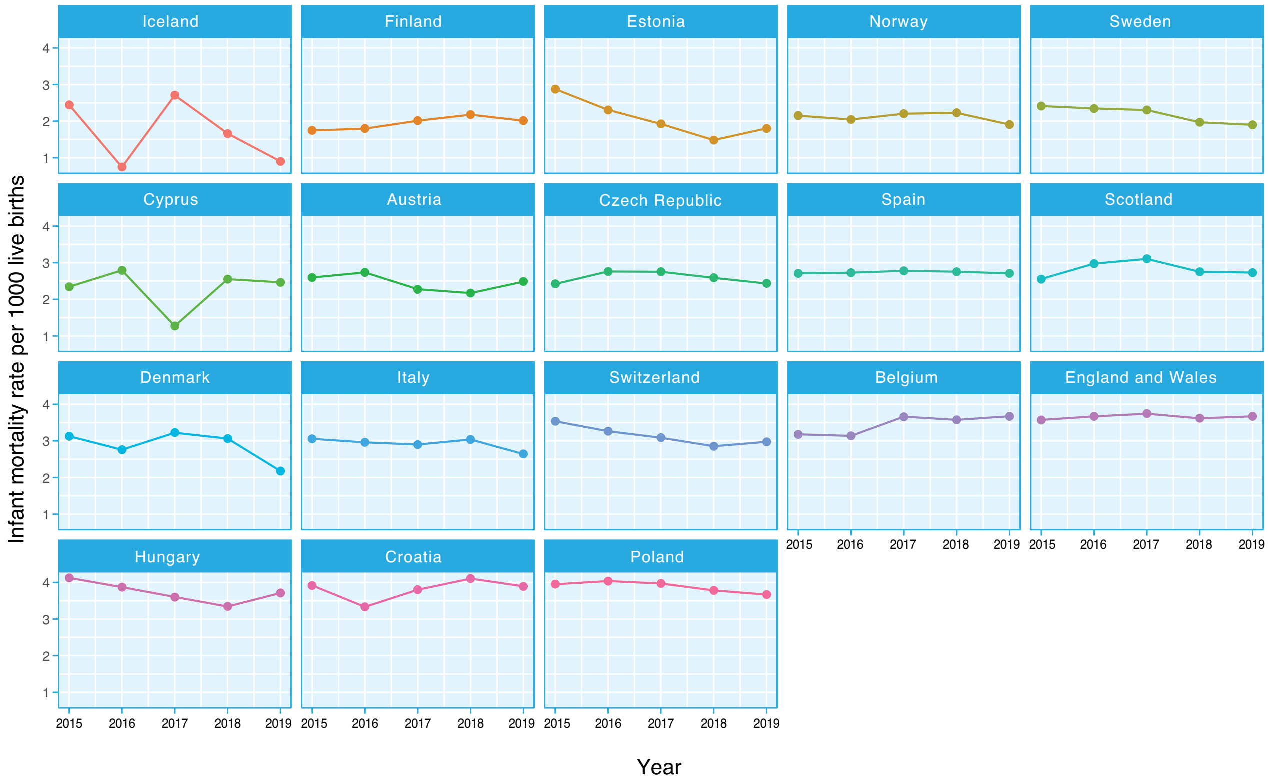


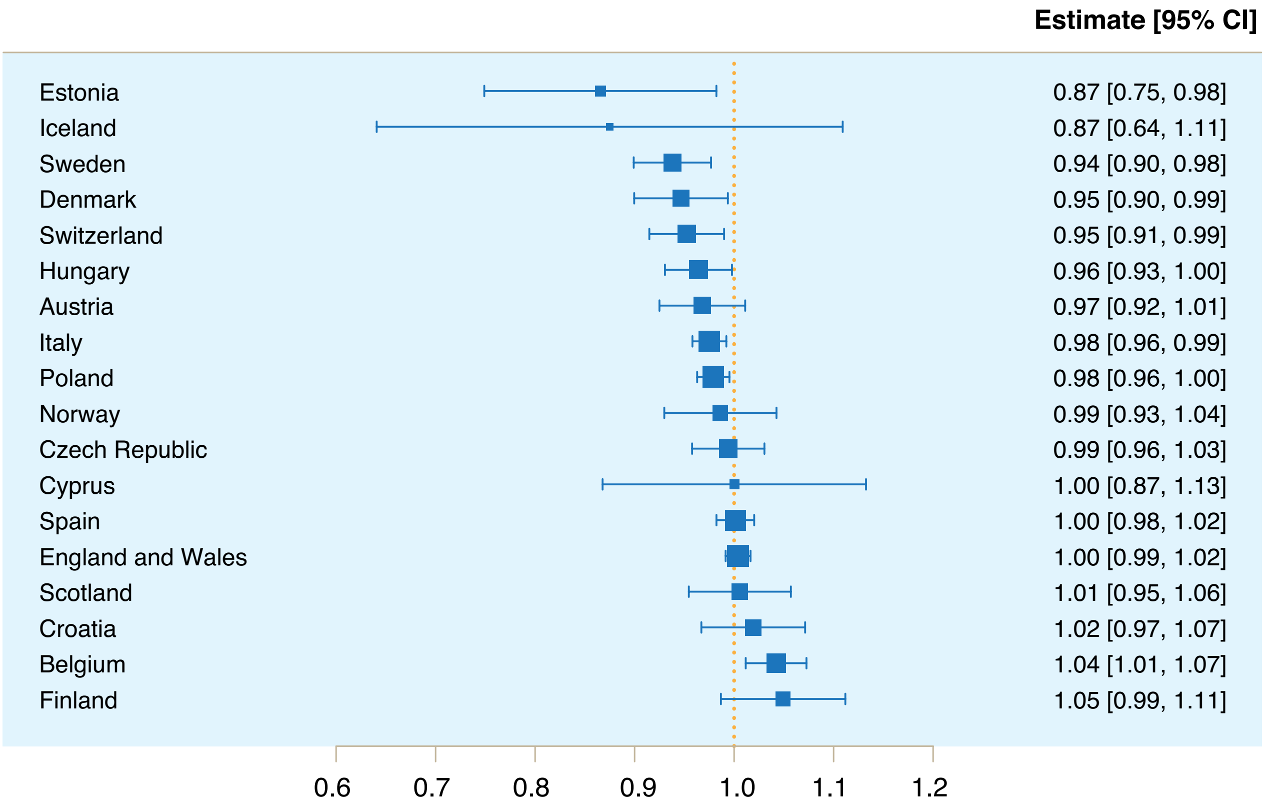
Figure C3.4: Change in infant mortality rates at or after 22 weeks of gestation per 1000 live births in Europe by year from 2015 to 2019



NOTE: Countries are sorted by the average rate from 2015 to 2019.

The pooled measure of annual change in infant mortality rates at or after 22 weeks of gestation across Europe from 2015 to 2019 was 0.99 (95% confidence interval 0.97, 1.00; based on a random effects model; Figure C3.5), indicating that overall infant mortality rates in Europe decreased slightly. However, these changes over time were heterogeneous across countries (I^2=71.7%; $p<0.01$).

Figure C3.5: Change in infant mortality rates at or after 22 weeks of gestation per 1000 live births in Europe from 2015 to 2019 (yearly change in rate and 95% confidence interval)



NOTE: This graph presents the average yearly percentage change in the infant mortality rate for each country (for example, 0.98 is equal to an average 2% annual reduction and 1.02 is equal to a 2% increase). CI: confidence interval.

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FACT SHEET: C4

BIRTH WEIGHT IN EUROPE, 2015-2019

KEY POINTS

- The percentage of low birthweight births (less than 2500g) in 2019 in the 32 countries providing data ranged widely, from 4.0% to 10.1% of live births. Percentages were lower in northern Europe compared to southern Europe.
- About 1% of live births were of very low birth weight (less than 1500g), ranging from 0.6% to 1.3%. High birth weights (4500g or more) were also relatively uncommon, but ranged more widely from 0.2% to 4.8%.
- In most countries, the proportions of low weight births decreased slightly between 2015 and 2019 (median -0.2%, interquartile range [IQR] -0.4%, 0.0%), while there was virtually no change in the percentages of high weight births (median 0.0%, IQR -0.1%, 0.1%).
- Differences in low birth weight between countries can arise from physiological differences in size at birth or variation in risks of preterm birth or fetal growth restriction. Further research is needed to assess the contribution of preterm birth and fetal growth restriction to these differences.

INTRODUCTION

Healthy growth of the fetus during pregnancy is key for later health and development.[1] Growth restriction is associated with many adverse perinatal health outcomes, including mortality and morbidity,[2] short and long term neurological impairments,[3,4] and metabolic complications, including high blood pressure, ischemic heart diseases, other cardiovascular diseases, and diabetes.[5]

Rates of low birth weight (less than 2500g) and high birth weight (4500g or more) are reflections of the intrauterine environment, placental function, and gestational age at birth used to assess fetal growth. Babies with low birth weights include those born preterm (see Fact Sheet C5 on gestational age distribution) as well those with fetal growth restriction, regardless of their gestational age at birth. Ideally, growth restriction is measured by relating birth weight to gestational age to identify small for gestational age babies. To do this, growth charts that can be used in all European countries and for all population groups within each country are needed, posing a considerable challenge.[6] In contrast, birth weight is included in many national and international data systems. This means it can be used for comparing diverse geographical areas and for monitoring trends over time.

Risk factors for poor growth can include mothers with chronic diseases, pregnancy-related complications such as hypertension or preeclampsia, and congenital conditions. Smoking and low socioeconomic status are also related to fetal growth impairment.[7] Management of fetal growth restriction during pregnancy involves monitoring the fetus and, if indicated, delivering the baby early.[8]

At the other end of the birthweight spectrum, macrosomia, usually defined as high birth weight of 4500g or more, is associated with pregnancy complications and adverse perinatal health outcomes, including shoulder dystocia, neonatal morbidity, and caesarean section.[9,10] Mothers with diabetes are known to be at higher risk of having a macrosomic fetus and the risk of diabetes is higher among older mothers and those with higher body weights.

METHODS

Definition

In the initial data collection, birth weight (grams) was grouped as: <500, 500-999, 1000-1499, 1500-2499, 2500-4499, or 4500g or more. For this report, we focus on very low birth weight (less than 1500g), low birth weight (less than 2500g), and high birth weight (4500g or more). Birth weight is reported as the live births in a given birthweight group as a percentage of all live births with a stated birth weight.

Data availability

32 countries provided data on birth weight, including the United Kingdom (MBRRACE-UK) and its constituents (England [combined with Wales], Northern Ireland, Scotland, and Wales [separately and combined with England]). Results for the United Kingdom and its constituents are presented separately in figures, with MBRRACE-UK data used for reporting of statistics (medians and interquartile ranges [IQR]) and pooled analyses to avoid duplication of data.

Data were extracted primarily from medical birth registers, perinatal databases, or civil registration systems by a representative of each country and then transferred to the coordinating team as anonymised, aggregate data.

In general, the extent of missing data was minimal (under 2.5%), but was slightly higher in Spain (5.1%).

Additional methodological considerations

Results are presented for live births (rather than live births and stillbirths), as the recording of live births is more consistent between countries than that of stillbirths (see Fact Sheet C1 on stillbirth) thus enabling more consistent comparisons.

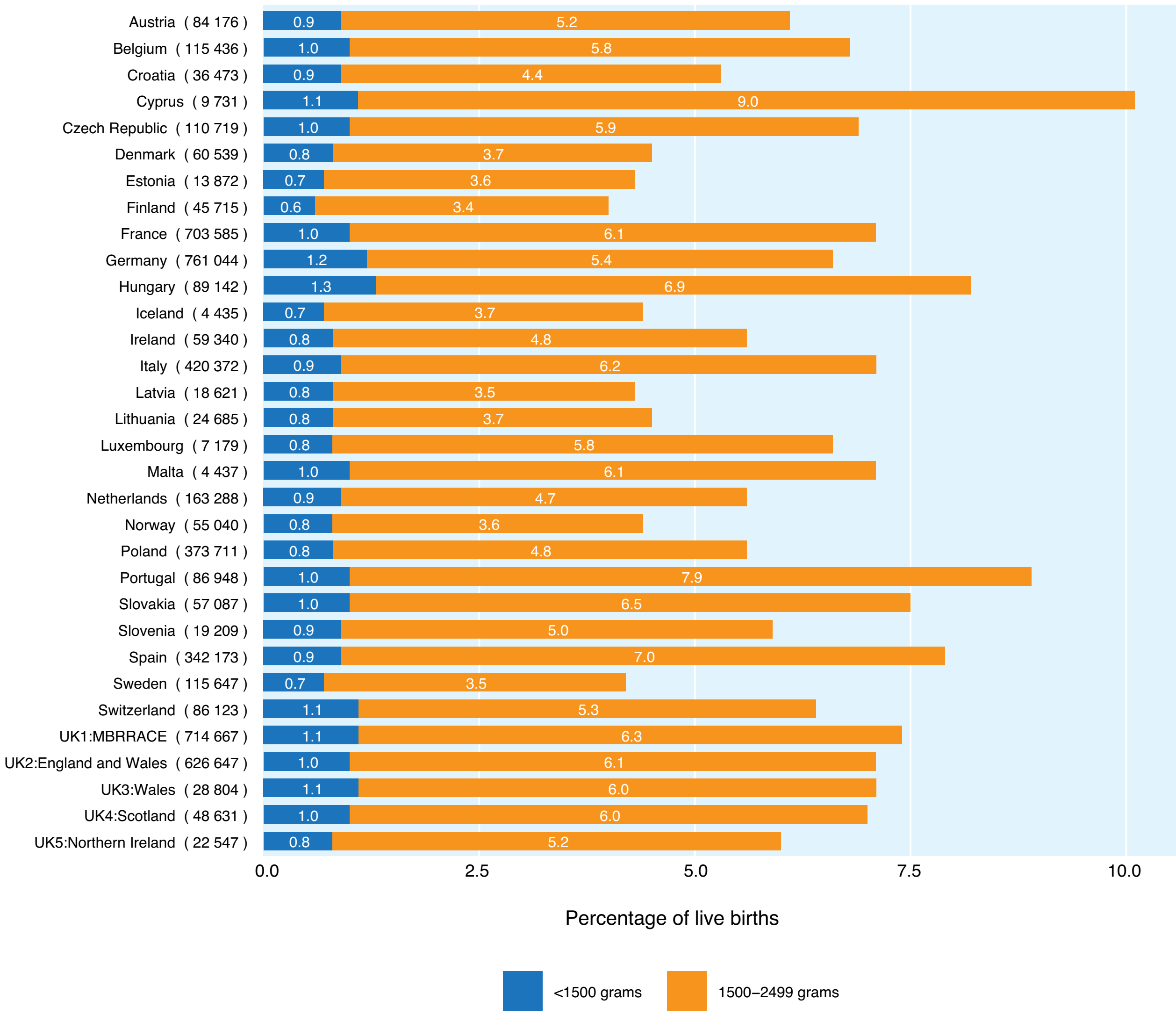
Birth weight is a useful indicator of infant morbidity because it is consistently recorded and thus can be more readily compared between countries. In contrast, gestational age at birth is less consistently reported, especially in low or middle income countries. On the other hand, because birth weight reflects both gestational age and fetal growth, which may differ between countries, differences in birth weight are more difficult to interpret.

RESULTS

Birth weight in Europe in 2019

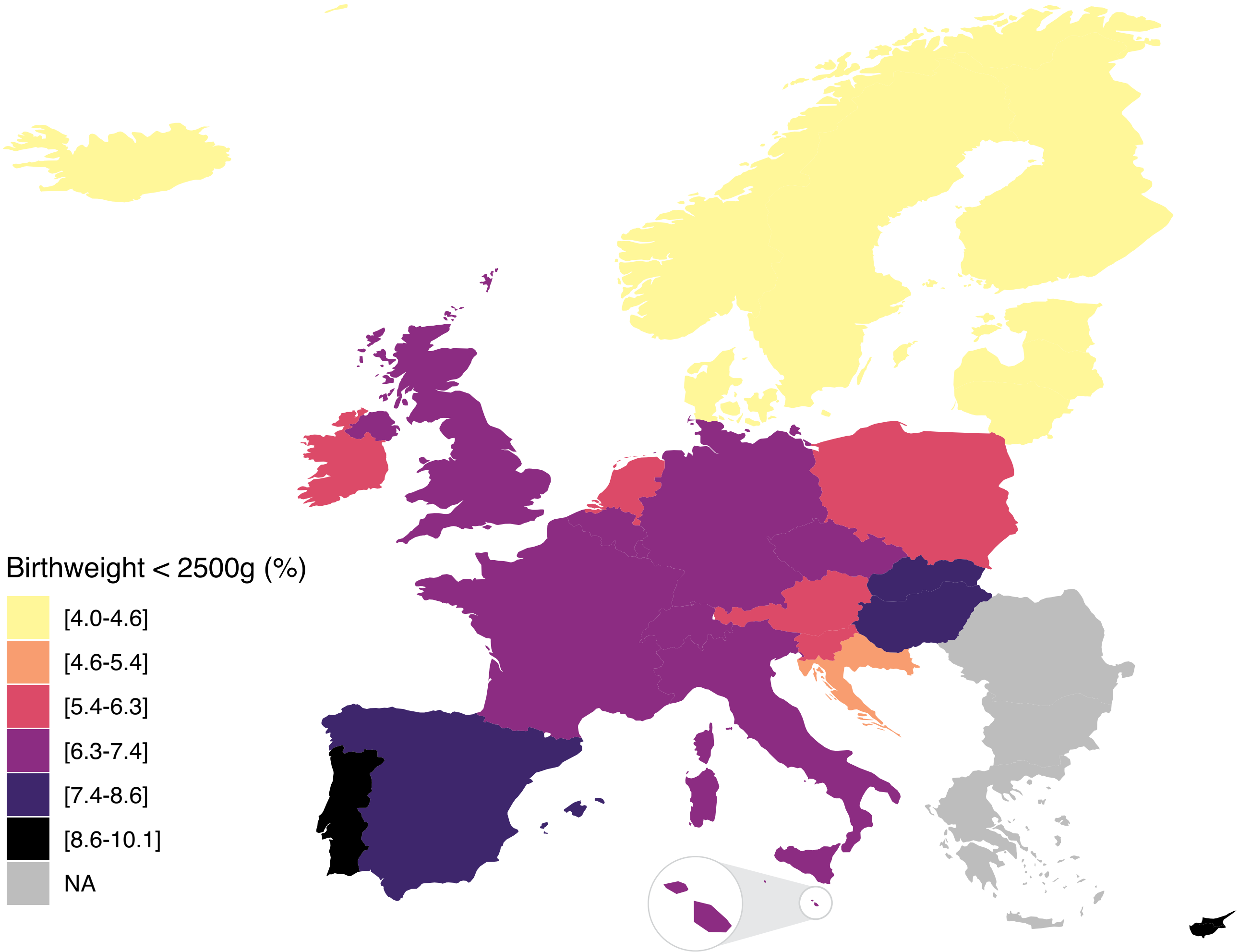
The percentage of low weight births (less than 2500g) ranged from 4.0% to 10.1% (Figure C4.1). There were considerable geographical differences, with the percentage of low weight births tending to be the lowest in northern European countries (less than 4.5% in Finland, Sweden, Latvia, Estonia, Norway, Lithuania, and Denmark; Map C4.1). The highest rates were concentrated in southern and eastern European countries (Cyprus, Portugal, Hungary, Slovakia and Spain). The percentage of very low weight births (less than 1500g) was below 1.0% in most of Europe (median 0.9%, IQR 0.8%, 1.0%). Again, the lowest percentages were found in northern European countries.

Figure C4.1: Percentage of live births with birth weight under 1500g and 1500-2499g in Europe in 2019



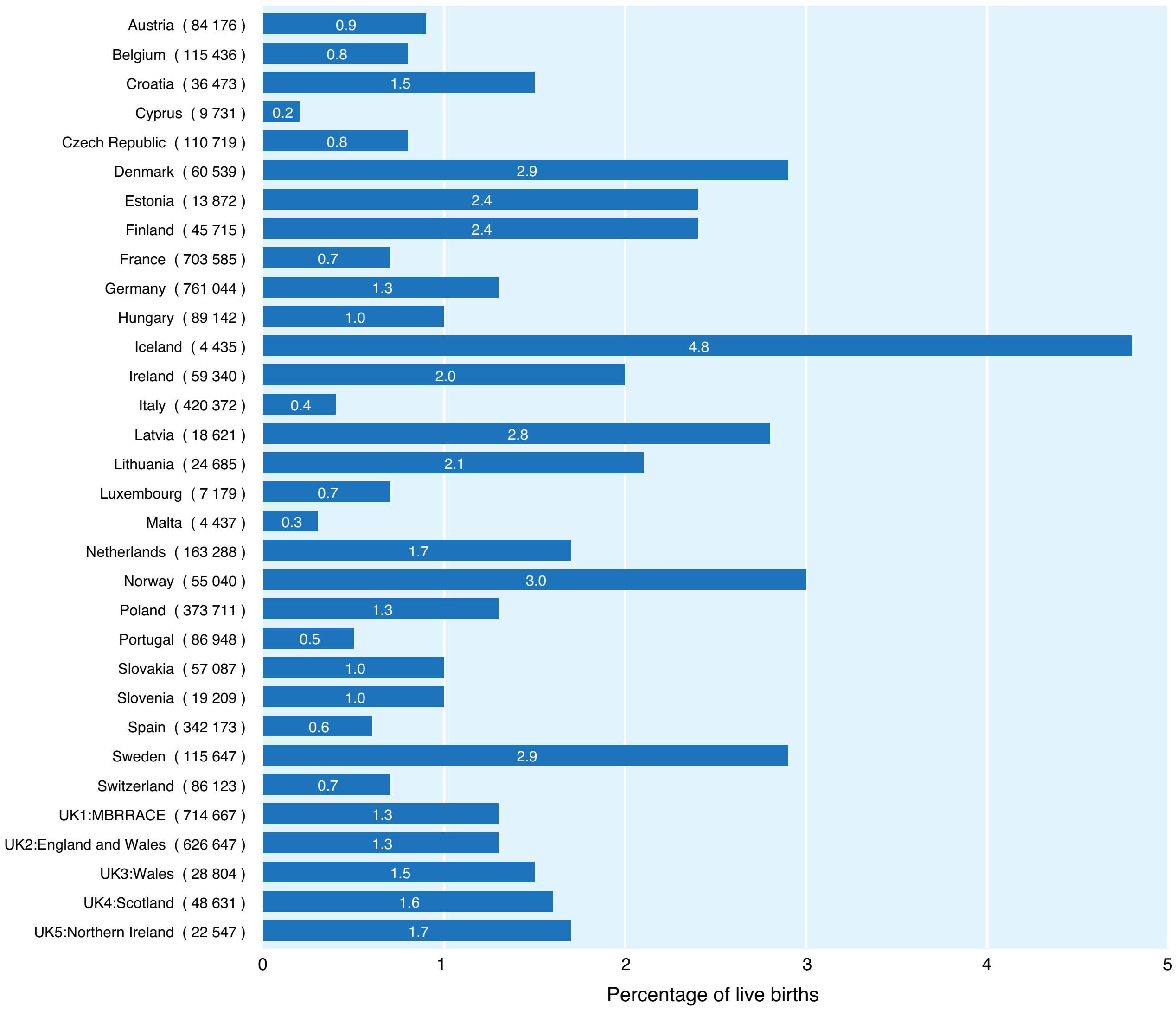
NOTE: Number of live births with data on birth weight in parentheses after country name.

Map C4.1: Percentage of live births with birth weight under 2500g in Europe in 2019



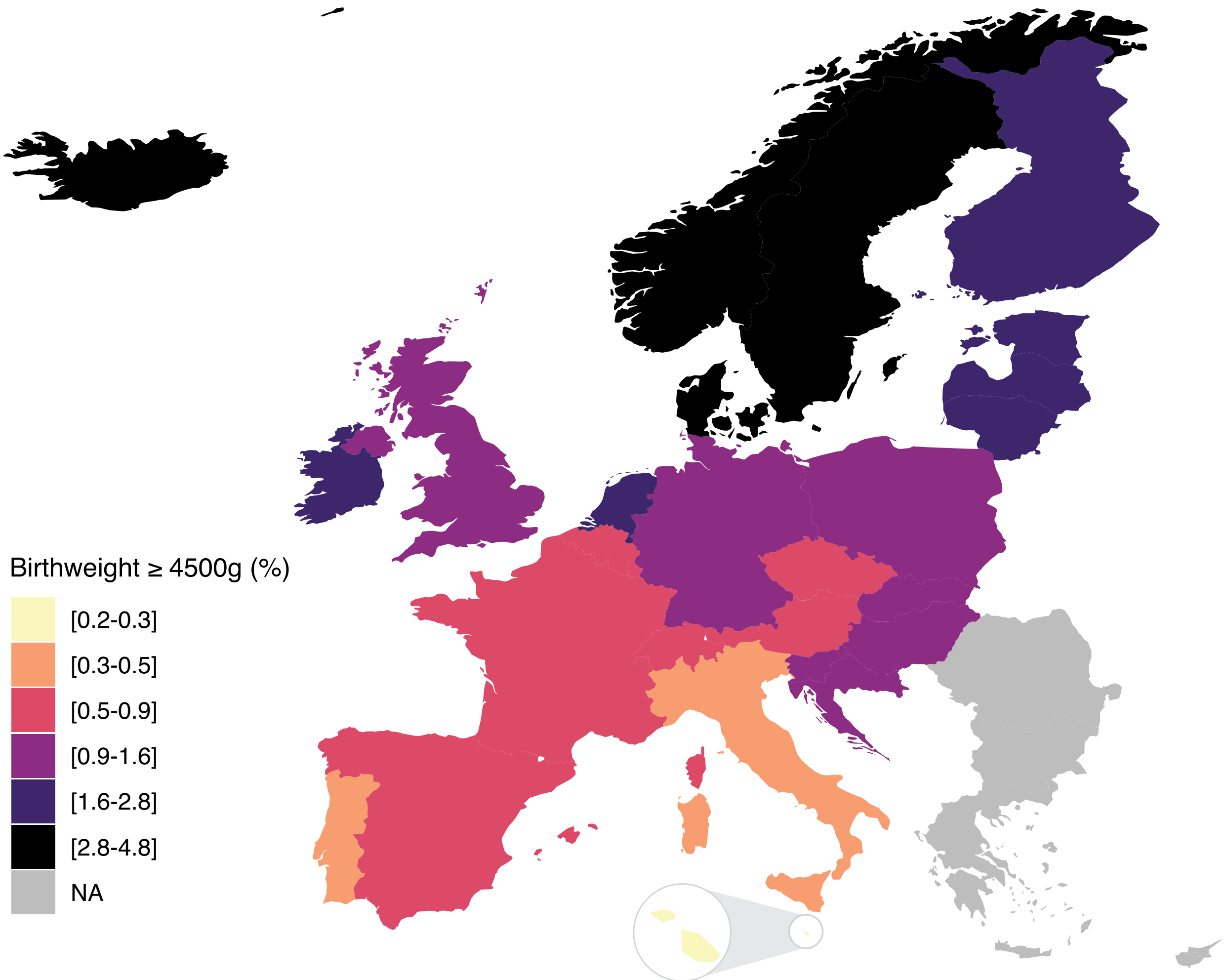
The percentage of high birth weights also tended to be low across Europe (median 1.1%, IQR 0.7%, 2.4%). In line with results for low birth weights, high birth weight was more common in northern European countries and less common in southern European countries.

Figure C4.2: Percentage of live births with birth weight 4500g or more in Europe in 2019



NOTE: Number of live births with data on birth weight in parentheses after country name.

Map C4.2: Percentage of live births with birth weight 4500g or more in Europe in 2019

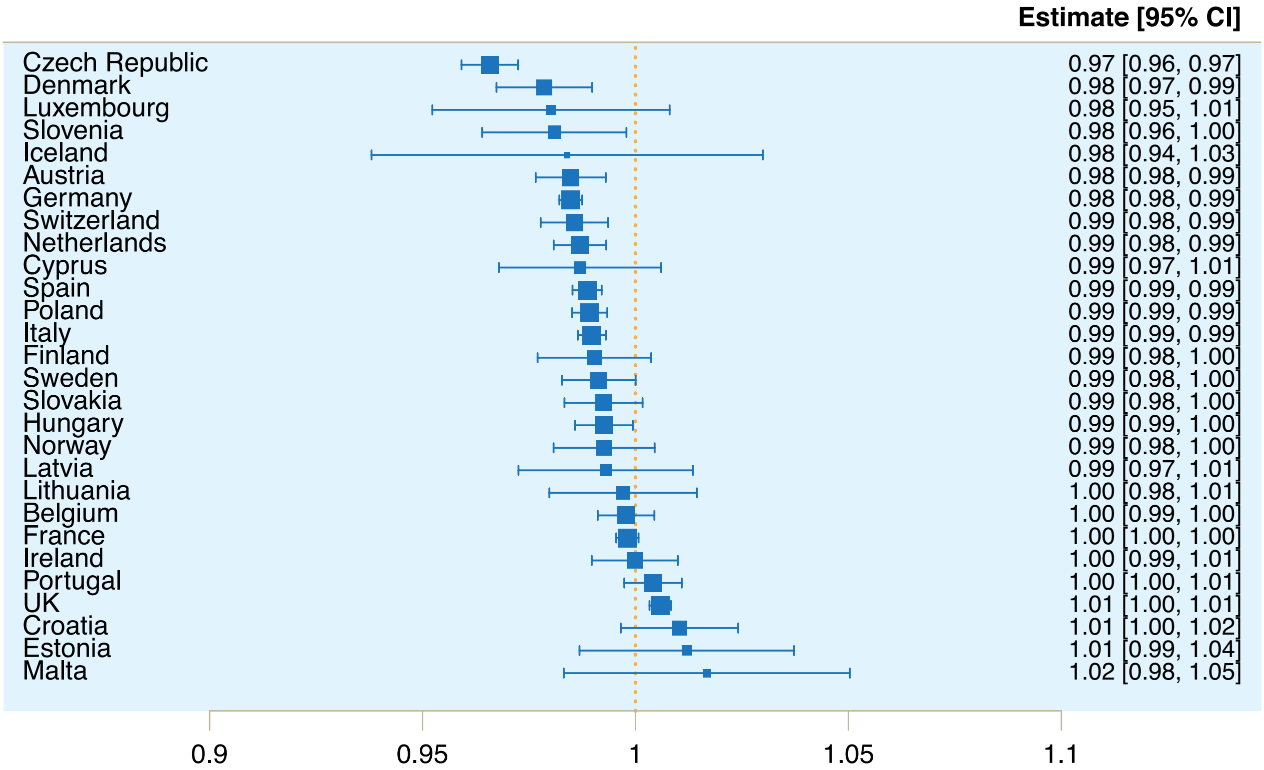


Changes in birth weight in Europe, 2015-2019

In most countries in Europe, the percentage of low weight births (less than 2500g) decreased slightly from 2015 to 2019 (median -0.2%, IQR -0.4%, 0.0%). The biggest decreases were in the Czech Republic (-1.0%), Cyprus (-0.5%), Slovenia (-0.5%), and Denmark (-0.5%), and the greatest increases in Wales (+0.5%) and Malta (+0.8%).

The pooled measure of change in low birth weight for Europe as a whole from 2015 to 2019 was 0.99 (95% confidence interval 0.99, 1.00; based on a random effects model; Figure C4.3), indicating that overall the percentage of low birth weight in Europe decreased slightly. However, changes differed between countries (I^2=89.4%; p<0.01).

Figure C4.3: Change in percentage of live births with birth weight less than 2500g in Europe from 2015 to 2019 (yearly change and 95% confidence interval)

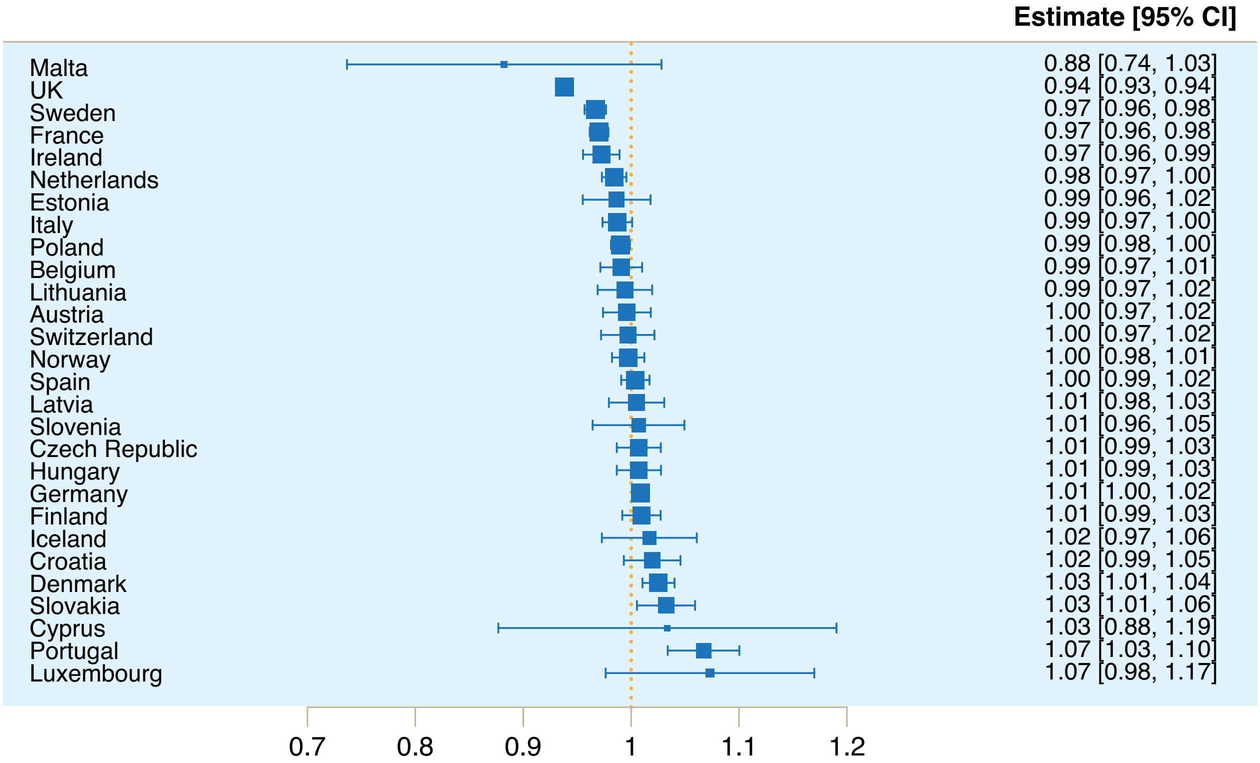


NOTE: This graph presents the average yearly percentage change in the low birthweight rate for each country (for example, 0.98 is equal to an average 2% annual reduction and 1.02 is equal to a 2% increase). CI: confidence interval.

The proportion of high weight births remained relatively constant in Europe from 2015 to 2019 (median 0.0%, IQR -0.1%, 0.1%).

The pooled measure of change in high birth weight across Europe from 2015 to 2019 was 1.00 (95% confidence interval 0.99, 1.01; based on a random effects model; Figure C4.4), indicating that overall the proportion of high weight births in Europe remained unchanged. However, change in high birth weight births differed between countries (I^2=90.3%; p<0.01).

Figure C4.4: Change in percentage of live births with birth weight 4500g or more in Europe from 2015 to 2019 (yearly change and 95% confidence interval)



NOTE: This graph presents the average yearly percentage change in the high birthweight rate for each country (for example, 0.98 is equal to an average 2% annual reduction and 1.02 is equal to a 2% increase). CI: confidence interval.

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FACT SHEET: C5

GESTATIONAL AGE AT BIRTH IN EUROPE, 2015-2019

KEY POINTS

- In the 32 European countries contributing data, the preterm birth rate (percentage of births at 22-36 weeks of gestation) among live births ranged from 5.3% to 11.3%, with a median of 6.9% (interquartile range [IQR] 6.1%, 7.5%). Rates were lowest in the Nordic and Baltic countries.
- Although preterm birth rates tended to decrease from 2015 to 2019 (median difference of -0.2%, IQR -0.4%, 0.0%), rates remained high in some countries and increased in others.
- Early term birth rates (at 37-38 weeks of gestational age) also differed between European countries (median 22.6%, IQR 19.1%, 26.2%), ranging from 17.0% to 42.8%. Post-term birth rates (at or after 42 weeks) also differed, although these were generally low (less than 1% in most countries).
- These differences between countries of Europe raise questions about the impact of population, clinical, and social risk factors and about differences in clinical practice on the gestational age distribution. The origin of these differences and their impact on short and long term child outcomes warrant further research to inform evidence-based policy and practice.

INTRODUCTION

Babies born preterm, defined as birth before 37 completed weeks of gestation (22 weeks+0 days to 36 weeks+6 days), face higher risks of mortality and morbidity at birth and account for about three-quarters of all neonatal deaths. Preterm birth is also associated with health and developmental risks in childhood and adulthood, including impaired motor and cognitive function and metabolic and other chronic diseases. These risks increase as gestational age at birth decreases and very preterm babies born before 32 weeks of gestation are the most vulnerable. Between 10% and 15% of these infants die in infancy and neurodevelopmental impairments are more frequent; for example, cerebral palsy occurs in between 5% and 10% of children born very preterm. However, babies born moderate or late preterm (32 weeks+0 days to 36 weeks+6 days) and to a lesser extent early term births (37 weeks+0 days to 38 weeks+6 days) also have worse health and developmental outcomes than full term (39 weeks+0 days to 41 weeks+6 days) babies.[1,2] At the other extreme of the distribution, post-term birth (42 weeks+0 days and over) confers additional risks of perinatal death and morbidity; most countries have implemented policies to induce birth before 42 weeks of gestation to manage these risks.[3]

The causes of preterm birth are heterogeneous and are often unknown.[4] About two-thirds of preterm births occur because of spontaneous labour or after preterm rupture of membranes or result from a clinical decision to induce labour or carry out a prelabour caesarean section.[4,5] Indicated preterm deliveries are principally due to fetal growth restriction or maternal complications, such as severe preeclampsia. While the survival of babies born preterm improved markedly over past decades, reflecting medical advances and quality initiatives in obstetric and neonatal care, few interventions exist to prevent preterm birth. Increases in the frequency of many risk factors such as older age at childbirth, maternal co-morbidities such as hypertensive disorders, multiple pregnancy, lower and higher body mass index,[5] and the use of indicated deliveries have led to higher preterm birth rates in many countries.[6,7] Importantly, however, this is not the case everywhere and rates have declined in some countries.[8] Understanding these population trends and whether they relate to interventions that target the social and environmental causes of preterm birth such as stress, poverty, smoking, and air pollution could inform new strategies for prevention.[9,10]

METHODS

Definition

Gestational age at birth is compiled in completed weeks, so 32 completed weeks includes births from 32 weeks+0 days to 32 weeks +6 days, with gestational age defined as the best obstetrical estimate.

Preterm births are defined as those occurring before 37 completed weeks of gestation (22 weeks+0 days to 36 weeks+6 days) and subdivided into gestational age at birth in completed weeks of gestation as: 22-31 (extremely and very preterm) and 32-36 (moderate and late preterm). The gestational age distribution is also classified into: 37-38 (early term), 39-41 (full term), and 42 or more (post-term) completed weeks of gestation. Rates are reported as the percentage of live births in a given gestational age category as a percentage of all live births. We report preterm rates overall and among multiple births.

Data availability

32 countries provided data on gestational age at birth, including the United Kingdom (MBRRACE-UK) and its constituents (England [combined with Wales], Northern Ireland, Scotland, and Wales [separately and combined with England]). Results for the United Kingdom and its constituents are presented separately in figures, with MBRRACE-UK data used for reporting of statistics (medians and interquartile ranges [IQR]) and pooled analyses to avoid duplication of data. Hungary did not provide data by pregnancy type and was excluded from that analysis.

Data were extracted primarily from medical birth registers, perinatal databases, or civil registration systems by a representative of each country and then transferred to the coordinating team as anonymised, aggregated data.

In general, there were few missing data, under 4.0% in most countries, with the exception of Spain (15.2% in 2015 and 10.8% in 2019).

Additional methodological considerations

Results are presented for live births (rather than live births and stillbirths), as the recording of live births is more consistent between countries than that of stillbirths (see Fact Sheet C1 on stillbirths) so more useful comparisons can be made.

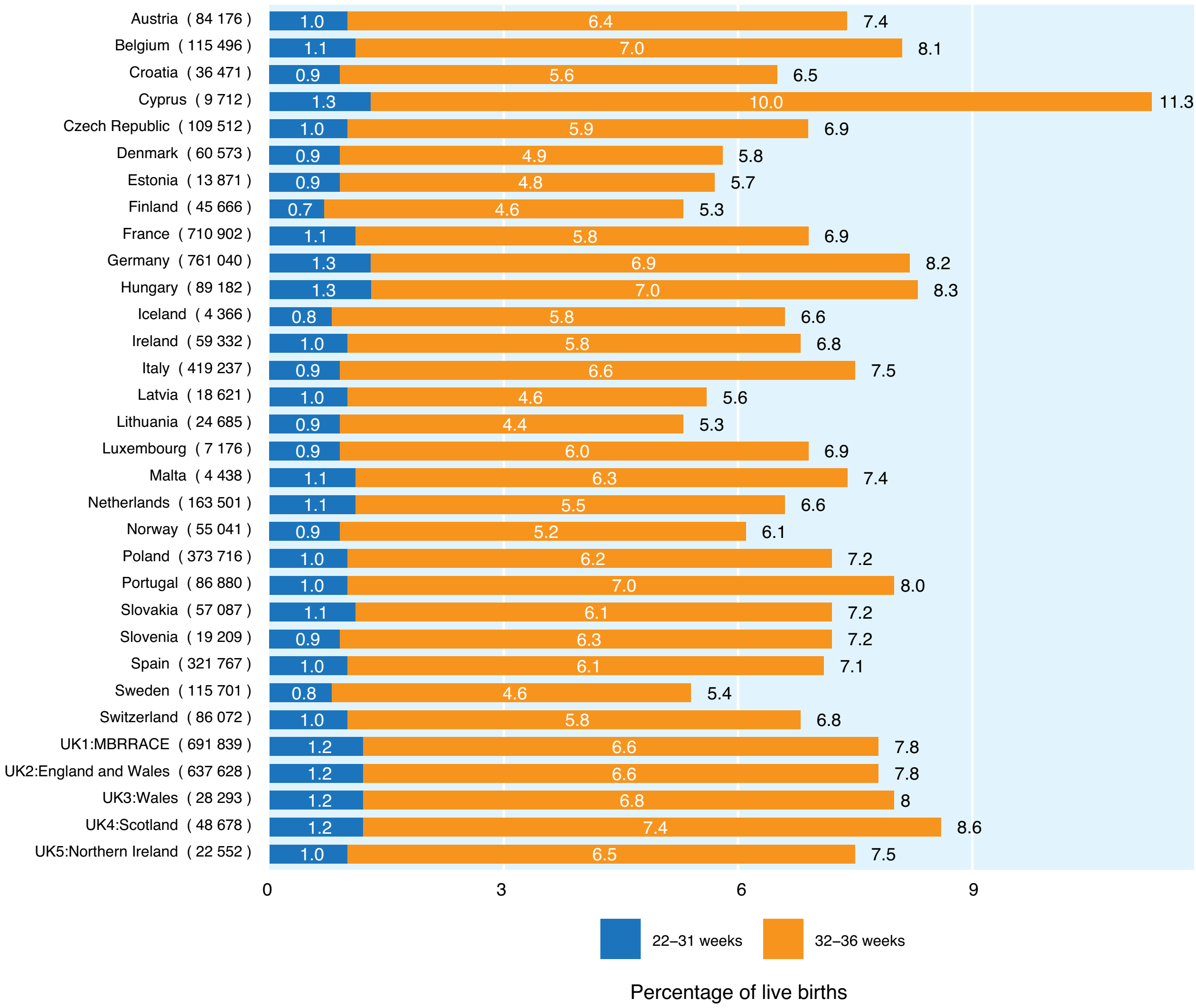
While Euro-Peristat requested gestational age based on the best obstetrical estimate using clinical and ultrasound data, the details of the determination of gestational age may vary between countries and between providers. This may be due to differences in use and timing of first trimester ultrasound for dating pregnancies, although this ultrasound is routinely provided in European countries. Another issue when assessing the preterm birth rate among live births is differences between countries in the recording of very early births as stillbirths or live births. Previous Euro-Peristat analyses have indicated that comparability improves after 24 weeks of gestation, but also that these extremely preterm births constitute a very small proportion of all preterm births.[11]

RESULTS

Gestational age at birth in Europe in 2019

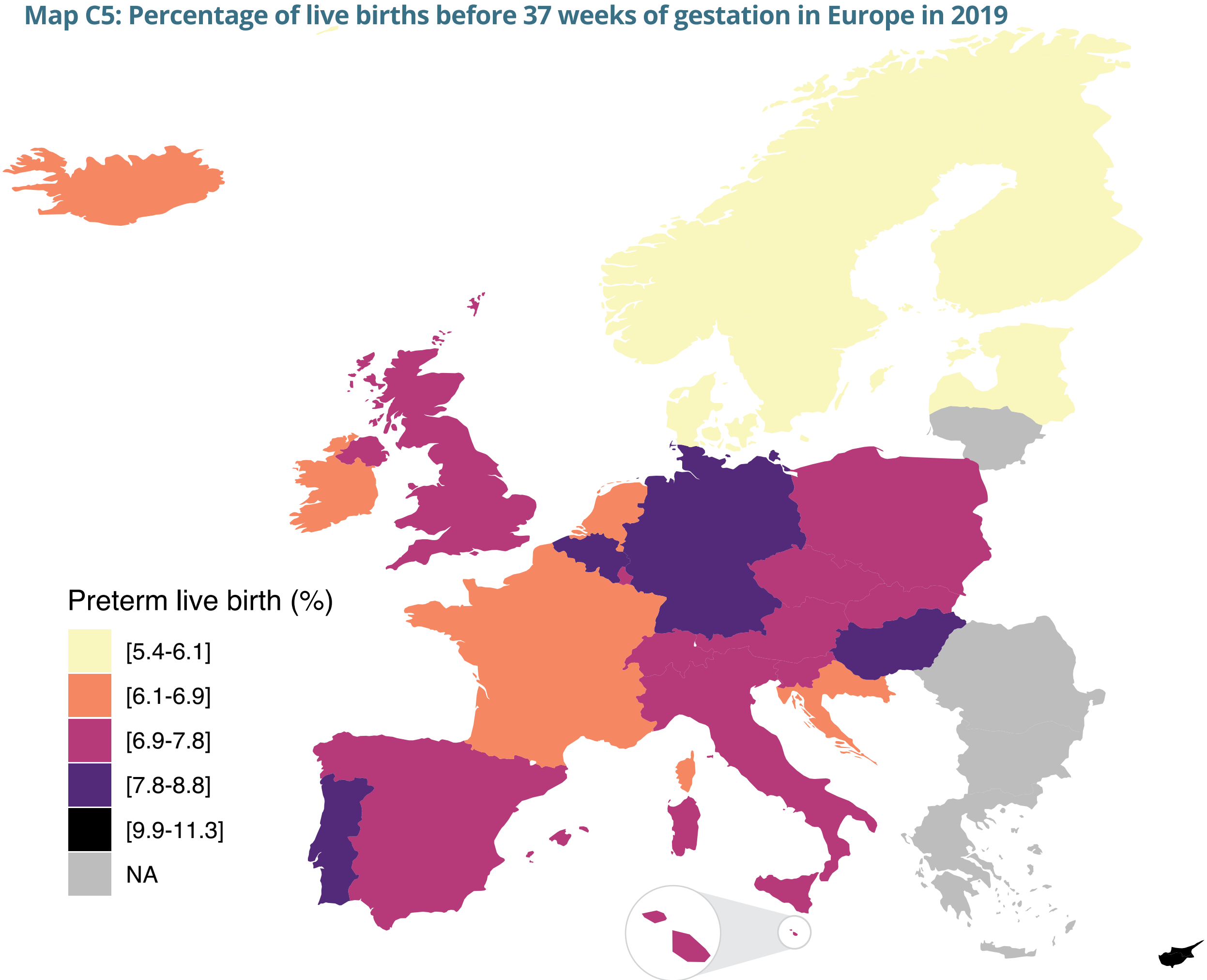
The preterm birth rate before 37 weeks of gestation varied between the 32 countries contributing data, from 5.3% in Lithuania and Finland to 11.3% in Cyprus (Figure C5.1; Map C5). The median rate was 6.9% (IQR 6.1%, 7.5%). In general, preterm birth rates were lowest in Nordic and Baltic countries and were less than 6.0% in Lithuania, Finland, Sweden, Latvia, Estonia, and Denmark. Higher rates of 8.0% or more were noted in Wales, Portugal, Belgium, Germany, Hungary, Scotland, and Cyprus. Very preterm birth rates (22-31 weeks of gestation) were low across Europe, ranging from 0.7% to 1.3%, with similar geographical patterns.

Figure C5.1: Percentages of extremely and very preterm (22-31 weeks of gestation) and moderate and late preterm (32-36 weeks of gestation) live births in Europe in 2019



NOTE: Percentage of all preterm births (<37 weeks) reported following bar. Number of live births with data for gestational age in parentheses after country name.

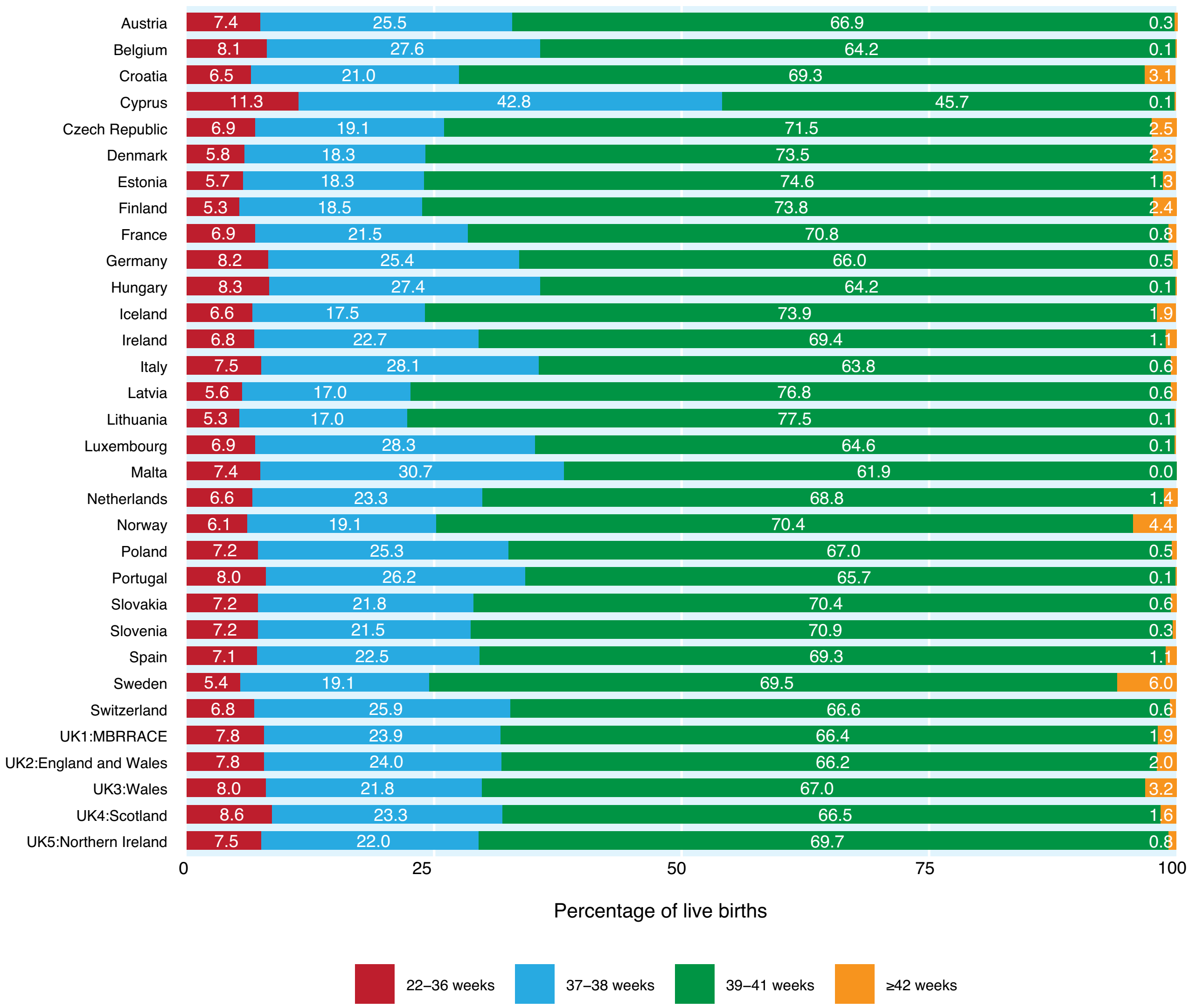
Map C5: Percentage of live births before 37 weeks of gestation in Europe in 2019



The median early term birth rate in European countries was 22.6% (IQR 19.1%, 26.2%; Figure C5.2). However, the range was much wider, from 17.0% (Latvia and Lithuania) to 42.8% (Cyprus). Countries with low preterm birth rates generally had lower early term birth rates, although countries with higher preterm birth rates did not necessarily have higher early term birth rates (eg, Wales, Germany, and Scotland).

Post-term births accounted for less than 1.0% of births in the majority of European countries (median 0.6%, IQR 0.1%, 1.9%), with the lowest rates of 0.1% or less observed in Malta, Belgium, Cyprus, Portugal, Luxembourg, Hungary, and Lithuania. The highest rates were found in Sweden (6.0%) and Norway (4.4%), with relatively high rates of more than 2.0% also found in Denmark, Finland, the Czech Republic, Croatia, and Wales.

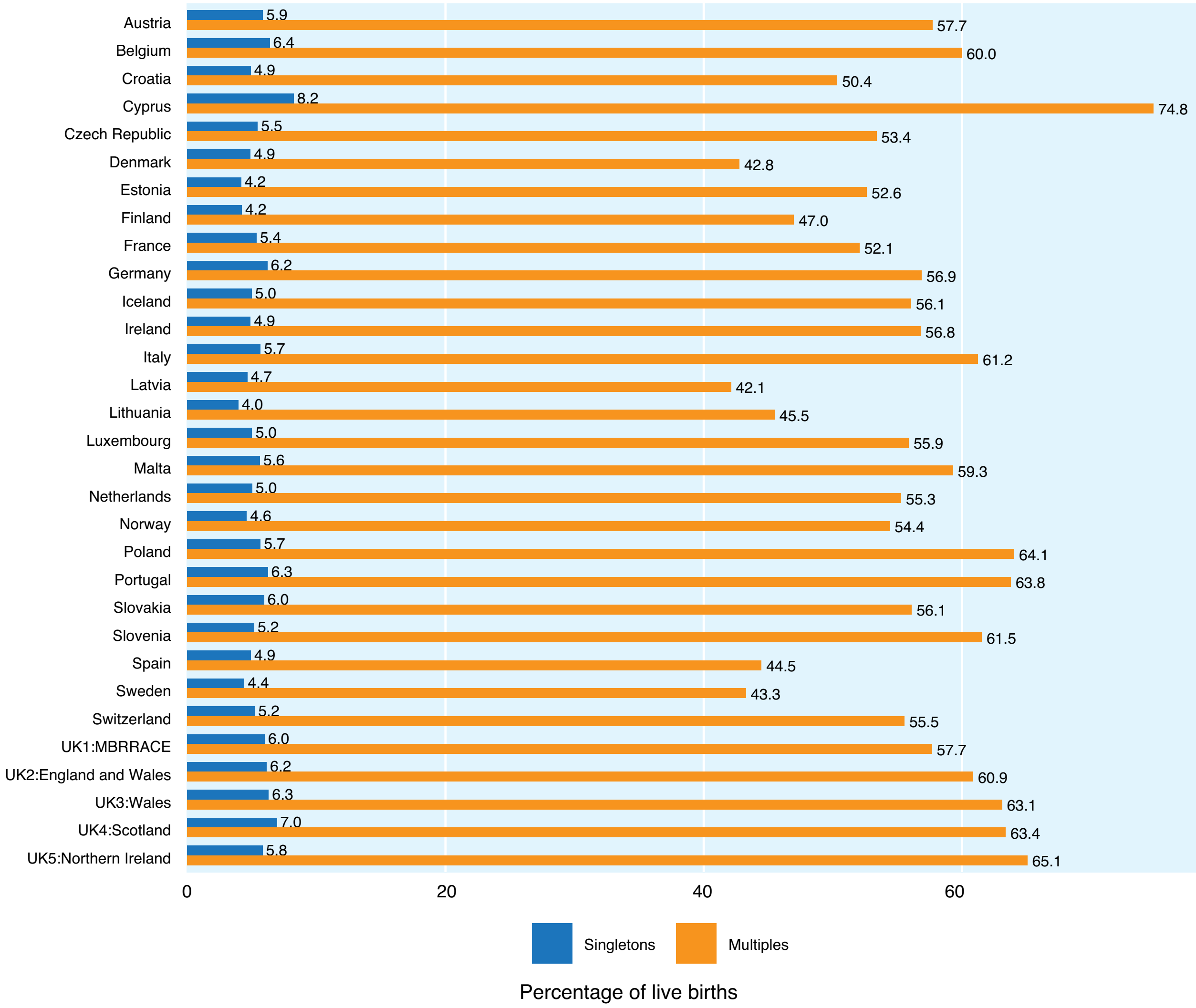
Figure C5.2: Distribution of preterm (22-36 weeks of gestation), early term (37-38 weeks of gestation), full term (39-41 weeks of gestation), and post-term (at or after 42 weeks of gestation) live births in Europe in 2019



Preterm birth by multiplicity in Europe in 2019

Preterm birth rates were significantly higher in multiple pregnancies than in singleton pregnancies (Figure C5.3), with over half of multiple births before 37 weeks of gestation in most countries.

Figure C5.3: Percentage of live preterm births by multiplicity (singleton or multiple) in Europe in 2019



Changes in gestational age at birth in Europe, 2015-2019

In most countries in Europe, preterm birth rates decreased from 2015 to 2019 (median difference of -0.2%, IQR -0.4%, 0.0%; Figure C5.4). The greatest decreases were found in Cyprus (-0.7%) and the Czech Republic (-0.7%) and the greatest increases in Wales (+0.7%) and Malta (+0.6%). Greater year-to-year variation was noted in some smaller countries (Luxembourg and Malta; Figure C5.5).

Figure C5.4: Percentage of live preterm births in Europe in 2015 and 2019

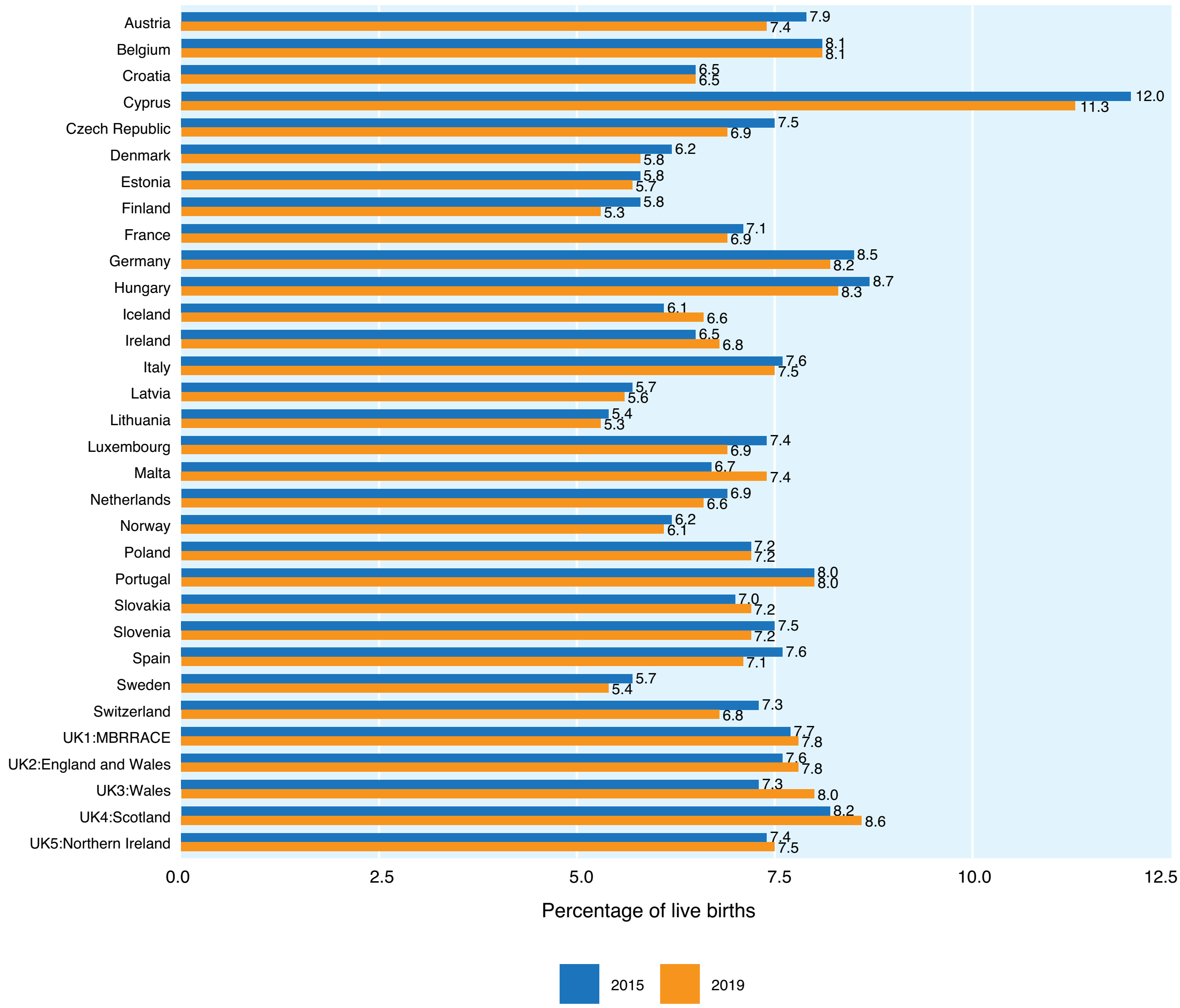
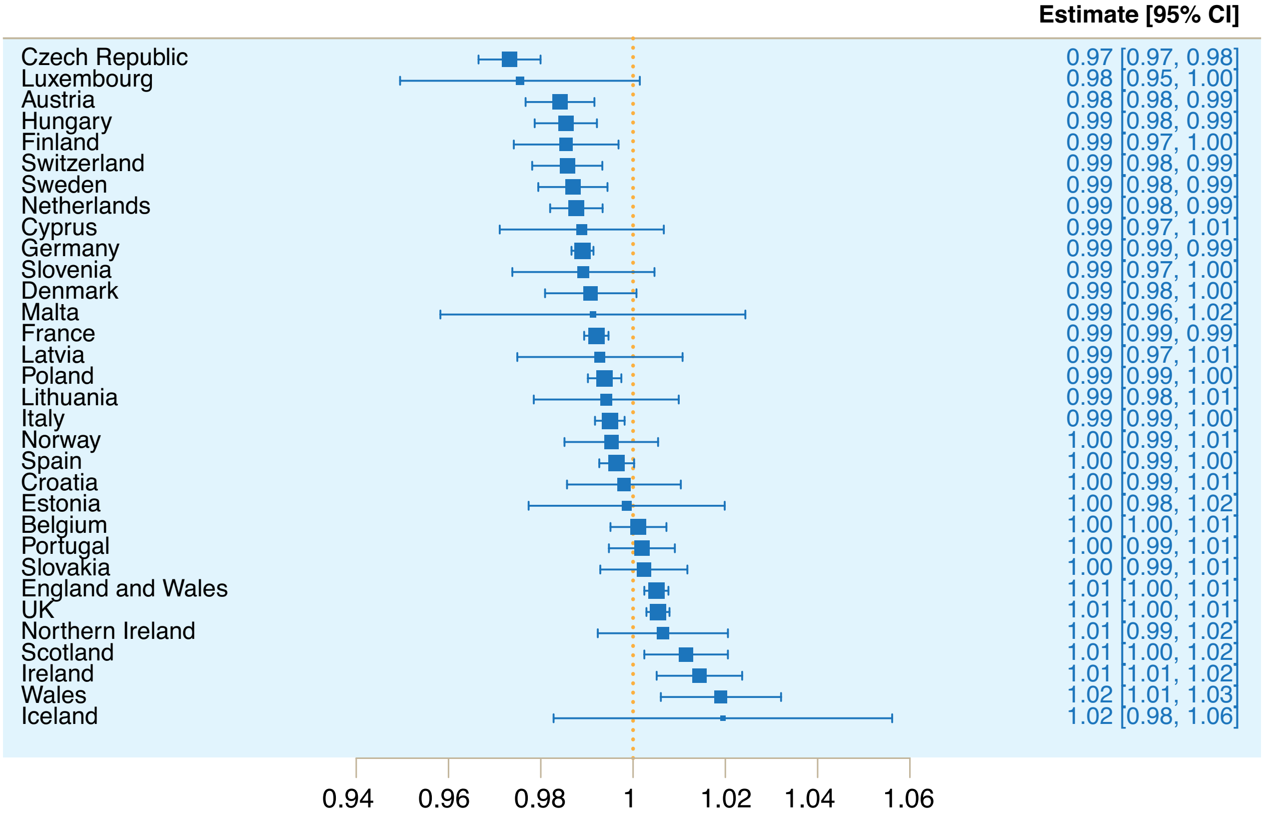


Figure C5.5: Percentage of live preterm births by year from 2015 to 2019 in Europe

NOTE: Countries are sorted by the average rate from 2015 to 2019.

The pooled measure of average yearly change in preterm birth rates in Europe from 2015 to 2019 was 0.99 (95% confidence interval 0.99, 1.00; based on a random effects model; Figure C5.6), indicating that overall preterm birth rates in Europe decreased slightly. Differences between countries in changes were very marked, however (I^2=91.3%; $p<0.01$).

Figure C5.6: Change in the percentage of live preterm births in Europe from 2015 to 2019 (yearly change and 95% confidence interval)



NOTE: This graph presents the average yearly percentage change in the preterm birth rate for each country (for example, 0.98 is equal to an average 2% annual reduction and 1.02 is equal to a 2% increase). CI: confidence interval.

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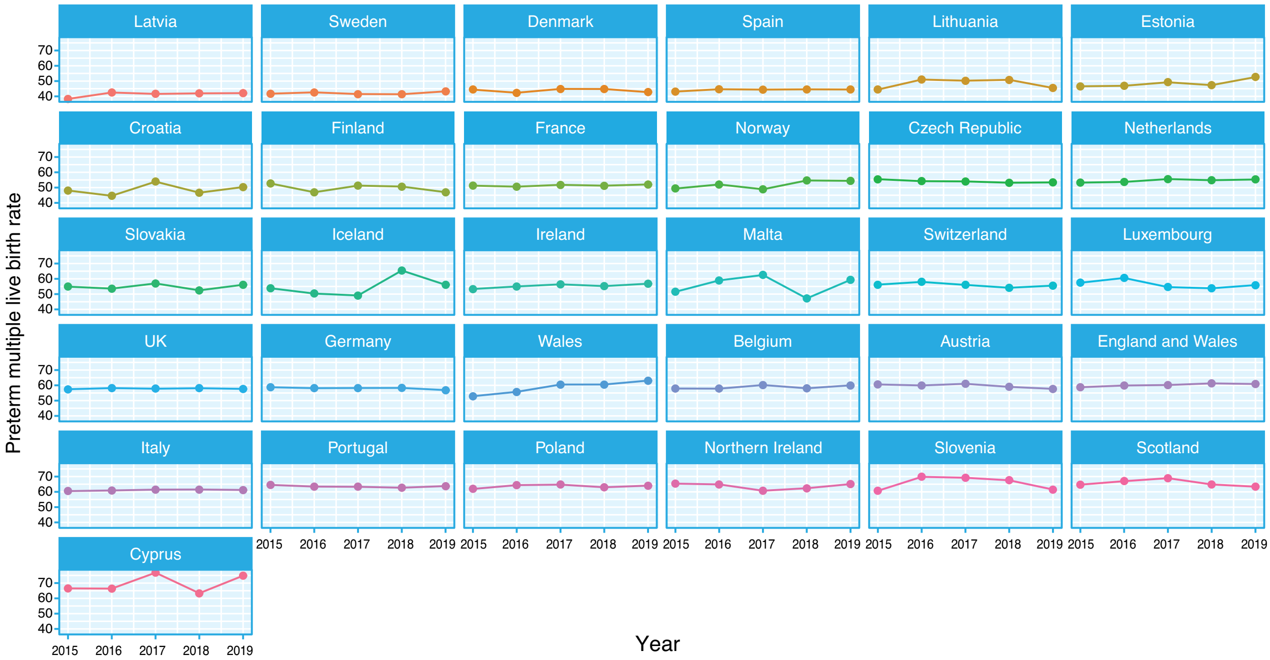
Greater year-to-year variation in preterm birth rates among multiples was also noted in some smaller countries (Luxembourg, Malta, Iceland, Cyprus; Figure C5.7).

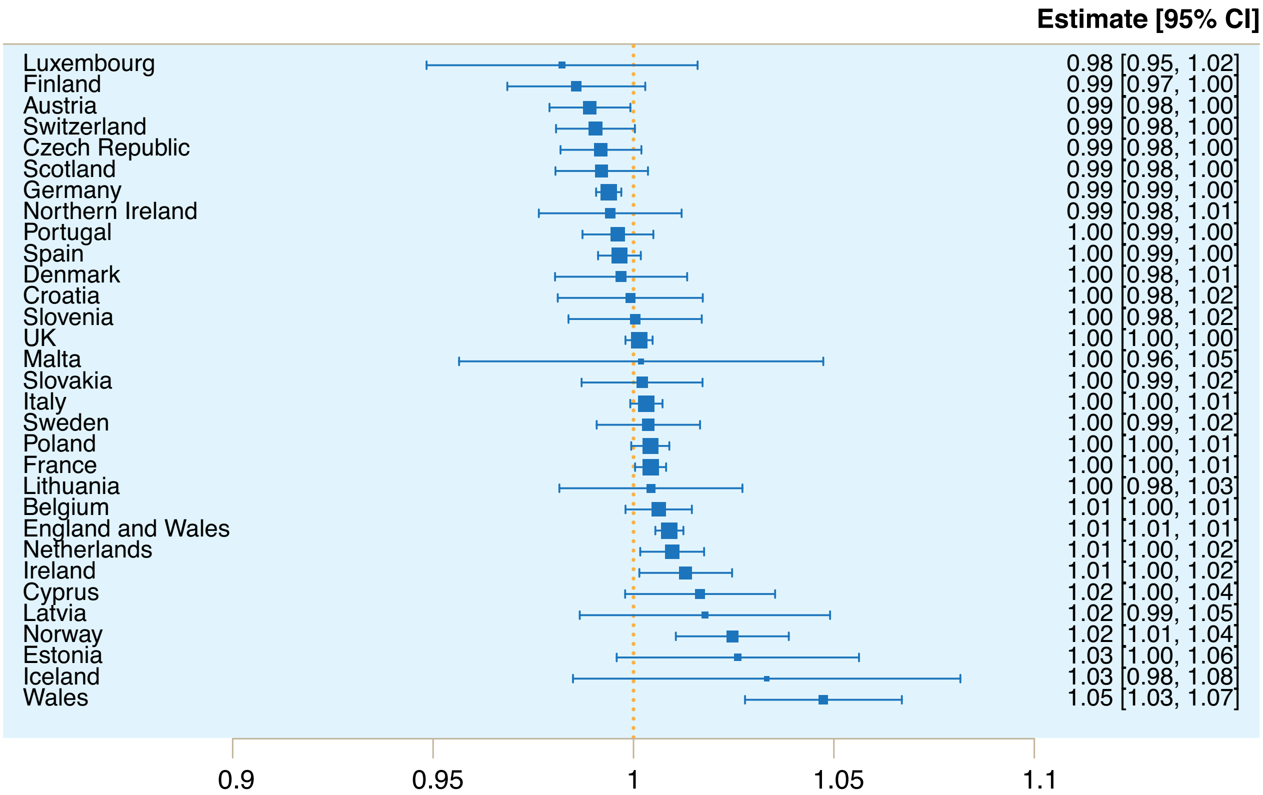
Figure C5.7: Percentage of multiple live preterm births by year from 2015 to 2019 in Europe



NOTE: Countries are sorted by the average rate from 2015 to 2019. Hungary did not provide data by multiplicity.

The pooled measure of average yearly change in rates of preterm birth among multiple births over countries of Europe from 2015 to 2019 was 1.00 (95% confidence interval 1.00, 1.00; based on a random effects model; Figure C5.8), indicating that overall preterm birth rates among multiple births in Europe were stable. Differences between countries in changes were significant (I^2=72.3%; p<0.01) however.

Figure C5.8: Change in the percentage of multiple live preterm births in Europe from 2015 to 2019 (yearly change and 95% confidence interval)



NOTE: This graph presents the average yearly percentage change in the preterm birth rate for each country (for example, 0.98 is equal to an average 2% annual reduction and 1.02 is equal to a 2% increase). CI: confidence interval.

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FACT SHEET: C7

MULTIPLE BIRTHS IN EUROPE, 2015-2019

KEY POINTS

- Monitoring rates of twin and higher order pregnancies is important because they have a higher incidence of adverse outcomes. Many countries promote single embryo transfer policies to limit multiple pregnancies from assisted reproductive technologies (ART).
- Across Europe, changing maternal characteristics, namely increased maternal age and use of ART, led to higher multiple birth rates over the past few decades.
- In the countries contributing data, twin pregnancies represented between 11.9 and 23.6 births per 1000 women delivering a live birth or stillbirth. The median twin rate was 15.6 per 1000 (interquartile range (IQR) 13.2, 17.1) women giving birth and the median triplets or higher order rate was 0.2 per 1000 (IQR 0.1, 0.3).
- Overall, there were decreasing rates from 2015 to 2019 (median difference between 2015 and 2019 of -1.1 per 1000, IQR -1.8, 0.1), potentially reflecting more widespread adoption of single embryo transfer policies.
- These decreases in multiple pregnancy rates could contribute to improved maternal and newborn health and particularly to lower prevalence of preterm birth and low birth weight because of the excess risks of these complications for multiples.

INTRODUCTION

Compared to singleton pregnancies, multiple pregnancies (twins, triplets, or higher order multiples) pose greater risks for mothers and babies. Women with multiple pregnancies are more likely to develop complications, such as preeclampsia and gestational diabetes, and give birth by caesarean section than women with singleton pregnancies. Preterm birth is also much more common, over 50% in multiples versus 6-7% in singletons,[1] and risks are higher for other adverse perinatal and childhood outcomes, including stillbirth, neonatal and infant mortality, low birth weight, congenital conditions, and cerebral palsy.[2,3]

Multiple birth rates and trends vary widely across Europe.[4] This may be due to differences in maternal age, as older women are more likely to have multiple gestations and to use assisted reproductive technologies (ART), and in ART policies, for example, related to the number of embryos transferred.[5-7] In 2018, for the first time, single embryo transfers represented the majority of in vitro fertilization (IVF)/intracytoplasmic sperm injection (ICSI) procedures in Europe, reflecting policy changes in many countries.[7] The reductions in multiple pregnancies after ART can affect overall multiple birth rates, as multiple gestations following ART procedures accounted for between 18.3% and 29.0% of all multiple deliveries in several European countries evaluated in 2006.[6]

METHODS

Definitions

Pregnancies were classified as singleton, twin, or triplet and higher-order. Rates are presented based on the number of women having a live birth or stillbirth and calculated as the number of women with twin or triplet and higher-order births per 1000 women giving birth to one or more fetuses.

Because data were originally collected by live births and stillbirths (number of babies), the total number of twins and triplets or higher order were divided (by 2 for twins and by 3 for twins and higher-order births) to approximate the number of women giving birth.

Data availability

32 countries provided data on multiple births, including the United Kingdom (MBRRACE-UK) and its constituents (England [combined with Wales], Northern Ireland, Scotland, and Wales [separately and combined with England]). Results for the United Kingdom and its constituents are presented separately in figures, with MBRRACE-UK data used for reporting of statistics (medians and interquartile ranges [IQR]) and pooled analyses to avoid duplicate data. Italy does not differentiate between twins, triplets and higher-order pregnancies so we are only able to provide an estimate of the overall multiple rate.

Data were collected primarily from medical birth registers, perinatal databases, or civil registration systems by a representative of each country and then transferred to the coordinating team as anonymous, aggregate data. Overall, missing data were minimal (<1.0%), except in Wales (14.4%).

Additional methodological notes

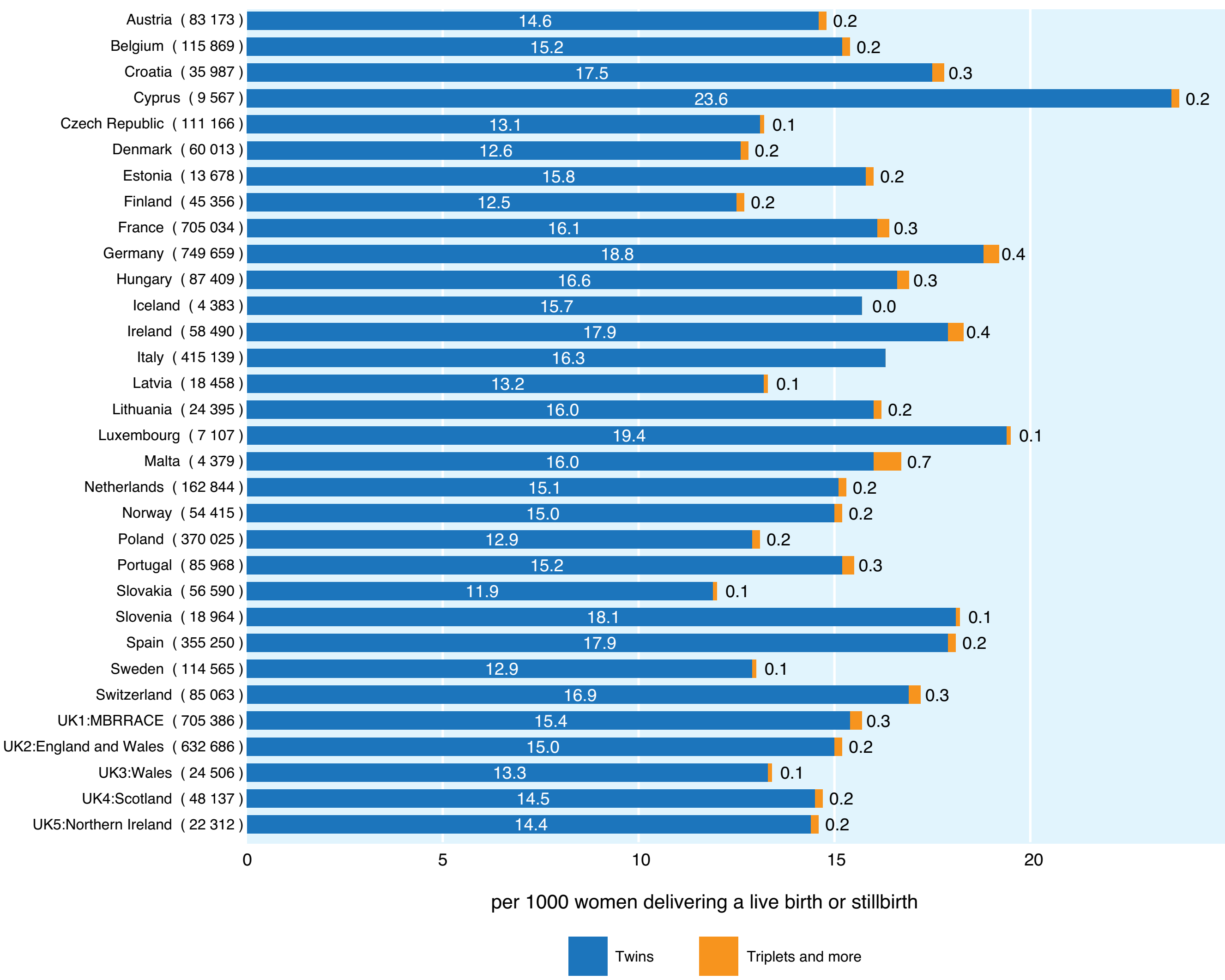
Our estimates and those of other data sources may differ depending on whether births or pregnant women are the denominator for the calculation of rates. Further, our approach to approximating the number of women may lead to small differences with other published rates. Other considerations include differences in laws and in practices related to which pregnancies are registered and specifically how multiple births are registered in cases where one or more baby dies before birth or registration. Greater variation is also to be expected in countries with smaller populations (Cyprus, Estonia, Iceland, Luxembourg, and Malta).

RESULTS

Multiple birth rates in Europe in 2019

In 2019, multiple births rates varied in the 32 countries providing data (Figure C7.1). The median twin rate was 15.6 per 1000 (IQR 13.2, 17.1) women giving birth and the median triplets or higher order rate was 0.2 per 1000 (IQR 0.1, 0.3). For twins, the lowest rates (less than 13.0 per 1000) were observed in Denmark, Finland, Poland, Slovakia, and Sweden, while the highest rates were observed in Cyprus (23.6 per 1000), Luxembourg (19.4 per 1000), Germany (18.8 per 1000), and Slovenia (18.1 per 1000). For triplets or higher order gestations, lowest rates were around 0.1 per 1000 women giving birth, while highest rates were 0.4 per 1000 and over.

Figure C7.1: Twin and triplet or higher order birth rates per 1000 women delivering a live birth or stillbirth in Europe in 2019

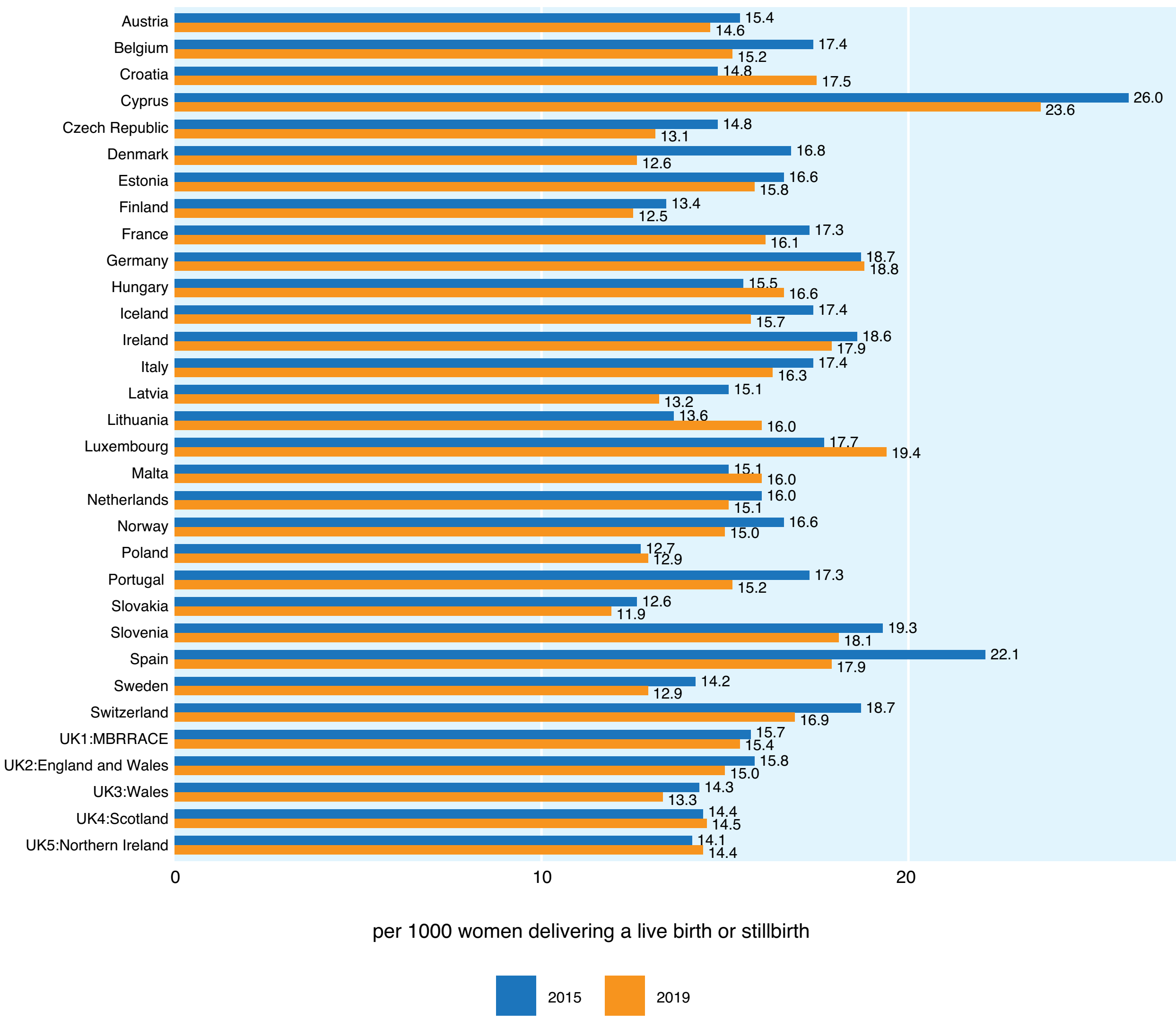


NOTE: Rate for Italy combines twin and triplet or more births.

Changes in multiple birth rates in Europe, 2015-2019

In most European countries, twin births rates decreased from 2015 to 2019 (Figure C7.2), with a median decrease of -1.1 per 1000 women delivering a live birth or stillbirth between 2015 and 2019 (IQR -1.8, 0.1). The greatest decreases (more than 4.0 per 1000 women) were observed in Denmark and Spain. In the countries where increases were observed, the greatest increases (more than 1.0 per 1000 women) were noted in Croatia, Lithuania, and Luxembourg.

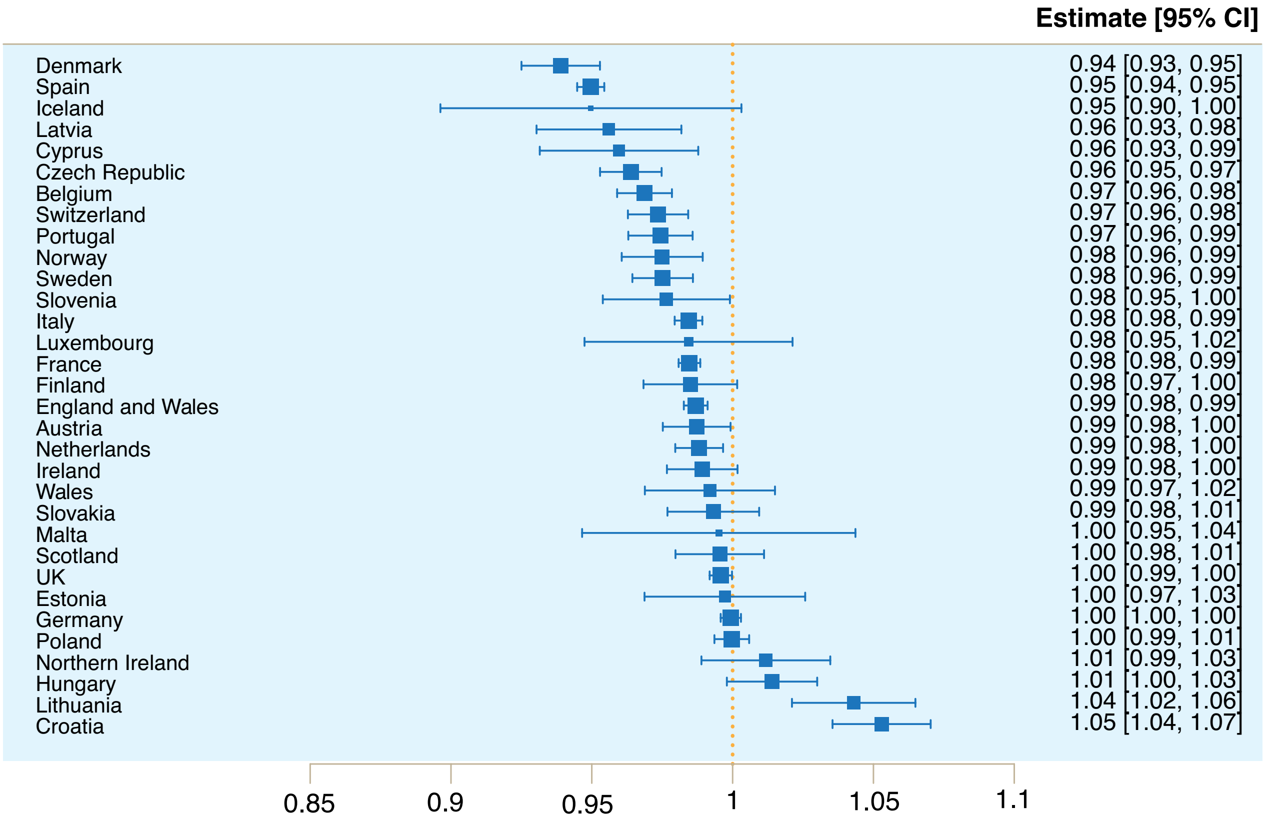
Figure C7.2: Twin birth rates per 1000 women delivering a live birth or stillbirth in Europe in 2015 and 2019



NOTE: Rate for Italy combines twin and triplet or more births.

The pooled measure of annual change in multiple birth rates across Europe from 2015 to 2019 was 0.98 (95% confidence interval 0.98, 0.99; based on a random effects model; Figure C7.3), indicating that overall multiple birth rates in Europe decreased. However, changes in rates were very different between countries (I^2=96.6%; $p<0.01$).

Figure C7.3: Change in multiple birth rates per 1000 women delivering a live birth or stillbirth in Europe from 2015 to 2019 (yearly change and 95% confidence interval)



NOTE: This graph presents the average yearly percentage change in the multiple birth rate for each country (for example, 0.98 is equal to an average 2% annual reduction and 1.02 is equal to a 2% increase). CI: confidence interval.

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FACT SHEET: C8

MATERNAL AGE AT DELIVERY IN EUROPE, 2015-2019

KEY POINTS

- Younger and older maternal ages are associated with worse pregnancy outcomes.
- The percentage of women under than 20 years old giving birth in Europe is low, with a median of 1.7% in 2019 (interquartile range [IQR] 1.1%, 2.3%), and declined over the period 2015 to 2019 (median change in the percentage over this period of -0.4%, IQR -0.6%, -0.2%).
- Over 20.0% of births in most European countries occurred among women aged 35 years and older and 4.0% to women 40 years and older. Countries with higher percentages of childbearing women 35 years and older are Luxembourg (31.6%), Portugal (33.2%), Italy (34.4%), Ireland (39.4%), and Spain (40.0%).
- The percentage of older women aged 35 years is increasing, with a median increase of 2.6% between 2015 and 2019 (IQR 1.6%, 3.7%).
- Understanding these changes in maternal age at delivery and their impact on perinatal health is important for developing policies to inform childbearing choices and providing optimal care during pregnancy tailored to women's needs.

INTRODUCTION

The risks of poor pregnancy outcomes, including preterm birth and low birth weight,[1-4] are higher for younger (generally defined as under 20 years of age) and older (generally defined as 35 years of age or older) women giving birth. Risks of poor child health outcomes (eg, birth defects, cerebral palsy) are also increased for both age groups, though risks for some disorders are specific to younger (eg, asthma, neurodevelopment/behavioural and academic problems) or older (eg, cancer, autism spectrum disorder, chromosomal aberrations, type 1 diabetes) maternal ages.[1]

For younger women giving birth, higher risks are related to both biological and sociological factors, as younger women are more likely to have lower socioeconomic status and to be exposed to less favorable social conditions.[1,2,4] Conversely, older childbearing women are more likely to be of higher socioeconomic status and education-level and to have chosen to delay childbearing.[1,5] Delayed childbearing brings additional biological risks related to infertility and thus the need for assisted reproductive technology,[3] which in turn increases risks of certain outcomes, including multiple births (see Fact Sheet C7 on multiple births).

In Europe, maternal age has increased over the past several decades,[1,5,6] although there are wide geographic variations in the maternal age distribution and trends over time.[6] These differences need to be considered when comparing perinatal health indicators between countries. Given the importance of maternal age to pregnancy outcomes, education is important to promote informed choices regarding timing of pregnancies and policies are needed to support women and families with young children and to provide optimal care during pregnancy for the increasing population of older mothers.

METHODS

Definition

For this report, age was classified as <20, 20-24, 25-34, 35-39 and ≥40 years. Maternal age in years at delivery for these categories is reported as the percentage of the total number of women delivering a live born or stillborn baby. Results focus on the younger (less than 20 years old) and older (classified as 35 years old and over and 40 years old and over) mothers, given the higher risk for adverse perinatal outcomes in these groups.

Data availability

31 countries provided data on maternal age, including the United Kingdom (MBRRACE-UK) and its constituents (England [combined with Wales], Northern Ireland, Scotland, and Wales [separately and combined with England]). Results for the United Kingdom and its constituents are presented separately in figures, with MBRRACE-UK data used for reporting of statistics (medians and interquartile ranges [IQR]) and pooled analyses to avoid duplicate data.

Data were collected primarily from medical birth registers, perinatal databases, or civil registration systems by a representative of each country and then transferred to the coordinating team as anonymous, aggregate data.

Additional methodological considerations

Because the new Euro-Peristat protocol collects data on births, the number of women is estimated by retaining only one multiple (dividing by two for twins and by three for triplets). This can cause slight discrepancies with previous Euro-Peristat reports and national data depending on whether women or babies are the denominator and policies for reporting multiple births. Maternal age at delivery below 12 and above 59 years was considered implausible and excluded from analysis.

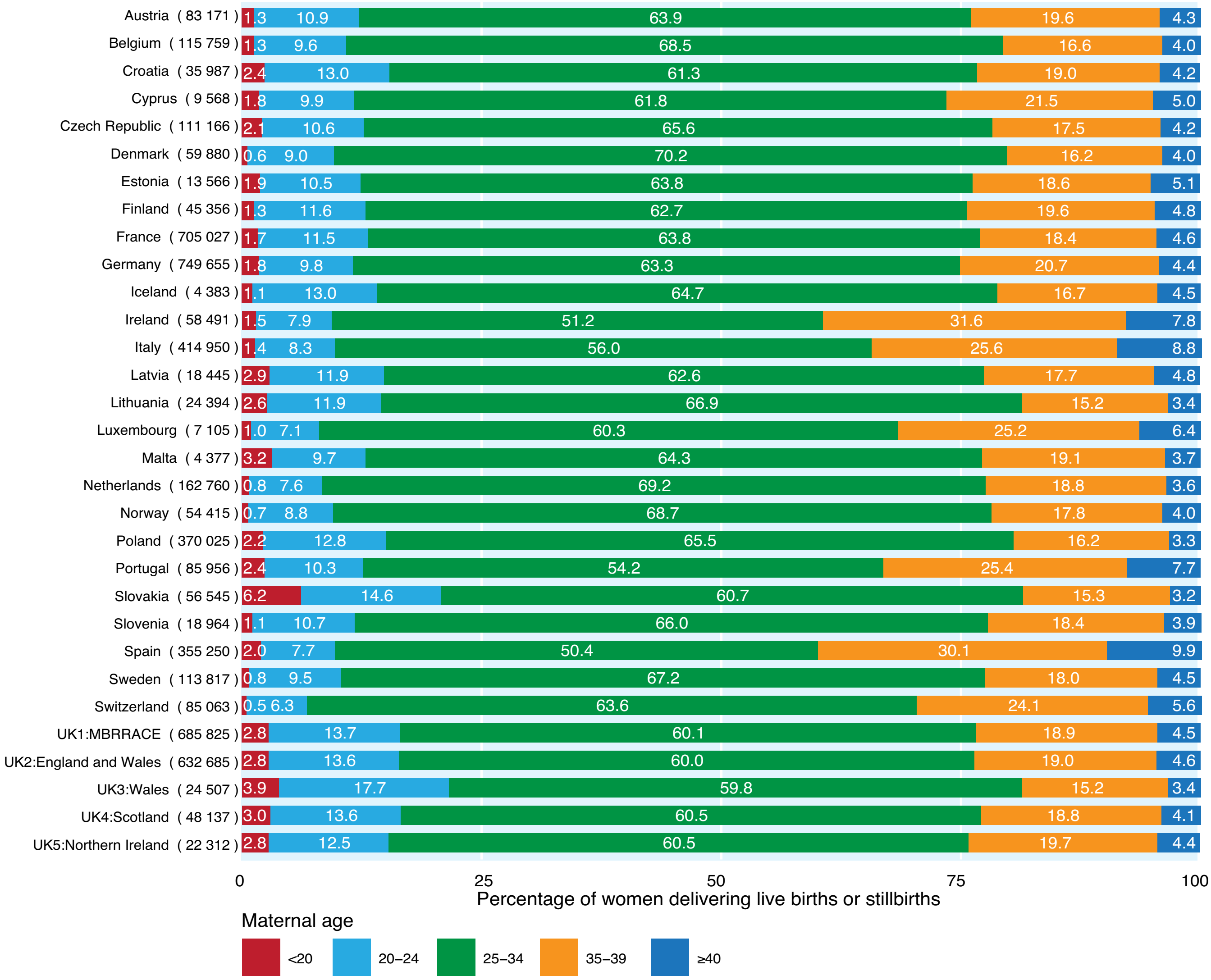
RESULTS

Maternal age at delivery in Europe in 2019

Few women gave birth at less than 20 years of age (median 1.7%, IQR 1.1%, 2.3%; Figure C8.1; Map C8.1). Countries with the lowest percentages (less than 1.0%) of young mothers were Switzerland, Denmark, Norway, the Netherlands, and Sweden, while the highest percentages (more than 3.0%) were observed in Malta, Wales, and Slovakia.

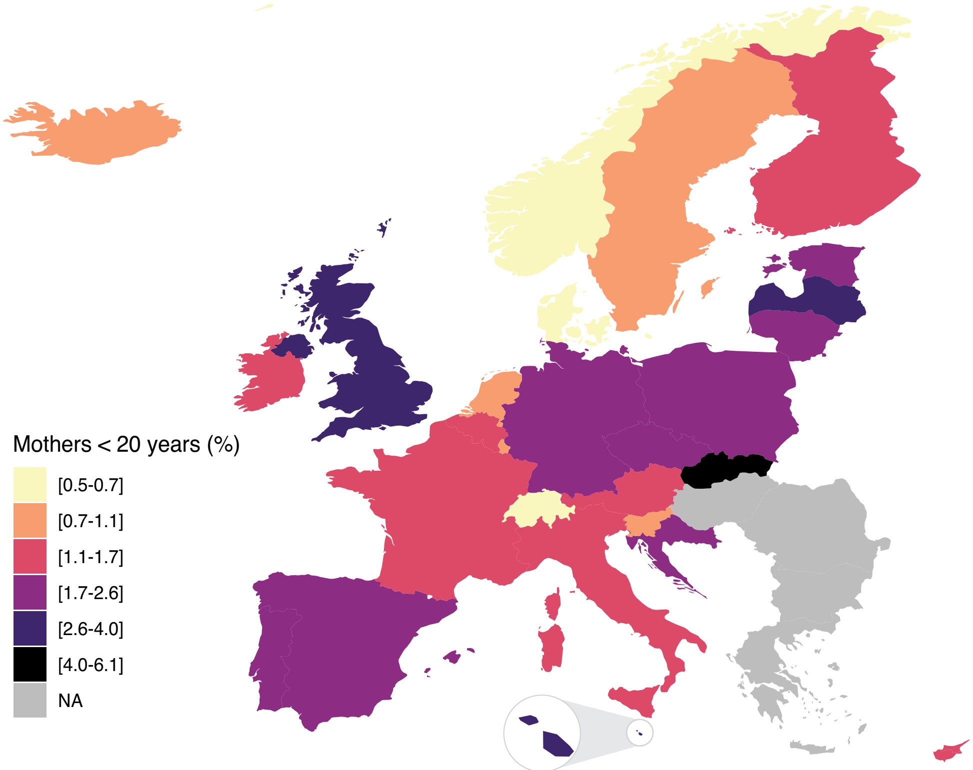
Conversely, the percentages of older mothers (35 years or more) varied widely across Europe (Map C8.2). Countries with the lowest percentages (18.6%-19.5%) of older mothers were Slovakia, Lithuania, Poland, and Wales, while the highest percentages (more than 30.0%) were observed in Spain (40.0%), Ireland (39.4%), Italy (34.4%), Portugal (33.2%), and Luxembourg (31.6%). These countries also had higher percentages of mothers 40 years or more (Spain: 9.9%; Italy: 8.8%; Ireland: 7.8%; Portugal: 7.7%; Luxembourg: 6.4%) compared to other European countries (median 4.5%, IQR 4.0%, 5.1%; Map C8.3).

Figure C8.1: Distribution of maternal age at delivery among women delivering a live born or stillborn baby in Europe in 2019

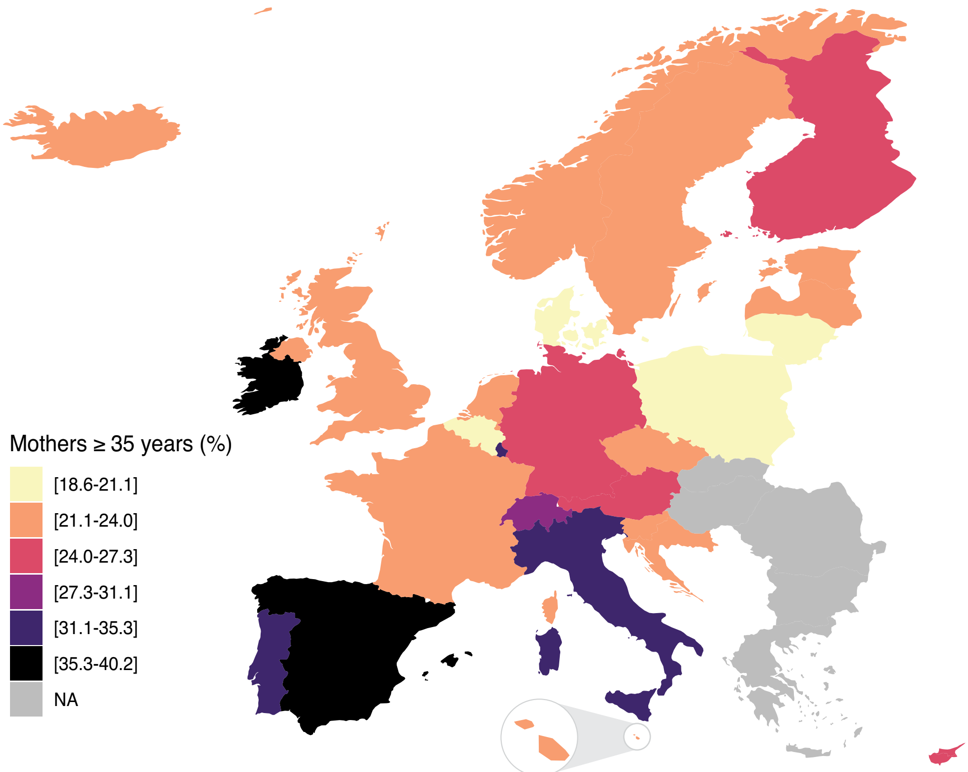


NOTE: Numbers in parentheses are women delivering live births or stillbirths.

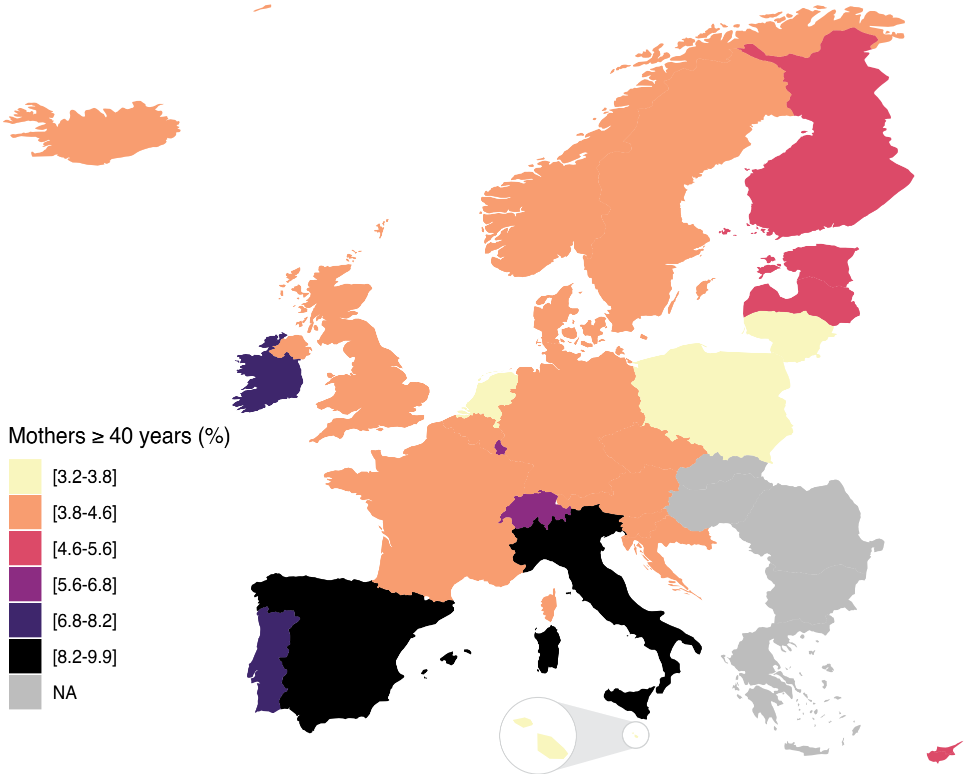
Map C8.1: Mothers aged less than 20 years at delivery as a percentage of all women delivering a live born or stillborn baby in Europe in 2019



Map C8.2: Mothers aged 35 years or more at delivery as a percentage of all women delivering a live born or stillborn baby in Europe in 2019



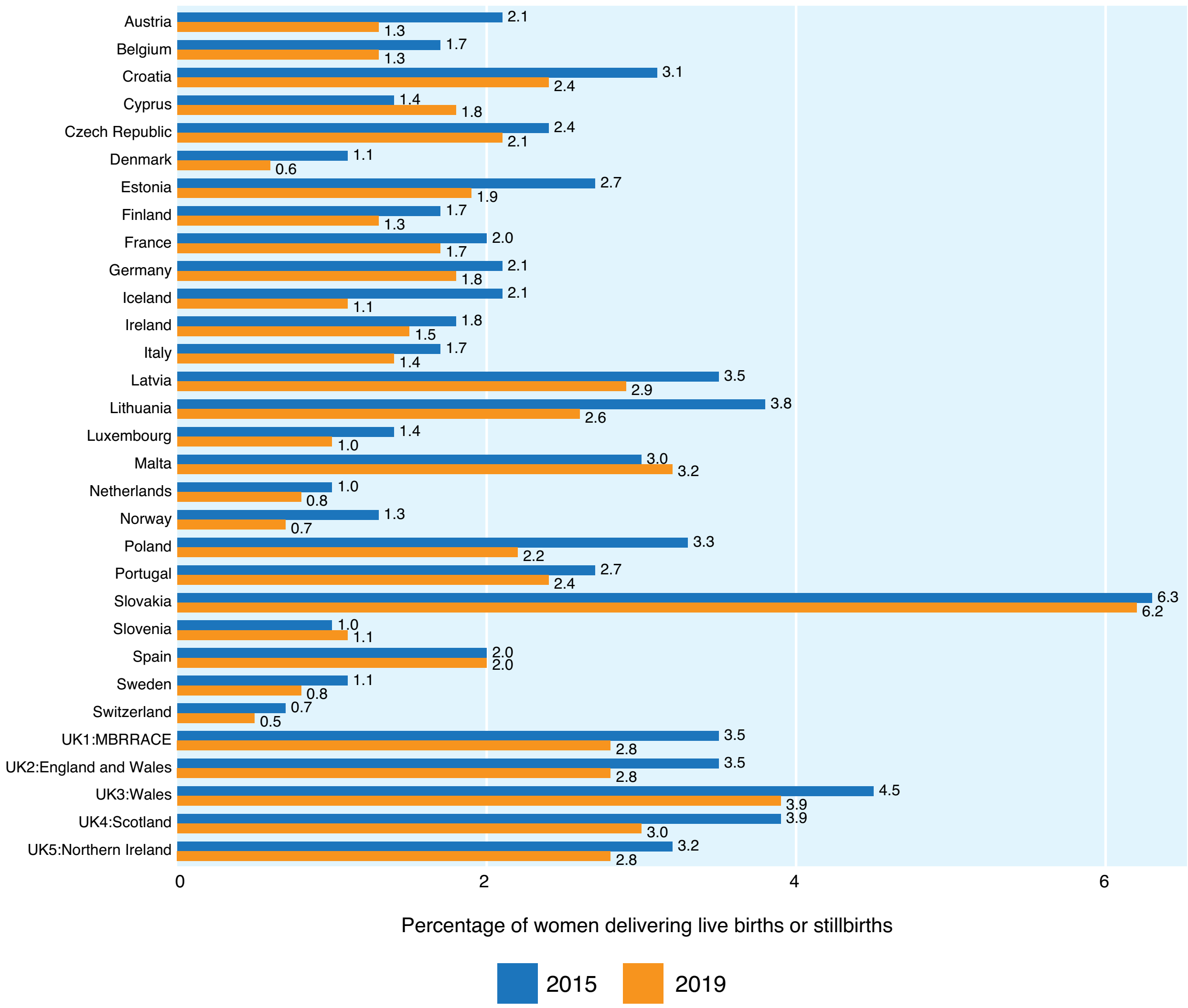
Map C8.3: Mothers aged 40 years or more at delivery as a percentage of all women delivering a live born or stillborn baby in Europe in 2019



Changes in maternal age at delivery in Europe, 2015-2019

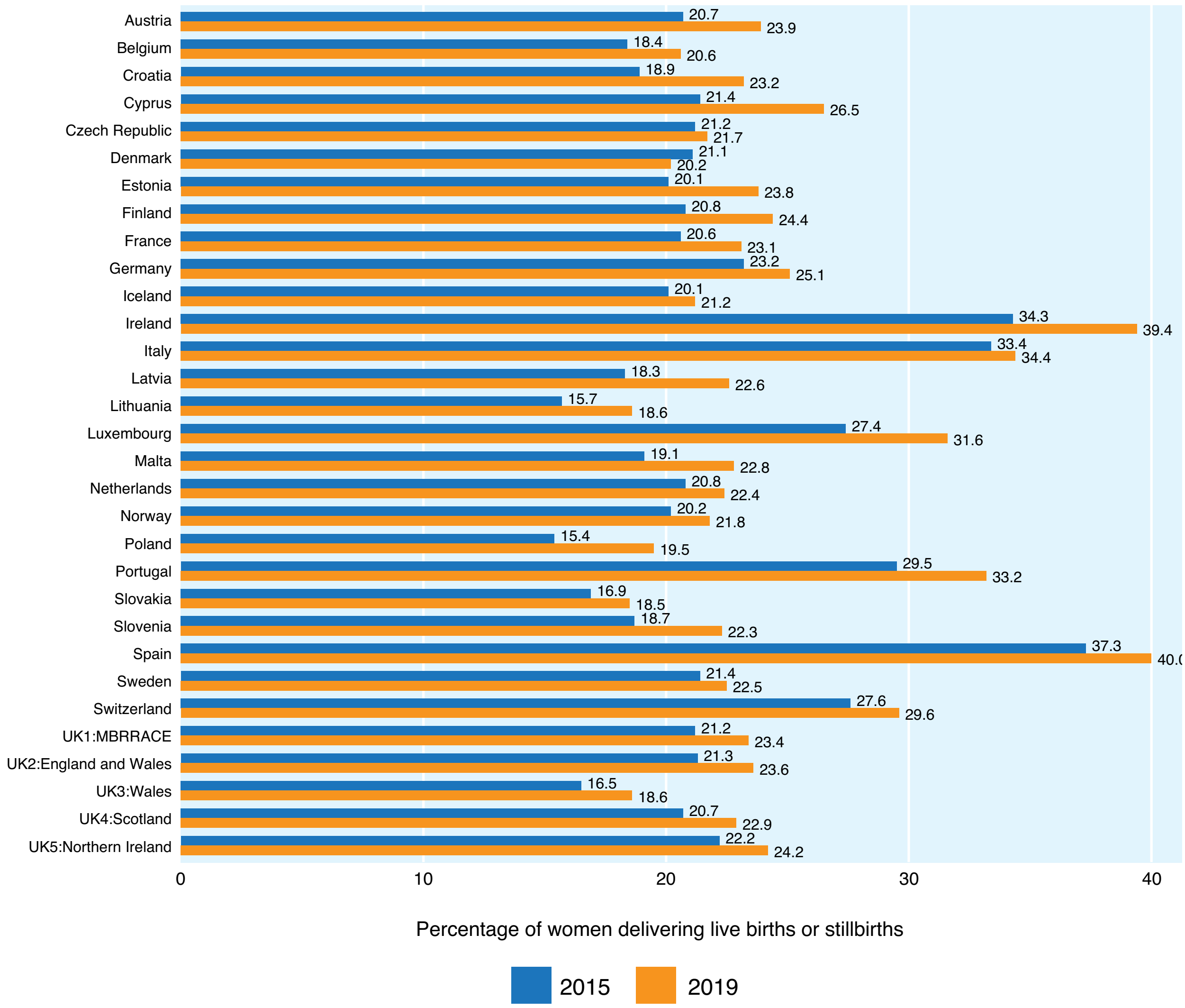
With the exceptions of Cyprus, Malta, and Slovenia, the percentage of young mothers (less than 20 years of age) giving birth in Europe decreased (median -0.4%, IQR -0.6%, -0.2%), with the greatest decreases (more than 1.0%) observed in Lithuania and Poland (Figure C8.2).

Figure C8.2: Mothers aged less than 20 years at delivery as a percentage of all women delivering a live born or stillborn baby in Europe in 2015 and 2019



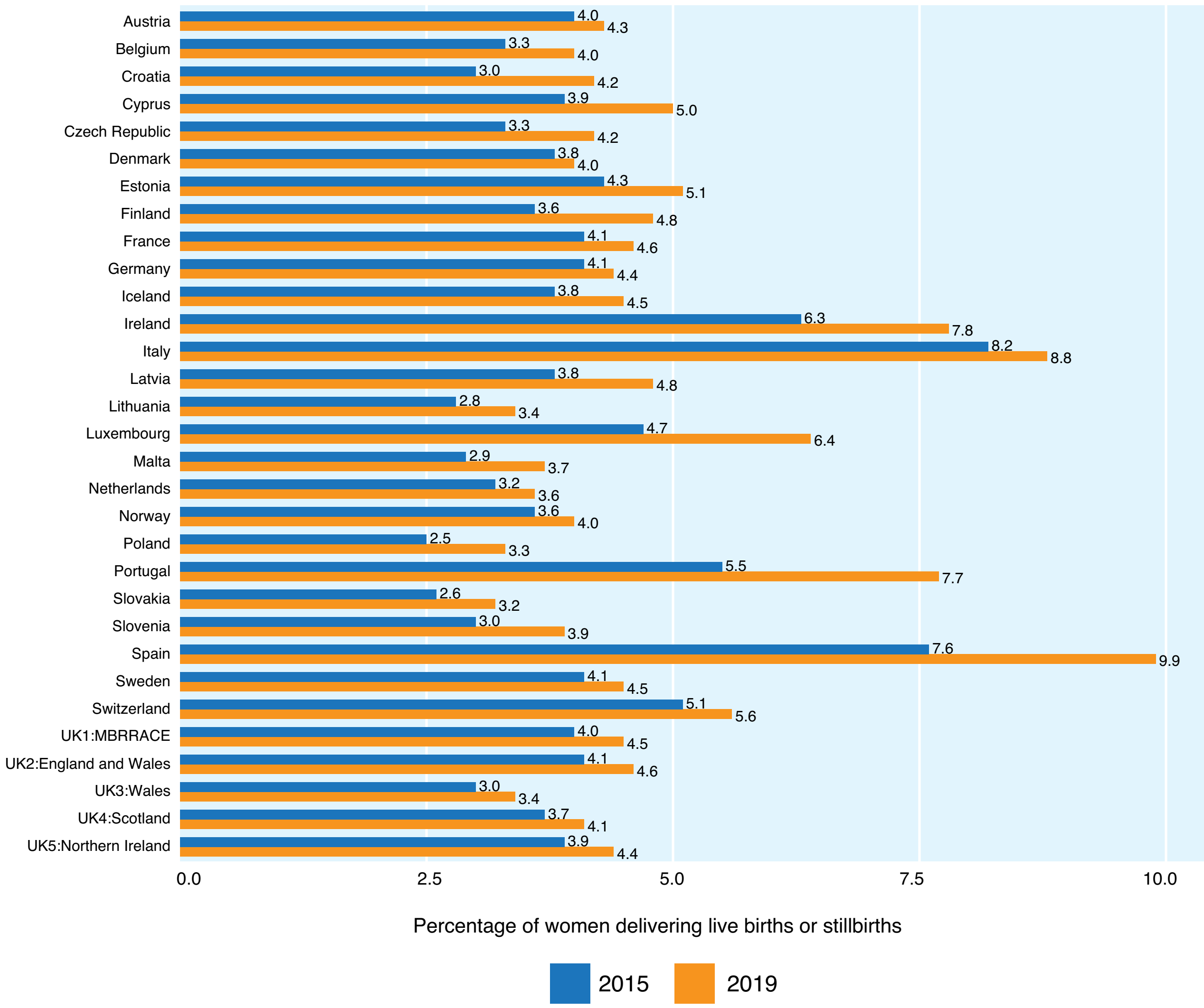
With the exception of Denmark (-0.9%), the percentage of mothers aged 35 years or more increased across Europe (median 2.6%, IQR 1.6%, 3.7%; Figure C8.3), with the greatest increases (more than 5.0%) observed in Cyprus and Ireland.

Figure C8.3: Mothers aged 35 years or more at delivery as a percentage of all women delivering a live born or stillborn baby in Europe in 2015 and 2019



This trend was also observed in all countries for mothers aged 40 years or more at delivery (median 0.7%, IQR 0.5%, 1.0%; Figure C8.4), with the greatest increases (2.3%) observed in Portugal and Spain.

Figure C8.4: Mothers aged 40 years or more at delivery as a percentage of all women delivering a live born or stillborn baby in Europe in 2015 and 2019



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FACT SHEET: C9

MATERNAL PARITY IN EUROPE, 2015-2019

KEY POINTS

- Pregnancy complications are more frequent for women having their first birth and for women with many previous births (more than 4 or 5); therefore parity should be considered when comparing national maternal and newborn outcomes.
- In the 31 countries reporting data, parity varies, with women having their first birth (primiparas) representing less than a third (31.3%) to more than half of women (53.3%) giving birth in different countries.
- In general, the percentage of primiparous women among women giving birth in Europe is decreasing or stable (median difference between 2015 and 2019 of -0.3%, interquartile range -2.3% to 0.6%).
- In the context of the relatively low fertility and delayed childbearing in Europe, the higher risks associated with primiparity, especially among women at older ages, are pertinent for public health policies and interventions.

INTRODUCTION

Parity, the number of deliveries a woman has experienced, is associated with adverse outcomes. Higher risks of certain adverse outcomes have been reported for women having their first birth (primiparas) or with many previous births (grand-multiparas; more than 4 or 5, depending on the definition used).[1-4] For example, compared with women who have had at least one previous birth (multiparas), primiparas have increased risks of pregnancy complications (eg, preeclampsia/ hypertensive disorders, diabetes), preterm birth, low birth weight/small for gestational age, and perinatal death.[4-6] Potential risks of multiparity are less clear, though some studies have found increased risks of preterm birth,[2] and this group may present with risk factors (eg, higher body mass index [BMI] and previous intrauterine death) requiring additional attention in antenatal care.[3]

Primiparity is associated with increased utilisation of antenatal care[7] and improved folic acid adherence.[8] Further, in the context of delayed childbearing as observed in low fertility European countries in the past several decades, primiparity is associated with increased maternal age and higher education and socioeconomic status,[9] though the relationship between education and parity has become less apparent in some countries in the last decade.[10] Grand-multiparity is associated with lower social status and education, decreased healthcare access, and increased maternal age.[3]

As reported in the previous Euro-Peristat Report, the percentage of primiparas among women giving birth in Europe is relatively high, but generally decreased or remained unchanged from 2010 to 2015. To promote healthy pregnancies and help women and their families in achieving their desired family size, supportive family policies, gender equality, and income protection are needed.[10]

METHODS

Definition

Maternal parity was classified as primiparous (0 previous live births or stillbirths) or multiparous (1 or more previous live births or stillbirths). The results presented focus on the percentage of primiparous women of all women with known parity having a live birth or a stillbirth in each country.

Data availability

31 countries provided data on parity, including the United Kingdom (MBRRACE-UK) and its constituents (England [combined with Wales], Northern Ireland, Scotland, and Wales [separately and combined with England]). Results for the United Kingdom and its constituents are presented separately in figures, with MBRRACE-UK data used preferentially for reporting of statistics (medians and interquartile ranges [IQR]) and pooled analyses to avoid duplicate data.

Data were collected primarily from medical birth registers, perinatal databases, or civil registration systems by a representative of each country and then transferred to the coordinating team as anonymous, aggregate data.

The United Kingdom (MBRRACE-UK) did not provided data for 2015, so individual constituent data were used for comparing change over time (England and Wales combined, Northern Ireland, Scotland). Data were not available for Poland for 2018 and were only partially available for 2017. For most countries, missing data for 2019 were low (less than 5.0%), except in Wales (10.1%). Missing data were also high for Hungary (14.3%), Croatia (27.7%) and Wales (26.1%) in 2015.

Additional methodological considerations

Some differences in how parity is determined should be noted. Civil registration systems may not include previous stillbirths for determining parity and different countries may use varying gestational age cutoffs to define what is included as a birth (starting at 20 weeks, 22 weeks, or 24 weeks of gestation). While the impact of these factors is likely minimal for overall findings, minor differences can occur when comparing our results with other data sources. Additionally, in some health information systems, multiples are considered as two births, whereas in others, only one delivery is counted, which could cause slight discrepancies in analyses considering the number of previous deliveries in multiparas.

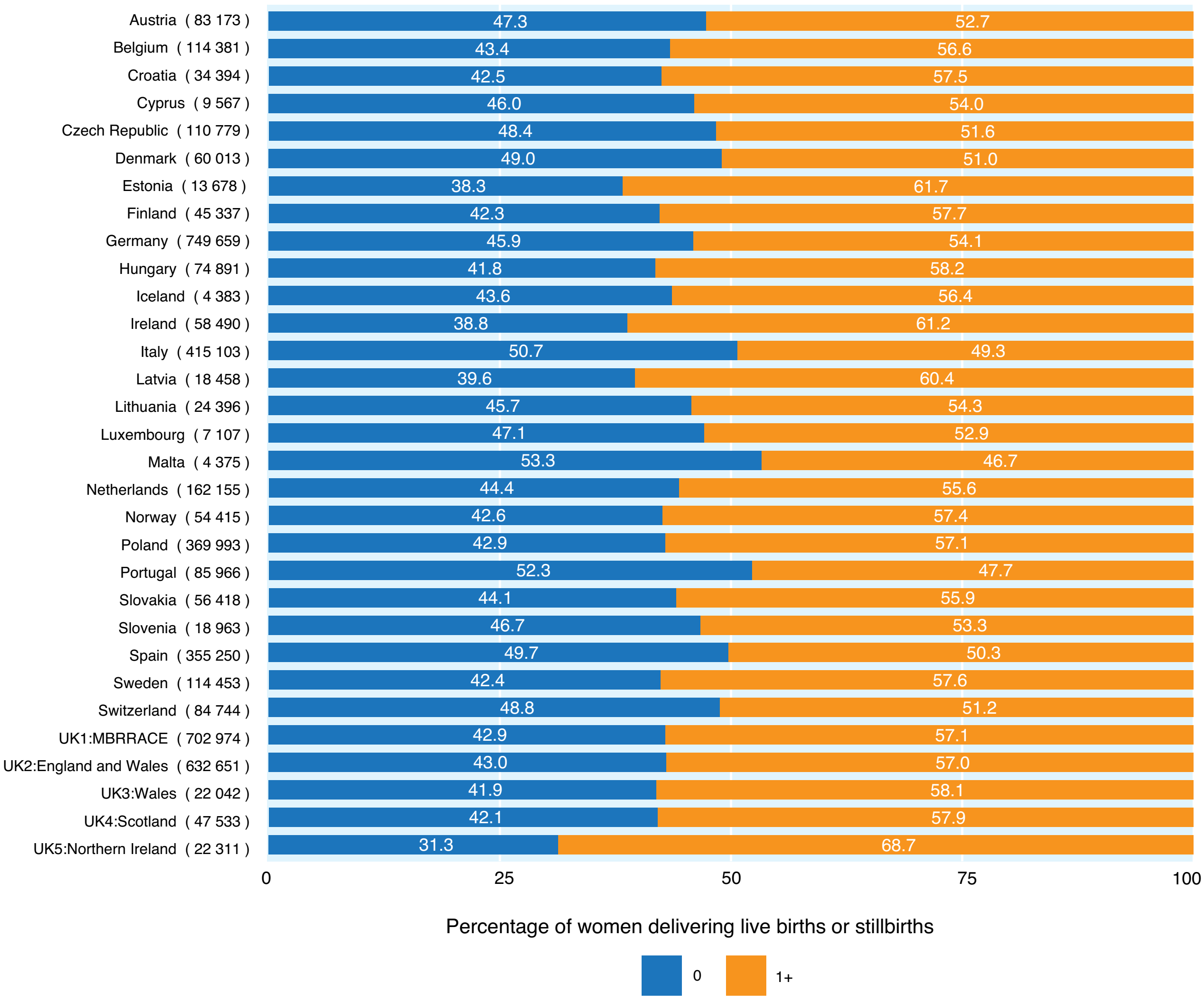
Because the new Euro-Peristat protocol collects data on births, the number of women are estimated by retaining only one multiple (dividing by two for twins and by three for triplets). This can cause slight discrepancies with previous Euro-Peristat reports and national data depending on whether women or babies are the denominator and policies for reporting multiple births (for example in instances where one of the multiples does not meet the definition of live birth).

RESULTS

Maternal parity at delivery in Europe in 2019

In the 31 countries reporting data in 2019, the percentage of primiparous women ranged from 31.3% to 53.3% (Figure C9.1) with a median of 44.2% (IQR: 42.4%, 48.4%). The lowest percentages (less than 40.0%) were in Northern Ireland, Estonia, Ireland, and Latvia. In contrast, the majority of women giving birth in Malta (53.3%), Portugal (52.3%), and Italy (50.7%) were primiparas.

Figure C9.1: Distribution of maternal parity (primiparas or multiparas) among women delivering a live born or a stillborn baby in Europe in 2019

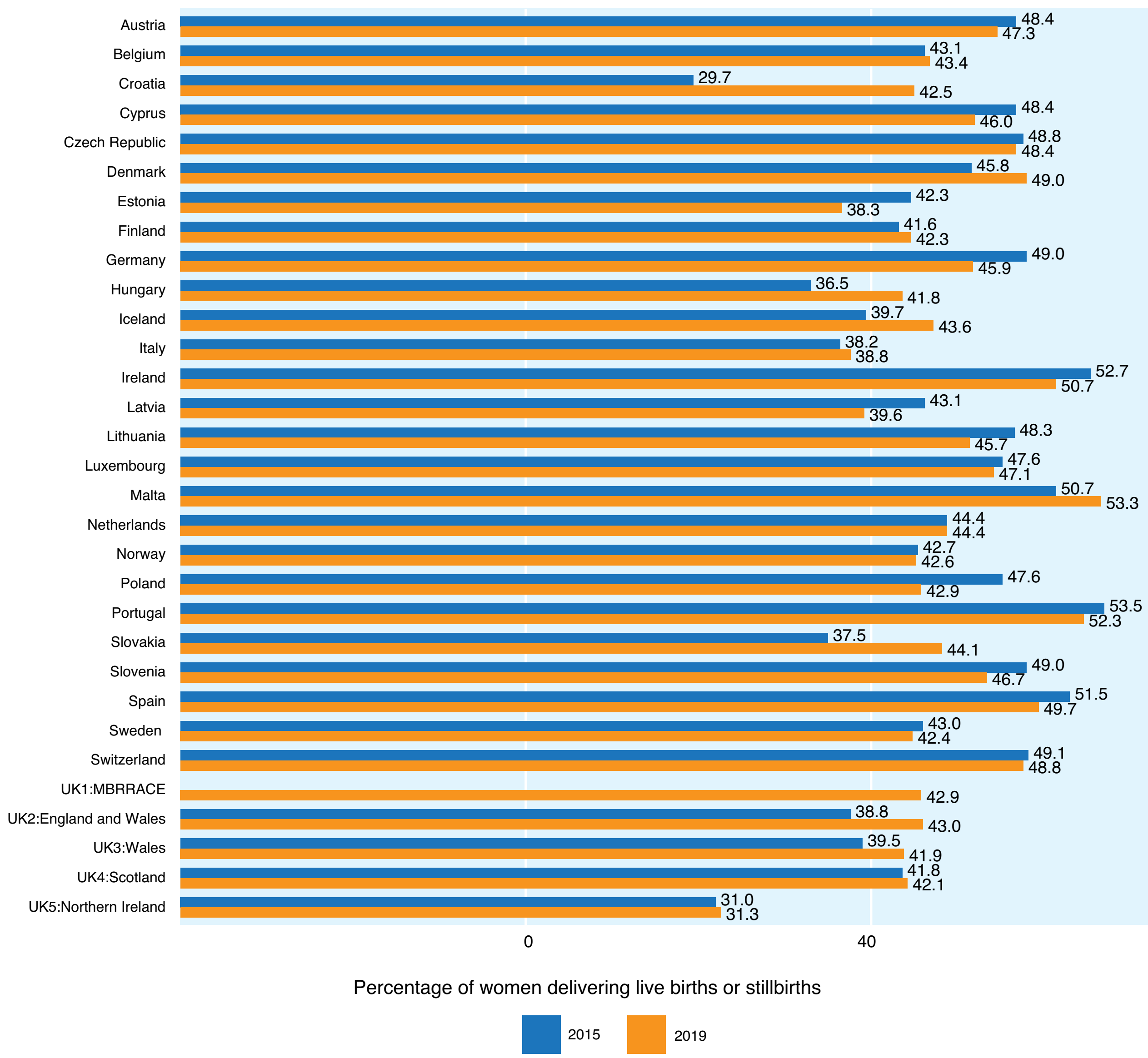


NOTE: Numbers in parentheses are women delivering live births or stillbirths.

Changes in maternal parity at delivery in Europe, 2015-2019

From 2015 to 2019, in the countries with data available for both years, the percentage of primiparas tended to decrease or remain stable (Figure C9.2), with a median decrease of -0.3% between 2015 and 2019 (IQR -2.3%, 0.6%). The greatest decreases (-3.0% or more) in were in Poland, Estonia, Latvia, and Germany, while the greatest increases (+3.0% or more) were in Denmark, Iceland, England and Wales, and Slovakia.

Figure C9.2: Percentage of primiparas among women delivering a live born or a stillborn baby in Europe in 2015 and 2019



NOTE: MBRRACE-UK only reported data on parity for 2019.

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FACT SHEET: C10

MODE OF DELIVERY IN EUROPE, 2015-2019

KEY POINTS

- In 2019, in the 28 countries that provided data on this indicator, the median caesarean section (CS) rate was 26.0% (interquartile range [IQR] 20.3%, 32.7%) with a range from 16.4% to 53.1%, while the median instrumental vaginal delivery rate was 6.1% (IQR 3.1%, 9.8%), with a range from 1.4% to 13.8%.
- CS rates were generally lower in northern Europe and higher in southern and central Europe.
- Trends in CS varied, with some countries having increasing and others having stable or decreasing rates.
- Differences in mode of delivery across Europe point to variations in clinical practice which can have important implications for maternal and child health. Evidence-based policies tailored to the local context are vital to ensure appropriate use of obstetric interventions and minimise adverse outcomes related to unnecessary CSs. Detailed evaluation of indications for CS using the Robson classification system in countries with high versus low CS rates might provide an insight into local/regional/national policies of obstetric care.

INTRODUCTION

Caesarean section (CS) is a vital intervention for safe delivery in the presence of certain pertinent maternal or fetal complications. However, in the absence of medical indications, overuse is a concern because of the risks of short and long term adverse maternal and neonatal outcomes and greater cost and resource utilisation.[1-3] A systematic review from the WHO suggested that CS rates above 9-16%, a threshold exceeded across Europe in 2015 (CS rates from 16.1% in Iceland to 56.9% in Cyprus),[4] were not associated with decreases in infant mortality.[5]

Worldwide, CS rates have been increasing over the past several decades and these trends are expected to continue.[1,6] However, in Europe, rates may be stabilising or even decreasing.[1] Indeed, the last Euro-Peristat report found that CS rates decreased from 2010 to 2015 in some European countries.[7,8]

The last Euro-Peristat report also found differences across Europe in instrumental vaginal delivery (VD; eg, forceps or vacuum extraction) rates (0.5% in Romania to 15.1% in Ireland) and trends (increasing or decreasing).[7,8] Though instrumental VD could be utilised in place of CS for some intrapartum complications, with lower CS rates therefore expected in countries with higher instrumental VD rates, no association was found between rates of the interventions.[8]

While some of the variation in mode of delivery across Europe likely reflects underlying differences in the risk profile of the obstetric population,[7,8] differences in culture and healthcare policy play an important role.[4,8] For example, differences have been found in the delivery mode for breech deliveries, preterm deliveries, and among women with previous CS.[4,8] Higher CS rates were also found in European countries with less comprehensive routine health information systems for reporting delivery mode.[4] To ensure evidence-based use of obstetric interventions, strengthening of health information systems is vital to evaluate obstetric practice and tailor policies aimed at reducing CS rates to the local context.

METHODS

Definition

Mode of delivery is classified as VD (spontaneous, instrumental, or VD of unknown type) or CS (prelabour, intrapartum, or CS with unknown timing). Mode of delivery is reported as the percentage of all deliveries (live born and stillborn) with known mode of delivery. This report focuses on operative delivery (instrumental VD and CS), with CS further evaluated based on the timing of CS (prelabour or intrapartum).

Data availability

28 countries provided data on mode of delivery, including 3 United Kingdom constituents (Northern Ireland, Scotland, and Wales).

Data were collected primarily from medical birth registers, perinatal databases, or civil registration systems by a representative of each country and then transferred to the coordinating team as anonymous, aggregate data.

Most countries reported little missing data (less than 4.0%), with the exception of the Czech Republic (5.5% in 2015; 6.1% in 2019). Additionally, timing of CS (prelabour or intrapartum) was not available for Ireland and Poland, type of VD (spontaneous or instrumental) was not available for Poland, and 2015 data was not available for France, thus these countries were excluded from the related analyses. In some other countries, missing data was high for timing of CS (2019: Germany: 8.5%; Denmark: 13.0%; Lithuania 13.5%; Scotland 28.1%).

Additional methodological considerations

The classification of timing of CS varies between countries. While some report CS as prelabour or intrapartum, others report CS as elective/planned (which can include CSs after onset of labour) or emergency/unplanned (which can include prelabour CSs). While the impact of these factors is likely minimal for overall findings, minor differences can occur when comparing our results with other data sources.

We compute this indicator on births which can create slight discrepancies with other indicators or data sources where mode of delivery is computed by women (for example, Robson’s Ten Group Classification System).

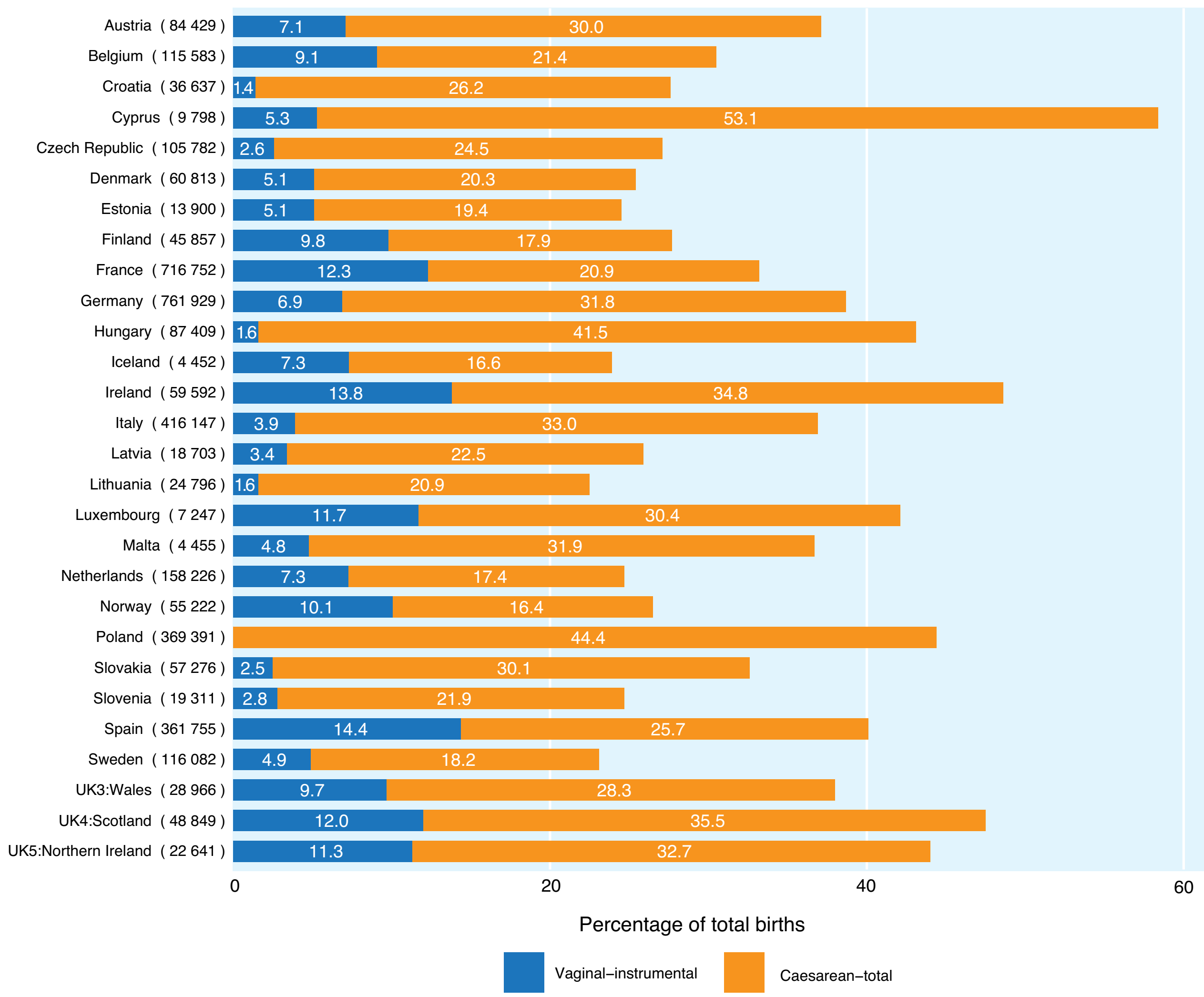
RESULTS

Mode of delivery in Europe in 2019

Rates of CS varied widely in the 28 countries providing data (Figure C10.1; Map C10), ranging from 16.4% in Norway to 53.1% in Cyprus. The median CS rate was 26.0% (interquartile range [IQR] 20.7%, 32.1%). CS rates tended to be lower in northern Europe and higher in southern and central Europe and the UK, though some countries with relatively high CS rates in the 2015 Report did not provide data for 2019 (Bulgaria, Romania).

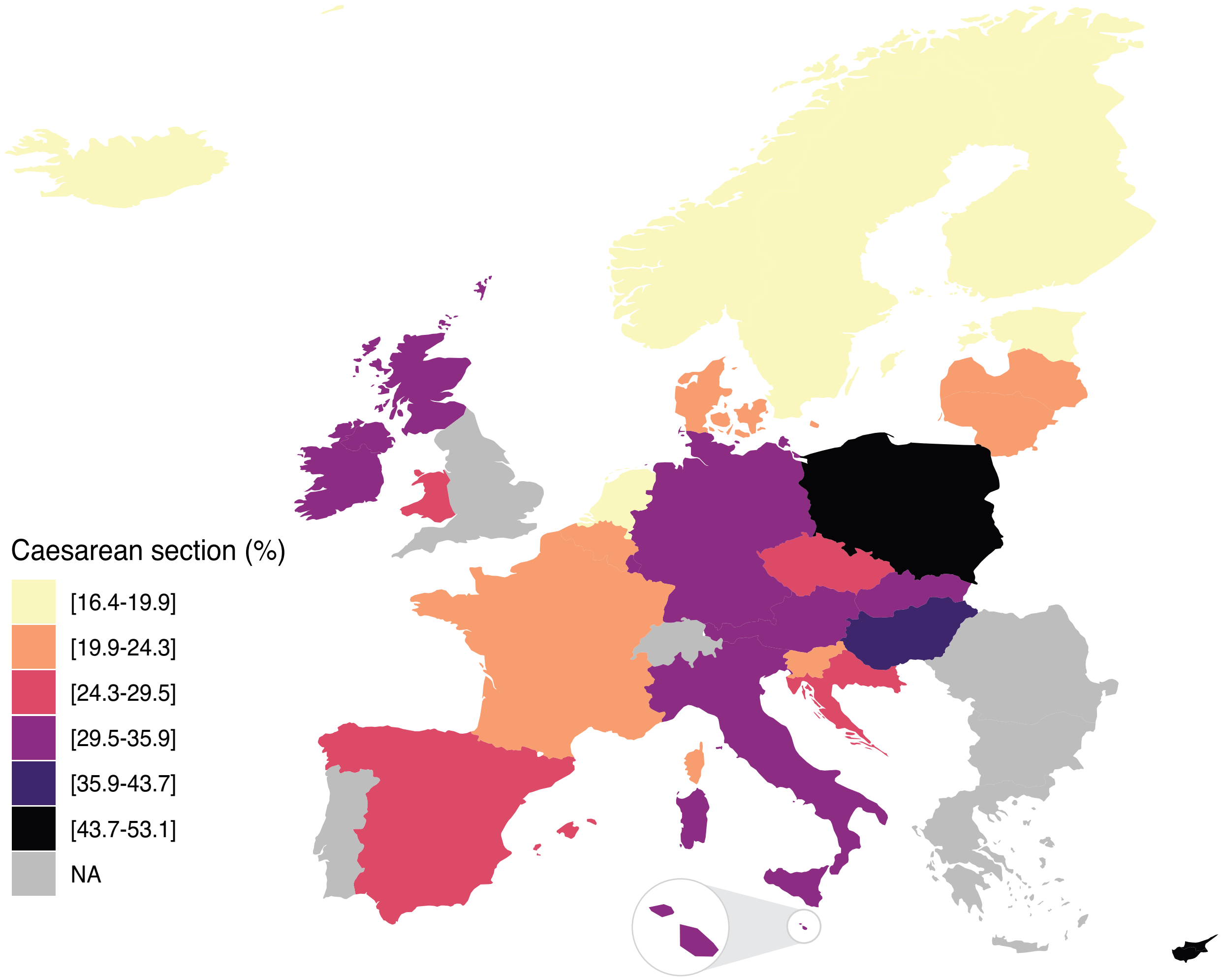
Rates of instrumental VD varied in the 27 countries providing data on type of VD, ranging from 1.4% in Croatia to 14.4% in Spain, with a median instrumental VD rate of 6.1% (IQR 3.5%, 9.8%).

Figure C10.1: Percentage of births by operative delivery (caesarean or instrumental vaginal delivery) of all live births and stillbirths in Europe in 2019



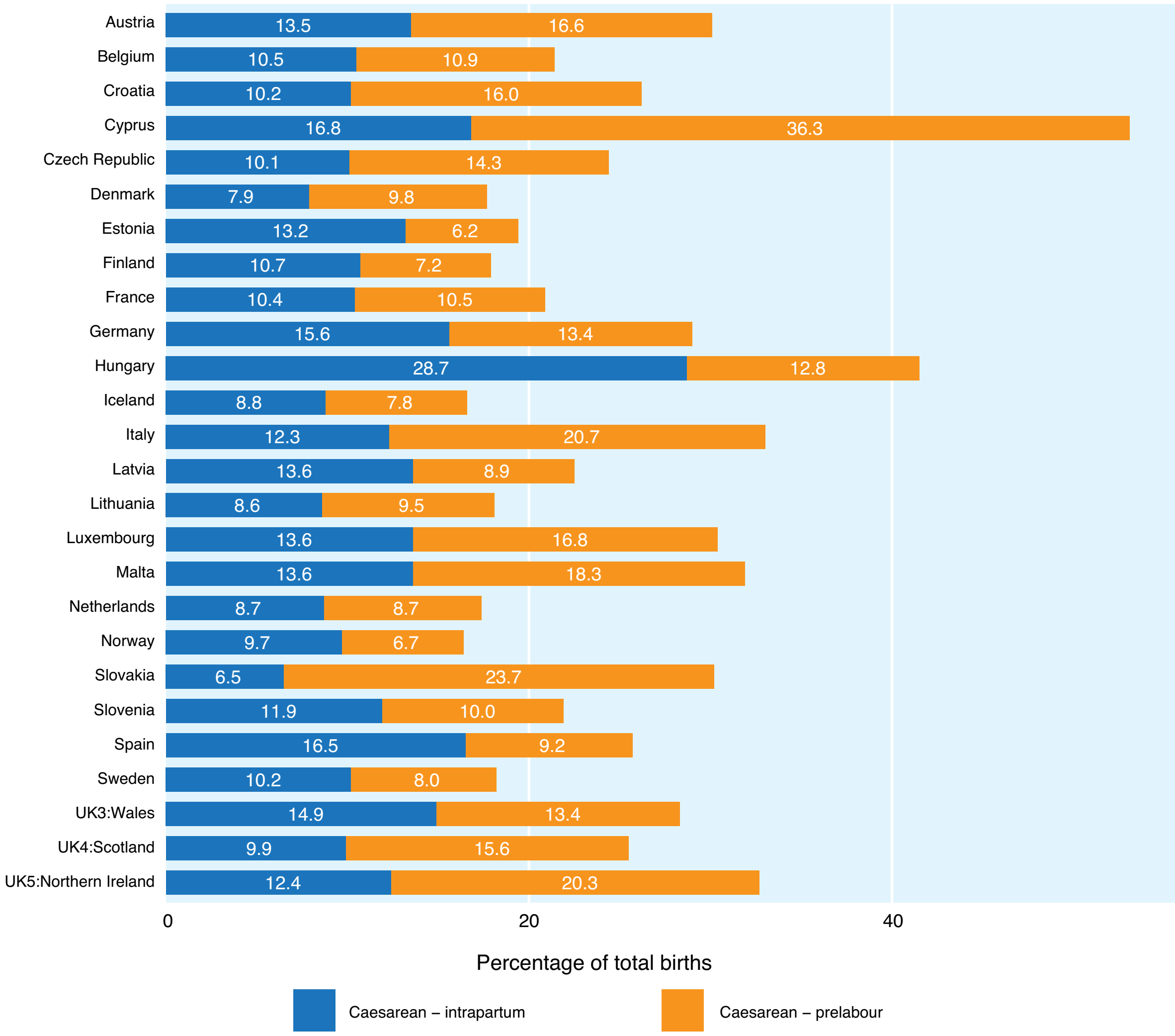
NOTE: Numbers in parentheses are total live births and stillbirths with data on mode of delivery. Poland did not have data on type of vaginal delivery.

Map C10: Percentage of births by caesarean section of all live born and stillborn births in Europe in 2019



In the 26 countries providing more detailed data, the timing of CS, particularly prelabour CS, also varied across Europe (Figure C10.2). Prelabour CS ranged from 6.2% in Estonia to 36.3% in Cyprus, with a median rate of 12.8% (IQR 8.8%, 16.7%). Intrapartum CS ranged from 6.5% in Slovakia to 28.7% in Hungary, with a median rate of 10.7% (IQR 9.8%, 13.6%).

Figure C10.2: Percentage of births by type of caesarean section (prelabour or intrapartum) of all live births and stillbirths births in Europe in 2019



NOTE: The total rate may differ from the sum of caesarean prelabour and caesarean intrapartum because of missing data on timing of caesarean.

Changes in mode of delivery in Europe, 2015 to 2019

Changes in CS rates varied in the 28 countries providing data for both years (Figure C10.3, C10.4), with half of the countries seeing increases and half seeing decreases (median 0.0%, IQR -0.9%, 1.5%). The greatest increases were found in Croatia (+4.7%), Ireland (+3.5%), Hungary (+2.7%), and the UK (Scotland +3.1%; Northern Ireland +2.5%; Wales +2.4%), while the greatest decreases were found in Cyprus (-3.7%), Italy (-2.4%), the Czech Republic (-2.4%), and Luxembourg (-2.2%).

Figure C10.3: Percentage of births by caesarean section of all live births and stillbirths in Europe in 2015 and 2019

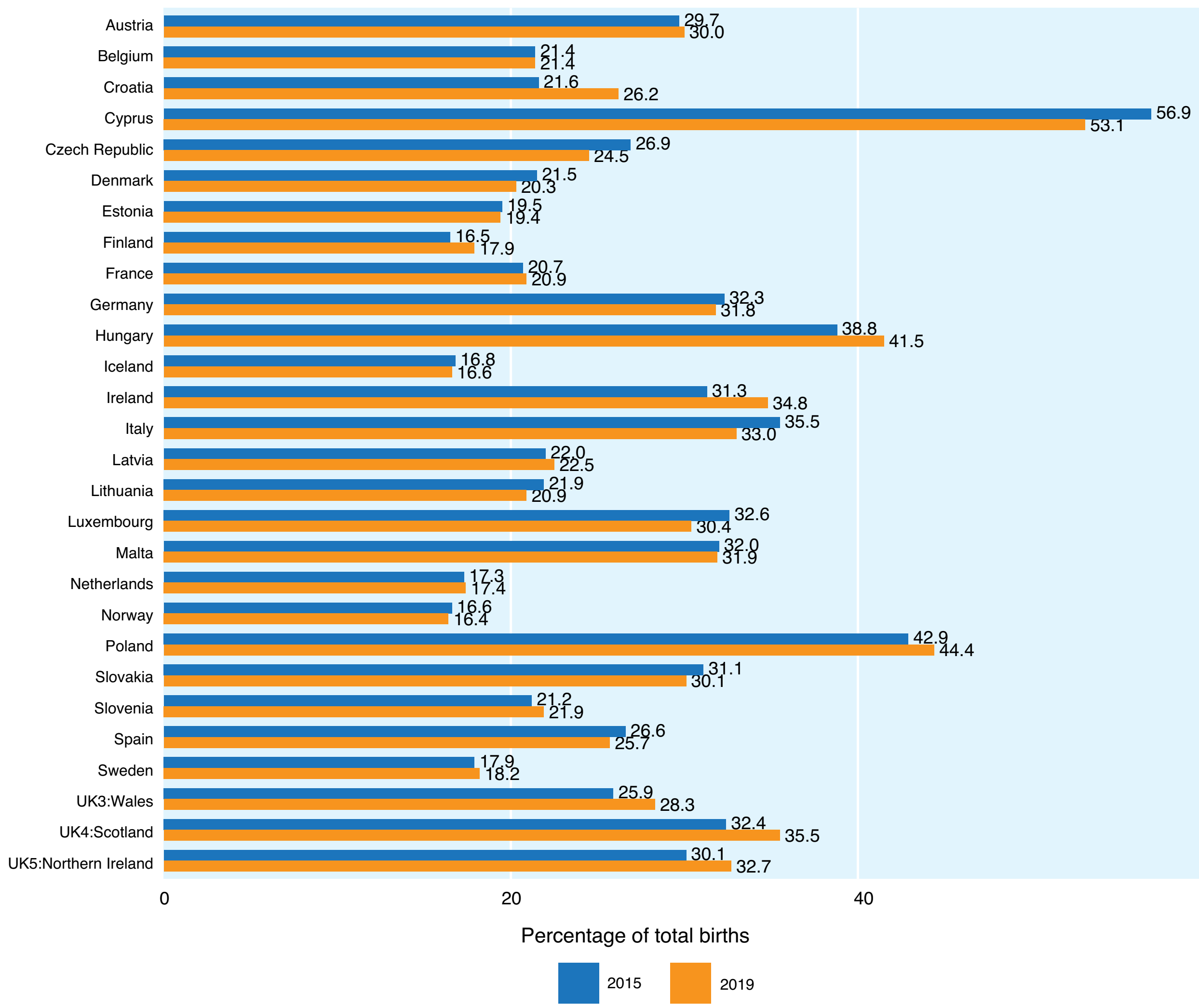
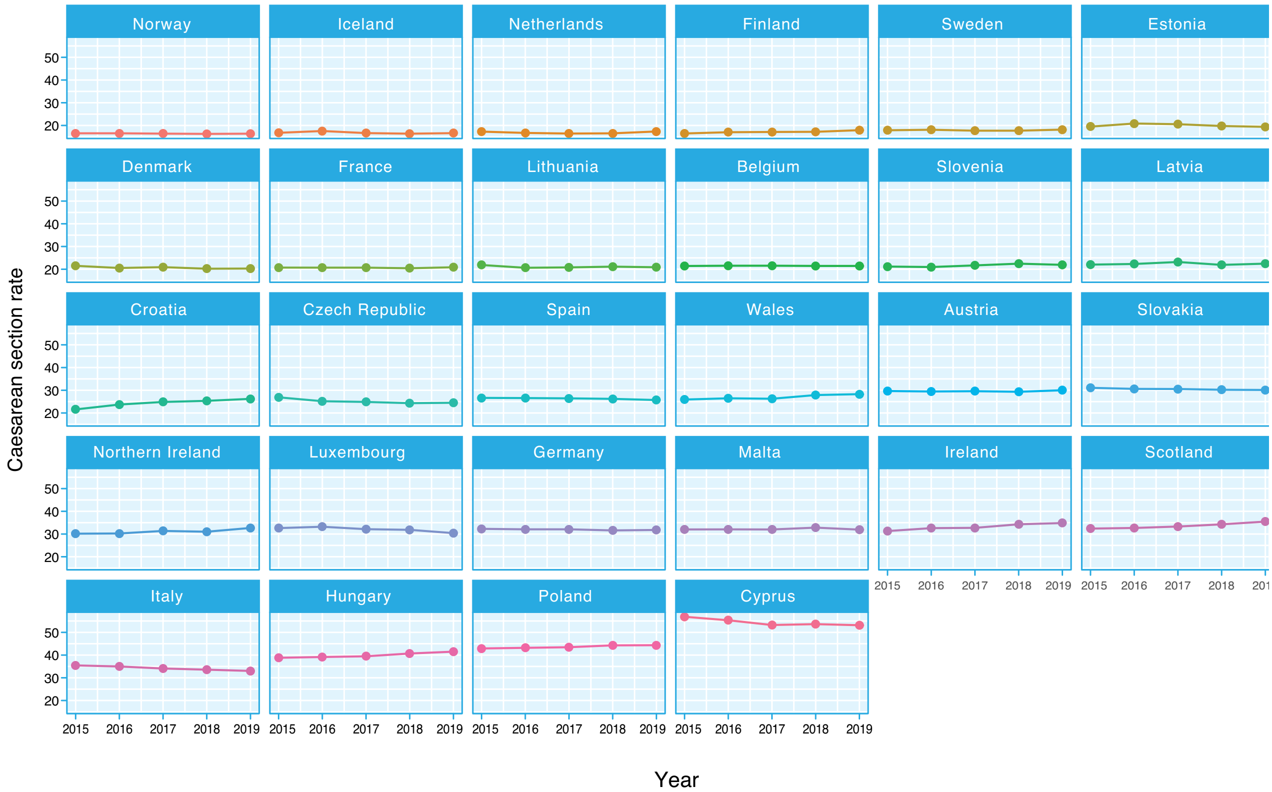


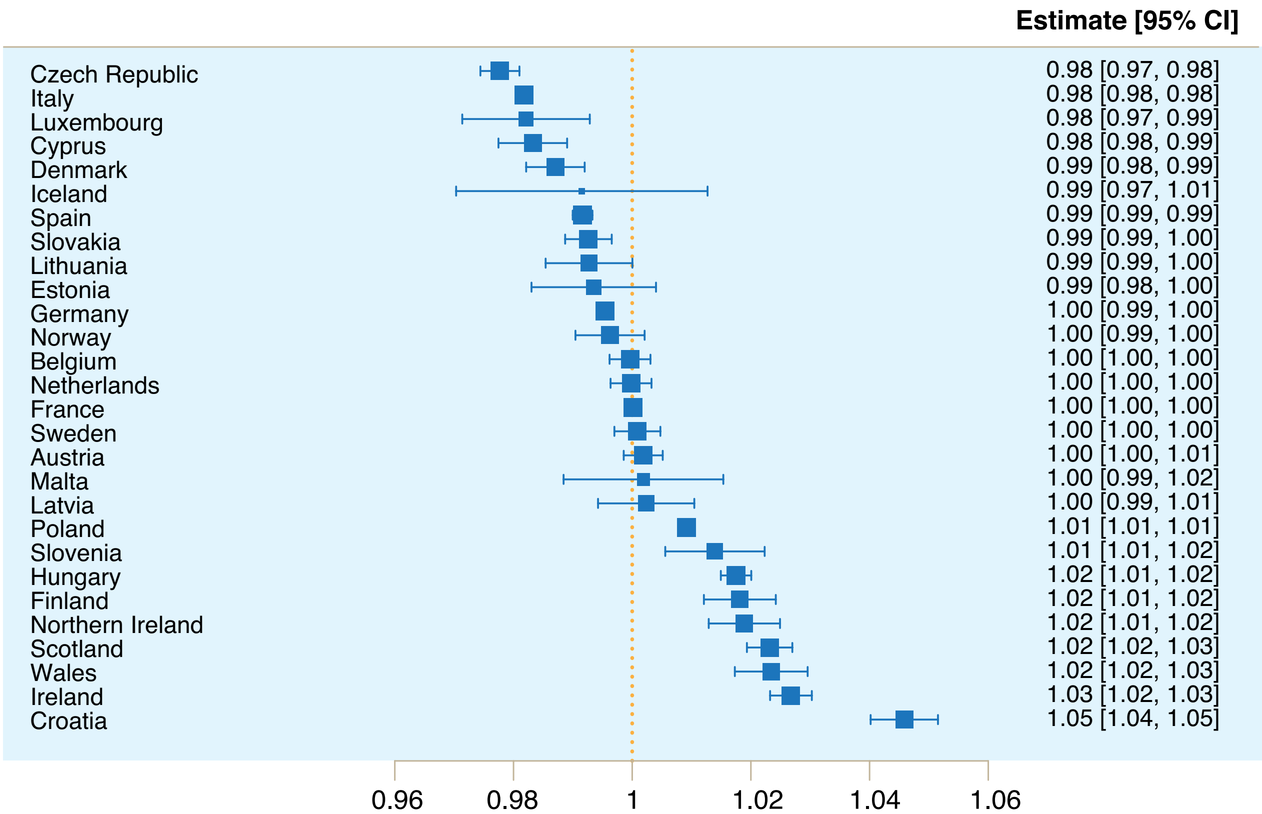
Figure C10.4: Percentage of births by caesarean section of all live births and stillbiths in Europe by year from 2015 to 2019



NOTE: Countries are sorted by the average rate from 2015 to 2019.

The pooled measure of annual change in CS across Europe from 2015 to 2019 was 1.00 (95% confidence interval 1.00, 1.01; based on random effects model; Figure C10.5), indicating that overall CS rates in Europe were stable. However, differences between countries were significant (I^2=99.2; p<0.01).

Figure C10.5: Comparison of percentage of caesarean section in Europe from 2015 to 2019 (yearly change and 95% confidence interval)



NOTE: This graph presents the average yearly percentage change in the caesarean section rate for each country (for example, 0.98 is equal to an average 2% annual reduction and 1.02 is equal to a 2% increase). CI: confidence interval.

In contrast, instrumental VD was relatively stable in the 26 countries reporting more detailed data, with a median change of 0.0% (IQR -0.7, 0.5). The greatest increases were found in Cyprus (+1.6%) and Latvia (+1.0%), while the greatest decreases were found in Wales (-1.6%), Ireland (-1.3%), Denmark (-1.1%), and the Netherlands (-1.1%).

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APPENDICES

APPENDIX A

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APPENDIX B

List of data sources and data providers to the European Perinatal Health Report, 2015 to 2019.

	Data sources	Data providers
Austria	* Birth statistics (Statistics Austria) * Cause of death statistics (Statistics Austria)	* Jeanette Klimont/Statistics Austria
Belgium	* Vital Statistics, Statistics Belgium (Statbel)	* Gisele Vandervelpen/Statbel
Bulgaria	* Vital Statistics (National Statistics Institute) * National birth register (National Center for Public Health and Analysis)	
Croatia	* Croatian Medical Birth Database (Croatian Public Health Institute), * Croatian Mortality Database (Croatian Central Bureau of Statistics) -	* Željka Draušnik/Croatian Institute of Public Health
Cyprus	* Medical Birth register (Health Monitoring Unit, Cyprus Ministry of Health) * Causes of Death register (Health Monitoring Unit, Cyprus Ministry of Health) * Database for COVID-19 confirmed cases and deaths (Health Monitoring Unit, Cyprus Ministry of Health)	* Theopisti Kyprianou/Health Monitoring Unit, Ministry of Health
Czech Republic	* Institute of Health Statistics and Information of the Czech Republic (national birth register (mothers and newborns) collecting individual perinatal data)	* Jitka Jirova/Institute of Health Information and Statistics of the Czech Republic
Denmark	* Medical birth register (The Danish Data authority, Danish Ministry of Health) * National patient register (The Danish Data authority, Danish Ministry of Health) * Danish causes of death register (The Danish Data authority, Danish Ministry of Health) * The Centralized Civil Register	* Anne Vinkel Hansen/ Statistics Denmark

	Data sources	Data providers
Estonia	* Estonian Medical Birth Register (National Institute for Public Health) was linked with data from * Estonian Cause of Death Register (National Institute for Public Health)	* Liili Abuladze/Estonian Institute for Population Studies
Finland	* Medical Birth Register (Finnish Institute for Health Welfare) linked with Central Population Register (Digital and Population Data Services Agency) and Cause of Death Register (Statistics Finland) * Register on Induced Abortions (Finnish Institute for Health Welfare) for late terminations 22-24 weeks	* Mika Gissler/Finnish Institute for Health and Welfare, Helsinki (THL)
France	* PMSI (ATIH: Technical agency of hospitalization information)	* Annick Vilain/Department for Research, Studies, Assessment and Statistics (DREES), French Ministry of Health
Germany	* IQTIG (Federal Institute for the Quality of Medical Care) * Destatis (Federal Statistical Office)	*Guenther Heller/IQTIG
Hungary	*Hungarian Central Statistical Office (KSH) *Hungarian National Obstetric Register	*Istvan Sziller/National Directory for Hospital Management and Andrea Valek/Semmelweis University
Iceland	* The Icelandic Birth Registration * Hospital register (National University Hospital)	*Helga Sol/National University Hospital
Ireland	*National Perinatal Reporting System (the Healthcare Pricing Office)	* Karen Kearns /Healthcare Pricing Office
Italy	* Birth certificates (Ministry of Health) * Causes of deaths (Istat) * Terminations of pregnancies (Istat) * Miscarriages (Istat)	* Marzia Loghi / Italian National Institute for Statistics-ISTAT
Latvia	* Newborn Register of Latvia (Centre for Disease Prevention and Control of Latvia) * Register of Causes of Death (Centre for Disease Prevention and Control of Latvia)	* Irisa Zile / The Centre for Disease Prevention and Control of Latvia

	Data sources	Data providers
Lithuania	* Medical Date of Births (Institute of Hygiene Health Information Centre) * Database of the Demographic Statistics (Central Statistical Office) * Causes of Death register (Institute of Hygiene Health Information Centre)	* Jelena Isakova / Institute of Hygiene, Health Information Centre
Luxembourg	* Perinatal Health Monitoring System (Luxembourg Institute of Health) * National Causes of Death Registry (Directorate of Health of Luxembourg)	* Audrey Billy / Department of Population Health, Luxembourg Institute of Health * Aline Lecomte / Department of Population Health, Luxembourg Institute of Health * Jessica Pastore / Department of Population Health, Luxembourg Institute of Health * Guy Weber / Directorate of Health of Luxembourg
Malta	* National Obstetrics Information System (Directorate for Health Information and Research) * National Mortality Register (Directorate for Health Information and Research)	* Miriam Gatt / Directorate for Health Information and Research
Netherlands	* Perined (The Netherlands Perinatal Registry)	* Lisa Broeders / Perined
Norway	* Medical Birth Register of Norway (The Norvegian Institute of Public Health)	* Rupali Akerkar, Kari Klungsøyr/ The Norwegian Institute of Public Health
Poland	* Central Statistical Office * Ministry of Health	* Katarzyna Szamotulska/ National Research Institute of Mother and Child
Portugal	* Instituto Nacional de Estatística – Portugal (Statistics Portugal) * Central Administration of the Health System	* Carina Rodrigues / Institute of Public Health of the University of Porto
Slovakia	*National Health Information Center	*Ján Čáp /nathinal Health Information Center
Slovenia	*Perinatal information system (National institute of public health)	* Ivan Verdenik / University Medical Centre, Research Unit

	Data sources	Data providers
Spain	* Vital Statistics (National Statistics Office) * Specialized Care Registry - Minimum Basic Data Set (Ministry of Health)	* Adela Recio Alcaide/ Senior Statistical State Corps and Oscar Zurriaga/ Public Health and Addictions Directorate, Generalitat Valenciana
Sweden	* Medical Birth Register (The National Board of Health and Welfare)	* Karin Kallen / The National Board of Health and Welfare
Switzerland	* BEVNAT, statistics of natural population change - vital statistics (Swiss federal Statistical Office)	* Tonia Rihs / Swiss Federal Statistical Office
UK, Northern Ireland	* Northern Ireland Maternity System - NIMATS (Department of Health)	* Joanne Murphy and Diane Anderson / Northern Ireland Maternal And Child Health (NIMACH)
UK, Scotland	* Scottish Morbidity Record 02 (maternity hospital discharge record) * National Records of Scotland Stillbirth, live birth, and infant death registrations (statutory vital event registration)	* Kirsten Monteath / Public Health Scotland
UK, England and Wales	*UK, Office for National Statistics (Live birth and stillbirth registration in England and Wales, notification of births in England and Wales)	* Hannah McConnell/ Office for National Statistics
UK, England	*Maternity Hospital Episode Statistics	*Craig Thomas / NHS Digital
UK, Wales	*Digital Health and Care Wales	*Mark Piper and Martin Williams/ Digital Health and Care Wales (DHCW)
UK, all	* MBRRACE UK (University of Oxford and University of Leicester)	* Lucy Smith / University of Leicester, MBRRACE-UK collaboration

APPENDIX C

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C1_A: Stillbirth rate by gestational age and birth weight in 2019 (numbers)

Country	Total births (stillbirths and live births)					Stillbirths			
		Gestational age stated	≥24 weeks	≥28 weeks	≥1000 g	Total	≥24 weeks	≥28 weeks	≥1000 g
Austria	84 429	84 429	84 364	84 089	84 058	253	231	186	176
Belgium	117 663	116 066	115 960	115 444	115 356	570	508	367	370
Croatia	36 635	36 635	36 585	36 468	36 435	164	146	117	108
Cyprus	9 799	9 776	9 754	9 711	9 722	64	46	31	24
Czech Republic	112 633	109 889	109 825	109 486	110 607	377	347	293	271
Denmark	60 779	60 747	60 692	60 507	60 437	174	136	112	94
Estonia	13 900	13 897	13 890	13 847	13 849	26	25	24	23
Finland	45 866	45 790	45 753	45 660	45 692	124	108	93	81
France	714 335	714 333	713 173	710 265	702 428	3 431	2573	1982	1677
Germany	763 946	763 931	763 030	759 716	759 029	2 891	2610	2026	1866
Hungary	89 573	89 573	89 568	89 517	87 950	391	386	335	N/A
Iceland	4 452	4 383	4 379	4 370	4 438	17	14	11	11
Ireland	59 592	59 583	59 521	59 290	59 285	251	238	170	151
Italy	422 184	420 628	420 204	418 917	419 933	1 391	1135	925	855
Latvia	18 703	18 703	18 679	18 620	18 611	82	69	59	59
Lithuania	24 796	24 796	24 767	24 676	24 680	111	100	82	78
Luxembourg	7 208	7 205	7 198	7 167	7 165	29	23	14	12
Malta	4 455	4 454	4 450	4 432	4 424	16	14	11	10
Netherlands	164 291	164 291	163 845	163 230	162 966	790	499	374	336
Norway	55 214	55 214	55 161	54 987	54 977	173	138	109	99
Poland	374 978	374 917	374 589	373 373	373 330	1 201	1085	873	821
Portugal	87 319	87 155	87 119	86 834	86 738	275	254	201	101
Slovakia	57 401	57 401	57 323	57 104	57 047	314	243	197	181
Slovenia	19 256	19 256	19 240	19 175	19 164	47	39	27	24
Spain	361 749	322 766	322 669	321 670	341 947	999	954	815	731
Sweden	116 082	116 071	115 976	115 629	115 553	370	344	284	267
Switzerland	86 368	86 368	86 190	85 891	85 796	296	241	195	173
UK: MBRRACE	717 654	694 749	716 627	713 724	712 986	2 910	2 398	1 794	1628
UK: England and Wales	641 808	639 883	639 371	636 669	625 224	2 255	2255	1625	1505
UK: Northern Ireland	22 641	22 641	22 613	22 525	22 515	89	79	61	55
UK: Scotland	48 876	48 869	48 814	48 637	48 562	191	162	129	109
UK: Wales	28 994	28 412	28 396	28 274	28 758	119	118	87	85

NOTE: Terminations of pregnancy are excluded, when possible. N/A: data not available. Data for the years 2015 to 2018 are available in Excel files on the Euro-Peristat website (www.europeristat.com)

C1_B: Stillbirth rate by gestational age and birth weight in 2019 (rates per 1000 total births)

Country	≥ 22 weeks	≥24 weeks	≥ 28 weeks	≥1000g
Austria	3.0	2.7	2.2	2.1
Belgium	4.9	4.4	3.2	3.2
Croatia	4.5	4.0	3.2	3.0
Cyprus	6.6	4.7	3.2	2.5
Czech Republic	3.4	3.2	2.7	2.5
Denmark	2.9	2.2	1.9	1.6
Estonia	1.9	1.8	1.7	1.7
Finland	2.7	2.4	2.0	1.8
France	4.8	3.6	2.8	2.4
Germany	3.8	3.4	2.7	2.5
Hungary	4.4	4.3	3.7	N/A
Iceland	3.9	3.2	2.5	2.5
Ireland	4.2	4.0	2.9	2.6
Italy	3.3	2.7	2.2	2.0
Latvia	4.4	3.7	3.2	3.2
Lithuania	4.5	4.0	3.3	3.2
Luxembourg	4.0	3.2	2.0	1.7
Malta	3.6	3.2	2.5	2.3
Netherlands	4.8	3.1	2.3	2.1
Norway	3.1	2.5	2.0	1.8
Poland	3.2	2.9	2.3	2.2
Portugal	3.2	2.9	2.3	1.2
Slovakia	5.5	4.2	3.5	3.2
Slovenia	2.4	2.0	1.4	1.3
Spain	3.1	3.0	2.5	2.1
Sweden	3.2	3.0	2.5	2.3
Switzerland	3.4	2.8	2.3	2.0
UK: MBRRACE	4.0	3.3	2.5	2.3
UK: England and Wales	3.5	3.5	2.6	2.4
UK: Northern Ireland	3.9	3.5	2.7	2.4
UK: Scotland	3.9	3.3	2.7	2.2
UK: Wales	4.2	4.2	3.1	3.0

NOTE: Terminations of pregnancy are excluded, when possible. N/A: data not available. Data for the years 2015 to 2018 are available in Excel files on the Euro-Peristat website (www.europeristat.com).

C2_A: Neonatal mortality rate for births at ≥22 weeks of gestation in 2019 (numbers and rates per 1000 live births)

Country		Number of neonatal deaths			Rate per 1000 live births		
	Total live births with gestational age stated	Total (day 0 to 27 after live birth) ≥22 weeks	Early (day 0 to 6 after live birth) ≥22 weeks	Late (day 7 to 27 after live birth) ≥22 weeks	Neonatal mortality ≥22 weeks	Early neonatal mortality ≥22 weeks	Late neonatal mortality ≥22 weeks
Austria	84 176	142	112	30	1.7	1.3	0.4
Belgium	115 496	300	206	94	2.6	1.8	0.8
Croatia	36 471	110	84	26	3.0	2.3	0.7
Cyprus	9 712	19	14	5	2.0	1.4	0.5
Czech Republic	109 512	173	111	62	1.6	1.0	0.6
Denmark	60 573	99	84	15	1.6	1.4	0.3
Estonia	13 871	13	5	8	0.9	0.4	0.6
Finland	45 666	64	54	10	1.4	1.2	0.2
Hungary	89 182	198	124	74	2.2	1.4	0.8
Iceland	4 366	*	*	*	0.5	0.2	0.2
Ireland**	59 332	135	135	N/A	2.3	2.3	N/A
Italy	419 237	731	497	234	1.7	1.2	0.6
Latvia	18 621	42	34	8	2.3	1.8	0.4
Lithuania	24 685	58	35	23	2.4	1.4	0.9
Malta	4 438	19	16	*	4.3	3.6	0.7
Netherlands	163 501	491	419	65	3.0	2.6	0.4
Norway	55 041	66	45	21	1.2	0.8	0.4
Poland	373 716	1 003	740	263	2.7	2.0	0.7
Slovenia	19 209	14	10	*	0.7	0.5	0.2
Spain	321 767	674	N/A	N/A	2.1	N/A	N/A
Sweden	115 701	149	105	44	1.3	0.9	0.4
Switzerland	86 072	203	176	27	2.4	2.0	0.3
UK: MBRRACE	691 839	1 494	1 088	406	2.2	1.6	0.6
UK: England and Wales	637 628	1 730	1 354	376	2.7	2.1	0.6
UK: Northern Ireland	22 552	74	60	14	3.3	2.7	0.6
UK: Scotland	48 678	84	60	24	1.7	1.2	0.5

NOTE: * less than 5 cases. **In Ireland, data only available on early neonatal deaths.
N/A: data not available. Data for the years 2015 to 2018 are available in Excel files on the Euro-Peristat website (www.europeristat.com).

C2_B: Neonatal mortality rate for births at ≥24 weeks of gestation in 2019 (numbers and rates per 1000 live births)

Country	Total live births ≥24 weeks	Total neonatal deaths ≥24 weeks	Neonatal mortality ≥24 weeks per 1000 live births
Austria	84 133	112	1.3
Belgium	115 452	242	2.1
Croatia	36 439	79	2.2
Cyprus	9 708	16	1.7
Czech Republic	109 478	145	1.3
Denmark	60 556	68	1.1
Estonia	13 865	11	0.8
Finland	45 645	53	1.2
Hungary	89 182	174	2.0
Iceland	4 365	*	0.5
Latvia	18 610	33	1.8
Lithuania	24 667	51	2.1
Malta	4 436	17	3.8
Netherlands	163 346	338	2.1
Norway	55 023	59	1.1
Poland	373 504	832	2.2
Slovenia	19 201	11	0.6
Sweden	115 632	117	1.0
Switzerland	85 949	119	1.4
UK: MBRRACE	691 326	1 153	1.7
UK: England and Wales	637 116	915	1.4
UK: Northern Ireland	22 534	63	2.8
UK: Scotland	48 652	68	1.4

NOTE: * less than 5 cases. Data for the years 2015 to 2018 are available in Excel files on the Euro-Peristat website (www.europeristat.com).

C3_A: Infant mortality rate for births ≥22 weeks of gestation in 2019 (numbers and rates per 1000 live births)

Country	Total live births with gestational age stated	Total infant deaths ≥22 weeks	Infant mortality ≥22 wks per 1000 live births
Austria	84 176	209	2.5
Belgium	115 496	430	3.7
Croatia	36 471	142	3.9
Cyprus	9 712	24	2.5
Czech Republic	109 512	273	2.5
Denmark	60 573	132	2.2
Estonia	13 871	25	1.8
Finland	45 666	92	2.0
Hungary	89 182	331	3.7
Iceland	4 366	*	0.9
Italy	419 237	1 111	2.7
Latvia	18 621	55	3.0
Norway	55 041	105	1.9
Poland	373 716	1 371	3.7
Slovenia	19 209	*	0.1
Spain	321 767	977	3.0
Sweden	115 701	220	1.9
Switzerland	86 072	256	3.0
UK: England and Wales	637 628	2 347	3.7
UK: Scotland	48 678	133	2.7

NOTE: * less than 5 cases. Data for the years 2015 to 2018 are available in Excel files on the Euro-Peristat website (www.europeristat.com).

C3_B: Infant mortality rate for births ≥24 weeks of gestation in 2019 (numbers and rates per 1000 live births)

Country	Total live births with gestational age stated	Total infant deaths ≥24 weeks	Infant mortality ≥24 weeks per 1000 live births
Austria	84 133	177	2.1
Belgium	115 452	371	3.2
Croatia	36 439	111	3.1
Cyprus	9 708	21	2.2
Czech Republic	109 478	240	2.2
Denmark	60 556	100	1.7
Estonia	13 865	23	1.7
Finland	45 645	79	1.7
Hungary	4 365	N/A	N/A
Iceland	18 610	46	2.5
Italy	55 023	98	1.8
Latvia	373 504	1 193	3.2
Norway	19 201	*	0.1
Poland	115 632	183	1.6
Slovenia	85 949	172	2.0
Spain	637 116	1 493	2.3
Sweden	48 652	117	2.4
Switzerland	84 133	177	2.1
UK: England and Wales	115 452	371	3.2
UK: Scotland	36 439	111	3.1

NOTE: * less than 5 cases. N/A: data not available. Data for the years 2015 to 2018 are available in Excel files on the Euro-Peristat website (www.europeristat.com).

C4_A: Distribution of birth weight for live births in 2019

Country	Number of live births					Percentage of live births		
	Birth weight stated	Birth weight not stated	<2500g	2500-4499g	≥4500g	<2500g	2500-4499g	≥4500g
Austria	84 176	0	5 156	78 224	796	6.1	92.9	0.9
Belgium	115 436	1 667	7 865	106 636	935	6.8	92.4	0.8
Croatia	36 473	0	1 917	34 004	552	5.3	93.2	1.5
Cyprus	9 731	*	982	8 730	19	10.1	89.7	0.2
Czech Republic	110 719	1 512	7 532	102 267	920	6.8	92.4	0.8
Denmark	60 539	66	2 719	56 084	1 736	4.5	92.6	2.9
Estonia	13 872	*	608	12 926	338	4.4	93.2	2.4
Finland	45 715	26	1 830	42 792	1 093	4.0	93.6	2.4
France	703 585	7 318	49 890	649 037	4 658	7.1	92.2	0.7
Germany	761 044	10	49 666	701 848	9 530	6.5	92.2	1.3
Hungary	89 142	0	7 338	80 889	915	8.2	90.7	1.0
Iceland	4 435	0	196	4 027	212	4.4	90.8	4.8
Ireland	59 340	0	3 338	54 818	1 184	5.6	92.4	2.0
Italy	420 372	420	29 649	388 881	1 842	7.1	92.5	0.4
Latvia	18 621	0	797	17 300	524	4.3	92.9	2.8
Lithuania	24 685	0	1 097	23 071	517	4.4	93.5	2.1
Luxembourg	7 179	0	474	6 653	52	6.6	92.7	0.7
Malta	4 437	*	317	4 106	14	7.1	92.5	0.3
Netherlands	163 288	213	9 151	151 300	2 837	5.6	92.7	1.7
Norway	55 040	0	2 427	50 989	1 624	4.4	92.6	3.0
Poland	373 711	56	21 099	347 802	4 810	5.6	93.1	1.3
Portugal	86 948	78	7 759	78 796	393	8.9	90.6	0.5
Slovakia	57 087	0	4 275	52 261	551	7.5	91.5	1.0
Slovenia	19 209	0	1 128	17 884	197	5.9	93.1	1.0
Spain	342 173	18 444	27 008	313 056	2 109	7.9	91.5	0.6
Sweden	115 647	65	4 852	107 384	3 411	4.2	92.9	2.9
Switzerland	86 123	31	5 437	80 080	606	6.3	93.0	0.7
UK: MBRRACE	714 667	68	53 348	652 099	9 220	7.5	91.2	1.3
UK: England and Wales	626 647	13 340	44 486	574 300	7 861	7.1	91.6	1.3
UK: Northern Ireland	22 547	5	1 365	20 802	380	6.1	92.3	1.7
UK: Scotland	48 631	54	3 394	44 442	795	7.0	91.4	1.6
UK: Wales	28 804	69	2 050	26 316	438	7.1	91.4	1.5

NOTE: * less than 5 cases. Data for the years 2015 to 2018 are available in Excel files on the Euro-Peristat website (www.europeristat.com).

C4_B: Low birth weight by plurality for live births in 2019

Country	All births			Singleton births			Multiple births		
	Live births, Birth weight stated	<1500g	1500-2499g	Live births, birth weight stated	<1500g	1500-2499g	Live births, birth weight stated	<1500g	1500-2499g
Austria	84 176	0.9	5.2	81 698	0.7	3.9	2 478	8.8	47.2
Belgium	115 436	1.0	5.8	111 919	0.7	4.5	3 517	9.8	48.4
Croatia	36 473	0.9	4.4	35 198	0.7	3.1	1 275	6.4	41.1
Cyprus	9 731	1.1	9.0	9 282	0.7	6.5	449	10.7	59.5
Czech Republic	110 719	1.0	5.9	107 826	0.7	4.7	2 893	10.5	50.3
Denmark	60 539	0.8	3.7	59 019	0.6	2.9	1 515	8.1	35.6
Estonia	13 872	0.7	3.6	13 435	0.6	2.4	437	6.4	41.4
Finland	45 715	0.6	3.4	44 570	0.4	2.5	1 145	6.3	38.3
France	703 585	1.0	6.1	681 134	0.8	4.7	22 451	8.9	47.3
Germany	761 044	1.2	5.4	732 364	0.8	3.8	28 680	10.6	44.5
Iceland	4 435	0.7	3.7	4 303	0.5	2.9	132	7.6	31.8
Ireland	59 340	0.8	4.8	57 185	0.6	3.5	2 155	6.9	40.3
Italy	420 372	0.9	6.2	406 952	0.6	4.6	13 416	8.3	53.3
Latvia	18 621	0.8	3.5	18 139	0.6	2.6	482	7.7	34.9
Lithuania	24 685	0.8	3.7	23 898	0.6	2.7	787	7.6	34.2
Luxembourg	7 179	0.8	5.8	6 907	0.5	3.9	272	8.5	52.2
Malta	4 437	1.0	6.1	4 292	0.6	4.8	145	13.8	44.8
Netherlands	163 288	0.9	4.7	158 466	0.7	3.5	4 822	8.1	43.3
Norway	55 040	0.8	3.6	53 388	0.6	2.5	1 652	8.0	40.2
Poland	373 711	0.8	4.8	363 976	0.6	3.6	9 735	8.2	49.3
Portugal	86 948	1.0	7.9	84 280	0.8	6.3	2 668	10.1	58.7
Slovakia	57 087	1.0	6.5	55 729	0.8	5.4	1 358	9.1	50.0
Slovenia	19 209	0.9	5.0	18 528	0.7	3.4	681	6.9	46.8
Spain	342 173	0.9	7.0	329 896	0.7	5.3	12 277	6.9	51.4
Sweden	115 647	0.7	3.5	112 650	0.6	2.6	2 997	6.9	36.6
Switzerland	86 123	1.1	5.3	83 228	0.8	3.8	2 895	9.5	46.8
UK: MBRRACE	714 667	1.1	6.3	691 632	0.8	5.0	21 963	9.9	47.7
UK: England and Wales	626 647	1.0	6.1	608 733	0.8	4.8	17 914	8.7	48.9
UK: Northern Ireland	22 547	0.8	5.2	21 900	0.6	4.0	647	7.1	46.4
UK: Scotland	48 631	1.0	6.0	47 247	0.8	4.8	1 384	8.4	48.0
UK: Wales	28 804	1.1	6.0	24 013	0.9	4.8	647	9.7	50.7

NOTE: Data for the years 2015 to 2018 are available in Excel files on the Euro-Peristat website (www.europeristat.com).

C5_A: Distribution of gestational age for live births in 2019

Country	Number of live births		Percentage of live births				
	Gestational age stated	Gestational age not stated	<32 weeks	32-36 weeks	37-38 weeks	39-41 weeks	≥42 weeks
Austria	84 176	0	1.0	6.4	25.5	66.9	0.3
Belgium	115 496	1 596	1.1	7.0	27.6	64.2	0.1
Croatia	36 471	0	0.9	5.6	21.1	69.3	3.1
Cyprus	9 712	22	1.3	10.0	42.8	45.7	0.1
Czech Republic	109 512	2 719	1.0	5.9	19.1	71.5	2.5
Denmark	60 573	32	0.9	4.9	18.3	73.5	2.3
Estonia	13 871	*	0.9	4.8	18.3	74.6	1.4
Finland	45 666	75	0.7	4.6	18.5	73.8	2.4
France	710 902	*	1.1	5.8	21.5	70.8	0.8
Germany	761 040	15	1.3	6.9	25.4	66.0	0.5
Hungary	89 182	0	1.3	7.0	27.4	64.2	0.1
Iceland	4 366	69	0.8	5.8	17.5	73.9	1.9
Ireland	59 332	8	1.0	5.8	22.7	69.4	1.1
Italy	419 237	1 555	0.9	6.6	28.1	63.8	0.6
Latvia	18 621	0	1.0	4.6	17.1	76.8	0.6
Lithuania	24 685	0	0.9	4.4	17.0	77.5	0.2
Luxembourg	7 176	*	0.9	6.0	28.3	64.6	0.1
Malta	4 438	*	1.1	6.3	30.7	61.9	0.0
Netherlands	163 501	0	1.1	5.5	23.3	68.8	1.4
Norway	55 041	0	0.9	5.2	19.1	70.4	4.4
Poland	373 716	51	1.0	6.2	25.3	67.0	0.5
Portugal	86 880	146	1.0	7.0	26.2	65.7	0.1
Slovakia	57 087	0	1.1	6.1	21.8	70.4	0.7
Slovenia	19 209	0	0.9	6.3	21.6	70.9	0.4
Spain	321 767	38 846	1.0	6.1	22.5	69.3	1.1
Sweden	115 701	11	0.8	4.6	19.1	69.5	6.0
Switzerland	86 072	0	1.0	5.8	26.0	66.6	0.6
UK: MBRRACE	691 839	22 903	1.2	6.6	23.9	66.4	1.9
UK: England and Wales	637 628	1 925	1.2	6.6	24.0	66.2	2.0
UK: Northern Ireland	22 552	0	1.0	6.5	22.0	69.7	0.8
UK: Scotland	48 678	7	1.2	7.4	23.3	66.5	1.6
UK: Wales	28 293	573	1.2	6.8	21.9	67.0	3.2

NOTE: * less than 5 cases. Data for the years 2015 to 2018 are available in Excel files on the Euro-Peristat website (www.europeristat.com).

C5_B: Preterm birth by plurality for live births in 2019

Country	All births			Singleton births			Multiple births		
	Live births with gestational age and multiplicity stated	<32 weeks	32-36 weeks	Live births with gestational age stated	<32 weeks	32-36 weeks	Live births with gestational age stated	<32 weeks	32-36 weeks
Austria	84 176	1.0	6.4	81 698	0.8	5.1	2 478	9.5	48.2
Belgium	115 496	1.1	7.0	111 974	0.8	5.7	3 522	11.1	49.4
Croatia	36 471	0.9	5.6	35 196	0.7	4.3	1 275	6.7	43.7
Cyprus	9 712	1.3	10.0	9 267	0.9	7.3	445	9.7	65.8
Czech Republic	109 512	1.0	5.9	106 688	0.7	4.9	2 824	9.1	45.9
Denmark	60 573	0.9	4.9	59 048	0.7	4.2	1 520	9.3	33.5
Estonia	13 871	0.9	4.8	13 434	0.7	3.5	437	7.6	45.1
Finland	45 666	0.7	4.6	44523	0.6	3.7	1 143	6.6	40.5
France	710 902	1.1	5.8	688 184	0.8	4.6	22 715	8.9	43.2
Germany	761 040	1.3	6.9	732 362	0.9	5.3	28 678	10.9	46.0
Iceland	4 366	0.8	5.8	4 234	0.6	4.5	132	7.6	48.5
Ireland	59 332	1.0	5.8	57 177	0.7	4.2	2 155	8.1	48.7
Italy	419 237	0.9	6.6	405 807	0.7	5.0	13 429	7.9	53.5
Latvia	18 621	1.0	4.6	18 139	0.8	3.8	482	8.9	33.2
Lithuania	24 685	0.9	4.4	23 898	0.7	3.3	787	8.9	36.6
Luxembourg	7 176	0.9	6.0	6 904	0.5	4.5	272	11.4	44.5
Malta	4 438	1.1	6.3	4 293	0.7	5.0	145	12.4	46.9
Netherlands	163 501	1.1	5.5	158 674	0.8	4.2	4 827	9.3	46.0
Norway	55 041	0.9	5.2	53 389	0.7	3.9	1 652	8.1	46.3
Poland	373 716	1.0	6.2	363 982	0.8	4.9	9 734	9.8	54.2
Portugal	86 880	1.0	7.0	84 211	0.8	5.5	2 669	7.9	55.9
Slovakia	57 087	1.1	6.1	55 729	0.9	5.1	1 358	9.5	46.6
Slovenia	19 209	0.9	6.3	18 528	0.7	4.5	681	6.2	55.4
Spain	321 767	1.1	6.1	310 138	0.8	4.7	11 629	6.6	42.5
Sweden	115 701	0.8	4.6	112 697	0.7	3.8	3 004	7.2	36.1
Switzerland	86 072	1.0	5.8	83 183	0.7	4.4	2 889	8.9	46.6
UK: MBRRACE	691 839	1.2	6.6	670 697	0.9	5.3	21 138	10.1	49.9
UK: England and Wales	637 628	1.2	6.6	618 466	0.9	5.2	19 162	9.9	51.1
UK: Northern Ireland	22 552	1.0	6.5	21 905	0.8	5.1	647	8.8	56.3
UK: Scotland	48 678	1.2	7.4	47 285	0.9	6.1	1 393	9.7	53.7
UK: Wales	28 293	1.2	6.8	23 515	1.0	5.5	639	8.9	55.9

NOTE: Data for the years 2015 to 2018 are available in Excel files on the Euro-Peristat website (www.europeristat.com).

C7: Multiple birth rate in 2019 (rates per 100 women)

Country	Number of women		Multiple birth rate per 100 women
	Multiplicity stated	Multiplicity Not stated	
Austria	83 173	0	14.9
Belgium	115 870	0	15.4
Croatia	35 987	0	17.8
Cyprus	9 568	0	23.9
Czech Republic	111 166	0	13.1
Denmark	60 013	22	12.8
Estonia	13 678	0	16.0
Finland	45 356	0	12.7
France	705 034	*	16.4
Germany	749 659	0	19.2
Hungary	87 409	0	16.6
Iceland	4 383	0	15.7
Ireland	58 490	0	18.4
Italy	415 138	703	16.3
Latvia	18 458	0	13.2
Lithuania	24 395	0	16.2
Luxembourg	7 107	0	19.6
Malta	4 379	0	16.7
Netherlands	162 844	0	15.3
Norway	54 415	0	15.2
Poland	370 026	0	13.2
Portugal	85 968	0	15.4
Slovakia	56 591	207	12.0
Slovenia	18 964	0	18.2
Spain	355 250	0	18.1
Sweden	114 565	0	13.1
Switzerland	85 063	0	17.1
UK: MBRRACE	705 386	1 075	15.6
UK: England and Wales	632 687	0	15.2
UK: Northern Ireland	22 312	0	14.6
UK: Scotland	48 137	65	14.6
UK: Wales	24 506	4 166	13.4

NOTE: * less than 5 cases. Data for the years 2015 to 2018 are available in Excel files on the Euro-Peristat website (www.europeristat.com).

C8: Distribution of maternal age in 2019 (rates per 100 women)

	Number of women		Percentage of women delivering live or stillbirths – Age in years				
Country	Age stated	Age not stated	<20	20-24	25-34	35-39	40+
Austria	83 171	*	1.3	10.9	63.9	19.6	1.3
Belgium	115 759	110	1.4	9.6	68.5	16.6	1.4
Croatia	35 987	0	2.4	13.0	61.3	19.0	2.4
Cyprus	9 568	0	1.8	9.9	61.8	21.5	1.8
Czech Republic	111 166	0	2.1	10.6	65.6	17.5	2.1
Denmark	59 880	134	0.6	9.0	70.2	16.2	0.6
Estonia	13 566	0	1.9	10.5	63.8	18.6	1.9
Finland	45 356	0	1.3	11.6	62.7	19.6	1.3
France	705 027	6	1.7	11.5	63.8	18.4	1.7
Germany	749 655	*	1.8	9.8	63.3	20.7	1.8
Iceland	4 383	0	1.1	13.0	64.7	16.7	1.1
Ireland	58 490	0	1.5	7.9	51.2	31.6	1.5
Italy	414 950	188	1.4	8.3	56.0	25.6	1.4
Latvia	18 445	13	2.9	11.9	62.6	17.7	2.9
Lithuania	24 394	*	2.6	11.9	66.9	15.2	2.6
Luxembourg	7 105	*	1.0	7.1	60.3	25.2	1.0
Malta	4 377	*	3.2	9.7	64.3	19.1	3.2
Netherlands	162 760	83	0.8	7.6	69.2	18.8	0.8
Norway	54 415	0	0.7	8.8	68.7	17.8	0.7
Poland	370 025	0	2.2	12.8	65.5	16.2	2.2
Portugal	85 956	12	2.4	10.3	54.2	25.4	2.4
Slovakia	56 545	47	6.2	14.6	60.7	15.3	6.2
Slovenia	18 964	0	1.1	10.7	66.0	18.4	1.1
Spain	355 250	0	2.0	7.7	50.4	30.1	2.0
Sweden	113 817	748	0.9	9.5	67.2	18.0	0.9
Switzerland	85 063	0	0.5	6.3	63.6	24.1	0.5
UK: MBRRACE	685 825	19 561	2.8	13.7	60.1	18.9	2.8
UK: England and Wales	632 685	*	2.8	13.6	60.0	19.0	2.8
UK: Northern Ireland	22 312	0	2.8	12.5	60.5	19.7	2.8
UK: Scotland	48 137	0	3.0	13.6	60.5	18.8	3.0
UK: Wales	24 507	0	3.9	17.7	59.8	15.2	3.9

NOTE: * less than 5 cases. Data for the years 2015 to 2018 are available in Excel files on the Euro-Peristat website (www.europeristat.com).

C9: Distribution of parity in 2019 (rates per 100 women)

	Number of women				Percentage of women	
Country	Parity stated	Parity not stated	Nulliparous	Multiparous	Nulliparous	Multiparous
Austria	83 173	0	39 360	43 813	47.3	52.7
Belgium	114 381	1 490	49 596	64 785	43.4	56.6
Croatia	34 394	1 594	14 615	19 779	42.5	57.5
Cyprus	9 567	0	4 397	5 170	46.0	54.0
Czech Republic	110 779	387	53 647	57 132	48.4	51.6
Denmark	60 013	0	29 398	30 615	49.0	51.0
Estonia	13 678	0	5 245	8 433	38.4	61.7
Finland	45 337	19	19 188	26 149	42.3	57.7
France	558 560	146 474	232 619	325 941	41.7	58.4
Germany	749 659	0	344 436	405 223	46.0	54.1
Hungary	87 409	12 518	31 268	43 623	41.8	58.3
Iceland	4 383	0	1 912	2 471	43.6	56.4
Ireland	58 490	0	22 694	35 796	38.8	61.2
Italy	415 103	35	210 594	204 509	50.7	49.3
Latvia	18 458	0	7 301	11 157	39.6	60.5
Lithuania	24 396	0	11 149	13 247	45.7	54.3
Luxembourg	7 107	0	3 350	3 757	47.1	52.9
Malta	4 375	*	2 330	2 045	53.3	46.7
Netherlands	162 155	690	71 979	90 176	44.4	55.6
Norway	54 415	0	23 185	31 230	42.6	57.4
Poland	369 994	31	158 779	211 215	42.9	57.1
Portugal	85 966	*	44 956	41 010	52.3	47.7
Slovakia	56 418	172	24 871	31 547	44.1	55.9
Slovenia	18 963	*	8 858	10 105	46.7	53.3
Spain	355 250	0	176 577	178 673	49.7	50.3
Sweden	114 453	112	48 539	65 914	42.4	57.6
Switzerland	84 744	318	41 390	43 354	48.8	51.2
UK: MBRRACE	702 974	2 412	301 858	401 116	42.9	57.1
UK: England and Wales	632 651	36	272 136	360 515	43.0	57.0
UK: Northern Ireland	22 311	0	6 975	15 336	31.3	68.7
UK: Scotland	47 533	604	19 994	27 539	42.1	57.9
UK: Wales	22 042	2 464	9 229	12 813	41.9	58.1

NOTE: * less than 5 cases. Data for the years 2015 to 2018 are available in Excel files on the Euro-Peristat website (www.europeristat.com).

C10: Mode of delivery in 2019 (rates per 100 total births)

	Number of total births		Percentage of total births					
Country	Mode of delivery stated	Mode of delivery not stated	Vaginal sponta-eous	Vaginal-Instrum-ental	Vaginal-Total	Caesarean-no labour or elective	Caesarean-during labour or emergency	Caesarean-total
Austria	84 429	0	62.9	7.1	70.0	16.6	13.5	30.0
Belgium	115 583	0	69.5	9.1	78.6	10.9	10.5	21.5
Croatia	36 637	0	72.4	1.4	73.8	16.0	10.2	26.2
Cyprus	9 798	0	41.6	5.3	46.9	36.3	16.8	53.1
Czech Republic	105 782	6 851	72.8	2.6	75.5	14.4	10.2	24.5
Denmark	60 813	0	66.2	5.1	79.7	9.8	7.9	20.3
Estonia	13 900	0	75.5	5.1	80.6	6.2	13.2	19.4
Finland	45 857	81	72.3	9.8	82.1	7.2	10.7	17.9
France	716 752	0	69.6	9.6	79.1	10.5	10.4	20.9
Germany	761 929	1 995	61.3	6.9	68.2	13.4	15.7	31.8
Hungary	87 409	0	56.9	1.7	58.5	12.8	28.7	41.5
Iceland	4 452	0	76.0	7.4	83.4	7.8	8.8	16.6
Ireland	59 592	0	51.3	13.9	65.2	N/A	N/A	34.8
Italy	416 147	6 462	63.1	3.9	67.0	20.7	12.3	33.0
Latvia	18 703	0	74.2	3.4	77.5	8.9	13.6	22.5
Lithuania	24 796	0	77.5	1.6	79.1	9.5	8.6	20.9
Luxembourg	7 247	0	57.9	11.7	69.6	16.8	13.6	30.4
Malta	4 455	0	63.2	4.9	68.1	18.3	13.6	31.9
Netherlands	158 226	6 065	75.3	7.3	82.7	8.7	8.7	17.4
Norway	55 222	0	73.5	10.1	83.6	6.7	9.7	16.4
Poland	369 391	0	N/A	N/A	55.7	N/A	N/A	44.4
Slovakia	57 276	207	67.4	2.5	69.9	23.7	6.5	30.1
Slovenia	19 311	*	75.3	2.8	78.1	10.0	11.9	21.9
Spain	361 755	0	59.9	14.4	74.3	9.2	16.5	25.7
Sweden	116 082	0	77.0	4.9	81.8	8.0	10.2	18.2
UK: Northern Ireland	22 641	0	56.0	11.3	67.3	20.3	12.4	32.7
UK: Scotland	48 849	0	52.3	12.0	64.5	15.6	9.9	35.5
UK: Wales	28 966	39	62.0	9.7	71.7	13.4	14.9	28.3

NOTE: * less than 5 cases. N/A: data not available. Data for the years 2015 to 2018 are available in Excel files on the Euro-Peristat website (www.europeristat.com).

More information on our website at
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