



EXECUTIVE SUMMARY

EUROPEAN PERINATAL HEALTH IN EUROPE IN 2015: EXECUTIVE SUMMARY

1.1 A EUROPEAN VISION OF MATERNAL AND NEWBORN HEALTH

THE CHALLENGES

Maternal and newborn health are essential indicators of population health and wellbeing. Medical advances, universal access to healthcare, changes in population health, and increases in knowledge among childbearing women have been the drivers of decades-long decreases in newborn and maternal mortality in Europe. Yet despite this progress, there are major challenges to the goal of providing an optimal start in life for all children and families. The number of families touched by the loss of a child, either a stillbirth or an infant death, remains substantial — more than 40 000 families in Europe every year.¹ Second, while maternal deaths are increasingly rare, up to half are associated with substandard care. Moreover, it is estimated that between 1 and 3% of women experience severe morbidity during their delivery hospitalization, also often due to substandard care, although we lack good tools to measure this indicator.² Third, although the mortality associated with pregnancy complications such as preterm delivery and intrauterine growth restriction has decreased, prevention of these complications has been much less successful. Preterm birth rates have generally stayed stable in Europe or have risen in some countries.³ Further, some major risk factors for maternal and infant complications, including older maternal age and obesity, are becoming more common and have the potential to stop or to reverse downward trends in mortality. Reducing these risk factors among childbearing women requires a holistic focus on population health before and during pregnancy. Finally, economic shocks in many countries have created difficult conditions for families that justify a special focus on protecting pregnant women and their newborns.

A LIFE COURSE APPROACH

As Europe adopts a life course approach to improving the health, well-being, and productivity of its citizens, the importance of maternal and newborn health takes on new weight. Good health during pregnancy and at birth extends beyond the perinatal period and is an essential building block for later health. Studies have related perinatal exposures and outcomes during pregnancy to increased susceptibility to many conditions, including asthma, allergies, obesity, hypertension, and other metabolic diseases. Mothers with particular complications during pregnancy, such as gestational diabetes or hypertension, are themselves more likely to develop these chronic problems later in life. The possibility of disrupting processes in the womb that can lead to poor health later in life or of intervening during pregnancy to promote women's later health provides a strong rationale for targeting the perinatal period. As poverty and social disadvantage remain key risk factors for a wide range of adverse perinatal outcomes, action in the perinatal period might also prevent the intergenerational transmission of poor health.

A EUROPEAN VISION

Exploring maternal and newborn health through a European lens offers a unique opportunity to obtain insight into these challenges and their possible solutions. Despite similar access to medical knowledge and universal insurance coverage for mothers and babies in most countries, the nations of Europe vary enormously in the care and support they provide during pregnancy and to newborn babies and their families.⁴ By comparing maternal and child health and care across



Europe, we can benefit from the success stories and learn from each other through working collaboratively, especially in a long-standing European project such as Euro-Peristat. These data are of interest for many different groups, but most importantly, for pregnant women, their partners and their families, clinicians, researchers, and public health professionals.

1.2 EURO-PERISTAT: BETTER STATISTICS FOR BETTER HEALTH FOR MOTHERS AND THEIR BABIES

THE EURO-PERISTAT PROJECT

Euro-Peristat aims to monitor health in Europe with valid and reliable indicators. The Euro-Peristat project began in 1999 as part of the European Union Health Monitoring Programme and received funding in successive phases of its Public Health Programme. Euro-Peristat has been coordinated by INSERM (the French Institute of Health and Medical Research) since its inception. Currently, Euro-Peristat is part of a European Joint Action, InfAct (Information for Action), launched in March 2018. InfAct is working to provide a sustainable solution for European health information networks and better coordination of health information surveillance and data collection in Europe (<https://www.inf-act.eu/>). Data compilation and analysis for this report was co-funded by the BRIDGE Health project, which provided support for Euro-Peristat from May 2015 to October 2017. Most importantly, however, Euro-Peristat is made possible by the support of the participating institutions that provide routine statistical data to the Euro-Peristat coordination team. In addition, Euro-Peristat would not be able to validate or to report on these data without the invaluable input of our network of experts who contribute their time and expertise. Appendix A lists all contributors to this report. We also acknowledge the support of Inserm for coordination activities and of our partners in the Netherlands and the UK for contributing funds for the project meeting for this report.

THE EURO-PERISTAT NETWORK

Our network includes over 100 data providers and participating members in 31 European member states and other collaborating countries. In each country, one Scientific Committee member is responsible for the coordination of data collection, and other data providers and experts make up the collaborating team for each country. Since 2016 when Bulgaria and Croatia joined Euro-Peristat, the network has included all 28 current EU member states, as well as Iceland, Norway, and Switzerland.

THE EURO-PERISTAT INDICATORS

The Euro-Peristat indicator list includes 10 core indicators and 20 recommended indicators, grouped into 4 themes: (i) fetal, neonatal, and child health, (ii) maternal health, (iii) population characteristics and risk factors, and (iv) health services.⁵ We define core indicators as those that are essential for monitoring perinatal health and recommended indicators as those considered desirable for a more complete comparison of perinatal health between countries. The Euro-Peristat indicators are compiled from population-based data aggregated at the national level from routine sources including civil registration systems, administrative or health registers, other statistical systems, or routine surveys.^{6,7} However, if data are not available at the national level, population-based data can be submitted from regions or, as in the UK, from constituent countries.

REPORTING ON PERINATAL HEALTH IN 2015

This report includes data for all 10 Euro-Peristat core indicators and two of the 20 recommended indicators of maternal and newborn health in 2015. In the absence of funding for a full data collection exercise, the network decided to collect core indicators to be able to update essential basic information related to maternal and newborn health. Two recommended indicators – maternal smoking during pregnancy and prepregnancy body mass index – were also selected because their association with adverse perinatal health outcomes makes them of key relevance for preventive policies. We are hopeful that in the future, sustainable funding for perinatal data collection will make it possible to produce the full set of Euro-Peristat indicators related to the broader set of health and healthcare factors, as only these data enable us to address the high priority question of health inequalities on a European scale.

DATA COLLECTION

Euro-Peristat compiles its indicators from public national data systems. Data collection for this report began in January 2017. We asked for data on births in 2015, or for the most recent year if 2015 data were not yet available. We collected aggregated data with a standardised Excel-based instrument developed and adapted by the Netherlands Organisation for Applied Scientific Research, TNO Healthy Living in Leiden, the Netherlands. We also experimented with a new protocol for collecting data in multivariable aggregate tables, which are less time-consuming to output and which enable more flexible analyses. A STATA programme developed by Inserm allowed these to be converted into the aggregate tables. Overall, aggregated data files were constructed this way in 16 of 31 countries. All data were reviewed by the project coordination team based at Inserm in France, and queries were sent to individual Scientific Committee members and country data providers for review. Members of the Euro-Peristat network met in the Netherlands in April 2018 to review the preliminary tables. They used these to discuss observed geographical and temporal variations, with a particular focus on possible differences in indicator definitions and data collection. Scientific Committee members checked data for the indicators, reviewed and corrected the Euro-Peristat output tables, and contributed to writing and reviewing the written text before publication of this report.

COMPARING “LIKE WITH LIKE”

Euro-Peristat focuses on ensuring the development of high quality indicators that are feasible to collect and are comparable. The indicator set was originally developed through a DELPHI consensus process with national experts and has been updated before each new data collection exercise. Euro-Peristat standardises the population of births used to produce the indicators: we ask countries to provide numbers of all births at 22 or more weeks of gestation or weighing 500 grams or more if gestational age is missing or not recorded. Next, we compile data in subgroups to allow us to refine our indicators. For the mortality indicators, we derive rates from data from which births at 22 and 23 weeks of gestation have been removed, because it is well known that these births are not recorded in the same ways in all statistical systems.⁸ Consequently, because almost all of these extremely preterm babies at 22 and 23 weeks die, they have an extensive impact on comparisons of mortality statistics. For stillbirths we derive rates from data from which births before 28 weeks have been removed, as recommended by the World Health Organization to increase comparability. However, as Euro-Peristat argued in an article in the *Lancet* in 2018,⁹ a 24-week cutoff can be used in most European countries, so that stillbirths can be compared at earlier gestational ages. We hope in the future to report all deaths from 22 weeks onwards to



acknowledge the burden of loss to a greater number of families and identify issues relating to variation in provision of care at these earlier gestations. We also collect data by other clinically relevant subgroups, such as multiplicity and birth weight. These subgroup analyses increase our ability to compare “like with like” and provide additional information about health and care. They are also very important for comparing women’s risks of caesarean birth.

1.3 RESULTS: THE BIG PICTURE

EUROPE CONTINUES TO PROVIDE STRONG MODELS OF MATERNAL AND NEWBORN HEALTH

A first overarching message is that in 2015 rates of stillbirth and neonatal, infant, and maternal death were lower for babies and women in Europe than in other parts of the world, including other high-income countries outside Europe. Reassuringly, stillbirth and neonatal mortality rates continue to decline, albeit unevenly and more slowly than in previous periods. Preterm birth and low birthweight rates, while not declining, have stayed stable overall, as observed in previous Euro-Peristat reports. Rates of caesarean birth in some Euro-Peristat countries are among the lowest in high-income and middle-income countries, in particular, Iceland, Finland, Norway, and the Netherlands. Most countries have declining or stable caesarean birth rates, although some, including Poland, Romania, Bulgaria, and Cyprus, report worrying increases. These positive achievements overall come despite widespread changes in some risk factors that predispose women to adverse pregnancy outcomes, such as older age at childbirth and obesity. In this respect, Europe offers strong models for providing high quality care to women and newborns.

BUT WIDE DIFFERENCES PERSIST BETWEEN COUNTRIES

A second message is the continuing striking variation between countries in Europe. Many indicators vary by a factor of at least two between countries with the highest and lowest rates. This variation is also evident in the changes in indicator values between the data for 2015 included in this report and our previous report on data from 2010. The comparisons we have presented show both significant decreases and increases. The successes in the countries with the best outcomes can be used to set goals for other countries. Moreover, this variation challenges clinicians, researchers, and policy makers to identify the explanations for changing outcomes, which may reflect population as well as healthcare factors. It is also important to consider whether there have been changes in data reporting. From a health policy perspective, the comparisons of indicators in 2010 and 2015 and the possibility that lower rates of some indicators might reflect policy decisions are highly interesting. For example, the Netherlands and the UK implemented audits on stillbirths and report a greater reduction in stillbirth rates between 2010 and 2015 than other countries. Policies to reduce the numbers of multiple pregnancies through assisted reproductive technology (ART) in the Czech Republic were accompanied by decreases in both multiple pregnancy and preterm birth rates. More investigation of these case studies is needed to understand these relationships and could yield important examples of successful policy initiatives that could be adopted more widely.

1.4 RESULTS: A SUMMARY OF KEY FINDINGS

THE INCREASE SINCE 2010 IN MANY RISK FACTORS FOR CHILDBEARING WOMEN PRESENTS A COMMON CHALLENGE

The core and recommended indicators in this report describe characteristics of the childbearing population that are related to risks of mortality, morbidity, and obstetric interventions. These are multiple birth, maternal age, parity, smoking, and maternal prepregnancy body mass index. Population characteristics may explain differences between countries as well as changes over time.

- Women with multiple pregnancies face higher risks of preterm birth and perinatal mortality and morbidity. In Europe, the median multiple pregnancy rate is 16.7 per 1000 women delivering a live or stillbirth. Countries with high multiple birth rates — over 19 per 1000 — are Ireland, Germany, Slovenia, Spain, and Cyprus, whereas low multiple birth rates — under 14 — are found in Romania, Slovakia, Poland, Greece, Finland, and Lithuania.
- The median percentage of women having babies at 35 years of age or older was 20.8%; percentages exceeded 29% in Portugal, Greece, Ireland, Italy, and Spain and were less than 15% in Bulgaria, Romania, and Poland.
- Teenage pregnancy is increasingly uncommon in Europe; in 21 countries, fewer than 3% of women were under 20 years of age at the birth of their child. This percentage exceeded 6% in several countries, however: Slovakia, Hungary, Romania, and Bulgaria.
- While the age distributions of childbearing women differ, there is a common trend toward later age at childbirth. Overall the percentage of mothers aged 35 years or older increased by 16%, with the biggest increases in Cyprus, Hungary, the Czech Republic, and Portugal.
- Maternal obesity is also increasing, although our vision is very partial as only 12 of the 31 countries participating in Euro-Peristat could provide this information. The median prevalence of obesity before pregnancy, as defined by a maternal body mass index of 30 or greater, was 13.2% in these countries, ranging from 7.8 to 25.6%. In 7 of the 9 countries that also had data for 2010, percentages were higher in 2015.
- Smoking in pregnancy is a subject on which there is good news to report. Overall, the percentage of women smoking during pregnancy in 2015 was 13% lower than in 2010. However, progress is possible in many countries. In a quarter of the 20 countries able to report data on smoking during pregnancy, more than 12.5% of women smoked, with percentages highest in Valencia in Spain (18.3), Wales (17.3), France (16.3), and Northern Ireland (14.3). In contrast, in Norway, Sweden, and Lithuania, fewer than 5% of women smoked during pregnancy.

EUROPEAN DISPARITIES IN MODE OF DELIVERY HAVE WIDENED

- In Europe, the median caesarean section rate is 27.0% and one quarter of countries have rates below 21%. Iceland, Finland, Norway, and the Netherlands have the lowest rates, under 18%, while Italy, Hungary, Poland, Bulgaria, Romania, and Cyprus had rates over 35%.
- Overall, caesarean birth rates were 4% higher in 2015 than in 2010, but this represents an average including much greater increases in countries such as Romania, up by 27% (from 36.9% to 46.9%), Poland 24% (from 34.0% to 42.2%), Hungary 21% (from 32.3% to 39%), and Scotland 17% (from 27.8% to 32.5%).
- In contrast, caesarean section rates decreased in Lithuania, Latvia, Portugal, Estonia, Italy, Norway, and Spain.



- These differences between countries are also observed in subgroup analyses. For babies in a breech presentation, the median caesarean rate was 89%, with a range from 64.3% to 100%. In 4 countries, Norway, Latvia, Finland, and France, 25% or more of breech babies were born vaginally.
- Ten countries have no data about risk subgroups; unfortunately, many of these countries are those with high rates of caesarean births, where evaluating current practices is particularly important.
- Instrumental birth rates varied widely. The median was 7.2%, ranging from below 3.5% in a quarter of countries to over 10.9% in another quarter. Rates under 2.5% were observed in Romania, Croatia, Lithuania, Slovakia, and Latvia and over 12% in France, Scotland and England in the UK, Spain, and Ireland.

POOR QUALITY STATISTICS CONTINUE TO HAMPER EUROPEAN SURVEILLANCE OF MATERNAL DEATHS

- Most countries rely on routine cause of death statistics to measure maternal deaths, despite well-known under-reporting. Because of this, and very low numbers, no firm conclusions can be drawn for most countries about whether their maternal mortality ratios (MMRs) are higher or lower than in other European countries or whether there have been changes over time. This is a major limitation to benchmarking across countries. All European countries should be able to provide reliable statistics on maternal deaths, as in the countries that have enhanced reporting systems.
- Maternal mortality appears to have declined in countries that carefully count and analyse maternal deaths. MMRs computed with data from enhanced systems decreased in the most recent five-year period compared to data reported in our previous report, but only 7 countries had data from these systems. Since many enhanced systems are accompanied by audits, these systems may contribute to improving care for pregnant women and therefore the results from these countries may not apply more generally.

OVERALL, STILLBIRTH AND NEONATAL MORTALITY RATES DECLINED, BUT WITH HIGH HETEROGENEITY

- The median stillbirth rate at 28 weeks of gestation and over was 2.7 per 1000 births. Rates below 2.3 per 1000 were reported in Cyprus, Iceland, Denmark, Finland, and the Netherlands, and rates of 3.5 per 1000 or more in Slovakia, Romania, Hungary, and Bulgaria. When stillbirths between 24 and 27 weeks of gestation were included, the median rate was 3.3, but the ranking of countries remained similar.
- Overall, stillbirth rates in 2015 were 5% lower than in 2010, but this reflects an average between large declines in the Netherlands, Scotland, and Poland and stable rates in other countries.
- For neonatal mortality rates at 22 weeks and over, the European median was 2.2 per 1000 live births. Countries with rates of 1.5 per 1000 or lower were Slovenia, Iceland, Finland, Norway, the Czech Republic, Estonia, and Sweden, while Northern Ireland, Malta, Romania, and Bulgaria had rates above 3.5 per 1000. Some of this variability in neonatal mortality rates is related to differences in policies governing terminations of pregnancy for fetal anomalies.

- After excluding births at 22 and 23 weeks of gestational age, accounting for about 19% of all neonatal deaths, the median was lower, 1.7 per 1000, but rankings were similar. Low rates were less than 1.2 per 1000 while higher rates exceeded 3.0 per 1000. However, 7 countries were unable to provide the information needed for this comparison.
- Overall, neonatal mortality declined, and these declines were more marked when babies born at 22 and 23 weeks were excluded. In some countries however, neonatal mortality rates were higher in 2015, significantly so in Portugal.
- For infant mortality, the median was 3.1 per 1000 with lower mortality countries reporting rates of 2 and lower, and higher mortality countries with rates of 5 per 1000 or more. Ten countries were unable to provide data to calculate mortality rates without babies born at 22 or 23 weeks, who were estimated to account for 12% of all deaths.

PRETERM BIRTH AND LOW BIRTH WEIGHT REMAIN STABLE OVERALL WITH STRONG GEOGRAPHICAL PATTERNS

- Babies with a low birth weight (< 2500 grams) accounted for less than 4.5% of all births in Iceland, Sweden, Finland, and Estonia and more than 8.0% in Spain, Hungary, Portugal, Greece, Bulgaria, and Cyprus.
- When comparing 2015 to 2010, there were significant decreases in some countries (Norway, Greece, and Austria) and increases in others (Iceland, France, Ireland, Northern Ireland, and Portugal).
- Preterm birth rates ranged from less than 6% in Finland, Latvia, Estonia, Sweden, and Lithuania to more than 8.0% in Belgium, Scotland, Romania, Germany, Hungary, Greece, and Cyprus, with a European median of 7.3%.
- Changes since 2010 were highly heterogeneous, with significant declines in 6 countries, including the Netherlands, Austria, and the Czech Republic and significant increases in 8 countries.

1.5 THE NEED FOR CONTINUOUS AND MORE COMPLETE MONITORING

This European Perinatal Health report illustrates the feasibility and the importance of comparable data on maternal and newborn health across Europe. It also highlights significant challenges, both in data quality and availability. These problems have been highlighted for each indicator in the text.

The set of Euro-Peristat indicators should represent minimum standards for national reporting. Data availability overall is good for the core indicators, but tabulations by subgroups are not available for all indicators. Many countries were unable to provide data on maternal smoking or prepregnancy body mass index, although these are needed to evaluate policies to improve population health.

In addition to the challenges facing each country in improving their data quality and availability, this report suffers from a lack of continuous time series data. We cannot accurately describe trends in the indicators without annual data, especially in countries with small numbers of births each year; consequently, we observe substantial year to year variation in indicator values. While combining data from 31 countries to undertake “like with like” comparisons requires substantial effort, especially with regard to data cleaning and checking, this report shows that it is possible. A goal for current health information initiatives should be to create a sustainable structure and a funding stream to support collection, data cleaning and validation, and analysis of data from routine statistical systems in European countries on an annual basis. This would provide up-to-date knowledge about key indicators of maternal and newborn health to pregnant women and their families, clinicians, and policy makers and enable better monitoring of trends over time.



REFERENCES TO SELECTED EURO-PERISTAT PUBLICATIONS

1. Euro-Peristat project with SCPE and EUROCAT. European Perinatal Health Report. The Health and Care of pregnant women and babies in Europe in 2010. J. Zeitlin, M Delnord, AD Mohangoo, eds., ed. http://www.euoperistat.com/images/doc/EPHR2010_w_disclaimer.pdf, 2013.
2. Bouvier-Colle MH, Mohangoo AD, Gissler M, et al. What about the mothers? An analysis of maternal mortality and morbidity in perinatal health surveillance systems in Europe. *BJOG* 2012;119(7):880-9; discussion 90. doi: 10.1111/j.1471-0528.2012.03330.x
3. Zeitlin J, Szamotulska K, Drewniak N, et al. Preterm birth time trends in Europe: a study of 19 countries. *BJOG* 2013;120(11):1356-65. doi: 10.1111/1471-0528.12281.
4. Macfarlane AJ, Blondel B, Mohangoo AD, et al. Wide differences in mode of delivery within Europe: risk-stratified analyses of aggregated routine data from the Euro-Peristat study. *BJOG* 2016;123(4):559-68. doi: 10.1111/1471-0528.13284.
5. Zeitlin J, Wildman K, Breart G, et al. Selecting an indicator set for monitoring and evaluating perinatal health in Europe: criteria, methods and results from the PERISTAT project. *Eur J Obstet Gynecol Reprod Biol* 2003;111 Suppl 1:S5-S14.
6. Gissler M, Mohangoo AD, Blondel B, et al. Perinatal health monitoring in Europe: results from the EURO-PERISTAT project. *Inform Health Soc Care* 2010;35(2):64-79.
7. Delnord M, Szamotulska K, Hindori-Mohangoo AD, et al. Linking databases on perinatal health: a review of the literature and current practices in Europe. *Eur J Public Health* 2016;26(3):422-30. doi: 10.1093/eurpub/ckv231.
8. Mohangoo AD, Buitendijk SE, Szamotulska K, et al. Gestational Age Patterns of Fetal and Neonatal Mortality in Europe: Results from the Euro-Peristat Project. *PLoS ONE* 2011;6(11):e24737.
9. Smith LK, Hindori-Mohangoo AD, Delnord M, et al. Quantifying the burden of stillbirths before 28 weeks of completed gestational age in high-income countries: a population-based study of 19 European countries. *Lancet* 2018;S0140-6736(18)31651-9.

