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Robson ten group classification system for Caesarean sections across Europe: A systematic review and meta-analysis

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ABSTRACT

The aim of this systemic review and meta-analysis was to examine the differences in caesarean section rates across European regions and at a country level by utilizing the Robson classification system. The study has compared caesarean rates across European regions using the Robson classification to identify the drivers of caesarean section use.

This review shows significant variations in caesarean section rates across European regions, ranging from 16.9 % in Northern Europe to 43.6 % in Southern Europe. There was a higher contribution of previous CS (Robson Group 5), ranging from 51.2 to 95.0 % of CS in this group to overall rates, particularly in Southern Europe (95.0 %), raises concerns about the "domino effect" of primary caesareans. This finding emphasises the critical importance of strategies to reduce primary CS rates.

Background: Caesarean section (CS) rates exhibit considerable global variation, reflecting diverse medical practices, cultural attitudes, and healthcare policies. While some regions maintain relatively low rates, others report significantly higher incidences of the procedure. Analysing these differences is crucial for understanding and developing targeted healthcare strategies and ensuring optimal maternal and neonatal outcomes. This review examines differences in CS rates in Europe according to the Robson 10 group classification.

Methods: We identified articles between January 2000 to June 2023 using MEDLINE/PubMed, CINAHL, EMBASE, Global Index Medicus, Web of Science and Cochrane library. There was no restriction on patient population, except for birth in a country of the European region. We excluded all studies that were conference proceedings and studies reported in a language other than English and Swedish.

Findings: The search generated a total of 1024 studies, out of which 44 were included, encompassing 6,641,615 births. The majority were from Northern (38 %) and Western Europe (33.5 %). CS rates varied markedly across Europe, ranging from 16.9 % in Northern region to 43.6 % in Southern Europe. The highest contribution to CS rates came from Robson Group 5 (previous CS), with contributions ranging from 51.2 % in Northern to 95.0 % in Southern Europe. The mode of birth for Robson Group 6 (nulliparous, breech) was predominately by CS (88.8 % in Northern to 92.5 % in Central-Eastern Europe).

Interpretation: CS rates continue to vary widely across Europe, with the highest rates in Southern and the lowest in Northern Europe. Previous CS and breech presentation were prominent drivers of CS rates. Region-specific strategies are needed to address these diverse factors to minimise accelerating CS rates across Europe.

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Introduction

Caesarean section (CS) rates are increasing globally, reflecting a significant shift in childbirth practices around the world [1]. This rise has been observed also in Europe [2]. A CS is a major obstetric intervention that can prevent both maternal and neonatal morbidity and mortality during pregnancy and labour-related complications [3]. However, when CS is used without medical justification, it becomes a public health concern due to its association with avoidable short- and long-term risks for both mothers and neonates [3,4]. Of late, some women's rights groups have called surgical interventions such as CS as obstetric violence [5]. As more women opt for or require CS birth, the trend underscores the need for ongoing evaluation of the reasons behind these increases.

Rates for CS vary significantly across European countries. In 2019, Cyprus, Poland, and Hungary reported high percentages of births by CS—53.1 %, 44.4 %, and 41.5 %, respectively—compared to a 16.4 % CS rate in Finland, highlighting significant regional disparities. A recent study reported an increase in CS rates in some European countries such as in Croatia (+4.7 %), Ireland (+3.5 %), Hungary (+2.7 %), and the UK (Scotland +3.1 %, Northern Ireland +2.5 %, Wales +2.4 %) [6]. These trends indicate an ongoing shift towards higher CS utilization, which may reflect changes in medical practices, patient preferences, or broader healthcare policies.

The Robson classification, also known as the 10-groups classification or ten groups classification system, is a global standard for assessing, monitoring, and comparing CS rates [7] and is recommended by World Health Organization (WHO) and the European Board and College of Obstetrics and Gynaecology (EBCOG) in its position statement published 2017 [8]. The classification system is an effective tool for reporting CS rates due to its standardisation and comprehensive inclusion of all pregnant women, categorised into clinically relevant groups based on factors such as parity, gestational age, onset of labour, foetal presentation, and number of foetuses. This uniformity facilitates consistent data collection, enabling meaningful comparisons within and between hospitals, thus identifying variations in practice and areas for improvement [9].

The aim of this systemic review and meta-analysis was to examine the differences in CS rates across European regions and at a country level by utilising the Robson classification system. Additionally, the study aimed to compare CS rates across different Robson groups within European regions to identify the most common drivers for CS use.

Methods

Search strategy and selection criteria

Our systematic review and meta-analysis were conducted following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses statement [10]. The developed protocol was registered in PROSPERO (Registration number 513579).

Data sources

With help from an experienced librarian at Lund University, Sweden, a systemic literature search was conducted using MEDLINE/PubMed, CINAHL EMBASE, Web of Science, Cochrane library, African Index Medicus via Global Index Medicus CAB (World Health Organization) and Latin American and Caribbean Health Sciences Literature (LILACS) via Global Index Medicus (World Health Organization) (Supplementary Table 1).

Eligibility criteria

All articles published from January 2000 to June 2023 were included in the search strategy. There was no restriction on patient population, except for birth in a country of the European region. Turkey was also included because it was considered a transcontinental country. We excluded all studies that were conference proceedings and studies reported in a language other than English or Swedish.

Search strategy

The search terms "Robson classification", "Robson 10 classification" and "Cesarean section" were used. All studies identified by the search were uploaded to Covidence systemic review software [11].

Study selection

We stored citations and removed duplicates using EndNote (Thomson Reuters, Toronto, Ontario, Canada) and Covidence [11]. Two authors (VER, LDC) independently: (i) screened titles and abstracts of research studies identified through the search strategies mentioned above in all relevant studies; and (ii) assessed their suitability for inclusion in the review. Any discrepancies or information conflicts was resolved by a third, more senior author (MZ). Full texts of each selected study were thereafter reviewed for potential eligibility. If any discrepancies occurred about the inclusion/exclusion of any study, a third, more senior author was consulted and, after independently assessing the full text, mediated the conflict.

Data analysis

Data were extracted from eligible studies, according to a prespecified protocol of data extraction using REDCap. The following data items were extracted: authors, year of publication, country, study design, aim of study, setting (public vs. private), study duration, total sample size, total number of vaginal births, total number of caesarean sections, indication for caesarean sections, absolute and relative group sizes according to Robson classification and adverse perinatal outcomes if any listed. All studies were categorised according to the following four European regions: Nordic Europe, Western Europe, Southern Europe and Central-Eastern Europe [12]. In case a study compared Robson group data for two or more different time points, we included data from only the latest time point for comparisons. Any discrepancies between the extracted data were resolved through group discussion.

Risk of bias in individual studies (quality assessment)

Two authors independently assessed the quality of the studies included in the primary meta-analysis using a modified version of the Newcastle-Ottawa quality assessment scale for cohort studies [13]. When there were different assessments, studies were discussed in detail until consensus was achieved. Regarding the domain 'selection', one star was given for the subdomain 'representativeness of the exposed cohort' for studies including all births in a specific country. Studies limited to regional, or district hospitals were not given a star. Similarly, if data for both CS and vaginal births were present, a star was given for the subdomain 'selection of nonexposed cohort'. One star was given for detailed information of births for each Robson group in 'ascertainment of exposure' and one star if the 'outcome was not present at the start of the study'. For the domain 'comparability', studies were given two stars if Robson groups were compared for two or more time-points. One star was given if studies made attempts to adjust their results for comparisons. Lastly, in the domain 'outcomes', one star was given for 'assessment of outcomes' if all Robson groups were reported. If any neonatal or maternal outcomes were reported, a star was given for 'length of follow-up' and 'adequacy of follow-up'.

Synthesis of results

As all the studies included in this review used the same scale (Robson classification), we performed the meta-analysis by calculating the total effect size of each group collectively and subdivided according to European Region. If percentages were given without absolute numbers, we calculated the absolute numbers by multiplying the total sample size by the percentage to get the number of individuals in each group. The total number of CS and vaginal births were calculated using the sum of the

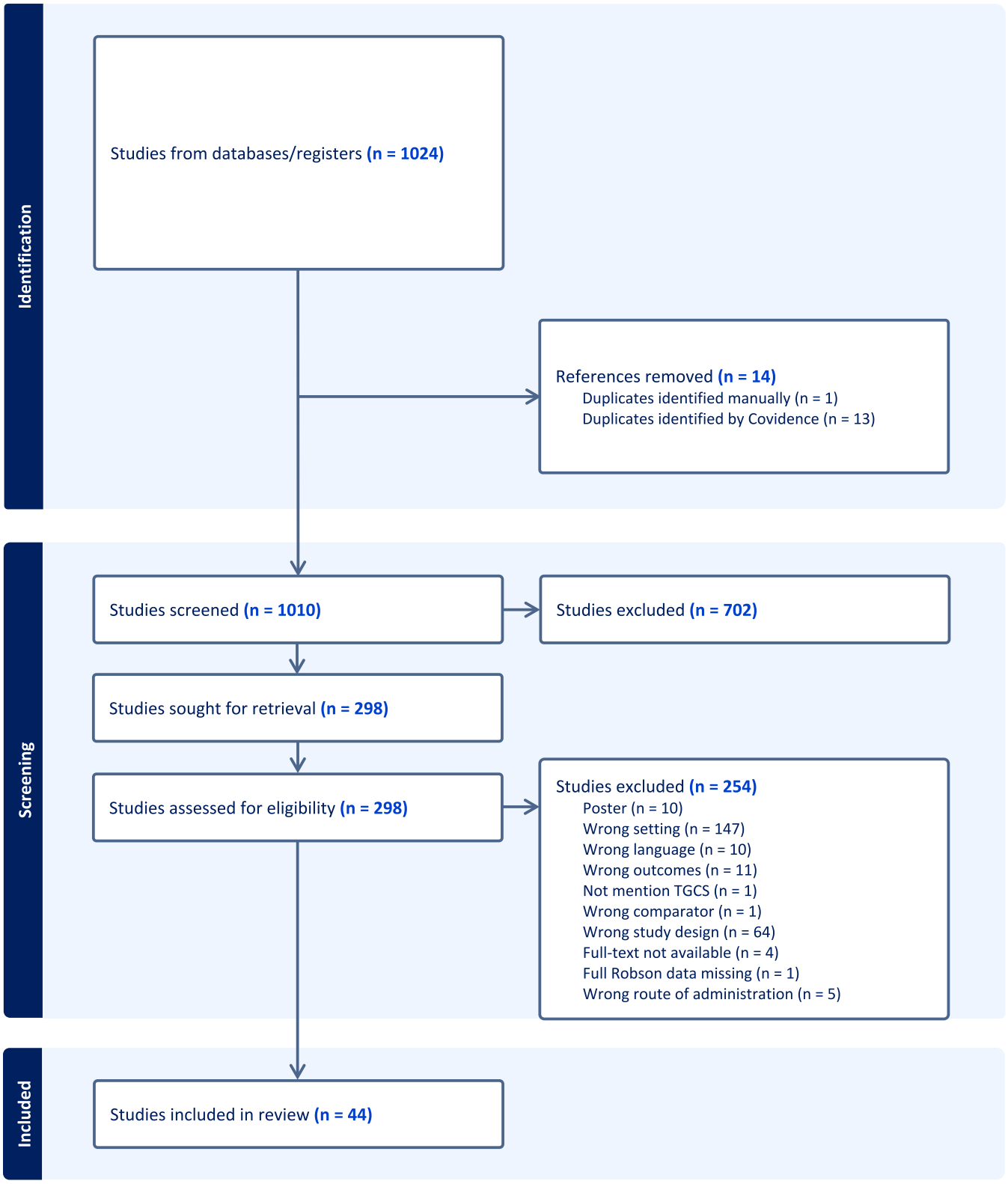

Fig. 1. PRISMA diagram showing the flow of study identification and selection.

individual Robson groups. Robson group sizes were calculated using pooled absolute numbers for continuous outcomes. Multi-country studies were extracted individually for country level data and data was reported separately for each country. All statistical analyses were performed using Microsoft Excel and Stata (Stata Statistical Software: College Station, TX: Stata Corp LP).

Role of the funding source

The funder of the study had no role in study design, data collection, data analysis, data interpretation, or writing of the report.

Table 1
Study characteristics.

First Author, year	Country	Type of Study	Study duration	Population characteristics	Public/ Private hospital	Reasons for caesarean section	Reported perinatal outcomes
Nordic Europe 11 studies (Denmark, Finland, Iceland, Norway and Sweden)							
Laine 2023	Norway	Retrospective cohort	01–1999 to 12–2018	All births in Norway	Public	NA	Perinatal Mortality Apgar < 7 at 5 mins
Muraca 2022	Sweden	Retrospective cohort	01–2004 to 12–2016	All births in Sweden	Public	NA	Pre-eclampsia
Savchenko 2022	Sweden	Prospective cohort	01–2017 to 12–2020	All births in Sweden	Public	NA	Postpartum Haemorrhage Apgar < 7 at 5 mins
Zeitlin 2021	Denmark	Cross-sectional	01–2015 to 12–2015	All births in Denmark	Public	NA	NA
Zeitlin 2021	Finland	Cross-sectional	01–2015 to 12–2015	All births in Finland	Public	NA	NA
Zeitlin 2021	Iceland	Cross-sectional	01–2015 to 12–2015	All births in Iceland	Public	NA	NA
Zeitlin 2021	Norway	Cross-sectional	01–2015 to 12–2015	All births in Norway	Public	NA	NA
Zeitlin 2021	Sweden	Cross-sectional	01–2015 to 12–2015	All births in Sweden	Public	NA	NA
Bakken 2019	Norway	Prospective cohort	01–2006 to 12–2013	Births from immigrant women with low obstetric risk	Public	NA	Neonatal intensive care unit admission
Einarsdóttir 2019	Iceland	Prospective cohort	01–1997 to 12–2015	All births in Iceland	Public	NA	Perinatal Mortality Postpartum Haemorrhage Apgar < 7 at 5 mins
Kempe 2019	Sweden	Cross-sectional	01–2013 to 12–2016	All births at tertiary hospital	Public	NA	Perinatal mortality Apgar < 7 at 5 mins
Western Europe 21 studies (Austria, Belgium, France, Germany, Ireland, Luxemburg, Netherlands and Switzerland)							
Quibel 2022	France	Retrospective cohort	01–2012 to 12–2014	French perinatal network of 10 maternaty wards in the Yvelines	5 Private and 5 Public	NA	Apgar < 7 at 5 mins
Eftekharian 2021	Austria	Retrospective cohort	01–2003 to 12–2013	All births at Medical University of Vienna	Public	NA	Neonatal intensive care unit admission
Pulvermacher 2021	Germany	Prospective cohort	10–2017 to 12–2018	All births at two German hospitals (1 university level, 1 district level)	Public	NA	NA
Quibel 2021	France	Prospective cohort	01–2014 to 12–2014	All births at 10 hospitals of the French Réseau Maternités en Yvelines et perinatalité active (MYPA) perinatal network	5 Private and 5 Public	NA	NA
Zeitlin 2021	Belgium	Cross-sectional	01–2015 to 12–2015	All births in Belgium		NA	NA
Zeitlin 2021	France	Cross-sectional	01–2015 to 12–2015	All births in France	Public and Private	NA	NA
Zeitlin 2021	Germany	Cross-sectional	01–2015 to 12–2015	All births in Germany		NA	NA
Zeitlin 2021	Luxemburg	Cross-sectional	01–2015 to 12–2015	All births in Luxemburg	Private/ Public	NA	NA
Zeitlin 2021	Netherlands	Cross-sectional	01–2015 to 12–2015	All births in Netherlands		NA	NA
Zeitlin 2021	Ireland	Cross-sectional	01–2015 to 12–2015	All births in Ireland	Public	NA	NA
Zeitlin 2021	Switzerland	Cross-sectional	01–2015 to 12–2015	All births in Switzerland		NA	NA
Bracic 2020	Austria	Retrospective cohort	01–2008 to 11–2019	Births at Medical University of Graz	Public	NA	NA
Crequit 2020	France	Retrospective cohort	01–2012 to 12–2019	Obese vs non-obese		NA	Perinatal Mortality Neonatal Mortality Stillbirths Pre-eclampsia/ eclampsia Neonatal intensive care unit admission Apgar < 7 at 5 min
Denona 2020	Ireland	Cross-sectional	01–2016 to 12–2016	Births with term, singleton, cephalic nulliparous and multiparous women without previous uterine scar at National Maternity Hospital, Dublin	Public	NA	Post-partum haemorrhage Blood transfusion Apgar < 7 at 5 min
LeRay 2020	France	Cross-sectional	01–1995 to 12–2010	Births included in French National perinatal Surveys	Public/ Private	NA	NA

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Table 1 (*continued*)

First Author, year	Country	Type of Study	Study duration	Population characteristics	Public/ Private hospital	Reasons for caesarean section	Reported perinatal outcomes
Linard 2019	France	Prospective cohort	01–2010 to 12–2012	Births from women living in France with origins from Sub-Saharan Africa compared to women of French origin		NA	NA
Jayot 2016	France	Cross-sectional	01–2002 to 12–2012	Births at Pitié-Salpètrière Hospital in Paris	Public	NA	NA
LeRay 2014	France	Cross-sectional	01–1995 to 12–2010	From the national perinatal survey in France	Public/ Private	NA	NA
Mueller 2014	Switzerland	Retrospective cohort	01–1999 to 12–2009	All births at the University Women's Hospital Bern	Public	NA	NA
Delbaere 2012	Belgium	Retrospective cohort	01–2000 to 12–2008	Flemish birth register		NA	Perinatal mortality Neonatal mortality
Minsart 2012	Belgium	Cross-sectional	01–2009 to 12–2009	Births from women of immigrant origin compared to Belgian origin		NA	NA
Southern Europe 19 studies (Cyprus, Italy, Malta, Spain and Turkey)							
Golbasi 2023	Turkey	Cross-sectional	01–2013 to 12–2020	Births at the at the University of Health Sciences, Tepecik Training and Research Hospital	Public	Previous uterine scar Foetal Distress Breech Twin or multiple pregnancy Cephalopelvis disproportion Macrosomia Hypertensive diseases of pregnancy Intrautrerine growth restriction Third-trimester vaginal bleeding	Pre-eclampsia
Keskin 2023	Turkey	Cross-sectional	01–2008 to 12–2020	Births at Ordu University Medical Faculty Training and Research Hospital, Ordu	Public	NA	NA
Bulut 2022	Turkey	Cross-sectional	05–2018 to 05–2020	All births at Kayseri Training and Research hospital		Foetal disrtress Breech Twin or multiple pregnancy Malpresentation Cephalopelvic disproportion Macrosomia Hypertensive diseases of pregnancy Failed induction of labour Chorioamnioitis Other pregnancy complications Other foetal indication Other maternal medical complication	NA
Marconi 2022	Italy	Retrospective cohort	01–1996 to 12–2019	All births at San Paolo Hospital in Milano		NA	NA
diPasquo 2022	Italy	Retrospective cohort	01–2014 to 12–2018	All births at University Hospital of Parma		NA	Perinatal Mortality Uterine rupture Hysterectomy
Sirico 2022	Italy	Prospective cohort	03–2020 to 11–2021	Mothers undergoing births with positive COVID-19		NA	Maternal intensive care admission
Eyi 2021	Turkey	Cross-sectional	01–2017 to 12–2017	1503 facilities (public, private and university hospitals)	Public/ Private	NA	NA
Palacios-Marques 2021	Spain	Cross-sectional	01–2009 to 12–2017	All births at Alicante University Hospital		NA	Perinatal Mortality Stillbirths Apgar < 7 at 5 mins
Topçu 2021	Turkey	Cross-sectional	01–2012 to 12–2017	All births at Zekai Tahir Burak hospital in Ankara		NA	NA
Valladolid 2021	Spain	Retrospective cohort	01–2015 to 12–2017	All births at Basurto University Hospital		NA	NA
Zeitlin 2021	Cyprus	Cross-sectional	01–2015 to 12–2015	All births in Cyprus		NA	NA
Zeitlin 2021	Italy	Cross-sectional	01–2015 to 12–2015	All births in Italy		NA	NA
Zeitlin 2021	Malta	Cross-sectional	01–2015 to 12–2015	All births in Malta		NA	NA

(*continued on next page*)

Table 1 (*continued*)

First Author, year	Country	Type of Study	Study duration	Population characteristics	Public/ Private hospital	Reasons for caesarean section	Reported perinatal outcomes
Pinto 2020	Spain	Retrospective cohort	01–2015 to 12–2018	Births at Fundación Alcorcón University Hospital		NA	Perinatal Mortality Uterine Rupture Postpartum Haemorrhage Blood Transfusion Apgar < 7 at 5 mins
Strambi 2020	Italy	Retrospective cohort	01–2012 to 12–2017	Births at Careggi University Hospital		Foetal Distress Malpresentation Cephalopelvic disproportion Hypertensive diseases of pregnancy Failed induction of labourIntrauterine growth restriction	NA
Vila-Candel 2020	Spain	Retrospective cohort	01–2010 to 12–2018	All births at La Ribera University Hospital in Valencia		NA	NA
Triunfo 2018	Italy	Retrospective cohort	01–1998 to 12–2011	Births in relation to BMI, age and epidural anaesthesia at Fondazione Policlinico Universitario 'A. Gemelli' in Rome		NA	NA
Triunfo 2015	Italy	Cross-sectional	01–1998 to 12–2011	All births in the time period at the GemelliUniversity hospital in Rome		NA	NA
Ciriello 2012	Italy	Retrospective cohort	01–1994 to 12–2006	Births at San Gerardo Hospital, Monza		NA	Apgar < 7 at 5 mins
Central and Eastern Europe 11 studies (Bosnia and Herzegovina, Estonia, Latvia, Lithuania, Romania, Slovakia and Slovenia)							
Zahumensky 2023	Slovakia	Retrospective cohort	01–2019 to 12–2020	Births at Dept of Obstetrics and Gynaecology of Faculty of Medicine, Comenius University and University Hospital in Bratislava		Foetal Distress Breech Macrosomia Hypertensive diseases of pregnancy Other	Perinatal Mortality Neonatal Mortality Hypertensive diseases of pregnancy Neonatal intensive care unit admission
Matei 2021	Romania	Cross-sectional	03–2020 to 03–2021	Births from teen pregnancies		Foetal distress Failed induction of labour Other pregnancy complication	Hypertensive diseases of pregnancy Prolonged maternal hospital stay Neonatal intensive care unit admission Apgar < 7 at 5 mins Other pregnancy complication
Zeitlin 2021	Estonia	Cross-sectional	01–2015 to 12–2015	All births in Estonia		NA	NA
Zeitlin 2021	Latva	Cross-sectional	01–2015 to 12–2015	All births in Latva		NA	NA
Zeitlin 2021	Slovenia	Cross-sectional	01–2015 to 12–2015	All births in Slovania		NA	NA
Zahumensky 2020	Slovakia	Retrospective cohort	01–2015 to 12–2018	Births at Dept of Obstetrics and Gynaecology of Faculty of Medicine, Comenius University and University Hospital in Bratislava		NA	Stillbirths Neonatal intensive care unit admission
Zahumensky 2019	Slovakia	Retrospective cohort	01–2017 to 12–2017	Births at Dept of Obstetrics and Gynaecology, Faculty of Medicine, Comenius University, University Hospital in Bratislava and Dept of Obstetrics and Gynaecology, Trenčín		NA	Perinatal Mortality Apgar < 6 at 5 mins
Kacerauskiene 2018	Lithuania	Prospective cohort	01–2012 to 12–2014	Nullipara from most hospitals in Lithuania		NA	Perinatal Mortality Neonatal Mortality Stillbirths Pre-eclampsia Apgar < 7 at 5 mins
Kacerauskiene 2017	Lithuania	Prospective cohort	01–2012 to 12–2014	Births from 23 hospitals in Lithuania		NA	Perinatal Mortality Neonatal Mortality Stillbirths
Fatusic 2016	Bosnia and Herzegovina	Cross-sectional	01–2015 to 12–2015	Births at University hospital of Tuzla		NA	NA
Barčaitė 2015	Lithuania	Cross-sectional	01–2012 to 12–2012	Births of all women in Lithuania		NA	NA

Results

Study selection

The search identified 1024 articles for screening. After 14 duplicates were removed, 1010 articles were screened with 700 excluded at the title/abstract screening stage as they were not eligible. This left 119 full-text articles that were assessed for eligibility, 44 of which met criteria for final inclusion (Fig. 1).

Study characteristics

In total, 6,641,615 births across 25 European countries were included in the review. The countries included were sub-divided according to European region. Nordic Europe included studies from Denmark, Finland, Iceland, Norway and Sweden; Western Europe from Austria, Belgium, France, Germany, Ireland, Luxemburg, Netherlands and Switzerland; Southern Europe from Cyprus, Italy, Malta, Spain and Turkey and Central-Eastern Europe from Bosnia and Herzegovina, Estonia, Latvia, Lithuania, Romania, Slovakia and Slovenia.

All multi-country studies were extracted individually for country level data. The country-level data was presented as separate studies in Tables 1 and 2, leading to a total of 62 data sets in the tables from the 44 selected studies. Of the included studies, 11/62 (17.7 %) were from Nordic Europe, 21/62 (33.9 %) from Western Europe, 19/62 (30.6 %) from Southern Europe and 11/62 (17.7 %) from Central-Eastern Europe. The largest study was a retrospective cohort study from Sweden in which 1,392,779 births were analysed from 2004 to 2016 [14]. The smallest study was a cross-sectional study from Romania that included only 251 women [15]. Most of the studies were cross-sectional in design (34/62, 54.8 %) (Table 1) and the duration of data collection varied from 22 years in Ciriello et al. [16] to 12 months in Zeitlin et al. [17].

Regional level data according to Robson Group

Table 3 illustrates the combined data according to European Region. With regard to the total study population, Nordic Europe accounted for the largest portion with 2,523,567 of 6,641,615 (38 %), and Central-Eastern Europe accounted for the least with 159,727 of the total 6,641,615 (2.1 %) births. CS rates were lowest in Nordic Europe (Total CS rate: 426,847/2,523,567, 16.9 %), with CS in Robson 1 accounting for only 60,263/752,462, 8.0 % of the population. The majority of nulliparous, term women with a single cephalic pregnancy and labour induced/CS before labour (Robson 2), gave birth vaginally (143,349/219,659, 65.3 %). Only half of all women with previous uterine scare (Robson 5) gave birth via CS (113,059/220,842, 51.2 %) and the nulliparous women with breech presentation (Robson 6) gave birth in Nordic Europe mostly via CS (42,908/48,341, 88.8 %). One the other hand, studies from Southern Europe presented the highest CS rates with a total CS rate of 756,810/1,735,854, 43.6 %, where CS in Robson 1 accounted for 97,950/418,346, 23.4 % of the population. Fifty three percent of women with Robson 2 gave birth via CS (116,969/218,897, 53.4 %). Similarly, almost all women with previous uterine scar (Robson 5) gave birth via CS (327,549/341,563, 95.0 %) in Southern Europe. However, like other regions, the majority of nulliparous women with breech presentation (Robson 6) gave birth via CS (33,430/36,970, 90.0 %).

Individual study level data

Zeitlin 2021 [17] was the largest European study using the Robson classification for comparing CS rates in Europe with data from the Euro-Peristat study. The CS rates ranged from 15.6 % in Norway to 57.9 % in Cyprus. The highest CS rates in Norway was seen in Robson 9 (99.5 %) and Robson 6 (70.8 %). Cyprus had the highest CS rates in Robson 6 (97.9 %) and Robson 7 (95.9 %). The largest study from Western Europe was published with data from Austria. It had 24,835 participants with an overall CS rate of 44.2 %. Both Robson 6 and 9 had a CS rate of 99.1 % [17]. Eyi et al. [18] reported data from Turkey, with 887,683 participants. The authors reported an overall CS rate of 51.2 % with Robson 5 displaying the highest CS rate (97.0 %), followed by Robson 8 (91.8 %).

Risk of bias assessment

The quality assessment using the Newcastle-Ottawa Scale of the included studies has been presented in Table 4. Most studies demonstrated strong 'selection' criteria, with the majority scoring 3 stars. However, 'representativeness of exposed cohort' was often lacking in the included studies. Only a few studies scored 4 stars in 'selection' [14,17,17-31]. 'Comparability' often received fewer stars as most studies did not adjust data for any reason such as maternal body mass index (BMI), induction of labour, maternal age, neonatal- and maternal outcome nor had compared data from two different time points. There was therefore limited control of confounding factors. Similarly, 'Outcome/Exposure' assessment varied widely, with many studies lacking adequate follow-up (Table 4). Overall, the mean Risk of Bias Assessment of all studies was 6.2 stars with Kacerauskiene 2017 [27] having the highest number of stars (maximum 9 stars) and Denona 2020 [32] had the lowest (3 stars) (Fig. 2).

Discussion

Our study confirms significant variations in CS rates across European regions, ranging from 16.9 % in Northern Europe to 43.6 % in Southern Europe. These findings align with previous research documenting wide disparities in CS rates between countries [33,34]. A comprehensive systematic review by Betrán et al. reported CS rates ranging from 6.0 % to 27.2 % in Europe in 2014, suggesting our data indicates a continued upward trend in many countries [33].

The high contribution of previous CS (Robson Group 5) to overall rates, particularly in Southern Europe (95.0 %), raises concerns about the "domino effect" of primary caesareans. Our finding that 51.2–95.0 % of CS were in this group emphasises the critical importance of strategies to reduce primary CS rates. A Cochrane review by Chen and colleagues [35] found several interventions to reduce primary CS with moderate- or high-certainty evidence targeting healthcare professionals. These included implementations of guidelines combined with mandatory second opinion, implementation of guidelines combined with audit and feedback, and physician education by local opinion leader which all were shown to safely reduce CS rates. Similarly, a study by Rosenstein et al. [36] in the United States demonstrated an inverse relationship between vaginal birth after caesarean (VBAC) rates and primary CS rates. This group also includes CS performed to avoid pelvic floor dysfunction. However, a review by EBCOG suggested that while there is evidence of an association between mode of birth and pelvic floor dysfunction, the causal relationship between pre-labour CS and protection against pelvic floor issues was not conclusively established [37]. EBCOG therefore recommended that obstetricians use an evidence-based approach when counselling women about different birth modes and their potential effects on pelvic floor dysfunction [37].

Notably, EBCOG has an established inspection system for accrediting teaching hospitals across Europe. In a recent study, Wladimiroff et al. [38] analysed 400 hospital inspection reports, revealing that CS rates have steadily increased, while the proportion of women giving birth via instrumental vaginal birth has significantly declined. Their findings suggest that the next generation of obstetricians may lack proficiency in instrumental vaginal birth and may default to performing CS whenever possible. This underscores the urgent need for a cultural shift toward reinforcing the fundamental principles of basic obstetric training (Fig. 3).

We observed consistently high CS rates for nulliparous breech presentations (88.8–92.5 %) in our study. This reflects a shift away from

Table 2
Total number of births, including vaginal and caesarean sections, according to Robson's classification in European regions.

Country	First Author Year	Births Total, n (%) Vaginal, n (%) CS, n (%)	Robson 1 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 2 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 3 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 4 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 5 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 6 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 7 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 8 Group size, n (%) Vaginal, n (%) CSn (%)	Robson 9 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 10 Group size, Vaginal, n (%) CS, n (%)
Nordic Europe (Denmark, Finland, Iceland, Norway and Sweden)												
Norway	Laine 2023	Total: 227,940 (100 %) VB: 191,071 (83.8 %) CS: 36,869 (16.2 %)	29,577 (26.7 %) 27,163 (91.8 %) 2414 (8.2 %)	11,678 (10.6 %) 8536 (73.1 %) 3142 (26.9 %)	38,096 (34.4 %) 37,464 (98.3 %) 632 (1.7 %)	10,980 (9.9 %) 9597 (87.4 %) 1383 (12.6 %)	9698 (8.8 %) 5072 (52.3 %) 4626 (47.7 %)	2363 (2.1 %) 626 (26.5 %) 1737 (73.5 %)	1780 (1.6 %) 667 (37.5 %) 1113 (62.5 %)	1718 (1.6 %) 992 (57.7 %) 726 (42.3 %)	356 0.3 %) 0 (0 %) 356 (100 %)	4348 (3.9 %) 3021 (69.5 %) 1327 (30.5 %)
Sweden	Muraca 2022	Total:1392779 (100 %) VB:1153773 (82.8 %) CS:239006 (17.2 %)	431,199 (31.0 %) 396,315 (91.9 %) 34,884 (8.1 %)	113,927 (8.2 %) 71,453 (63.7 %) 42,474 (37.3 %)	500,236 (35.9 %) 492,122 (98.4 %) 8114 (1.6 %)	98,901 (7.1 %) 77,605 (78.5 %) 21,296 (21.5 %)	120,104 (8.6 %) 58,181 (48.4 %) 61,923 (51.6 %)	27503(2.0 %) 1699 (6.2 %) 25,804 (93.8 %)	16572(1.2 %) 1911 (11.5 %) 14661(88.5 %)	19,701 (1.4 %) 8921 (45.3 %) 10,780 (54.7 %)	1905 (0.1 %) 13 (0.7 %) 1892 (99.3 %)	58,500 (4.2 %) 41,322 (70.6 %) 17,178 (29.4 %)
Sweden	Savchenko 2022	Total: 417,217 (100 %) VB: 344,621 (82.6 %) CS: 72,595 (17.4 %)	114,657 (27.5 %) 106,287 (92.7 %) 8370 (7.3 %)	45,027 (10.8 %) 30,483 (67.7 %) 14,544 (32.3 %)	140,839 (33.8 %) 138,726 (98.5 %) 2113 (1.5 %)	39,575 (9.5 %) 32,768 (82.8 %) 6807 (17.2 %)	39,592 (9.5 %) 18,687 (47.3 %) 20,905 (52.8 %)	7289 (1.7 %) 518 (7.1 %) 6771 (92.9 %)	4445 (1.1 %) 613 (13.8 %) 3832 (86.2 %)	5807 (1.4 %) 2718 (46.8 %) 3089 (53.2 %)	1141 (0.3 %) 32 (2.8 %) 1109 (97.2 %)	10,771 (4.2 %) 2874 (73.1 %) 2897 (26.9 %)
Denmark	Zeitlin 2021	Total: 57,847 (100 %) VB: 46,002 (79.5 %) CS: 11,845 (20.5 %)	16,951 (29.9 %) 15,252 (90.0 %) 1699 (10.0 %)	5864 (10.4 %) 3827 (65.3 %) 2037 (34.7 %)	17,703 (31.3 %) 17,335 (98.0 %) 348 (2.0 %)	5443 (9.6 %) 4199 (77.1 %) 1244 (22.9 %)	5303 (9.4 %) 2044 (38.6 %) 3259 (61.4 %)	1207 (2.1 %) 100 (8.3 %) 1107 (91.7 %)	702 (1.2 %) 90 (12.9 %) 612 (87.1 %)	974 (1.7 %) 358 (26.8 %) 616 (63.2 %)	132 (0.2 %) 12 (9.0 %) 120 (91.0 %)	2331 (4.1 %) 1528 (65.6 %) 803 (34.4 %)
Finland	Zeitlin 2021	Total: 55,759 (100 %) VB: 47,017 (84.3 %) CS: 8742 (15.7 %)	13,484 (24.5 %) 12,217 (90.6 %) 1267 (9.4 %)	6206 (11.3 %) 4398 (70.9 %) 1808 (29.1 %)	18,104 (33.0 %) 17,835 (98.5 %) 269 (1.5 %)	5525 (11.0 %) 4980 (90.1 %) 545 (9.9 %)	5250 (9.6 %) 3089 (58.8 %) 2161 (41.2 %)	786 (1.4 %) 225 (28.6 %) 561 (71.4 %)	533 (1.0 %) 215 (40.3 %) 318 (59.7 %)	748 (1.4 %) 378 (50.5 %) 370 (49.5 %)	2124 (3.9 %) 1381 (65.0 %) 743 (35.0 %)	2190 (32.0 %) 1490 (68.0 %) 700 (32.0 %)
Iceland	Zeitlin 2021	Total: 4098 (100 %) VB: 3456 (84.3 %) CS: 642 (15.7 %)	1021 (25.6 %) 935 (91.7 %) 86 (8.3 %)	410 (10.2 %) 306 (74.6 %) 104 (25.4 %)	1395 (35.1 %) 1375 (98.6 %) 20 (1.4 %)	371 (11.9 %) 331 (89.2 %) 40 (10.8 %)	389 (9.7 %) 165 (43.0 %) 224 (57.0 %)	57 (1.4 %) 9 (15.8 %) 48 (84.2 %)	37 (0.9 %) 4 (10.8 %) 33 (89.2 %)	36 (0.9 %) 20 (55.5 %) 16 (44.4 %)	19 (0.5 %) 0 (0 %) 19 (100 %)	156 (3.9 %) 104 (66.7 %) 52 (33.3 %)
Norway	Zeitlin 2021	Total: 59,928 (100 %) VB: 50,553 (84.4 %) CS: 9375 (15.6 %)	16,511 (28.1 %) 15,077 (91.3 %) 1434 (8.7 %)	5629 (9.6 %) 4062 (72.2 %) 1567 (27.8 %)	20,524 (35.0 %) 20,162 (98.2 %) 362 (1.8 %)	5258 (9.0 %) 4480 (85.2 %) 778 (14.8 %)	5058 (8.6 %) 2632 (52.0 %) 2426 (48.0 %)	1233 (2.1 %) 361 (29.2 %) 872 (70.8 %)	864 (1.5 %) 333 (38.5 %) 531 (61.5 %)	998 (1.7 %) 535 (53.6 %) 463 (46.4 %)	205 (0.3 %) 1 (0.5 %) 204 (99.5 %)	2427 (4.1 %) 1689 (69.6 %) 738 (30.4 %)
Sweden	Zeitlin 2021	Total: 116,667 (100 %) VB: 96,626 (82.8 %) CS: 20,041 (17.2 %)	34,958 (30.4 %) 32,023 (91.6 %) 2935 (8.4 %)	9971 (8.7 %) 6442 (64.6 %) 3529 (35.4 %)	41,091 (35.7 %) 40,336 (98.2 %) 755 (1.8 %)	8641 (7.5 %) 6900 (79.9 %) 1741 (20.1 %)	10,348 (9.0 %) 4830 (46.7 %) 5518 (53.3 %)	2018 (1.8 %) 138 (6.8 %) 1880 (93.2 %)	1250 (1.1 %) 184 (14.7 %) 1066 (85.3 %)	1669 (1.5 %) 751 (45.0 %) 918 (55.0 %)	303 (0.3 %) 46 (15.2 %) 257 (84.8 %)	4717 (4.1 %) 3275 (69.4 %) 1442 (30.6 %)

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Table 2 (*continued*)

Country	First Author Year	Births Total, n (%) Vaginal, n (%) CS, n (%)	Robson 1 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 2 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 3 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 4 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 5 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 6 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 7 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 8 Group size, n (%) Vaginal, n (%) CSn (%)	Robson 9 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 10 Group size, Vaginal, n (%) CS, n (%)
Iceland	Einarsdóttir 2019	Total: 81,839 (100 %) VB: 68,436 (84 %) CS: 13,403 (16 %)	23,429 (28.7 %) 21,149 (90.2 %) 2289 (9.8 %)	5965 (7.3 %) 4208 (70.5 %) 1757 (29.5 %)	30,998 (38.0 %) 30,342 (97.9 %) 656 (2.1 %)	6833 (8.4 %) 5959 (87.2 %) 874 (12.8 %)	7541 (9.2 %) 3355 (44.5 %) 4186 (55.5 %)	1156 (1.4 %) 125 (10.8 %) 1031 (89.2 %)	962 (1.2 %) 122 (12.7 %) 840 (87.3 %)	1452 (1.8 %) 785 (54.1 %) 667 (45.9 %)	254 (0.3 %) 6 (2.4 %) 248 (97.6 %)	3043 (3.7 %) 2188 (71.9 %) 855 (28.1 %)
Sweden	Kempe 2019	Total: 6398 (100 %) VB: 5294 (82.7 %) CS: 1104 (17.3 %)	1780 (27.8 %) 1671 (93.9 %) 109 (6.1 %)	478 (7.5 %) 274 (57.3 %) 204 (42.7 %)	2321 (36.2 %) 2292 (98.8 %) 29 (1.2 %)	499 (7.8 %) 399 (80.0 %) 100 (20.0 %)	648 (10.1 %) 296 (45.7 %) 352 (54.3 %)	100 (1.6 %) 3 (3.0 %) 97 (97.0 %)	64 (1 %) 11 (17.2 %) 53 (82.8 %)	97 (1.5 %) 36 (37.1 %) 61 (62.9 %)	10 (0.2 %) 0 (0.0 %) 10 (100.0 %)	286 (4.5 %) 199 (69.6 %) 87 (30.4 %)
Western Europe (Austria, Belgium, France, Germany, Ireland, Luxemburg, Netherlands and Switzerland)												
France	Quibel 2022	Total: 116,029 (100 %) VB: 85,180 (75.2 %) CS: 28,147 (24.8 %)	15,228 (23.8 %)* 13,281 (87.2 %) 1947 (12.8 %)	7449 (11.7 %)* 5280 (57.5 %) 3169 (42.5 %)	20,315 (43.4 %)* 19,576 (96.4 %) 739 (3.6 %)	8029 (12.6 %)* 6134 (76.4 %) 1895 (23.4 %)	6694 (10.5 %)* 2162 (32.3 %) 4532 (67.7 %)	1035 (1.6 %)* 81 (7.8 %) 954 (92.2 %)	944 14.(1.5 %)* 137 (14.5 %) 807 (85.5 %)	1093 (1.7 %)* 365 (33.4 %) 728 (66.6 %)	191 (0.3 %)* 5 (2.6 %) 186 (97.4 %)	2923 (4.6 %)* 1833 (62.7 %) 1090 (37.3 %)
Austria	Eftekharian 2021	Totalt: 24,835 (100 %) VB: 13857b (55.8 %) CS: 10,978 (44.2 %)	5290 (21.3 %) 4626 (87.4 %) 664 (12.6 %)	2699 (10.9 %) 817 (30.3 %) 1882 (69.7 %)	6623 (26.7 %) 6320 (95.4 %) 303 (4.6 %)	2065 (8.3 %) 899 (43.5 %) 1166 (56.5 %)	2283 (9.2 %) 21 (0.9 %) 2262 (99.1 %)	809 (3.3 %) 35 (4.3 %) 774 (95.7 %)	585 (2.4 %) 371 (6.3 %) 548 (93.7 %)	1798 (7.2 %) 148 (8.2 %) 1650 (91.8 %)	218 (0.9 %) 2 (0.9 %) 216 (99.1 %)	2465 (9.9 %) 952 (38.6 %) 1513 (61.4 %)
Germany	Pulvermacher 2021	Totalt: 125,149 (100 %) VB: 85,512 (68.3 %) CS: 39,637 (31.7 %)	35,753 (20.4 %)* 29,959 (83.8 %) 5794 (16.2 %)	19,416 (16.0 %)* 11,202 (57.7 %) 8214 (42.3 %)	23,300 (19.2 %)* 22,265 (95.6 %) 1035 (4.4 %)	8976 (7.4 %)* 6846 (76.3 %) 2130 (23.7 %)	18211(15.0 %)* 6946 (38.1 %) 11,265 (61.9 %)	4151 3.4 %)* 523 (12.6 %) 3628 (87.4 %)	2008 (1.7 %)* 388 (19.3 %) 1620 (80.7 %)	2410 (2.0 %)* 841 (34.9 %) 1569 (65.1 %)	496 0.4 %)* 0 (0 %) 496 (100 %)	6829 (5.6 %)* 4218 (61.8 %) 2611 (38.2 %)
France	Quibel 2021	Totalt: 17,511 (100 %) VB:13329 (76.1 %) CS: 4182 (23.9 %)	4300 (24.7 %) 3818 (88.8 %) 482 (11.2 %)	1880 (10.8 %) 1128 (60.0 %) 752 (40.0 %)	5504 (31.6 %) 5331 (96.9 %) 173 (3.1 %)	2123 (12.2 %) 1670 (78.7 %) 453 (21.3 %)	1795 (10.3 %) 592 (33.0 %) 1203 (67.0 %)	293 (1.7 %) 12 (4.1 %) 281 (95.9 %)	196 (1.1 %) 39 (19.9 %) 157 (81.1 %)	467 (2.7 %) 154 (33.0 %) 313 (67.0 %)	49 (0.2 %) 3 (6.1 %) 46 (93.8 %)	825 (4.7 %) 503 (61.0) 322 (39.0 %)
Belgium	Zeitlin 2021	Total: 122,838 (100 %) VB: 96,674 (78.7 %) CS: 26,164 (21.3 %)	28,844 (24.3 %) 26,134 (90.6 %) 2710 (9.4 %)	15,025 (12.7 %) 11,754 (78.2 %) 3271 (21.8 %)	33,236 (28.0 %) 32,677 (98.3 %) 559 (1.7 %)	15,995 (13.4 %) 14,701 (91.9 %) 1294 (0.8 %)	11,177 (9.4 %) 3922 (35.1 %) 7255 (64.9)	2856 (2.4 %) 161 (5.6 %) 2695 (94.4 %)	2242 (1.9 %) 303 (13.5 %) 1939 (86.5 %)	2140 (1.8 %) 905 (42.3 %) 1235 (57.7 %)	426 (0.4 %) 14 (3.3 %) 412 (96.8 %)	6641 (5.6 %) 4821 (72.6 %) 1820 (27.4 %)
France	Zeitlin 2021	Total: 13,311 (100 %) VB: 9691 (72.8 %) CS: 3615 (27.2 %)	3412 (26.2 %) 3053 (89.4 %) 359 (10.6 %)	1411 (10.9 %) 926 (65.6 %) 485 (34.4)	4210 (32.3 %) 4146 (98.5 %) 64 (1.5 %)	1246 (9.6 %) 1078 (86.5 %) 168 (13.5 %)	1276 (9.8 %) 573 (44.9 %) 703 (55.3 %)	261 (2.0 %) 53 (20.3 %) 208 (79.8 %)	217 (1.7 %) 54 (24.9 %) 163 (75.3 %)	233 (1.8 %) 107 (45.9 %) 126 (54.3 %)	60 (0.5 %) 6 (10.0 %) 54 (90.0 %)	686 (5.3 %) 479 (69.8 %) 207 (30.3 %)

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Table 2 (*continued*)

Country	First Author Year	Births Total, n (%) Vaginal, n (%) CS, n (%)	Robson 1 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 2 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 3 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 4 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 5 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 6 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 7 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 8 Group size, n (%) Vaginal, n (%) CSn (%)	Robson 9 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 10 Group size, Vaginal, n (%) CS, n (%)
Germany	Zeitlin 2021	Total: 728,496 (100 %) VB: 500,181 (68.7 %) CS: 228,315 (31.3 %)	196,968 (27.4 %) 161,611 (82.1 %) 35,357 (17.9 %)	100,656 (14.0 %) 54,837 (54.5 %) 45,819 (45.5 %)	179,511 (24.9 %) 171,473 (95.5 %) 8038 (4.5 %)	68,272 (9.5 %) 47,782 (70.0 %) 20,490 (30.0 %)	79,447 (11.0 %) 24,899 (31.3 %) 54,548 (68.7 %)	20,875 (2.9 %) 1458 (7.0 %) 19,417 (93.0 %)	11,111 (1.5 %) 1554 (14.0 %) 9557 (86.0 %)	8544 (1.2 %) 2065 (24.2 %) 6479 (75.8 %)	3454 (0.5 %) 194 (5.6 %) 3260 (94.4 %)	50,973 (7.1 %) 25,623 (50.3 %) 25,350 (49.7 %)
Luxemburg	Zeitlin 2021	Total: 6862 (100 %) VB: 4723 (68.8 %) CS: 2139 (31.2 %)	1747 (25.9 %) 1444 (82.7 %) 303 (17.3 %)	1009 (15.0 %) 542 (53.7 %) 467 (46.3 %)	1539 (22.8 %) 1471 (95.6 %) 68 (4.4 %)	821 (12.2 %) 713 (86.8 %) 108 (13.2 %)	817 (12.1 %) 197 (24.1 %) 620 (75.9 %)	196 (2.9 %) 7 (3.6 %) 189 (96.4 %)	140 (2.1 %) 7 (5 %) 133 (95.0 %)	125 (1.9 %) 22 (17.6 %) 103 (82.4 %)	31 (0.5 %) 2 (6.5 %) 29 (93.5 %)	310 (4.6 %) 191 (61.6 %) 119 (38.4 %)
Netherlands	Zeitlin 2021	Total: 169,234 (100 %) VB: 142,032 (83.9 %) CS: 27,202 (16.1 %)	46,481 (28.8 %) 42,080 (90.5 %) 4401 (9.5 %)	16,032 (9.9 %) 18,888 (74.2 %) 4144 (25.8 %)	52,277 (32.3 %) 51,399 (98.3 %) 878 (1.7 %)	17,899 (11.1 %) 15,378 (85.9 %) 2521 (14.1 %)	12,094 (7.5 %) 4960 (41.0 %) 7134 (59.0 %)	3628 (2.2 %) 622 (17.4 %) 3006 (82.9 %)	2188 (1.4 %) 497 (22.7 %) 1691 (77.3 %)	2685 (1.7 %) 1551 (57.7 %) 1134 (42.3 %)	897 (0.6 %) 218 (24.3 %) 679 (75.7 %)	7448 (4.6 %) 5834 (78.3 %) 1614 (21.7 %)
Ireland	Zeitlin 2021	Total: 65,913 (100 %) VB: 59,088 (89.6 %) CS: 6825 (10.4 %)	3879 (16.2 %) 3413 (88.0 %) 466 (12.3 %)	4039 (17.0 %) 2607 (64.5 %) 1432 (35.5 %)	5625 (23.4 %) 5506 (97.8 %) 119 (2.2 %)	4188 (17.5 %) 3664 (87.5 %) 524 (12.5 %)	3610 (15.4 %) 842 (23.3 %) 2768 (77.2 %)	431 (1.8 %) 24 (5.4 %) 407 (94.6 %)	456 (1.9 %) 46 (9.8 %) 410 (90.2 %)	356 (1.5 %) 105 (29.0 %) 251 (71.0 %)	73 (0.3 %) 57 (77.0 %) 16 (23.0 %)	1158 (4.9 %) 726 (62.0 %) 432 (38.0 %)
Switzerland	Zeitlin 2021	Total: 85,206 (100 %) VB: 58,543 (65.8 %) CS: 26,663 (34.2 %)	20,311 (25.7 %) 17,105 (84.2 %) 3206 (15.8 %)	11,086 (14.1 %) 6100 (55.0 %) 4986 (45.0 %)	19,956 (25.3 %) 19,111 (95.8 %) 845 (4.2 %)	8108 (10.3 %) 5431 (67.0 %) 2677 (33.0 %)	6831 (8.7 %) 944 (13.8 %) 5887 (86.2 %)	2628 (3.3 %) 75 (2.8 %) 2553 (97.2 %)	1254 (1.6 %) 85 (6.8 %) 1169 (93.2 %)	1550 (2.0 %) 300 (19.3 %) 1250 (80.7 %)	3562 (4.5 %) 1032 (28.9 %) 2530 (71.1 %)	3644 (4.6 %) 2084 (57.2 %) 1560 (42.8 %)
Austria	Bracic 2020	Total: 17,322 (100 %) VB: 11,991 (69.2 %) CS: 5331 (30.8 %)	2297 (24.2 %)* 1941 (84.5 %) 356 (15.5 %)	1408 (14.8 %)* 868 (61.6 %) 540 (38.4)	2239 (23.6 %)* 2161 (96.5 %) 78 (3.5 %)	901 (9.5 %)* 743 (82.5 %) 158 (17.5 %)	1097 (11.6 %)* 275 (25.1 %) 822 (74.9 %)	300 (3.2 %)* 0 (0 %) 300 (100 %)	163 (1.7 %)* 3 (1.8 %) 160 (98.2 %)	293 (3.1 %)* 61 (20.8 %) 232 (79.2 %)	36 (0.4 %)* 0 (0 %) 36 (100 %)	756 (8.0 %)* 387 (51.2 %) 369 (48.8 %)
France	Crequit 2020	Total: 14,788 (100 %) VB: 13,121 (88.7 %) CS: 1667 (11.3 %)	3226 (27.3 %) 2945 (91.3 %) 281 (8.7 %)	1130 (9.6 %) 842 (74.5 %) 288 (25.5 %)	3943 (33.4 %) 3875 (98.3 %) 68 (1.7 %)	735 (6.2 %) 684 (93.1 %) 51 (6.9 %)	1074 (9.1 %) 714 (66.5 %) 360 (33.5 %)	272 (2.3 %) 122 (44.9 %) 150 (55.1 %)	266 (2.3 %) 132 (49.6 %) 134 (50.4 %)	478 (4.1 %) 318 (66.5 %) 160 (33.5 %)	20 (0.2 %) 0 (0 %) 20 (100 %)	653 (5.5 %) 498 (76.3 %) 155 (23.7 %)
Ireland	Denona 2020	Total: 8851 VB: 6548 (74 %) CS: 2303 (26 %)	1925 (21.7 %) 1774 (92.2 %) 151 (7.8 %)	1472 (16.6 %) 902 (61.3 %) 570 (38.7 %)	2389 (27.0 %) 2365 (99.0 %) 24 (1 %)	1105 (12.5 %) 961 (87.0 %) 144 (13.0 %)	1069 (12.1 %) 248 (23.2 %) 821 (76.8 %)	171 (1.9 %) 9 (5.3 %) 162 (94.7 %)	124 (1.4 %) 9 (7.3 %) 115 (92.7 %)	187 (2.1 %) 68 (36.4 %) 119 (63.6 %)	30 (0.3 %) 0 (0 %) 30 (100 %)	379 (4.3 %) 212 (55.9 %) 167 (44.1 %)
France	LeRay 2020	Total: 27,233 (100 %) VB: 21,787 (80.0 %) CS: 5446 (20.0 %)	3409 (26.1 %) 3050 (89.5 %) 359 (10.5 %)	1411 (10.8 %) 926 (65.6 %) 485 (34.4 %)	4209 (32.2 %) 4145 (98.5 %) 64 (1.5 %)	1246 (9.5 %) 1078 (86.5 %) 168 (13.5 %)	1276 (9.8 %) 573 (44.9 %) 703 (55.1 %)	269 (2.1 %) 61 (22.7 %) 208 (77.3)	223 (1.7 %) 60 (26.9 %) 163 (73.1 %)	235 (1.8 %) 109 (46.4 %) 126 (53.6 %)	63 (0.5 %) 8 (12.7 %) 55 (87.3 %)	716 (5.5 %) 509 (71.1 %) 207 (28.9 %)

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Table 2 (*continued*)

Country	First Author Year	Births Total, n (%) Vaginal, n (%) CS, n (%)	Robson 1 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 2 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 3 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 4 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 5 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 6 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 7 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 8 Group size, n (%) Vaginal, n (%) CSn (%)	Robson 9 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 10 Group size, Vaginal, n (%) CS, n (%)
France	Linard 2019	Total: 3689 (100 %) VB: 2878 (77.7 %) CS: 828 (22.3 %)	930 (25.2 %) 840 (90.3 %) 90 (9.7 %)	437 (11.8 %) 287 (65.7 %) 150 (34.3 %)	1012 (27.4 %) 978 (96.6 %) 34 (3.4 %)	345 (9.4 %) 281 (81.4 %) 64 (18.9 %)	436 (11.8 %) 192 (44.0 %) 244 (56.0 %)	69 (1.9 %) 21 (30.4 %) 48 (69.6 %)	67 (1.2 %) 21 (31.3 %) 46 (68.7 %)	138 (3.7) 76 (55.1 %) 62 (44.9 %)	13 (0.4 %) 1 (7.7 %) 12 (92.3 %)	242 (6.6 %) 168 (69.4 %) 74 (30.6 %)
France	Jayot 2016	Total: 4477 (100 %) VB: 3286 (73.0 %) CS: 1209 (27.0 %)	652 (30.0 %)* 525 (80.5 %) 127 (19.5 %)	356 (15.3 %)* 197 (55.3 %) 159 (44.7 %)	559 (24.0 %)* 531 (95.0 %) 28 (5.0 %)	249 (10.7 %)* 197 (79.1 %) 52 (20.9 %)	296 (12.7 %)* 82 (27.7 %) 214 (72.3 %)	45 (1.9 %)* 8 (17.8 %) 37 (82.2 %)	20 (0.9 %)* 6 (30.0 %) 14 (70.0 %)	27 (1.2 %)* 8 (29.6 %) 19 (70.4 %)	4 (0.2 %)* 0 (0.0 %) 4 (100.0 %)	123 (5.3 %)* 72 (58.5 %) 51 (41.5 %)
France	LeRay 2014	Total: 40,803 (100 %) VB: 35,207 (86.3 %) CS: 5596 (13.7 %)	3795 (26.8 %)* 3392 (89.4 %) 403 (10.6 %)	1628 (11.5 %)* 1072 (65.8 %) 556 (34.2 %)	4393 (31.0 %)* 4300 (97.9 %) 93 (2.1 %)	1418(10.0 %)* 1226 (86.5 %) 192 (13.5 %)	1334 (9.4 %)* 517 (38.8 %) 817 (61.2 %)	295 (2.1 %)* 52 (17.6 %) 243 (82.4 %)	259 (1.8 %)* 82 (31.7 %) 177 (68.3 %)	220 (1.6 %)* 104 (47.3 %) 116 (52.7 %)	70 (0.5 %)* 9 (12.9 %) 61 (87.1 %)	762 (5.4 %)* 520 (68.2 %) 242 (31.8 %)
Switzerland	Mueller 2014	Total: 13,701 (100 %) VB: 8725 (63.7 %) CS: 4976 (36.3 %)	3227 (23.6 %) 2651 (82.2 %) 576 (17.8 %)	1530 (11.2 %) 887 (58.0 %) 643 (42.0 %)	3069 (22.4 %) 2940 (95.8 %) 129 (4.2 %)	1013 (7.4 %) 764 (75.4 %) 249 (24.6 %)	1207 (8.8 %) 363 (30.1 %) 844 (69.9 %)	532 (3.9 %) 27 (5.1 %) 505 (94.9 %)	348 (2.5) 22 (6.3 %) 326 (93.7 %)	624 (4.6 %) 97 (15.5 %) 527 (84.5 %)	130 (0.9 %)** 1 (0.8 %) 129 (99.2 %)	2021 (14.8 %)** 1873 (92.7 %) 1048 (7.3 %)
Belgium	Delbaere 2012	Total: 62,125 (100 %) VB: 51,585 (83.0 %) CS: 10,540 (17.0 %)	18,571 (26.7 %) 16,936 (91.2 %) 1635 (8.8 %)	8793 (12.6 %) 6217 (70.7 %) 2576 (29.3 %)	18,688 (26.9 %) 18,393 (98.4 %) 295 (1.6 %)	8451 (12.2 %) 7744 (91.6 %) 707 (8.4 %)	5369 (7.7 %) 1997 (37.2 %) 3372 (62.8 %)	1882 (2.7 %) 90 (4.8 %) 1792 (95.2 %)	1241 (1.8 %) 192 (15.5 %) 1049 (84.5 %)	2558 (3.7 %) 1117 (43.7 %) 1441 (56.3 %)	180 (0.3 %) 9 (5.0 %) 171 (95.0 %)	3800 (5.5 %) 2822 (74.3 %) 978 (25.7 %) 69,533
Belgium	Minsart 2012	Total: 37,628 (100 %) VB: 30,863 (82.0 %) CS: 6765 (18.0 %)	9217 (25.5 %) 8485 (92.1 %) 732 (7.9 %)	5555 (14.7 %) 4245 (76.4 %) 1310 (23.6 %)	9450 (25.1 %) 9276 (98.2 %) 174 (1.8 %)	5517 (14.7 %) 5271 (95.5 %) 246 (4.5 %)	3164 (8.4 %) 1413 (44.7 %) 1751 (55.3 %)	932 (2.5 %) 83 (8.9 %) 849 (91.1 %)	772 (2.1 %) 167 (21.6 %) 605 (78.3 %)	709 (1.9 %) 308 (43.4 %) 401 (56.6 %)	152 (0.4 %) 4 (2.6 %) 148 (97.3 %)	2160 (5.7 %) 1619 (75.9 %) 541 (25.0 %)
Southern Europe (Cyprus, Italy, Malta, Spain and Turkey)												
Turkey	Golbasi 2023	Total: 69,051 (100 %) VB: 30,738 (44.5 %) CS: 38,313 (55.5 %)	13,413 (19.4 %) 9443 (70.4) 3970 (29.6 %)	7692 (11.%) 855 (11.1 %) 6837 (88.9 %)	20,089 (29.1 %) 17,435 (86.8) 2654 (13.2 %)	3818 (5.5 %) 1021 (26.7) 2797 (73.3 %)	16,506 (23.9 %) 42 (0.03) 16,464 (99.7 %)	525 (0.8 %) 20 (3.8 %) 505 (96.2 %)	259 (0.4 %) 12 (4.6 %) 247 (95.4 %)	1032 (1.5 %) 37 (3.6 %) 995 (96.4 %)	16 (0.02 %) 0 (0 %) 16 (100 %)	5701 (8.2 %) 1873 (32.9 %) 3828 (67.1 %)
Turkey	Keskin 2023	Total: 5432 (100 %) VB: 1937 (35.7 %) CS: 3495 (64.3 %)	807 (21.2 %) 438 (54.3) 369 (45.7 %)	548 (14.4 %) 70 (12.8 %) 478 (87.2 %)	757 (19.9 %) 582 (76.9) 175 (23.1 %)	485 (12.7 %) 146 (30.1 %) 339 (69.9 %)	857 (22.5 %) 5 (0.6 %) 852 (99.4 %)	114 (3.0 %) 2 (1.8 %) 112 (98.2 %)	33 (0.9 %) 4 (12.1 %) 29 (87.9 %)	62 (1.6 %) 2 (3.2 %) 60 (96.8 %)	6 (0.2 %) 0 (0 %) 6 (100 %)	138 (3.6 %) 85 (61.6 %) 53 (38.4 %)
Turkey	Bulut 2022	Total: 18,576 (100 %) VB: 12,094 (65.1 %) CS: 6482 (34.9 %)	NA NA 305 (8.2 %)	NA NA 271 (7.3 %)	NA NA 239 (6.5 %)	NA NA 91 (2.5 %)	NA NA 2240 (60.5 %)	NA NA 92 (2.5 %)	NA NA 105 (2.8 %)	NA NA 132 (3.6 %)	NA NA 16 (0.4 %)	NA NA 209 (5.6 %)

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Table 2 (*continued*)

Country	First Author Year	Births Total, n (%) Vaginal, n (%) CS, n (%)	Robson 1 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 2 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 3 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 4 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 5 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 6 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 7 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 8 Group size, n (%) Vaginal, n (%) CSn (%)	Robson 9 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 10 Group size, Vaginal, n (%) CS, n (%)
Italy	Marconi 2022	Total: 24,483 (100 %) VB: 22,617 (92.4 %) CS: 1866 (7.6 %)	9047 (36.4 %) 8452 (93.4 %) 595 (6.6 %)	4698 (18.9 %) 3674 (78.2 %) 1024 (21.8 %)	8552 (34.4 %) 8414 (98.4 %) 138 (1.6 %)	2546 (10.2 %) 2437 (95.7 %) 109 (4.3 %)	NA NA NA	NA NA NA	NA NA NA	NA NA NA	NA NA NA	NA NA NA
Italy	diPasquo 2022	Total: 12,939 (100 %) VB: 5134 (39.7 %) CS: 5854 (60.3 %)	667 (25.7 %)* 625 (93.7 %) 42 (6.3 %)	471 (18.2 %)* 365 (77.5 %) 106 (22.5 %)	626 (24.1 %)* 620 (99.0 %) 6 (1.0 %)	227 (8.7 %)* 205 (90.3 %) 22 (9.7 %)	299 (11.5 %)* 277 (92.4 %) 22 (74.2 %)	61 (2.4 %)* 0 (0.0 %) 61 (100 %)	32 (1.2 %)* 1 (3.1 %) 31 (96.9 %)	55 (2.2 %)* 5 (9.0 %) 50 (91.0 %)	12 (0.5 %)* 0 (0.0 %) 12 (100 %)	145 (5.6 %)* 100 (69 %) 45 (31.0 %)
Italy	Sirico 2022	Totalt: 323 (100 %) VB: 171 (52.9 %) CS: 152 (47.1 %)	24 (23.5 %)* 16 (66.7 %)* 8 (33.3 %)*	8 (7.8 %)* 3 (37.5 %)* 5 (62.5 %)*	22 (21.6 %)* 20 (90.9 %)* 2 (9,1%)*	5 (4.9 %)* 4 (80 %)* 1(20 %)*	26 (25.5 %)* 0 (0 %)* 26 (100 %)*	4 (3.9 %)* (0 %)* 4 (100 %)*	1 (1 %)* 0 (0 %)* 1 (100 %)*	2 (2 %)* 0 (0 %)* 2 (100 %)*	1 (1 %)* 0 (0 %)* 1 (100 %)*	9 (8.9 %)* 0 (0 %)* 9 (100 %)*
Turkey	Eyi 2021	Total: 887,683 (100 %) VB: 432,947 (48.8 %) CS: 454,736 (51.2 %)	195211 (22.0 %) 132,809 (68.0 %) 62,402 (32.0 %)	91,322 (10.3 %) 36,872 (40.4 %) 54,450 (59.6 %)	224,300 (25.3 %) 199,268 (88.8 %) 25,032 (11.2 %)	67,088 (7.6 %) 42,368 (63.2 %) 24,720 (36.8 %)	224,178 (25.2 %)** 6864 (3.1 %) 217,314 (97.0 %)	20,352 (2.3 %) 2842 (13.4 %) 17,510 (86.6 %)	15,037 (1.7 %) 1807 (12.9 %) 13,230 (88.0 %)	11,473 (1.3 %) 939 (8.2 %) 10,534 (91.8 %)	11,380 (1.3) 1092 (9.6 %) 10,288 (90.4 %)	27,332 (3.1 %) 8076 (29.5 %) 19,256 (70.5 %)
Spain	Palacios-Marques 2021	Totalt: 22,487 100 %) VB: 8585 (38.2 %) CS: 13,902 (62.8 %)	2636 (23.0 %)* 2438 (92.5 %) 198 (7.5 %)	2263 (19.8 %)* 1609 (71.1 %) 654 (28.9 %)	2640 (23.1 %)* 2603 (98.6 %) 37 (1.4 %)	1163 (10.2 %)* 1043 (89.7 %) 120 (10.3 %)	1150 (10.0 %)* 599 (52.1 %) 551 (47.9 %)	222 (0.9 %)* 7 (3.2 %) 215 (96.8 %)	147 (1.3 %)* 17 (11.6 %) 130 (88.4 %)	363 (3.2 %)* 152 (41.9 %) 211(58.1 %)	42 (0.4 %)* 0 (0 %) 42 (100 %)	826 (7.2 %)* 588 (71.2 %) 238 (28.8 %)
Turkey	Topçu 2021	Total: 100,326 (100 %) VB: 55,885 (55.7 %) CS: 44,441 (44.3 %)	18,468 (18.4 %) 11,904 (64.5 %) 6564 (35.5 %)	16,802 (16.7 %) 12,154 (72.3 %9 4648 (27.7 %)	20,808 (20.7 %) 17,986 (86.4 %) 2822 (13.6 %)	13593(13.5 %) 11503(84.6 %) 2090 (15.4 %)	19,996 (19.9 %) 51 (0.3 %) 19,945 (99.7 %)	1451 (1.4 %) 21 (1.4 %) 1430 (98.6 %)	1109 (1.1 %) 50 (4.5 %) 1059 (95.5 %)	1943 (1.9 %) 132 (6.8 %) 1811 (93.2 %)	238 (0.2 %) 5 (2.1 %) 233 (97.9 %)	5918 (5.9 %) 2079 (35.1 %) 3839 (64.9 %)
Spain	Valladolid 2021	Totalt: 6975 (100 %) VB: 6046 (86.7 %) CS: 928 (13.3 %)	2603 (37.3 %) 2437 (93.6 %) 166 (6.4 %)	1123 (16.1 %) 882 (78.5 %) 241 (21.5 %)	1782 (25.6 %) 1740 (97.6 %) 42 (2.4 %)	398 (5.7 %) 351 (88.2 %) 47 (11.8 %)	390 (5.6 %) 244 (62.6 %) 146 (37.4 %)	123 (1.8 %) 36 (29.3 %) 87 (70.7 %)	65 (0.9 %) 17 (26.2 %) 48 (73.9 %)	176 (2.5 %) 101 (57.4 %) 75 (42.6 %)	18 (0.3 %) 0 (0 %) 18 (100 %)	297 (4.3 %) 239 (80.5 %) 58 (19.5 %)
Cyprus	Zeitlin 2021	Total: 9425 (100 %) VB: 3969 (43.1 %) CS: 5456 (57.9 %)	1719 (19.0 %) 1316 (76.6 %) 403 (23.4 %)	1977 (21.9 %) 492 (24.9 %) 1485 (75.1 %)	1449 (16.1 %) 1375 (94.9 %) 74 (5.1 %)	854 (9.5 %) 464 (54.3 %) 390 (45.7 %)	1731 (19.1 %) 88 (5.1 %) 1643 (94.9 %)	191 (2.1 %) 4 (2.1 %) 187 (97.9 %)	121 (1.3 %) 5 (4.1 %) 116 (95.9 %)	250 (2.8 %) 17 (6.8 %) 233 (93.3 %)	23 (0.3 %) 1 (4.3 %) 22 (95.7 %)	719 (8.0 %) 219 (30.5 %) 500 (69.5 %)
Italy	Zeitlin 2021	Total: 486,557 (100 %) VB: 332,034 (68.2 %) CS: 153,623 (31.8 %)	137,708 (29.5 %) 120,387 (87.4 %) 17,321 (12.6 %)	72,320 (15.8 %) 33,019 (45.7 %) 39,301 (54.3 %)	114,610 (24.4 %) 11,336 (97.1 %) 3274 (3.0 %)	29,346 (6.4 %) 20,506 (69.9 %) 8840 (30.1 %)	57,165 (12.6 %) 7972 (13.9 %) 49,193 (86.1 %)	10,974 (2.4 %) 687 (6.3 %) 10,287 (94.0 %)	6029 (1.3 %) 482 (8.0 %) 5547 (92.0 %)	8163 (1.8 %) 1264 (15.5 %) 6899 (84.5 %)	2400 (0.5 %) 682 (28.5 %) 1718 (72.5 %)	24,430 (5.3 %) 13,187 (53.9 %) 11,243 (47.1 %)
Malta	Zeitlin 2021	Total: 4453 (100 %) VB: 3093 (68.0 %) CS: 1360 (32.0 %)	1076 (24.5 %) 924 (85.9 %) 152 (14.1 %)	891 (20.3 %) 550 (61.7 %) 341 (38.3 %)	880 (20.1 %) 848 (96.4 %) 32 (3.6 %)	513 (11.7 %) 423 (82.5 %) 90 (17.5 %)	591 (13.5 %) 141 (23.9 %) 450 (76.1 %)	90 (2.1 %) 2 (2.2 %) 88 (97.8 %)	43 (1.0 %) 1 (2.3 %) 42 (97.7 %)	68 (1.6 %) 1 (1.5 %) 67 (98.5 %)	7 (0.2) 0 (0 %) 7 (100 %)	227 (5.2 %) 136 (59.9 %) 91 (40.1 %)

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Table 2 (*continued*)

Country	First Author Year	Births Total, n (%) Vaginal, n (%) CS, n (%)	Robson 1 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 2 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 3 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 4 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 5 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 6 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 7 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 8 Group size, n (%) Vaginal, n (%) CSn (%)	Robson 9 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 10 Group size, Vaginal, n (%) CS, n (%)
Spain	Pinto 2020	Total: 12,766 (100 %) VB: 10,433 (81.7 %) CS: 2333 (18.3 %)	1493 (26.5 %)* 1375 (92.1 %) 118 (7.9 %)	1012 (18.0 %)* 789 (78.0 %) 223 (22.0 %)	1718 (30.5 %)* 1691 (98.4 %) 27 (1.6 %)	442 (7.9 %)* 424 (95.9 %) 18 (4.1 %)	411 (7.3 %)* 243 (59.1 %) 168 (40.9 %)	101 (1.8 %)* 0 (0.0 %) 101 (100.0 %)	43 (0.8 %)* 0 (0.0 %) 43 (100.00 %)	119 (2.1 %)* 48 (40.3 %) 71 (59.7 %)	11 (0.2 %)* 0 (0.0 %) 11 (100.0 %)	276 (4.9 %)* 222 (80.4 %) 54 (19.6 %)
Italy	Strambi 2020	Total: 18,079 (100 %) VB: 12,505 (69.2 %) CS: 5574 (30.8 %)	5406 (29.9 %) 4928 (91.2 %) 478 (8.8 %)	3478 (19.2 %) 1870 (53.8 %) 1608 (4.6 %)	4088 (22.6 %) 4020 (88.3 %) 68 (1.7 %)	1146 (6.3 %) 898 (78.4 %) 248 (21.6 %)	1484 (8.2 %) 180 (12.1 %) 1304 (87.9 %)	498 (2.8 %) 6 (1.2 %) 492 (98.8 %)	240 (1.3 %) 16 (6.7 %) 224 (93.3 %)	653 (3.6 %) 80 (12.3 %) 573 (87.7 %)	44 (0.2 %) 0 (0.0 %) 44 (100.0 %)	1042 (5.8 %) 507 (48.7 %) 535 (51.3 %)
Spain	Vila-Candel 2020	Total: 16,506 (100 %) VB: 13,374 (81.0 %) CS: 3132 (19.0 %)	5529 (33.5 %) 4891 (88.5 %) 638 (11.5 %)	2527 (15.3 %) 1606 (63.6 %) 921 (36.4 %)	5283 (32.0 %) 4945 (93.6 %) 338 (6.4 %)	1578 (9.6 %) 1176 (74.5 %) 402 (25.5 %)	118 (0.7 %) 95 (80.5 %) 23 (19.5)	320 (1.9 %) 16 (5.0 %) 304 (95.0 %)	158 (1.0 %) 22 (13.9 %) 136 (86.1 %)	229 (1.0 %)** 96 (41.9 %) 133 (58.1 %)	35 (0.2 %) 0 (0.0 %) 35 (100.0 %)	729 (4.4 %)** 507 (69.5 %) 222 (30.5 %)
Italy	Triunfo 2018	Total: 12,098 (100 %) VB: 7099 (58.7 %) CS: 4999 (41.3 %)	1302 (20.4 %)* 1001 (76.9 %) 301 (23.1 %)	787 (12.3 %)* 503 (63.9 %) 284 (36.1 %)	1502 (23.5 %)* 1338 (89.1 %) 164 (10.9 %)	742 (11.6 %)* 585 (78.8 %) 157 (21.2 %)	1035 (16.2 %)* 1 (0.1 %) 1034 (99.9 %)	116 (1.8 %)* 0 (0.0 %) 116 (100 %)	112 (1.8 %)* 0 (0.0 %) 112 (100 %)	137 (2.1 %)* 2 (1.5 %) 135 (98.5 %)	98 (1.5 %)* 0 (0.0 %) 98 (100 %)	551 (8.6 %)* 167 (30.3 %) 384 (69.7 %)
Italy	Triunfo 2015	Total: 12,098 (100 %) VB: 7099 (58.7 %) CS: 4999 (41.3 %)	1302 (20.4 %)* 1001 (76.9 %) 301 (23.1 %)	787 (12.3 %)* 503 (63.9 %) 284 (36.1 %)	1502 (23.5 %)* 1338 (89.1 %) 164 (10.9 %)	742 (11.6 %)* 585 (78.8 %) 157 (21.2 %)	1035 (16.2 %)* 1 (0.1 %) 1034 (99.9 %)	116 (1.8 %)* 0 (0.0 %) 116 (100 %)	112 (1.8 %)* 0 (0.0 %) 112 (100 %)	137 (2.1 %)* 2 (1.5 %) 135 (98.5 %)	98 (1.5 %) * 0 (0.0 %) 98 (100 %)	551 (8.6 %)* 167 (30.3 %) 384 (69.7 %)
Italy	Ciriello 2012	Total: 16,657 (100 %) VB: 14,288 (85.8 %) CS: 2369 (14.2 %)	2423 (28.8 %) 2218 (91.5 %) 205 (8.5 %)	1109 (13.2 %) 774 (67.8 %) 335 (30.2 %)	2646 (31.4 %) 2607 (98.5 %) 39 (1.5 %)	629 (7.5 %) 573 (91.1 %) 56 (8.9 %)	626 (7.4 %) 336 (53.7 %) 290 (46.3 %)	196 (2.3 %) 10 (5.1 %) 186 (94.9)	59 (0.7 %) 3 (5.1 %) 56 (94.9 %)	183 (2.2 %) 79 (43.2 %) 104 (56.8 %)	13 (0.2 %) 0 (0.0 %) 13 (100 %)	536 (6.4 %) 317 (59.1 %) 219 (10.9 %)
Central and Eastern Europe (Bosnia and Herzegovina, Estonia, Latva, Lithuania, Romania, Slovakia and Slovenia)												
Slovakia	Zahumensky 2023	Total: 6117 (100 %) VB: 4961 (81.1 %) CS: 1156 (18.9 %)	1093 (35.5 %)* 999 (91.3 %) 94 (8.6 %)	347 (11.3 %)* 258 (74.4 %) 89 (25.6 %)	849 (27.7 %)* 835 (98.4 %) 14 (1.6 %)	171 (5.6 %)* 156 (91.2 %) 15 (8.8 %)	373 (12.2 %)* 131 (35.1 %) 242 (64.9 %)	94 (3.1 %) * 11 (11.7 %) 83 (88.3 %)	40 (1.3 %)* 8 (20.0 %) 32 (80.0 %)	21 (0.7 %)* 10 (47.6 %) 11(52.4 %) *	9 (0.3 %)* 0 (0.0 %) 9 (100 %)	69 (2.3 %)* 45 (65.2 %) 24 (34.8 %)
Romania	Matei 2021	Total: 251 (100 %) VB: 133 (53.0 %) CS: 118 (47.0 %)	148 (59.0 %) 82 (55.4 %) 66 (44.6 %)	7 (2.8 %) 0 (0.0 %) 7 (100 %)	43 (9.3 %) 39 (90.7 %) 4 (9.3 %)	0 (0.0 %) 0 (0.0 %) 0 (0.0 %)	24 (9.4 %) 0 (0.0 %) 24 (100 %)	5 (2.0 %) 2 (40.0 %) 3 (60.0 %)	2 (0.8 %) 0 (0.0 %) 2 (100 %)	3 (1.2 %) 0 (0 %) 3 (100 %)	0 (0.0 %) 0 (0.0 %) 0 (0.0 %)	19 (7.6 %) 10 (52.6 %) 9 (47.4 %)
Estonia	Zeitlin 2021	Total: 13,961 (100 %) VB: 11,383 (81.5 %) CS: 2578 (18.5 %)	2932 (21.4 %) 2575 (87.8 %) 357 (12.2 %)	2267 (16.5 %) 1796 (79.2 %) 471 (20.8 %)	3701 (27.0 %) 3589 (97.0 %) 112 (3.0 %)	2341 (17.1 %) 2153 (92.0 %) 188 (8.0 %)	1281 (9.3 %) 522 (40.7 %) 759 (59.3 %)	138 (1.0 %) 10 (7.2 %) 128 (92.8 %)	97 (0.7 %) 10 (10.3 %) 87 (89.7 %)	230 (1.7 %) 86 (37.4 %) 144 (62.6 %)	190 (1.4 %) 33 (17.4 %) 157 (82.6 %)	554 (4.0 %) 379 (68.4 %) 175 (31.6 %)

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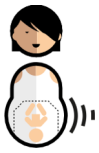
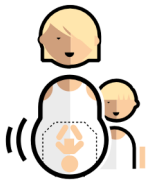
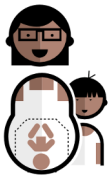
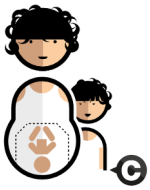
Table 2 (*continued*)

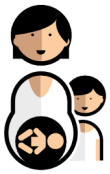
Country	First Author Year	Births Total, n (%) Vaginal, n (%) CS, n (%)	Robson 1 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 2 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 3 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 4 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 5 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 6 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 7 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 8 Group size, n (%) Vaginal, n (%) CSn (%)	Robson 9 Group size, n (%) Vaginal, n (%) CS, n (%)	Robson 10 Group size, Vaginal, n (%) CS, n (%)
Latva	Zeitlin 2021	Total: 21,826 (100 %) VB: 16,196 (74.2 %) CS: 5630 (25.8 %)	6721 (31.3 %) 5823 (86.6 %) 898 (13.4 %)	1525 (7.1 %) 1003 (65.8 %) 522 (34.2 %)	7994 (37.2 %) 7774 (97.2 %) 220 (2.8 %)	1147 (6.3 %) 997 (86.9 %) 150 (13.1 %)	2012 (9.4 %) 243 (12.1 %) 1769 (87.9 %)	288 (1.3 %) 56 (19.4 %) 232 (80.6 %)	231 (1.1 %) 82 (35.5 %) 149 (64.5 %)	329 (1.5 %) 138 (41.9 %) 191 (58.1 %)	309 (1.4 %) 86 (27.8 %) 223 (72.2 %)	942 (4.4 %) 675 (71.7 %) 267 (28.3 %)
Slovenia	Zeitlin 2021	Total: 20,336 (100 %) VB: 16,273 (80.0 %) CS: 4063 (20.0 %)	6574 (33.0 %) 5822 (88.5 %) 752 (11.5 %)	1902 (9.5 %) 1279 (67.2 %) 623 (32.8 %)	6466 (32.5 %) 6273 (97.0 %) 193 (3.0 %)	1557 (7.8 %) 1248 (80.2 %) 309 (19.8 %)	1281 (6.4 %) 294 (22.9 %) 987 (77.1 %)	499 (2.5 %) 52 (10.4 %) 447 (89.6 %)	266 (1.3 %) 44 (16.5 %) 222 (83.5 %)	393 (2.0 %) 154 (39.1 %) 239 (60.9 %)	26 (0.1 %) 0 (0.0 %) 26 (100 %)	947 (4.8 %) 682 (72.0 %) 265 (28.0 %)
Slovakia	Zahumensky 2020	Total: 5414 (100 %) VB: 3925 (73.5 %) CS: 1489 (26.8 %)	1157 (38.9 %)* 1038 (89.7 %) 119 (10.3 %)	368 (12.4 %)* 247 (67.1 %) 121(32.9 %)	709 (23.8 %)* 699 (98.6 %) 10 (1.4 %)	133 (4.5 %)* 122 (91,7%) 11 (8.3 %)	381 (12.8 %)* 125 (32.8 %) 256 (67.2 %)	93 (3.1 %)* 8 88.6 %) 85 (91.4 %)	38 (1.3 %)* 8 (21.1 %) 30 (78.9 %)	25 (0.8 %)* 12 (48.0 %) 13 (52.0 %)	2 (0.07 %)* 0 (0.0 %)) 2 (100.0 %)	69 (2.3 %)* 50 (72.5 %) 19 (27.5 %)
Slovakia	Zahumensky 2019	Total: 8237 (100 %) VD: 5768 (70.0 %) CS: 2469 (30.0 %)	3079 (37.4 %) 2536 (82.4 %) 543 (17.6 %)	861 (10.5 %) 422 (49.0 %) 439 (51.0 %)	2204 (26.8 %) 2157 (97.9 %) 47 (2.1 %)	314 (3.8 %) 240 (76.4 %) 74 (23.6 %)	876 (10.6 %) 390 (44.5 %) 486 (82.3 %)	253 (3.1 %) 24 (9.4 %) 229 (91.6 %)	94 (1.1 %) 18 (19.1 %) 76 (80.9 %)	149 (1.8 %) 28 (18.8 %) 121 (81.2 %)	37 (0.4 %) 0 (0.0 %) 37 (100.0 %)	370 (4.5 %) 188 (50.8 %) 182 (49.2 %)
Lithuania	Kacerauskiene 2018	Total: 7128 (100 %) VB: 5596 (78.5 %) CS: 1532 (21.5 %)	2698 (77.0 %)* 2358 (87.4 %) 340 (12.6 %)	804 (23.0 %)* 478 (59.5 %) 326 (40.5 %)	NA NA NA	NA NA NA	NA NA NA	NA NA NA	NA NA NA	NA NA NA	NA NA NA	NA NA NA
Lithuania	Kacerauskiene 2017	Total: 48,395 (100 %) VB: 36,411 (75.2 %) CS: 11,984 (24.8 %)	8646 (35.1 %)* 7437 (86.0 %) 1209 (14.0 %)	2239 (9.1 %)* 1301 (58.1 %) 938 (41.9 %)	7858 (31.9 %)* 7633 (97.1 %) 225 (2.9 %)	1175 (4.8 %)* 895 (76.2 %) 280 (23.8 %)	2535 (10.3 %)* 771 (30.4 %) 1764 (69.6 %)	493 (2.0 %)* 73 (14.8 %) 420 (85.2 %)	286 (1.2 %)* 41 (14.3 %) 245 (85.7 %)	305 (1.2 %)* 129 (42.3 %) 176 (57.7 %)	68 (0.3 %)* 1 (1.5 %) 67 (98.5 %)	1048 (4.3 %)* 767 (73.2 %) 281 (26.8 %)
Bosnia and Herzegovina	Fatusic 2016	Total: 3672 (100 %) VB: 2736 (74.5 %) CS: 936 (25.5 %)	NA NA NA	NA NA NA	NA NA NA	NA NA NA	NA NA NA	NA NA NA	NA NA NA	NA NA NA	NA NA NA	NA NA NA
Lithuania	Barčaitė 2015	Total: 25,373 (100 %) VB: 18,676 (76.6 %) CS: 6697 (26.4 %)	NA NANA (15.9 %)	NA NANA (52.6 %)	NA NA NA (3.9 %)	NA NANA (35.4 %)	NA NANA (80.6 %)	NA NANA (95.7 %)	NA NANA (88.6 %)	NA NANA (66.4 %)	NA NANA (98.2 %)	NA NANA (28.5 %)

Table 3
Metaanalysis of Robson groups from included studies according to European Region.

Robson Group	Description of Robson Group	Nordic Europe Total N (% contribution to total births) Vaginal = N (%) CS = N (%)	Western Europe Total N (% contribution to total births) Vaginal = N (%) CS = N (%)	Southern Europe Total N (% contribution to total births) Vaginal = N (%) CS = N (%)	Central-Eastern Europe Total N (% contribution to total births) Vaginal = N (%) CS = N (%)
Group 1 	Nulliparous women with a single cephalic pregnancy, ≥37 weeks gestation in spontaneous labour	Total = 752462 (29.8 %) Vaginal = 692199 (92.0 %) CS = 60263 (8.0 %)	Total = 589034 (26.5 %) Vaginal = 496310 (84.3 %) CS = 92723 (15.7 %)	Total = 418346 (24.1 %) Vaginal = 320893 (76.7 %) CS = 97950 (23.4 %)	Total = 45717 (28.6 %) Vaginal = 39384 (86.2 %) CS = 6584 (14.4 %)
Group 2 	Nulliparous women with a single cephalic pregnancy, ≥37 weeks gestation who either had labour induced or gave birth by caesarean section before labour	Total = 219659 (8.7 %) Vaginal = 143349 (65.3 %) CS = 76310 (34.7 %)	Total = 294184 (13.2 %) Vaginal = 171178 (58.2 %) CS = 123005 (41.8 %)	Total = 218897 (12.6 %) Vaginal = 102362 (46.8 %) CS = 116969 (53.4 %)	Total = 14124 (8.8 %) Vaginal = 8722 (61.7 %) CS = 5554 (39.3 %)
Group 3 	Multiparous women without a previous uterine scar, with a single cephalic pregnancy, ≥37 weeks gestation in spontaneous labour	Total = 904130 (35.8 %) Vaginal = 889384 (98.4 %) CS = 14746 (1.6 %)	Total = 587578 (26.4 %) Vaginal = 566766 (96.5 %) CS = 20812 (3.5 %)	Total = 431288 (24.9 %) Vaginal = 394790 (91.5 %) CS = 36912 (8.6 %)	Total = 39019 (24.4 %) Vaginal = 37853 (97.0 %) CS = 1182 (3.0 %)
Group 4 	Multiparous women without a previous uterine scar, with a single cephalic pregnancy, ≥37 weeks gestation who either had labour induced or gave birth by caesarean section before labour	Total = 196132 (7.8 %) Vaginal = 158092 (80.6 %) CS = 38040 (19.4 %)	Total = 220190 (9.9 %) Vaginal = 173051 (78.6 %) CS = 47139 (21.4 %)	Total = 130745 (7.5 %) Vaginal = 88741 (67.8 %) CS = 42158 (32.2 %)	Total = 8342 (5.2 %) Vaginal = 6858 (82.0 %) CS = 1504 (18.0 %)
Group 5 	All multiparous women with at least one previous uterine scar, with a single cephalic pregnancy, ≥37 weeks gestation	Total = 220842 (8.6 %) Vaginal = 107783 (48.8 %) CS = 113059 (51.2 %)	Total = 250425 (11.3 %) Vaginal = 79024 (31.6 %) CS = 171401 (68.4 %)	Total = 341563 (19.7 %) Vaginal = 18083 (5.0 %) CS = 327549 (95.0 %)	Total = 11715* (7.3 %) Vaginal = 2861 (24.4 %) CS = 9141 (78.0 %)
Group 6 	All nulliparous women with a single breech pregnancy	Total = 48341 (1.9 %) Vaginal = 5433 (11.2 %) CS = 42908 (88.8 %)	Total = 60052 (2.7 %) Vaginal = 4596 (7.7 %) CS = 55456 (92.3 %)	Total = 36970 (2.1 %) Vaginal = 3705 (10.0 %) CS = 33430 (90.0 %)	Total = 2534* (1.6 %) Vaginal = 271 (10.6 %) CS = 2343 (92.5 %)
Group 7 	All multiparous women with a single breech pregnancy, including women with previous uterine scars	Total = 31108 (1.2 %) Vaginal = 5828 (18.7 %) CS = 25280 (81.3 %)	Total = 35633 (1.6 %) Vaginal = 5357 (15.0 %) CS = 30276 (85.0 %)	Total = 24445 (1.4 %) Vaginal = 2504 (10.0 %) CS = 22107 (90.0 %)	Total = 1392* (0.9 %) Vaginal = 263 (18.9 %) CS = 1153 (82.8 %)

(*continued on next page*)

Table 3 (*continued*)

Robson Group	Description of Robson Group	Nordic Europe Total N (% contribution to total births) Vaginal = N (%) CS = N (%)	Western Europe Total N (% contribution to total births) Vaginal = N (%) CS = N (%)	Southern Europe Total N (% contribution to total births) Vaginal = N (%) CS = N (%)	Central-Eastern Europe Total N (% contribution to total births) Vaginal = N (%) CS = N (%)
Group 8 	All women with multiple pregnancies, including women with previous uterine scars	Total = 37403 (1.5 %) Vaginal = 17955 (48.0 %) CS = 19448 (52.0 %)	Total = 40091 (1.8 %) Vaginal = 11977 (29.9 %) CS = 28114 (70.1 %)	Total = 26265 (1.5 %) Vaginal = 3202 (12.2 %) CS = 23304 (88.8 %)	Total = 1822* (1.1 %) Vaginal = 677 (31.2 %) CS = 1170 (64.2 %)
Group 9 	All women with a single pregnancy with a transverse or oblique lie, including women with previous uterine scars	Total = 7154 (0.3 %) Vaginal = 1535 (21.5 %) CS = 5619 (78.5 %)	Total = 12712 (0.6 %) Vaginal = 1576 (12.4 %) CS = 11136 (87.6 %)	Total = 14782 (0.9 %) Vaginal = 1780 (12.0 %) CS = 13028 (88.0 %)	Total = 759* (0.5 %) Vaginal = 122 (16.1 %) CS = 653 (86.0 %)
Group 10 	All women with a single cephalic pregnancy, <37 weeks gestation, including women with previous uterine scars	Total = 106336 (4.2 %) Vaginal = 75162 (70.7 %) CS = 31174 (29.3 %)	Total = 132568 (6.0 %) Vaginal = 76500 (57.7 %) CS = 56456 (42.6 %)	Total = 73977 (26.5 %) Vaginal = 30890 (42.0 %) CS = 43403 (58.0 %)	Total = 5258* (3.3 %) Vaginal = 3671 (69.8 %) CS = 1652 (31.4 %)
TOTAL	**All regions = 6641615 (100 %) Vaginal = 4783799 (72 %) CS = 1857816 (28 %)**	**N = 2523567 (38 %) Vaginal = 2096720 (83.1 %) CS = 426847 (16.9 %)**	**N = 2222467 (33.5 %) Vaginal = 1585941 (71.4 %) CS = 636526 (28.6 %)**	**N = 1735854 (26.1 %) Vaginal = 979044 (56.4 %) CS = 756810 (43.6 %)**	**N = 159727 (2.1 %) Vaginal = 122094 (76.4 %) CS = 37633 (23.6 %)**

* Data extracted from percentage data and not absolute counts in some articles. Total numbers and percentages may therefore have small discrepancies to the 0.1 %.
Robson group pictures from Robson Classification: Implementation Manual. [Internet]. WHO. Published 26 November 2017. Accessed 6 September 2024. Available at: https://www.who.int/publications/i/item/9789241513197.

vaginal breech birth following the publication of the Term Breech Trial in 2000 [39]. This landmark study significantly influenced clinical practice, leading to a dramatic increase in CS for breech presentations worldwide. In a mini-symposium commissioned by EBCOG, medical experts have questioned whether this shift has gone too far, arguing for a more nuanced approach to breech management [40]. A prospective cohort study in France and Belgium found that planned vaginal birth for selected breech presentations was not associated with increased neonatal mortality or morbidity compared to planned CS [41]. More recently, the FRABAT trial showed that neonatal morbidity and mortality was not significantly different in births of nulliparous versus multiparous women with breech presentation [42]. Nulliparous women, however, had a higher rate of a CS during birth than multiparous women [42]. This suggested that vaginal breech birth may still be a safe option for carefully selected cases, and appropriately trained clinicians, potentially reducing unnecessary CS.

Our findings on regional variations are consistent with a study by Macfarlane et al. [34], which used data from the Euro-Peristat project to examine differences in mode of birth across Europe. They found that CS rates varied from 14.8 % in Iceland to 52.2 % in Cyprus, highlighting the influence of country-specific factors on obstetric practice. The reasons for these variations are likely multifactorial, including differences in clinical guidelines, healthcare systems, cultural attitudes, and medico-legal environments.

The high rates of CS in Southern Europe observed in our study are particularly noteworthy. This trend has been documented in other research, with countries like Italy and Greece consistently reporting some of the highest CS rates in Europe [1,43]. A study by Mazzoni et al. [43] suggested that factors such as maternal request, convenience for healthcare providers, and fear of litigation contribute to these elevated rates. However, women should be informed that a planned CS carries significant risks of morbidity and does not protect against pelvic floor dysfunction in later years [37].

Our study's use of the Robson classification system allows for more meaningful comparisons between populations and healthcare facilities. This approach is increasingly being adopted globally, as recommended by the WHO, to identify key groups contributing to overall CS rates [9]. A systematic review by Vogel et al. found that the use of the Robson classification has increased over time, facilitating more targeted interventions to optimize CS use [44]. However, the Robson is not without its limitations and provides little to no information regarding the indication for the operation [45].

Table 4
Risk of bias assessment using the Newcastle-Ottawa Scale.

Study	Selection				Comparability	Outcomes			Total
	Representativeness of exposed cohort	Selection of nonexposed cohort	Ascertainment of exposure	Outcome not present at the start of the study		Assessment of outcomes	Length of follow-up	Adequacy of follow-up	
Golbasi 2023	–	*	*	*	–	*	*	*	6
Keskin 2023	*	*	*	*	**	*	–	–	7
Laine 2023	*	*	*	*	**	*	*	–	7
Zahumensky 2023	–	*	*	*	**	*	*	*	8
Bulut 2022	–	*	*	*	**	*	–	–	6
Marconi 2022	–	*	*	*	*	–	–	–	4
diPasquo 2022	–	*	*	*	**	*	*	–	7
Muraca 2022	*	*	*	*	*	*	*	*	8
Quibel 2022	–	*	*	*	**	*	*	*	8
Savchenko 2022	*	*	*	*	–-	*	*	*	7
Sirico 2022	–	*	*	*	**	*	*	*	8
Eftekharian 2021	–	*	*	*	*	*	*	–	6
Eyi 2021	*	*	*	*	–-	*	–	–	5
Matei 2021	–	*	*	*	–-	*	*	*	6
Palacios-Marques 2021	–	*	*	*	**	*	*	*	8
Pulvermacher 2021	*	*	*	*	**	–	–	–	6
Quibel 2021	*	*	*	*	–-	*	–	–	5
Topçu 2021	–	*	*	*	–-	*	–	–	4
Valladolid 2021	*	*	*	*	–-	*	–	–	5
Zeitlin 2021	*	*	*	*	*	*	–	–	6
Bracic 2020	–	*	*	*	**	*	–	–	6
Crequit 2020	–	*	*	*	*	*	*	*	7
Denona 2020	–	*	–	*	*	–	–	–	3
LeRay 2020	*	*	*	*	**	*	–	–	7
Pinto 2020	–	*	*	*	**	*	*	*	8
Strambi 2020	–	*	*	*	–-	*	–	–	4
Vila-Candel 2020	*	*	*	*	–-	*	–	–	5
Zahumensky 2020	–	*	*	*	**	*	*	*	8
Einarsdóttir 2019	*	*	*	*	–-	*	*	–	6
Kempe 2019	–	*	*	*	–-	*	*	*	6
Linard 2019	–	*	*	*	*	*	–	–	5
Zahumensky 2019	–	*	*	*	–-	*	*	*	6
Kacerauskiene 2018	*	*	–	*	**	–	–	–	5
Triunfo 2018	–	*	*	*	**	*	–	–	6
Kacerauskiene 2017	*	*	*	*	**	*	*	*	9
Fatusic 2016	–	*	*	*	–-	*	–	–	4
Jayot 2016	–	*	*	*	**	*	–	–	6
Barčaitė 2015	*	*	*	*	–-	–	–	–	4
Triunfo 2015	–	*	*	*	**	*	–	–	6
LeRay 2014	*	*	*	*	**	*	–	–	7
Mueller 2014	–	*	*	*	**	*	–	–	6
Minsart 2013	*	*	*	*	*	*	–	–	6
Ciriello 2012	–	*	*	*	**	*	*	–	7
Delbaere 2012	–	*	*	*	**	*	*	–	7

Comparability:
* Studies that have been adjusted for any reason such as BMI, induction of labour maternal age, neonatal- and maternal outcome.
** Studies that have compared two different timepoints.

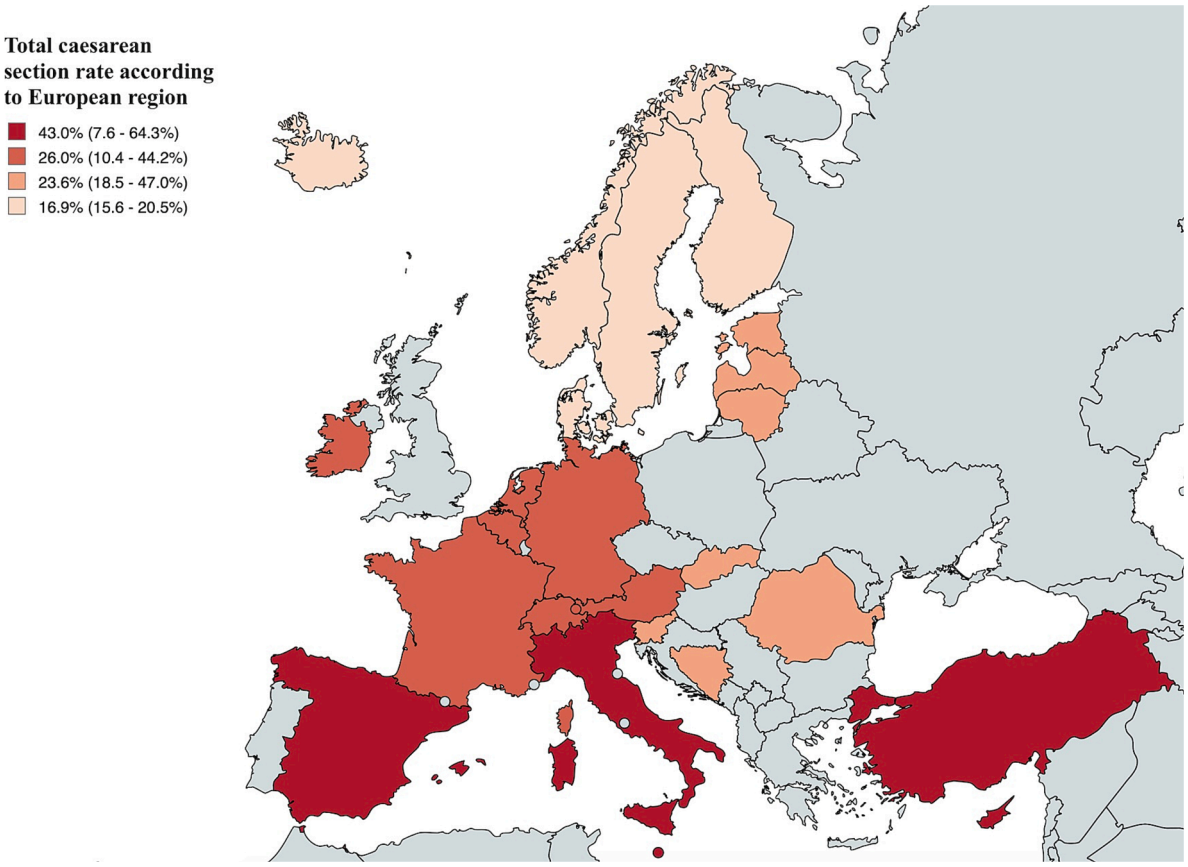


Fig. 2. Total caesarean section rate according to European region with average percentage and range.

To the best of our knowledge, this is the largest systematic review and meta-analysis using the Robson classification in any region of the world. Our review therefore offers a comprehensive examination of regional changes in CS across Europe over a time interval spanning from 1 [17] to 24 [46] years. The inclusion of diverse study designs, including both cohort and cross-sectional studies [47-80], enhanced the overall robustness of the review, allowing for a thorough exploration of CS variations across different methodologies. Additionally, the studies were conducted in 25 different countries collectively, providing a thorough understanding of the distribution of CS rates across Europe. The main strengths of our study include the large sample size, good representation from all major European regions, consistency of our study methods, and definitions of the variables collected across facilities. These results will also allow future standardised comparisons with other datasets across other regions of the world. However, our analysis is not without limitations. Some large studies for example Leray 2020 [24] and Quibel 2022 [71] provided population level data from overlapping time periods, leading to the possibility of duplicates thereby restricting our ability to conduct a thorough analysis, and potentially introducing bias in our overall assessment. In addition, including studies reporting on CS rates from as long as 24 years ago may not correctly mirror current trends and add additional reporting bias. There was also inherent heterogeneity between the included studies, with considerable variations in the risk of bias assessment, potentially affecting the robustness of our findings. Also, since most of the individual studies were cohort studies with unadjusted analyses, this may affect the precision of our pooled estimates, especially for smaller studies and lead to confounding.

Our findings underscore the complex interplay of clinical, cultural, and systemic factors influencing CS decision-making across Europe. The variation in CS rates, particularly for specific Robson groups, suggests that there is room for improvement in standardising care and reducing unnecessary interventions. As proposed by the FIGO Working Group on Challenges in Care of Mothers and Infants during Labour and Delivery, efforts should focus on implementing evidence-based guidelines, improving audit and feedback systems, and addressing non-medical factors influencing CS rates [81]. EBCOG has long recognised the increasing rates of CS across Europe and, in its position statement on CS [82], clearly calls for professional societies to take the lead in addressing this issue. EBCOG is dedicated to improving the standards of care for women during childbirth through the implementation of its European standards of care, first published in 2014 [83], which are currently being revised. The working committee has recommended that every obstetric unit collect annual data using the Robson criteria, to be compiled at the national level. This approach would facilitate the development of targeted strategies to reduce rising CS rates across Europe.

Conclusion

This comprehensive review of CS rates across Europe using the Robson 10 group classification system reveals significant regional variations and important trends in obstetric practice. The stark contrast in CS rates underscores the need for a deeper understanding of the factors

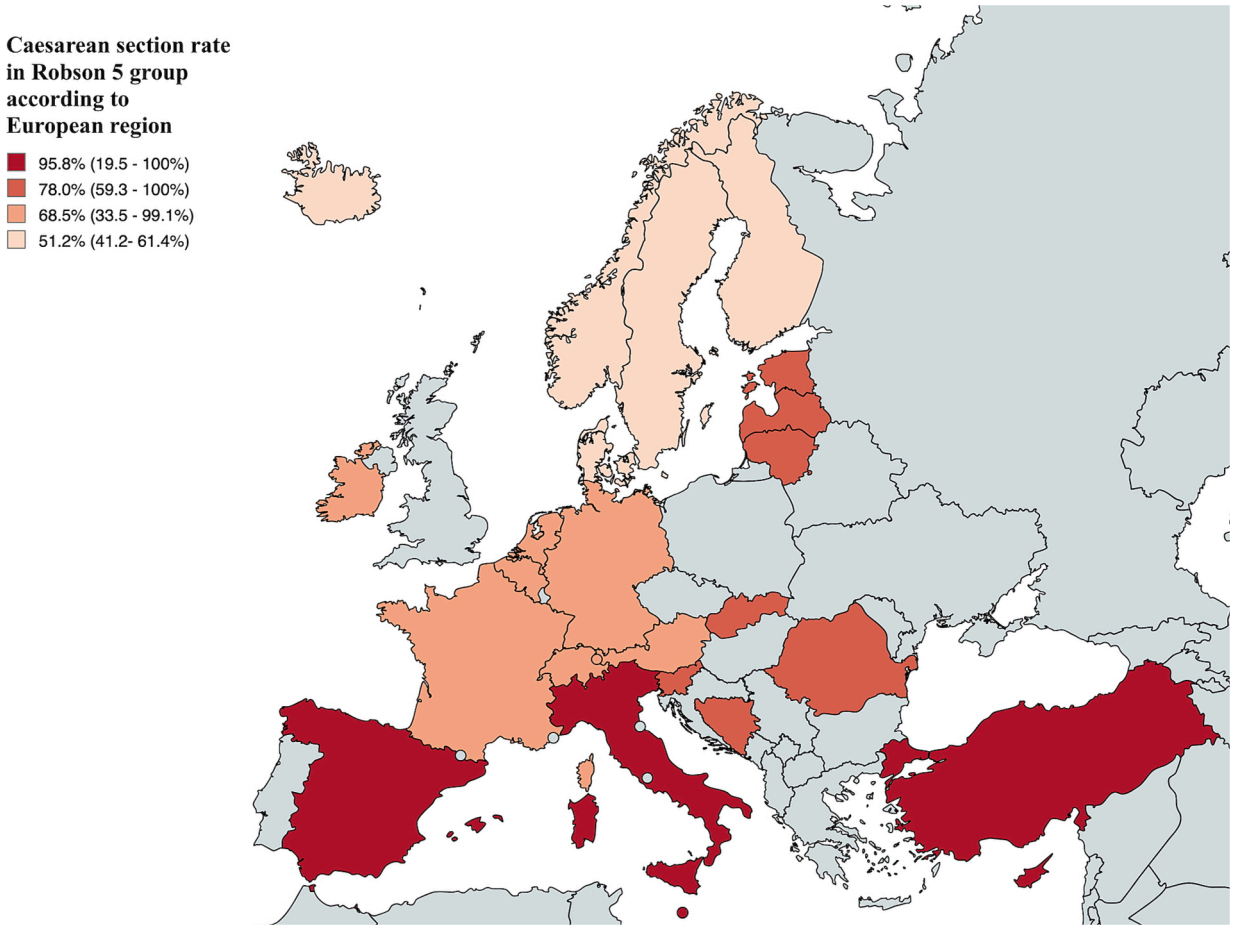


Fig. 3. section rate in Robson group 5 according to European region with average percentage and range.

driving these disparities for shaping future maternal healthcare policies and practices. Our review also supports the importance of tailored, evidence-based approaches to reduce unnecessary CS while ensuring safe outcomes for mothers and babies. Future research should focus on understanding the reasons behind these variations and developing strategies to promote appropriate use of CS across all Robson groups.

Contributors

MZ conceived the idea for the study.

VER, **LNC** and **MZ** analysed data, with major inputs from other authors.

VER wrote the first draft, which major inputs from all authors.

All authors have approved the final version of the manuscript for submission.

Reviewers

The manuscript was reviewed by Associate Professor Alexandra Kristufkova (Bratslava), Associate Professor Agnieszka Horała (Poland) and Sophie Karlin Alexander (Belgium). The final draft was approved by the EBCOG Standing Committee on Standards of Care and Position Statements.

Declaration of competing interest

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

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Availability of data

All data is available on reasonable request.

Appendix A. Supplementary material

Supplementary material to this article can be found online at https://doi.org/10.1016/j.ejogrb.2024.11.052.

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