Trends in caesarean section rates in Europe from 2015 to 2019 using Robson's Ten Group Classification System: A Euro-Peristat study

Melissa Amyx, Marianne Philibert, Alex Farr, Serena Donati, Alexander K Smárason, Vlad Tica, Petr Velebil, Sophie Alexander, Mélanie Durox, Maria Fernandez Elorriaga, et al.

Accepted: 1 September 2023

DOI: 10.1111/1471-0528.17670

BJOG An International Journal of Obstetrics and Gynaecology

RESEARCH ARTICLE

Trends in caesarean section rates in Europe from 2015 to 2019 using Robson's Ten Group Classification System: A Euro-Peristat study

Melissa Amyx[1] | Marianne Philibert[1] | Alex Farr[2] | Serena Donati[3] | Alexander K. Smárason[4] | Vlad Tica[5] | Petr Velebil[6,7] | Sophie Alexander[8] | Mélanie Durox[1] | Maria Fernandez Elorriaga[9] | Günther Heller[10] | Theopisti Kyprianou[11] | Ewa Mierzejewska[12] | Ivan Verdenik[13] | Irisa Zīle-Velika[14] | Jennifer Zeitlin[1] | for the Euro-Peristat Research Group

[1]Université de Paris Cité, Épidémiologie Obstétricale, Périnatale et Pédiatrique (EPOPé), Centre de Recherche Épidémiologie et Statistiques Sorbonne Paris Cité (CRESS), INSERM U1153, INRA, Paris, France

[2]Department of Obstetrics and Gynecology, Division of Obstetrics and Feto-Maternal Medicine, Medical University of Vienna, Vienna, Austria

[3]National Centre for Disease Prevention and Health Promotion, Istituto Superiore di Sanità, Italian Ministry of Health (ISS), Rome, Italy

[4]Institution of Health Science Research, University of Akureyri, Akureyri, Iceland

[5]Faculty of Medicine, East European Institute for Reproductive Health, Academy of Romanian Scientists, University 'Ovidius' Constanța, Constanța, Romania

[6]Institute for the Care of Mother and Child, Prague, Czech Republic

[7]3rd Medical School of Charles University, Prague, Czech Republic

[8]Perinatal Epidemiology and Reproductive Health Unit, CR2, School of Public Health, Université Libre de Bruxelles (ULB), Brussels, Belgium

[9]Nursing Department, School of Medicine, Autonomous University of Madrid, Madrid, Spain

[10]Institute for Quality Assurance and Transparency in Healthcare (IQTIG), Berlin, Germany

[11]Health Monitoring Unit, Ministry of Health, Nicosia, Cyprus

[12]Department of Epidemiology and Biostatistics, Institute of Mother and Child, Warsaw, Poland

[13]Department of Obstetrics and Gynaecology, University Medical Centre, Ljubljana, Slovenia

[14]The Centre for Disease Prevention and Control of Latvia, Riga, Latvia

Correspondence
Jennifer Zeitlin, INSERM U1153 – EPOPé, 53 avenue de l'Observatoire, 75014 Paris, France.
Email: jennifer.zeitlin@inserm.fr

Funding information
This research was part of PHIRI (Population Health Information Research Infrastructure), which received funding from the European Union's Horizon 2020 Research and Innovation programme (grant agreement No 101018317). The funding source was not involved in conducting this research or writing this manuscript.

Abstract

Objective: To assess changes in caesarean section (CS) rates in Europe from 2015 to 2019 and utilise the Robson Ten Group Classification System (TGCS) to evaluate the contribution of different obstetric populations to overall CS rates and trends.
Design: Observational study utilising routine birth registry data.
Setting: A total of 28 European countries.
Population: Births at ≥22 weeks of gestation in 2015 and 2019.
Methods: Using a federated model, individual-level data from routine sources in each country were formatted to a common data model and transformed into anonymised, aggregated data.
Main Outcome Measures: By country: overall CS rate. For TGCS groups (by country): CS rate, relative size, relative and absolute contribution to overall CS rate.

All Euro-Peristat Research Group members are presented in Appendix 1.

Results: Among the 28 European countries, both the CS rates (2015, 16.0%–55.9%; 2019, 16.0%–52.2%) and the trends varied (from −3.7% to +4.7%, with decreased rates in nine countries, maintained rates in seven countries (≤ ± 0.2) and with increasing rates in 12 countries). Using the TGCS (for 17 countries), in most countries labour induction increased (groups 2a and 4a), whereas multiple pregnancies (group 8) decreased. In countries with decreasing overall CS rates, CS tended to decrease across all TGCS groups, whereas in countries with increasing rates, CS tended to increase in most groups. In countries with the greatest increase in CS rates (>1%), the absolute contributions of groups 1 (nulliparous term cephalic singletons, spontaneous labour), 2a and 4a (induction of labour), 2b and 4b (prelabour CS) and 10 (preterm cephalic singletons) to the overall CS rate tended to increase.
Conclusions: The TGCS shows varying CS trends and rates among countries of Europe. Comparisons between European countries, particularly those with differing trends, could provide insight into strategies to reduce CS without clinical indication.

KEYWORDS
caesarean birth, Europe, health information systems, perinatal health indicators, Robson classification, Ten Group Classification System

1 | INTRODUCTION

Worldwide, caesarean section (CS) rates have increased over the past few decades and are expected to continue to increase over the next decade.[1] Although CS is a necessary intervention in certain circumstances, the associated increased risks of maternal and neonatal morbidity and mortality raise concern for the potential overuse of CS in some countries/regions.[1] In contrast to overall increasing trends, evidence now points to some levelling off of CS rates in parts of Northern and Western Europe.[1,2] Despite their geographic and cultural proximity, European countries differ greatly in overall CS rates (16.1% in Iceland vs 56.9% in Cyprus),[3] and in CS trends, maternal characteristics,[2] culture and healthcare policy,[4] making regional comparisons of interest for the efforts to optimise the use of CS.

The Robson Ten Group Classification System (TGCS),[5] recommended by the World Health Organization for comparisons between hospitals,[6,7] has further been recommended for making meaningful comparisons of CS rates among European countries.[8] Briefly, the TGCS categorises all deliveries into 10 (or 12, in an expanded version) mutually exclusive groups based on parity, previous CS, labour onset (spontaneous, induced, prelabour CS), fetal presentation/lie (cephalic, breech, transverse), singleton or multiple pregnancy and gestational age (term, preterm). In previous analyses, as well as differences in the overall CS rates among European countries, differences were also found in group-specific CS rates, particularly for women with a previous CS, with breech presentation, or with preterm birth. These variations were noted even in countries with similar overall CS rates, pointing to possible differences in obstetric practice and the organisation of maternity care.[2,9] However, trends over time were not analysed in this prior analysis.

Given the wide differences related to CS usage/trends among European countries, despite their commonalities, in-depth comparisons between countries can provide insight into the drivers of changes in CS rates and inform policies to promote the optimal use of CS. Therefore, the objectives of this study were to assess longitudinal changes in the overall CS rates in countries across Europe, from 2015 to 2019, and to use the Robson TGCS to compare changes in each obstetric group in population size, CS rate, and their absolute and relative contribution to overall CS rates.

2 | METHODS

2.1 | Data sources

Data come from the Euro-Peristat Network, a European research network for the surveillance and evaluation of maternal and newborn health in Europe. Established in 1999 as part of the European Union's Health Monitoring Programme, the network is comprised of clinicians, epidemiologists and statisticians from the 27 EU member states and Iceland, Norway, Switzerland and the UK (with England, Wales, Northern Ireland and Scotland providing data separately), for 34 participating countries/nations in total. Euro-Peristat has periodically collected routine data on 10 core and 20 recommended perinatal indicators from birth registries, hospital discharge data, vital statistics, civil registration and cause-of-death statistics to produce European perinatal health reports.[2,10]

The analysis described here used data collected by the Euro-Peristat Network as part of the Population Health Information Research Infrastructure (PHIRI) project (European Union's Horizon 2020 Research and Innovation programme; grant agreement no. 101018317). Using a federated

model, individual-level data maintained by representatives from each country (data sources included in Table S1) were formatted into a common data model and transformed by implementing R scripts developed by INSERM/Euro-Peristat to anonymised, aggregated data, and then transferred to the Euro-Peristat coordination team.[11] The common data model is available from https://zenodo.org/record/7639001 and the R scripts are available from https://zenodo.org/record/6936870. Data outputs were reviewed and verified by representatives from each country and the Euro-Peristat coordination team to ensure the completeness and accuracy of the data. As only country-level aggregate data were utilised, informed consent was not required.

2.2 | Study population

Data for all stillbirths and live births at ≥22 weeks of gestation, or weighing 500 g or more, if the gestational age was missing, were requested from Euro-Peristat Network country teams from 2015 to 2020. For the initial analysis of overall trends in Europe, all participating countries providing information on mode of delivery for 2015 and 2019 were included. For the subsequent analyses, countries providing data necessary to implement the TGCS for 2015 and 2019 (or for at least a 4-year period, such as 2016 and 2019 or 2015 and 2018), and with less than 20% of data missing (TGCS group X, unable to classify), were included. As the mode of delivery may have been impacted by the COVID-19 pandemic, 2020 was not included in this analysis of trends.[12]

2.3 | Variables

Euro-Peristat reports CS rates as the percentage of liveborn and stillborn births with known mode of delivery, in other words baby-based CS rates. For countries able to produce the TGCS, aggregated tables were produced that included the total number of CSs and the total number of births in each subgroup. As the TGCS is intended for use with data based on numbers of women giving birth, in group 8 (multiple births) the totals were divided by two, as in previous work.[3] The overall CS rates were then calculated based on percentages of women with known mode of delivery delivering liveborn and stillborn babies by CS (woman-based CS rates).

The TGCS subgroups were defined using Euro-Peristat indicator definitions. Data included parity (nulliparous, multiparous), previous CS (yes, no) for multiparous women, fetal presentation/lie (cephalic, breech, transverse/oblique), plurality (singleton, multiple pregnancy) and gestational age (term, ≥37 weeks of gestation; preterm, <37 weeks of gestation). The onset of labour was defined as spontaneous, induction of labour (initiation of contractions prior to the onset of labour by medical or surgical means) or prelabour/elective CS (before the onset of labour, including elective CS; all emergency CSs were considered CSs during labour, as previously).[9]

2.4 | Statistical analysis

The overall CS rate (proportion of all stillbirths and live births) was determined for each country, for 2015 and 2019. Then, for eligible countries, the TGCS was applied. That is, for each TGCS subgroup, its relative size = (number in subgroup/total births) × 100, CS rate = (number of CSs in subgroup/number of births in subgroup) × 100, and absolute = (number of CSs in subgroup/total births) × 100 and relative contribution = (absolute contribution/overall CS rate) × 100 to the overall CS rate were determined. To calculate trends, absolute differences in relative size, CS rate and absolute contribution to CS rate (with 95% CI) from 2015 to 2019 were calculated. Results are reported as absolute changes in these percentages. For example, for a CS rate of 32.0% in 2015 and 30.0% in 2019, the change is reported as −2.0 percentage points.

A previously published Excel file was utilised to perform these statistical analyses and provide country-specific standard TGCS tables.[13] To help summarise/interpret the data, countries were ranked by the size of their change in overall CS rate from 2015 to 2019. Data quality and misclassification were evaluated by examining the relative size of CS rates in groups 9 and 10.[14]

We used R (R Foundation for Statistical Computing, Vienna, Austria) for the initial data compilation, validation and management, with some data management performed using SAS 9.4 (SAS Institute Inc., Cary, NC, USA).

2.5 | Patient participation

Neither maternity service users nor other members of the public were involved in the study.

2.6 | Core outcomes sets

The Robson TGCS represents part of the core outcome sets.[15]

3 | RESULTS

Of the Euro-Peristat network participants detailed in Table S2, two countries did not provide data in the PHIRI project (Bulgaria and Greece), and four countries participated in PHIRI but could not provide data on mode of delivery (Portugal, Romania, Switzerland and England (UK)). Therefore, 28 countries/nations (including three UK nations: Northern Ireland, Scotland and Wales) were included in the initial analysis of overall CS trends. Of these, 11 were unable to implement the TGCS. Therefore, 17 countries, including two UK nations, were included in the TGCS analysis: Belgium, Cyprus, Estonia, Finland, Germany, Iceland, Italy, Latvia, Luxembourg, Malta, Northern Ireland (UK), Norway, Slovenia and Sweden,

with some including alternative time periods as a result of data availability/misclassification issues (Czech Republic, 2016, 2019; Denmark, 2015, 2018; Scotland (UK), 2016, 2019).

CS rates varied among European countries between 2015 and 2019 (Table 1), with the lowest rates observed in Finland (16.0% in 2015) and Norway (16.0% in 2019), and with the highest rate observed in Cyprus (55.9% in 2015 and 52.2% in 2019). Trends in CS rates from 2015 to 2019 also varied, ranging from −3.7 to +4.7 percentage points, with decreasing rates in nine countries, with fairly level rates in seven countries (with a change of no more than ±0.2 percentage points) and with increasing rates in 12 countries.

Detailed information on the TGCS for 2015 and 2019 for each country is provided in Appendix S1. In most countries, the relative size of TGCS groups 2 and 4 (nulliparous or multiparous [respectively], term cephalic singletons, with induced labor or prelabour CS) increased from 2015 to 2019 (Table 2), with increases specifically noted in groups 2a and 4a (those with induced labour). In most countries, the relative size of group 8 (multiple pregnancies) decreased or remained the same from 2015 to 2019. The relative size of group 10 (preterm cephalic singletons) decreased or remained similar in most countries except in those with the biggest increases in CS rates (over 1.0%). Notably, in Cyprus, rates were relatively high both years (7.8% in 2015 and 7.4% in 2019), compared to around 5.0% or less in other countries.

TABLE 1 Change in overall caesarean section (CS) rates in European countries from 2015 to 2019, listed from country with highest decrease to country with highest increase.

	2015		2019		Absolute change in CS rate (2015 vs 2019)
	Total births[a]	CS rate (%)	Total births[a]	CS rate (%)	
Cyprus	**9172**	**55.9**	**9569**	**52.2**	**−3.7**
Italy	**455 865**	**35.8**	**393 850**	**33.4**	**−2.4**
Czechia[b]	103 525	26.1	**104 409**	**23.8**	**−2.3**
Luxembourg	**6737**	**31.8**	**7070**	**29.5**	**−2.3**
Lithuania	29 019	21.9	24 796	20.9	−1.0
Denmark[b]	**58 337**	**20.8**	**60 009**	**19.8**	**−1.0**
Spain	421 599	26.6	361 755	25.7	−0.9
Slovakia	55 816	31.1	57 276	30.1	−0.9
Germany	**725 766**	**32.3**	**763 793**	**31.8**	**−0.5**
Iceland	**4026**	**16.3**	**4385**	**16.2**	**−0.1**
Malta	**4386**	**31.0**	**4381**	**30.9**	**−0.1**
Norway	**58 745**	**16.1**	**54 390**	**16.0**	**−0.1**
Estonia	**13 732**	**18.8**	**13 680**	**18.8**	**0.0**
Belgium	**118 120**	**20.8**	**113 816**	**20.9**	**0.1**
The Netherlands	160 855	17.3	158 226	17.4	0.1
France	764 085	20.7	716 752	20.9	0.2
Sweden	**115 248**	**17.4**	**114 574**	**17.7**	**0.3**
Austria	83 884	29.7	84 429	30.0	0.3
Latvia	**21 507**	**21.5**	**18 459**	**22.0**	**0.5**
Slovenia	**19 952**	**20.4**	**18 909**	**21.3**	**0.8**
Poland	367 802	42.9	369 391	44.4	1.4
Finland	**55 011**	**16.0**	**45 279**	**17.5**	**1.5**
Wales, UK	24 881	25.9	28 966	28.3	2.4
Northern Ireland, UK	**24 198**	**29.5**	**22 314**	**32.2**	**2.6**
Hungary	90 080	38.8	87 409	41.5	2.7
Scotland, UK[b]	**53 791**	**31.8**	**48 139**	**34.9**	**3.1**
Ireland	65 912	31.3	59 592	34.8	3.5
Croatia	37 435	21.6	36 637	26.2	4.7

Note: Entries set in bold indicate countries (and years) that were included in the Robson analysis. Some discrepancies arise from rounding.

[a]The overall CS rate is presented following Euro-Peristat conventions as the number of liveborn and stillborn babies (birth-based rate); the Robson classification uses the number of women delivering a liveborn or stillborn baby (woman-based rate).

[b]Czech Republic 2016 data used for subsequent Robson analysis, as this was the first year Robson data became available; Denmark uses 2018 for Robson analysis and Scotland uses 2016, as explained in the methods section.

TABLE 2 Absolute change in percentage points in relative size (% of the total population) of Robson Ten Group Classification System groups from 2015 to 2019, from country with highest decrease to country with highest increase in overall caesarean section (CS) rate.

			ROBSON GROUPS														
COUNTRY	CS Rate (%) 2015, 2019**	CS rate Change	1	2	2a	2b	3	4	4a	4b	5	6	7	8	9	10	X
Cyprus	55.9,52.2	(-3.7)	-2.1	1.0	3.1	-2.0	-1.3	2.9	3.8	-0.9	1.4	0.0	0.1	-0.3	0.0	-0.4	-1.3
Italy	35.8, 33.4	(-2.4)	-2.0	0.5	2.2	-1.6	0.4	1.1	1.4	-0.3	0.6	0.0	0.0	-0.1	0.0	-0.1	-0.4
Luxembourg	31.8, 29.5	(-2.3)	0.4	-0.7	-0.5	-0.2	1.1	-1.1	-0.8	-0.3	0.8	0.1	-0.5	0.1	0.0	-0.3	0.1
Denmark* (2015, 2018)	20.8, 19.6	(-1.2)	0.0	1.0	1.1	-0.1	-0.3	0.0	0.2	-0.2	-0.5	0.1	-0.2	-0.2	0.0	0.1	0.0
Czech Republic* (2016, 2019)	24.4, 23.8	(-0.6)	-0.8	0.6	0.5	0.1	1.0	0.4	0.5	-0.1	0.7	-0.6	-0.4	-0.1	-0.3	-0.3	-0.1
Germany	32.3, 31.8	(-0.5)	-1.8	-0.7	-0.2	-0.4	0.9	0.0	0.3	-0.3	1.9	-0.1	0.0	0.0	0.0	-0.3	0.0
Iceland	16.3, 16.2	(-0.1)	1.8	1.7	1.5	0.2	-2.5	-0.6	-0.3	-0.3	-0.7	-0.2	0.2	-0.2	-0.1	0.6	---
Malta	31.0, 30.9	(-0.1)	1.7	0.3	1.0	-0.7	0.2	-0.4	-0.3	0.0	-2.5	0.2	0.4	0.2	-0.1	-0.3	0.3
Norway	16.1, 16.0	(-0.1)	-2.5	2.3	2.3	0.1	-1.8	2.0	2.1	-0.1	0.0	0.1	0.1	-0.2	0.1	-0.1	---
Estonia	18.8, 18.8	(0.0)	-6.1	1.5	1.8	-0.3	-1.5	3.4	3.5	-0.1	0.8	0.3	0.4	-0.1	1.6	-0.4	0.0
Belgium	20.8, 20.9	(+0.1)	0.2	0.6	0.7	-0.1	0.3	0.4	0.2	0.2	-0.2	0.0	-0.1	-0.2	-0.8	0.2	-0.3
Sweden	17.4, 17.7	(+0.3)	-2.3	1.9	1.9	0.0	-1.8	1.8	1.9	-0.1	0.7	-0.1	-0.1	-0.1	---	-0.1	0.1
Latvia	21.5, 22.0	(+0.5)	-5.0	2.1	2.3	-0.2	0.1	2.8	2.7	0.1	0.4	-0.1	0.0	-0.2	0.0	-0.1	---
Slovenia	20.4, 21.3	(+0.8)	-3.5	2.0	2.1	-0.1	-1.2	2.5	2.5	-0.1	0.9	-0.3	-0.2	-0.1	0.1	-0.2	---
Finland	16.0, 17.5	(+1.5)	-1.2	4.1	3.4	0.7	-3.0	4.1	3.8	0.3	0.2	-0.8	-0.6	-0.1	-2.9	0.1	0.1
UK: Northern Ireland	29.5, 32.2	(+2.6)	-0.8	1.7	1.2	0.5	-2.0	2.2	1.6	0.6	0.0	0.1	-0.2	0.0	-0.5	0.3	-0.7
UK: Scotland* (2016, 2019)	32.0, 34.9	(+2.8)	0.6	1.9	1.7	0.2	-0.3	2.1	1.8	0.2	1.9	0.4	0.4	0.0	-1.8	0.6	-5.7

Trend	Change from 2015-2109
Increasing	≥5.0%
	1.0-4.9%
	<1.0%
Decreasing	<-1.0%
	-1.0-4.9%
	≥-5.0%

Note: Green shading is indicative of decreasing relative group size, whereas red shading is indicative of increasing group size, with darker shades indicating greater changes in relative size. Colours/shading represent the same trends for cells with overall CS rates for countries, with green indicating decreasing (that is, improving) and red indicating increasing (that is, worsening) CS rates. Some discrepancies arise from rounding.

[a]Czech Republic and Scotland 2016, 2019; Denmark 2015 and 2018.

[b]The overall CS rate is presented following Euro-Peristat conventions as the number of liveborn and stillborn babies (birth-based rate); the Robson classification uses the number of women delivering a liveborn or stillborn baby (woman-based rate).

Among countries with decreasing overall CS rates, the CS rates within most subgroups tended to decrease, whereas in countries with increasing overall CS rates, the CS rates within most subgroups tended to increase, particularly in countries with the biggest overall changes (±1.0%) in CS from 2015 to 2019 (Table 3).

In line with the increases in relative size, the absolute contribution of TGCS groups 2a and 4a (nulliparous or multiparous, term cephalic singleton, with induced labour) to the overall CS rates increased, particularly in countries with higher increases in overall CS rates (Table 4). In addition, the absolute contribution of groups 1 (nulliparous, term cephalic singleton, with spontaneous labour) and 10 (all preterm cephalic singletons) to overall CS rates increased in countries with the greatest increases in overall CS rates but decreased in countries with the greatest decreases in overall CS rates. Despite this, the absolute contribution of group 5 (previous CS, term cephalic singletons) increased in most countries. In most countries, regardless of the overall trend in CS, the contribution of group 8 (multiple pregnancies) decreased slightly.

For countries included in the TGCS analysis, the availability (Table S2), quality and completeness of the data varied. Examining Robson groups indicative of data quality/misclassification, the relative size of group X (unable to classify) was generally small (less than 5%), except in Scotland (UK) (17.9% in 2016 and 12.3% in 2019). Suggestive of misclassification, the relative size of group 9 (singletons in transverse or oblique lie, expected to be 1%)[14] was over 2% in Belgium, Estonia, Finland and Scotland (UK) in at least one of the years examined, with lower than expected CS rates (100%),[14] as also observed in other countries (<85%, Latvia and Northern Ireland (UK)).[14]

4 | DISCUSSION

4.1 | Main findings

We found wide variation in CS rates and in trends among the overall CS rates from 2015 to 2019, with decreasing rates in roughly a third of the countries. Just 17 of the 28 countries that could provide the data for overall CS rates could provide the data necessary to construct the Robson TGCS subgroups, with varying data completeness and quality. In these countries, the percentage of nulliparous and multiparous women with term cephalic singleton pregnancies with induced labour (groups 2a and 4a, respectively) and the absolute contribution of these groups to the overall CS rates increased, whereas the size and contribution of group 8 (multiple pregnancies) decreased. In countries with decreasing overall CS rates, the CS rates tended to decrease in all TGCS groups, whereas in countries with increasing overall CS rates, the CS rates tended to increase in all TGCS groups. In countries with the biggest changes in overall CS rates, the absolute contribution of groups 1 (nulliparous, term cephalic singletons, spontaneous labour) and 10 (all preterm cephalic singletons) tended to show corresponding increases or decreases.

4.2 | Strengths and limitations

Euro-Peristat benefits from an established network of experts to assemble routinely collected data from across Europe, with stringent quality assurance and control. Given the collaborative spirit of the network, members provided routinely collected birth data that gave a valuable insight to understanding the CS trends in their countries. As CS rates are increasing in most parts of the world, this analysis provides a unique opportunity to conduct an in-depth analysis of CS trends in countries where rates are decreasing or remain level, to compare with countries where rates are increasing. Encouragingly, compared with the previous Euro-Peristat analysis using 2015 data,[2] additional countries were able to implement the TGCS for at least a 4-year time period (Czech Republic, Scotland (UK) and Wales (UK)), and others have become able to do this more recently (Lithuania in 2017 and Slovakia in 2018).

Although data required for the TGCS are routinely collected in hospital records, the data collected in the PHIRI project were largely drawn from vital statistics/routine data sources. As a result, in many countries it was not possible to implement the TGCS, which we previously found was associated with higher CS rates.[2] Indeed, several countries with the highest CS rates in 2015 (Bulgaria, 43%, in 2014; Greece, approx. 50%; Romania, 46.9%; Switzerland 34.2%, in 2014) were unable to implement the TGCS for this analysis,[2] which is a potential source of bias. Compared with the TGCS analysis conducted using only 2015 data,[2] several countries could not provide the data necessary to analyse births according to the TGCS used in this study (France, due to previous data provided from a routine survey carried out every 5 years; the Netherlands, due to temporary changes to data; Switzerland, due to delivery mode not linked in data hub).[11]

Additionally, as discussed extensively in a previous Euro-Peristat article,[2] the use of routine data sources may lead to misclassification, particularly for fetal presentation (as observed based on results for group 9), labour onset and prior CS. Countries differ in classifications for prelabour/intrapartum/emergency CS and for labour induction/augmentation, which implies some heterogeneity of the corresponding TGCS groups between countries.

As the data were originally collected for individual births, we divided this number by two to approximate the number of women in group 8, leading to some misclassification of triplet and higher-order pregnancies. Further, our woman-based CS rates for the TGCS analysis could differ from those of other sources, including Euro-Peristat reports,[4,16] which use birth-based rates. Differences between our estimates and those of other data sources are also possibly dependent on the treatment of multiple births (we estimated this by dividing by two, meaning that triplets and higher-order births would be misclassified) and missing data (imputing

TABLE 3 Absolute change in percentage points in caesarean section (CS) rate (%) of Robson Ten Group Classification System groups from 2015 to 2019, from country with highest decrease to country with highest increase in overall CS rate.

			ROBSON GROUPS														
COUNTRY	**CS Rate (%) 2015, 2019****	**CS rate Change**	1	2	2a	2b	3	4	4a	4b	5	6	7	8	9	10	X
Cyprus	55.9,52.2	(-3.7)	1.1	-12.5	-10.9	0.0	1.7	-16.5	-2.7	0.0	-3.3	-3.5	1.3	0.3	0.8	-3.4	-23.6
Italy	35.8, 33.4	(-2.4)	-0.6	-7.9	0.6	0.0	-0.4	-7.1	0.0	0.0	-0.7	0.8	-0.1	0.1	1.3	-0.6	-27.1
Luxembourg	31.8, 29.5	(-2.3)	-1.8	-4.8	-5.3	0.0	-0.8	-2.2	-0.7	0.0	-3.3	0.8	-3.3	-0.6	3.3	-1.2	-52.4
Denmark* (2015, 2018)	20.8, 19.6	(-1.2)	-0.6	-2.2	-0.4	0.0	-0.4	-3.4	-1.5	0.0	-2.3	-4.0	0.3	-3.0	3.5	2.5	1.0
Czech Republic* (2016, 2019)	24.4, 23.8	(-0.6)	0.5	0.1	1.9	0.0	0.1	-3.7	-0.2	0.0	-1.1	-1.1	-2.0	0.9	0.0	2.1	4.6
Germany	32.3, 31.8	(-0.5)	-0.5	-1.9	-0.5	0.0	-0.9	-3.4	-0.7	0.0	0.3	-0.8	-0.9	-1.3	0.0	-0.8	-4.2
Iceland	16.3, 16.2	(-0.1)	0.1	-3.5	-4.6	0.0	0.1	-0.3	2.0	0.0	5.3	-4.2	-12.7	-0.2	0.0	-4.0	---
Malta	31.0, 30.9	(-0.1)	2.8	-3.1	-0.3	0.0	-0.4	1.2	1.3	0.0	8.9	-0.9	2.5	-5.2	-5.3	-3.2	---
Norway	16.1, 16.0	(-0.1)	-1.0	-1.1	-0.7	0.0	-0.1	-3.0	-0.6	0.0	-0.3	2.7	-0.3	-2.1	-1.9	-2.4	---
Estonia	18.8, 18.8	(0.0)	-0.2	-4.6	-1.1	0.0	-0.3	-6.8	-3.3	0.0	-6.3	1.2	-3.5	-8.1	-12.9	-2.9	---
Belgium	20.8, 20.9	(+0.1)	0.4	-0.6	0.4	0.0	0.1	1.8	0.4	0.0	-1.5	-0.1	-1.4	-1.6	21.1	-0.6	13.8
Sweden	17.4, 17.7	(+0.3)	0.0	-3.2	-1.7	0.0	0.0	-4.4	-0.8	0.0	1.0	-0.8	1.7	-0.2	---	2.4	1.0
Latvia	21.5, 22.0	(+0.5)	1.6	-2.6	2.3	0.0	0.3	-1.1	1.3	0.0	-5.0	7.6	1.8	-0.9	-0.8	3.0	---
Slovenia	20.4, 21.3	(+0.8)	1.1	-2.1	-0.2	0.0	0.0	-4.0	0.4	0.0	0.3	3.2	-0.2	0.9	0.0	1.5	---
Finland	16.0, 17.5	(+1.5)	1.1	4.8	2.8	0.0	0.6	1.1	1.0	0.0	6.1	-6.7	-6.9	-0.6	26.2	4.0	1.7
UK: Northern Ireland	29.5, 32.2	(+2.6)	1.8	5.4	4.3	0.0	0.8	4.3	2.9	0.0	1.5	-1.8	-0.5	-3.9	-1.9	3.1	---
UK: Scotland* (2016, 2019)	32.0, 34.9	(+2.8)	1.3	1.9	2.1	0.0	0.3	0.5	0.1	0.0	2.8	1.2	1.6	0.9	26.1	1.5	14.2

Trend	Change from 2015-2109
Increasing	≥5.0%
	1.0-4.9%
	<1.0%
Decreasing	<-1.0%
	-1.0-4.9%
	≥-5.0%

Note: Green shading is indicative of decreasing (that is, improving) CS rates, whereas red shading is indicative of increasing (that is, worsening) CS rates, with darker shades indicating greater changes in relative size. Some discrepancies arise from rounding.

*Czech Republic and Scotland 2016, 2019; Denmark 2015 and 2018.

**The overall CS rate is presented following Euro-Peristat conventions as the number of liveborn and stillborn babies (birth-based rate); the Robson classification uses the number of women delivering a liveborn or stillborn baby (woman-based rate).

TABLE 4 Absolute change in percentage points in absolute contribution of Robson Ten-Group Classification System groups to the overall caesarean section (CS) rate, from country with highest decrease to country with highest increase in overall CS rate.

			ROBSON GROUPS														
COUNTRY	**CS Rate (%) 2015, 2019****	CS rate **Change**	1	2	2a	2b	3	4	4a	4b	5	6	7	8	9	10	X
Cyprus	55.9,52.2	(-3.7)	-0.3	-2.1	0.0	-2.0	0.2	-0.7	0.2	-0.9	0.7	-0.1	0.2	-0.3	0.0	-0.5	-0.7
Italy	35.8, 33.4	(-2.4)	-0.4	-1.0	0.6	-1.6	-0.1	-0.2	0.1	-0.3	0.5	0.0	0.0	-0.1	0.0	-0.1	-1.0
Luxembourg	31.8, 29.5	(-2.3)	-0.4	-1.0	-0.8	-0.2	-0.1	-0.4	-0.1	-0.3	0.2	0.1	-0.6	0.1	0.0	-0.2	0.0
Denmark* (2015, 2018)	20.8, 19.6	(-1.2)	-0.2	0.1	0.2	-0.1	-0.1	-0.3	-0.1	-0.2	-0.5	0.0	-0.1	-0.1	0.0	0.1	0.0
Czech Republic* (2016, 2019)	24.4, 23.8	(-0.6)	0.1	0.3	0.2	0.1	0.0	-0.1	0.0	-0.1	0.4	-0.6	-0.4	-0.1	-0.3	0.0	0.1
Germany	32.3, 31.8	(-0.5)	-0.5	-0.5	-0.1	-0.4	-0.2	-0.3	0.0	-0.3	1.3	-0.1	0.0	0.0	0.0	-0.2	0.0
Iceland	16.3, 16.2	(-0.1)	0.2	0.0	-0.2	0.2	0.0	-0.1	0.2	-0.3	0.1	-0.2	0.1	-0.1	-0.1	0.0	---
Malta	31.0, 30.9	(-0.1)	1.0	-0.5	0.2	-0.7	-0.1	0.1	0.1	0.0	-0.9	0.1	0.4	0.1	-0.1	-0.3	0.1
Norway	16.1, 16.0	(-0.1)	-0.5	0.5	0.4	0.1	-0.1	0.0	0.1	-0.1	0.0	0.1	0.0	-0.1	0.0	-0.1	---
Estonia	18.8, 18.8	(0.0)	-0.8	0.1	0.4	-0.3	-0.2	-0.1	0.0	-0.1	-0.1	0.3	0.3	-0.2	0.9	-0.2	---
Belgium	20.8, 20.9	(+0.1)	0.1	0.1	0.2	-0.1	0.0	0.3	0.1	0.2	-0.3	0.0	-0.1	-0.2	0.3	0.0	-0.1
Sweden	17.4, 17.7	(+0.3)	-0.2	0.3	0.2	0.0	0.0	-0.1	0.0	-0.1	0.4	-0.1	0.0	-0.1	0.0	0.1	0.1
Latvia	21.5, 22.0	(+0.5)	-0.2	0.5	0.7	-0.2	0.1	0.3	0.2	0.1	-0.2	0.0	0.0	-0.1	---	0.1	---
Slovenia	20.4, 21.3	(+0.8)	-0.1	0.4	0.5	-0.1	0.0	0.1	0.1	-0.1	0.7	-0.2	-0.2	-0.1	0.1	0.0	---
Finland	16.0, 17.5	(+1.5)	0.1	1.8	1.1	0.7	0.1	0.5	0.2	0.3	0.7	-0.7	-0.5	0.0	-0.7	0.2	0.0
UK: Northern Ireland	29.5, 32.2	(+2.6)	0.1	1.4	0.9	0.5	0.1	1.3	0.7	0.6	0.2	0.0	-0.2	-0.1	-0.4	0.3	-0.3
UK: Scotland* (2016, 2019)	32.0, 34.9	(+2.8)	0.3	1.0	0.8	0.2	0.0	0.4	0.2	0.2	1.8	0.4	0.4	0.0	-0.6	0.3	-1.1

Trend	Change from 2015-2109
Increasing	≥5.0%
	1.0-4.9%
	<1.0%
Decreasing	<-1.0%
	-1.0-4.9%
	≥-5.0%

Note: Green shading is indicative of decreasing absolute contribution, whereas red shading is indicative of increasing absolute contribution, with darker shades indicating greater changes in relative size. Colours/shading represent the same trends for cells with overall CS rates for countries, with green indicating decreasing (that is, improving) and red indicating increasing (that is, worsening) CS rates. Some discrepancies arise from rounding.

*Czech Republic and Scotland 2016, 2019; Denmark 2015 and 2018.

**The overall CS rate is presented following Euro-Peristat conventions as the number of liveborn and stillborn babies (birth-based rate); the Robson classification uses the number of women delivering a liveborn or stillborn baby (woman-based rate).

or excluding the group X category), but these differences are likely to be minimal. Given the small numbers of births in some countries (Cyprus, Luxembourg, Malta and Iceland) and low proportions of women in some TGCS groups (in particular group 9), some changes noted could have arisen from random fluctuations. Finally, using the TGCS does not allow in-depth investigations into the reasons for changes in CS rates or the exploration of other characteristics that may result in differences between countries, such as maternal age at delivery or body mass index (BMI).

4.3 | Interpretation

In line with our previous findings,[2] many European countries remained unable to implement the Robson TGCS using routinely collected data, including some with the highest CS rates. Further, in the current study, the biggest decreases in CS rates were noted in countries able to implement the TGCS, whereas the highest increases were noted in countries that could not. The positive association between TGCS implementation and improvements in CS rates could be indicative of a country's investment in evidence-based best practices for mode of delivery.[2] Continued efforts are necessary, from professional and legislative bodies, to improve the collection of these data to provide a common structure to evaluate CS use, as well as to evaluate other perinatal events.

In contrast to the rising CS rates worldwide over the past several decades,[1,13] we found decreasing or relatively level rates in most European countries. Previously, a decrease in CS rates has only been reported in Japan,[13] and in North America (Canada and the USA).[1] Although a previous study suggested that CS rates in Northern and Western Europe may be levelling off,[1] several countries with the highest increases in our study were from Northern Europe (in Northern Ireland, Scotland and Wales in the UK, and in Ireland). Other geographic patterns were not evident in our findings, potentially because of differences in the countries included, with Eastern and Southern Europe (based on their classification) less well represented in our study, and the shorter period evaluated. In most countries with the highest rates in 2015, the CS rates decreased or were relatively level in 2019 (six of the 10 countries with initial rates above 30%). Notably, though, several countries with the highest initial levels also had relatively large increases in CS rates (Hungary, Scotland (UK), Ireland: 2.7%–3.5%). In most countries with lower initial rates (<20%), the CS rates were relatively level, although Finland, with the lowest initial CS rates, had an increase of 1.5%.

In most European countries with data for the TGCS, the relative size of groups 2a and 4a (nulliparae or multiparae with singleton, cephalic, term births and induced labour) increased. Although induction rates had been increasing over the previous decades,[17–19] a randomised controlled trial published in 2018 (ARRIVE), conducted in the USA in low-risk nulliparas, found that elective induction of labour at 39 weeks of gestation lowered the CS rates but did not increase adverse perinatal outcomes.[20] Based on these findings, professional bodies concluded that offering the elective induction of labour for this population is reasonable under certain circumstances,[21] sparking off debates on universal induction of labour at 39 weeks of gestation,[19] and seemingly accelerating increasing trends in induction rates,[18] as also suggested in our data.

Although ARRIVE found no increase in CS rate with labour induction,[20] our analysis found that the induction subgroups contributed to absolute increases in overall CS rates, because of their increasing size. In the case of countries with the biggest increases in CS rates (Finland, Northern Ireland and Scotland [UK]), the increasing use of CS in these subgroups coupled with their increasing size led to notable increases in the absolute contribution of these groups to the overall CS rate. The CS rate for group 4a is generally 4%–6%,[22] which was exceeded in many countries in 2019 with high overall CS rates (Cyprus, Northern Ireland and Scotland [UK]) or increasing rate (Northern Ireland and Scotland [UK]), as well as others (Germany). However, solely based on this ecological analysis, understanding the potential causal impact of increasing labour induction on CS use is challenging, and warrants further study in general European obstetric populations. In countries with decreasing overall CS rates, increases in the size of groups 2a and 4a (nulliparas and multiparas, term cephalic singletons, with induced labour) occurred in conjunction with decreases in the size of groups 2b and 4b (nulliparas and multiparas, term cephalic singletons, with prelabour CS). These could be interpreted positively as a shift from prelabour CS to induction without increasing the CS rates in groups 2a and 4a in these countries.[23]

The differences between ARRIVE and our study are numerous (for example, with older and thinner obstetric populations, differing sociocultural environments, and differing healthcare systems and insurance in Europe).[24] The CS rates in ARRIVE were also relatively low of 18.6% (labour induction) and 22.2% (expectant management), and may not reflect clinical practice outside a clinical trial, which enrols specific populations and is carried out in academic settings.[20]

The link between changes in overall CS rates in groups 1 (nulliparous, term cephalic singletons, with spontaneous labour) and 10 (all preterm cephalic singletons) with their absolute contribution is also of note. As women in group 1 will move to the higher risk group 5 in subsequent pregnancies, ensuring the appropriate use of CS in this group is vital to maintaining low or decreasing CS rates in the near future. Additionally, given the risks of preterm birth for the neonate,[25,26] the appropriate management of group 10 is essential.

Across Europe, similarities were noted in the groups driving trends in the countries with the greatest and smallest decrease in CS rates. Conversely, in Japan, the decreasing CS rates were attributed to decreases in the contributions of groups 1, 2a and 5,[13] whereas in our study the strongest contributors to the decreases in countries with the greatest decreases were from groups 1, 2b (and correspondingly 2), 4b (and correspondingly 4) and 10, suggesting differences in

the underlying drivers of the decreases in CS rates. Given the myriad of differences in culture and policy (also reflected in the differences in CS rates for breech deliveries, groups 6 and 7), it is not surprising that different factors underlie the decreases and point to the need to formulate policies specific to the needs of a given population.

5 | CONCLUSION

In Europe, between 2015 and 2019, CS rates and trends varied widely across countries. In contrast to worldwide trends over the past several decades, CS rates decreased in some European countries, with greater decreases generally in countries able to implement the Robson TGCS. Given the importance of reducing the numbers of CSs performed without clinical indication, stakeholders should continue to promote policies aimed at their reduction. Given the divergent trends, a thorough and transparent evaluation of CS rates and trends, in light of countries' policies, could inform these strategies.

AUTHOR CONTRIBUTIONS

MA and JZ conceived and planned the present work. Data were collected by AF, SD, AS, VT, PV, SA, MFE, GH, TK, EM, IV and IZE, under the coordination of JZ, MP and MD, and were reviewed for completeness/accuracy by MP. MA carried out the analysis, with assistance from MP. MA drafted the initial article, with support from JZ, MP and MD. All authors, including those in the Euro-Peristat Group, participated in the study design and data collection for their countries and reviewed, edited and approved the final version for publication.

ACKNOWLEDGEMENTS

We acknowledge the support of the multiple data providing institutions participating in the Euro-Peristat network and the coordinators of the PHIRI project for the development and implementation of this protocol.

FUNDING INFORMATION

This research was part of Population Health Information Research Infrastructure (PHIRI), which received funding from the European Union's Horizon 2020 Research and Innovation programme (grant agreement no. 101018317). Euro-Peristat is a member of the ConcePTION consortium, which is funded by the Innovative Medicines Initiative 2 Joint Undertaking (grant agreement no. 821520) which receives support from the European Union's Horizon 2020 Research and Innovation programme and European Federation of Pharmaceutical Industries and Associations (EFPIA). The funding sources were not involved in conducting this research or writing this article.

CONFLICT OF INTEREST STATEMENT

The authors report no conflicts of interest.

DATA AVAILABILITY STATEMENT

The data that supports the findings of this study are available in the supplementary material of this article

ETHICS APPROVAL

Euro-Peristat received authorisations for its 2015 core database from the French Advisory Committee on Use of Health Data in Medical Research (no. 17–048, 30 March 2017) and the French National Commission for Data Protection and Liberties (DR-2019-089, 26 March 2019).

ORCID

Melissa Amyx https://orcid.org/0000-0003-4660-7716
Marianne Philibert https://orcid.org/0000-0003-2847-7655
Alex Farr https://orcid.org/0000-0002-4628-9052
Serena Donati https://orcid.org/0000-0002-4607-2072
Alexander K. Smárason https://orcid.org/0000-0003-4640-7925
Vlad Tica https://orcid.org/0000-0001-9000-4731
Sophie Alexander https://orcid.org/0000-0002-2861-9003
Maria Fernandez Elorriaga https://orcid.org/0000-0002-6346-8044
Ewa Mierzejewska https://orcid.org/0000-0003-0822-4781
Irisa Zīle-Velika https://orcid.org/0000-0003-1553-1130
Jennifer Zeitlin https://orcid.org/0000-0002-9568-2969

REFERENCES

1. Betran AP, Ye J, Moller A, Souza JP, Zhang J. Trends and projections of caesarean section rates: global and regional estimates. BMJ Global Health. 2021;6(6):e005671.
2. Zeitlin J, Alexander S, Barros H, Blondel B, Delnord M, Durox M, et al. Perinatal health monitoring through a European lens: eight lessons from the euro-Peristat report on 2015 births. BJOG. 2019;126(13):1518–22.
3. Zeitlin J, Durox M, Macfarlane A, Alexander S, Heller G, Loghi M, et al. Using Robson's ten-Group classification system for comparing caesarean section rates in Europe: an analysis of routine data from the euro-Peristat study. BJOG. 2021;128(9):1444–53.
4. Peristat E, Macfarlane A. Euro-Peristat Project. European Perinatal Health Report. Core Indicators of the Health and Care of Pregnant Women and Babies in Europe in 2015. 2018.
5. Robson MS. Classification of caesarean sections. Fetal Matern Med Rev. 2001;12:23–39.
6. Torloni MR, Betran AP, Souza JP, Widmer M, Allen T, Gulmezoglu M, et al. Classifications for cesarean section: a systematic review. PLoS ONE. 2011;6(1):e14566.
7. World Health Organization. WHO statement on caesarean section rates. 2015.
8. Kačerauskienė J, Bartusevičienė E. EBCOG position statement on caesarean section in Europe. Eur J Obstet Gynecol Reprod Biol. 2017;219:P129.
9. MacFarlane AJ, Blondel B, Mohangoo AD, Cuttini M, Nijhuis J, Novak Z, 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.
10. Zeitlin J, Mohangoo AD, Delnord M, Cuttini M, Euro-Peristat Scientific Committee. The second European perinatal health report: documenting changes over 6 years in the health of mothers and babies in Europe. J Epidemiol Community Health. 2013;67(12):983–5.

11. Zeitlin J, Philibert M, Estupiñán-Romero F, Loghi M, Sakkeus L, Draušnik Ž, et al. Developing and testing a protocol using a common data model for federated collection and analysis of national perinatal health indicators in Europe. Open Research Europe. 2023;3:54.
12. Wagner M, Falcone V, Neururer SB, Leitner H, Delmarko I, Kiss H, et al. Perinatal and postpartum care during the COVID-19 pandemic: a nationwide cohort study. Birth. 2022;49(2):243–52.
13. Vogel JP, Betran AP, Vindevoghel N, Souza JP, Torloni MR, Zhang J, et al. Use of the Robson classification to assess caesarean section trends in 21 countries: a secondary analysis of two WHO multicountry surveys. Lancet Glob Health. 2015;3(5):e260–70.
14. Bunch K, Allin B, Jolly M, Hardie T, Knight M. Developing a set of consensus indicators to support maternity service quality improvement: using Core outcome set methodology including a Delphi process. BJOG. 2018;125(12):1612–8.
15. World Health Organization. Robson classification: implementation manual. 2017.
16. Euro-Peristat Research Network. The European Perinatal Health Report, 2015-2019. 2022.
17. Drife JO. The history of labour induction: how did we get here? Best Pract Res Clin Obstet Gynaecol. 2021;77:3–14.
18. Gilroy LC, Al-Kouatly HB, Minkoff HL, McLaren RA Jr. Changes in obstetrical practices and pregnancy outcomes following the ARRIVE trial. Obstet Gynecol. 2022;226(5):716.e1–716.e12.
19. Migliorelli F, De Oliveira SS, de Tejada BM. The ARRIVE trial: towards a universal recommendation of induction of labour at 39 weeks? Eur J Obstet Gynecol Reprod Biol. 2020;244:192–5.
20. Grobman WA, Rice MM, Reddy UM, Tita AT, Silver RM, Mallett G, et al. Labor induction versus expectant management in low-risk nulliparous women. N Engl J Med. 2018;379(6):513–23.
21. American College of Obstetricians and Gynecologists. Clinical guidance for integration of the findings of the ARRIVE Trial: labor induction versus expectant management in low-risk nulliparous women. August 2018 2020.
22. Robson M, Hartigan L, Murphy M. Methods of achieving and maintaining an appropriate caesarean section rate. Best Pract Res Clin Obstet Gynaecol. 2013;27(2):297–308.
23. Le Ray C, Blondel B, Prunet C, Khireddine I, Deneux-Tharaux C, Goffinet F. Stabilising the caesarean rate: which target population? BJOG. 2015;122(5):690–9.
24. Facchinetti F, Menichini D, Perrone E. The ARRIVE trial will not "arrive" to Europe. J Matern Fetal Neonatal Med. 2020;35:1–4.
25. Delnord M, Zeitlin J. Epidemiology of late preterm and early term births–an international perspective. Semin Fetal Neonatal Med. 2019;24(1):3–10.
26. Kramer MS, Demissie K, Yang H, Platt RW, Sauvé R, Liston R. Fetal and infant health study Group of the Canadian Perinatal Surveillance System, fetal and infant health study Group of the Canadian Perinatal Surveillance System. The contribution of mild and moderate preterm birth to infant mortality. JAMA. 2000;284(7):843–9.

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

How to cite this article: Amyx M, Philibert M, Farr A, Donati S, Smárason AK, Tica V, et al. Trends in caesarean section rates in Europe from 2015 to 2019 using Robson's Ten Group Classification System: A Euro-Peristat study. BJOG. 2023;00:1–11. https://doi.org/10.1111/1471-0528.17670

APPENDIX 1

Jeannette Klimont, Alex Farr (Austria); Sophie Alexander, Marie Delnord, Judith Racapé, Gisèle Vandervelpen, Wei-Hong Zhang (Belgium); Rumyana Kolarova, Evelin Jordanova (Bulgaria); Željka Draušnik (Croatia); Theopisti Kyprianou, Vasos Scoutellas (Cyprus); Jitka Jirova, Petr Velebil (Czech Republic); Anne Vinkel Hansen, Laust Hvas Mortensen (Denmark); Liili Abuladze, Luule Sakkeus (Estonia); Mika Gissler, Anna Heino (Finland); Melissa Amyx, Béatrice Blondel, Anne Chantry, Catherine Deneux Tharaux, Mélanie Durox, Jeanne Fresson, Alice Hocquette, Marianne Philibert, Annick Vilain, Jennifer Zeitlin (France); Guenther Heller, Björn Misselwitz (Germany); Aris Antsaklis (Greece); István Sziller (Hungary); Jóhanna Gunnarsdóttir, Helga Sól Ólafsdóttir (Iceland); Karen Kearns, Izabela Sikora (Ireland); Rosaria Boldrini, Marina Cuttini, Serena Donati, Marzia Loghi, Marilena Pappagallo (Italy); Janis Misins, Irisa Zile-Velika (Latvia); Rita Gaidelyte, Jelena Isakova (Lithuania); Audrey Billy, Aline Lecomte, Jessica Pastore, Guy Weber (Luxembourg); Miriam Gatt (Malta); Peter Achterberg, Lisa Broeders, Ashna Hindori-Mohangoo, Jan Nijhuis (the Netherlands); Rupali Akerkar, Hilde Engjom, Kari Klungsøyr (Norway); Ewa Mierzejewska, Katarzyna Szamotulska (Poland); Henrique Barros, Carina Rodrigues (Portugal); Mihaela-Alexandra Budianu, Alexandra Cucu, Mihai Horga, Lucian Puscasiu, Petru Sandu, Vlad Tica (Romania); Ján Cáp (Slovakia); Miha Lucovnik, Ivan Verdenik (Slovenia); Adela Recio Alcaide, Mireia Jané, Maria José Vidal, Óscar Zurriaga (Spain); Karin Källén, Anastasia Nyman (Sweden); Tonia A. Rihs (Switzerland); Diane Anderson, Hannah McConnell, Alison Macfarlane, Sinead Magill, Kirsten Monteath, Joanne Murphy, Mark Piper, Sonya Scott, Lucy Smith, Craig Thomas (UK).