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# Caesarean section rates across Europe and its impact on specialist training in Obstetrics: A qualitative review by the Standing Committee of Hospital Visiting Programme for Training Recognition of the European Board and College of the Obstetrics and Gynaecology (EBCOG)

Juriy Wladimiroff [a,*], Sofia Tsiapakidou [b], Tahir Mahmood [c], Petr Velebil [d]

[a] Visiting Obstetrician-Department of Obstetrics & Gynaecology, Erasmus University Medical Centre, Rotterdam, the Netherlands, and Past chair EBCOG Standing Committee on Training Recognition, Emeritus Council Member of EBCOG, Leuven, Belgium

[b] 1st Department of Obstetrics and Gynecology, Aristotle University of Thessaloniki, "Papageorgiou" General Hospital, Thessaloniki, Greece and President European Network of Trainees in Obstetrics and Gynaecology (ENTOG), Leuven, Belgium

[c] Visiting Gynaecologist, Spire Murrayfield Hospital, Edinburgh, Scotland, United Kingdom, Past President EBCOG, and Chair EBCOG Standing Committee on Standards of Care and Position Statements, Leuven, Belgium

[d] Chief Perinatal Centre of the institute for the care of mother and child, 3rd Medical School of Charles, University of Prague, Czech Republic, Chief WHO Collaborating centre in perinatal medicine, Prague, Czech Republic and Chair EBCOG Standing Committee on Training Recognition, Leuven, Belgium

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ABSTRACT

Information is presented from hospital visiting reports with focus on Caesarean section and vaginal instrumental delivery rates from training units in European countries during the period 1999–2023. In a considerable number of countries training units were audited more than once, allowing assessment of trends in both obstetric interventions. There is a notable rise in Caesarean section rate in a number of European countries, with the highest rates in Poland (55.1%), Turkey (54.8%) and Greece (48.6%). Conversely Caesarean sections were low in France (19.3%) associated with a higher rate of instrumental vaginal delivery rates. Some countries like Germany and Poland have high variability in their rates, indicating fluctuations or regional differences over the years.

Vaginal instrumental delivery rates varied across countries having very low rates (Turkey with 1.0% and Poland with 1.2%) and others having relatively high rates (like Switzerland, France and Belgium). Germany and Belgium showed a balanced use of both Caesarean sections and vaginal instrumental deliveries but with considerable variability in both practices. Countries in Central Europe display marked differences in Caesarean section rate: Hungary 37.8%; Slovakia 34.5%, Czech Republic 27.5% and Slovenia 20.7%. Apart from Poland (1.2%), differences in vaginal instrumental delivery rate between these countries are relatively small with Hungary 2.7%, Slovakia 2.8%, Czech Republic 2.9% and Slovenia 2.9%. Low instrumental delivery rates have major effect on the quality of training for the trainees in their formative years. Having a limited experience in this area of clinical practice would influence their future clinical obstetric practice.

## Introduction

The Caesarean section (CS) is a vital and irreplaceable surgical intervention that plays a crucial role in ensuring the safety of both the mother and the infant when vaginal delivery poses considerable risks. There is a rising trend of women opting for CS as a voluntary alternative instead of vaginal delivery, even without any medical requirement.

The rising rates of CS in Europe have particularly drawn the attention of healthcare professionals, policymakers, and researchers. Several factors contribute to this rise, including women's request for a Caesarean section, fear of litigation, previous difficult vaginal delivery, concerns about the potential pelvic floor damage, and the perception that CS is a safe procedure for the baby and occasionally financial incentives [1].

In 2021, the European Board and College of Obstetrics and Gynaecology (EBCOG) alongside other European national societies in obstetrics and gynaecology published position statement expressing their concern around the rising Caesarean section (CS) rates across Europe.

* Corresponding author.
*E-mail address:* j.wladimiroff@btinternet.com (J. Wladimiroff).

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This document underscores the necessity of evaluating and mitigating the factors contributing to the increased prevalence of CS, aligning with broader concerns within the medical community and public health organizations [1,2].

The World Health Organization (WHO) has provided guidelines regarding the use of CS, emphasizing that the procedure should only be performed when medically necessary. The WHO recommends that the ideal CS rate should be between 10 % and 15 % of all births. Rates higher than this range are not associated with reductions in maternal and neonatal mortality and morbidity; instead, they may expose women and infants to unnecessary risks associated with surgical interventions [3]. The International Federation of Obstetrics and Gynaecology (FIGO) published a statement in June 2020 which states that, "*a Caesarean delivery should be recommended as the only medically reasonable alternative if, and only if, there is certainty of an evidence-base for the clinical judgment that Caesarean delivery is clinically superior to vaginal delivery*". Additionally, this paper also outlines FIGO's good practice recommendations for counselling expectant mothers and the conduct of elective Caesarean versus vaginal delivery [4].

Caesarean section is associated with surgical complications and may have impact on immediate and future health of the mother and child including implications for future pregnancies. In addition to the clinical and health implications, the costs associated with CS are significantly higher than those for vaginal deliveries. These increased costs place a substantial burden on healthcare systems and can strain resources that might otherwise be allocated to other critical areas of maternal and child health [5].

The rise in CS rate has resulted in trainees having sufficient exposure to this surgical procedure. It has been reported that, high CS rates within an institute are often associated with low vaginal instrumental delivery rates. The latter could potentially have a negative impact on a trainee's level of exposure to this mode of delivery. Moreover, an elevated CS rate may potentially affect the overall quality of obstetric training.

### *Objective*

This paper focuses on those European regions in which the EBCOG Hospital Visiting Programme has been able to establish trends in Caesarean section and vaginal instrumental delivery rates across training units.

### *EBCOG visiting and accreditation programme*

The EBCOG Hospital Visiting programme was initiated in August 1994 when the first visit was conducted in Norway. The unit was formally accredited in January 1995. That led to the inception of the formal EBCOG hospital accreditation programme, which involves visiting training units in Europe onsite to assess their training environments, provide support for trainees and monitor units' performance as regards clinical governance [6,7]. EBCOG Hospital Visiting programme thus has offered auditors of training units a unique opportunity to review data on Caesarean section and vaginal instrumental delivery rates across training units in Europe and trends over the past > 20 years. Although data collected from the individual unit may not accurately reflect the surgical delivery rate in a specific country, but it does provide valuable insights into trends in Caesarean section rate and vaginal instrumental delivery rates across different European regions.

During the period 1995–2023, EBCOG Hospital Visiting teams have carried out 373 accreditation visits at the training units in 27 countries across Europe and had their training programme in general obstetrics and gynaecology audited (see map of Europe).

Prior to each visit, the Head of Department or Programme Director of Training and a Trainee have to complete an application form which focuses on the local training programme, population served by the training unit, tutorship, training opportunities and assessment of trainees' progress.

At the end, the Visiting assessors prepare the Visiting Report, which contains basic data regarding departmental infrastructure and training programme; the view on training from Head/senior staff, trainees and Dean of Medical Faculty or Director of Hospital; training facilities; and the working relationship with Departments of Neonatology and Anaesthesiology. At the end of this report conclusions and recommendations are given, that the Department could review and addresses till the next EBCOG visit.

## Methods

Information presented in this paper had been gathered from hospital visiting reports during the period spanning between 1999–2023 with focus on annual numbers of Caesarean sections and vaginal instrumental delivery rates. Data on the total number of Caesarean section (n = 256) and vaginal instrumental delivery rates (n = 229) were available from Austria, the Baltic States (Estonia, Lithuania, Latvia), Belgium, Czech Republic, France, Germany, Greece, Hungary, Italy, Poland, Slovakia, Slovenia, Switzerland and Turkey. In a considerable number of these countries, training units were audited more than once.

Statistical analysis (Mean +/- SD) was only conducted on data from countries in which eight or more hospital visits had been conducted and the relevant data presented in the visiting reports. This has allowed EBCOG to look at trends in caesarean sections rates over time.

## Results

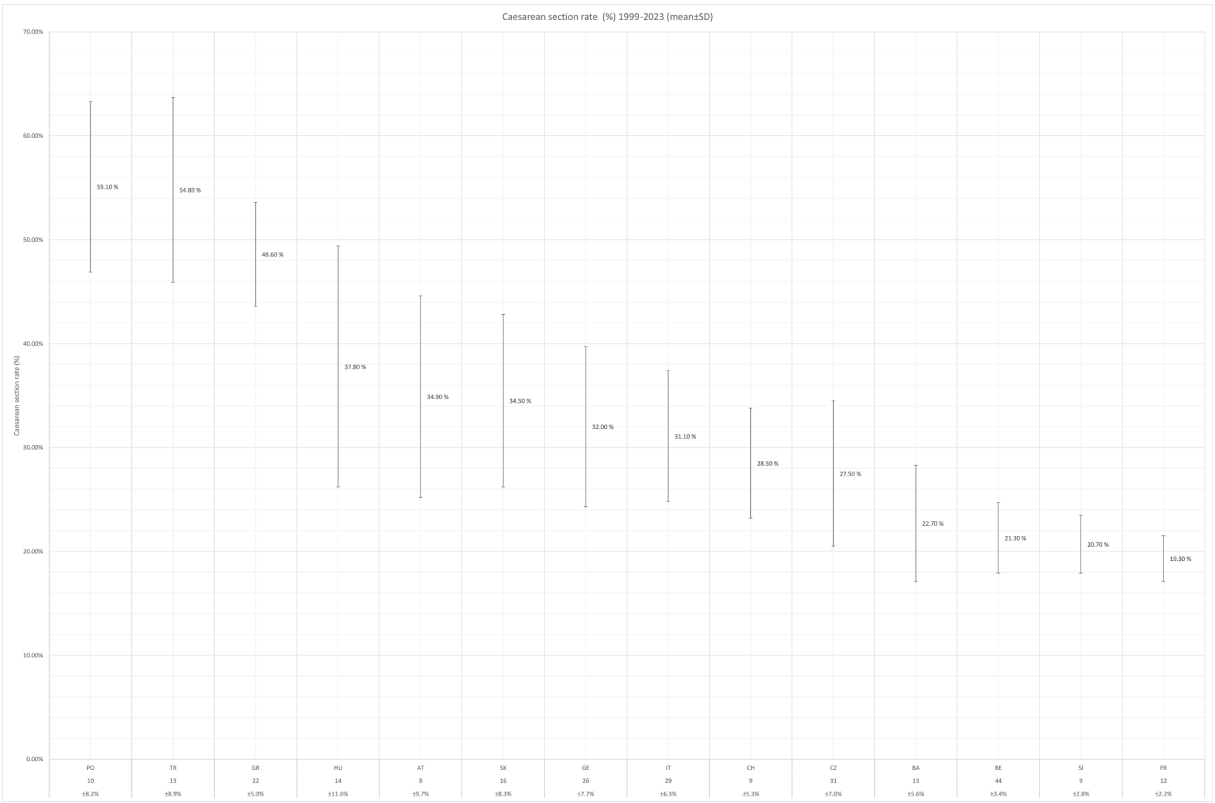
Table 1 presents the total number of Caesarean section data (n = 256) and vaginal instrumental delivery data (n = 229) available from the following countries: Austria, Baltic States (Estonia, Lithuania, Latvia), Belgium, Czech Republic, France, Germany, Greece, Hungary, Italy, Poland, Slovakia, Slovenia, Switzerland, and Turkey. In a number of countries, many training units had been visited more than once.

There were significant differences in **Caesarean section rates** among these **countries** audited by EBCOG from 1999 to 2023, highlighting not only the mean rates but also the variability within each country (Fig. 1). The highest Caesarean section rate was in Poland with a mean rate of 55.1 %, and the lowest rate was in France with a mean rate of 19.3 %. Some countries like Germany and Poland have high variability in their rates, indicating fluctuations or regional differences over the years.

Additionally, Fig. 2 illustrates the differences in **vaginal instrumental delivery rates** across the same countries over the specified period, where the rates vary significantly, with some countries having very low rates (like Turkey with 1.0 % and Poland 1.2 %) and others having relatively high rates (like France, Belgium and Switzerland). These figures highlight existing disparities in mode of delivery across

**Table 1**
Number of Caesarean sections and Instrumental vaginal deliveries in the European countries.

| | Caesarean sections (n) | Vaginal instrumental deliveries (n) |
|---|---|---|
| Austria: | 8 | 8 |
| Baltic States: | 13 | 13 |
| Belgium: | 44 | 40 |
| Czech Republic: | 31 | 26 |
| France: | 12 | 10 |
| Germany: | 26 | 18 |
| Greece: | 22 | 19 |
| Hungary: | 14 | 11 |
| Italy: | 29 | 28 |
| Poland: | 10 | 10 |
| Slovakia: | 16 | 19 |
| Slovenia: | 9 | 8 |
| Switzerland: | 9 | 9 |
| Turkey: | 13 | 10 |
| Total | 256 | 229 |




**Figs. 1 and 2.** Caesarean section rate (%) (Fig. 1) and vaginal instrumental delivery rate (%) (Fig. 2) presented as mean +/- standard deviation based on eight or more hospital visiting reports available from the following countries: Turkey (TR), Greece (GR), Hungary (HU), Germany (GE), Italy (IT), Czech Republic (CZ), Belgium (BE), Baltic countries (BA), Poland (PO), Slovakia (SK), Austria (AU), Switzerland (CH), Slovenia (SL) and France (FR) during the period 1999–2023.

different European countries. Specifically, France had a lower preference for Caesarean sections and a relatively high use of vaginal instrumental deliveries, indicating a preference for assisted vaginal births over surgical interventions. On the contrary, in Turkey and Poland there was a high preference for Caesarean sections with very low reliance on instrumental deliveries.

Germany showed a balanced use of both Caesarean sections and vaginal instrumental deliveries but with considerable variability in both practices. Belgium used both methods but had a relatively high rate of vaginal instrumental deliveries.

Of interest is that some geographically closely situated countries in Central Europe display marked differences in Caesarean section rate with Poland 55.1 % versus Hungary 37.8 %; Slovakia 34.9 % versus Czech Republic 27.5 % and Slovenia 20.7 %(Fig. 1). Apart from Poland (1.2 %), differences in vaginal instrumental delivery rate between these countries are relatively small with Hungary 2.7 %, Slovakia 2.8 %, Czech Republic 2.9 % and Slovenia 2.9 % (Fig. 2).

From 1999 to 2023, there was a notable rise in Caesarean section rates in five countries, as shown in Fig. 3. To be more precise, Greece consistently exhibits the highest rates, peaking at 63 % in 2023, indicating a substantial reliance on Caesarean deliveries. For Austria the Caesarean section rate remains between 20 % and 30 % or shows a steady increase to 46 % – 47 %, reflecting a growing preference or necessity for caesarean sections. Switzerland and Italy display mid-range rates with relative stability, though Italy experienced an early rise before stabilizing around 33 %-34 % in recent years. Slovenia shows a steady increase from 15.0 % to 21.6 %. Belgium, while having the lowest rates, demonstrates a slight increase from 22 % in 2005 to 23.6 % in 2023. These findings underscore diverse trends influenced by medical practices, healthcare policies, and cultural factors within each country.

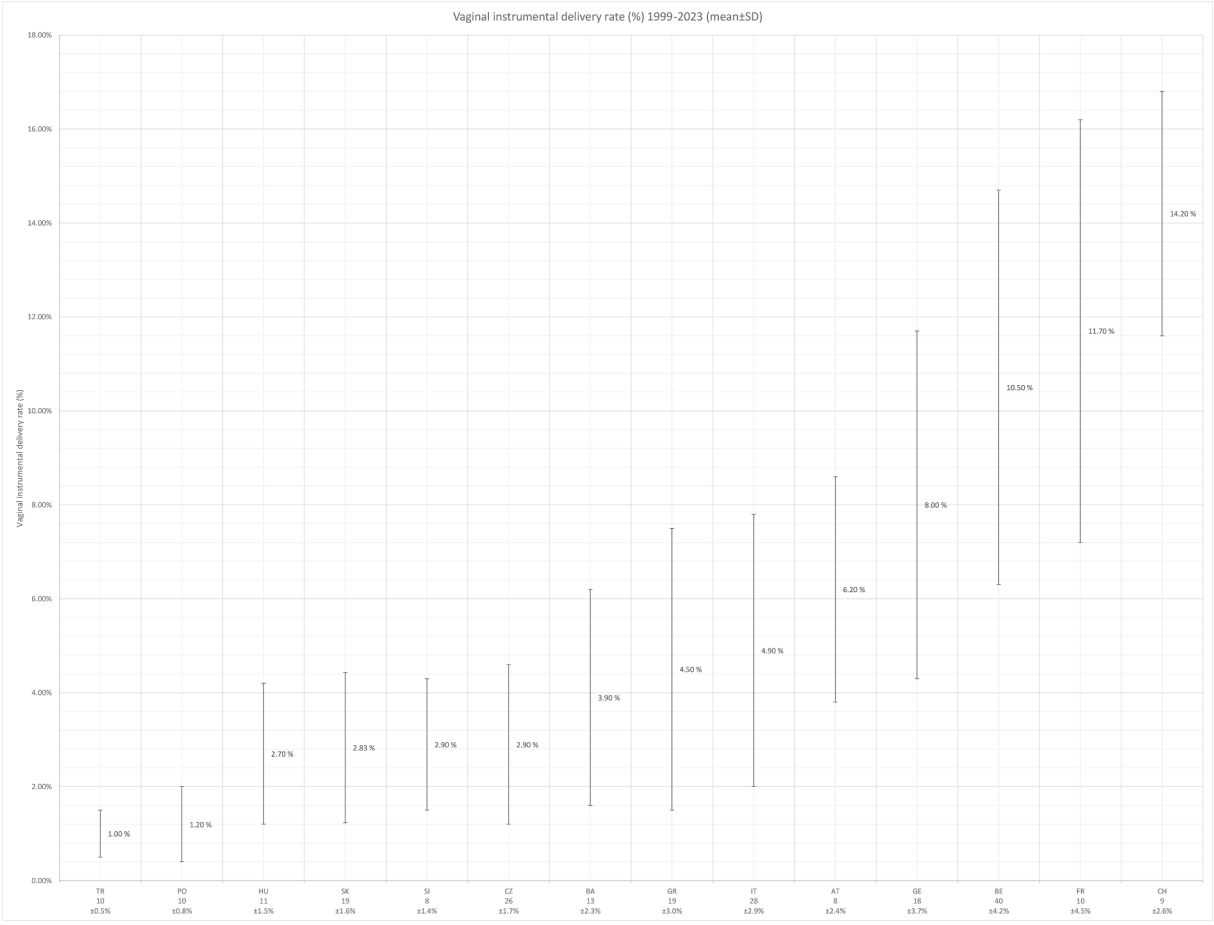
The Caesarean section rates in another four countries are displayed in Fig. 4. Germany experienced a significant decline, peaking at 36.7 % in 2014 with one training unit dropping to 12.3 % in 2023. Hungary displayed a steady increase from 14 % in 2002 to 24.9 % in 2023, indicating consistent changes in obstetrical practices. A rising trend can also be seen for Slovakia.

Fig. 5 describes the emergency (EM) and elective (EL) Caesarean section rates as a percentage of the total Caesarean section rate from 84 training units. The percentages were 50–50 in 36 training units. However, in 13 training units' emergency Caesarean section rate represented only 20 % as opposed to elective Caesarean section rate representing 80 % of the total Caesarean section rate. In six training units, it was the other way round; emergency Caesarean section of 80 % and elective Caesarean section rate of 20 % only of the total Caesarean section rate.

## Discussion

This analysis demonstrates a discrepancy between the WHO's recommended CS rates and the current trends observed in Europe. It necessitates a thorough examination of the underlying causes. It further emphasizes the significance of public health initiatives that aim to educate both healthcare providers and patients about the risks and benefits associated with caesarean section versus vaginal birth.

Comparing the trends between caesarean section and instrumental vaginal deliveries across Europe demonstrated that some countries show a clear preference for one method over the other. For example, Poland and Turkey seem to heavily rely on caesarean sections while in France, there is a definite preference for vaginal instrumental deliveries. Countries with higher variability in both rates may indicate inconsistent practices and changing guidelines over the years. Countries like Germany and Belgium have balanced but variable use of both methods. These findings emphasize the importance of gaining an understanding of




**Figs. 1 and 2.** (*continued*).

local medical practices, cultural preferences, and healthcare policies that affect childbirth methods.

It is becoming increasingly evident that there is a growing need for uniform development and harmonization of professional development across Europe. EBCOG's hospital visiting programme serves as a platform for OB/GYN departments in teaching hospitals to integrate and harmonise their teaching and learning strategies. EBCOG Hospital Visiting aims to improve, assure and assess the quality of specialist training in teaching hospitals throughout Europe. The visiting reports have attempted to address high Caesarean section rates through their recommendations, but their effectiveness has been only partly successful. It often represents a multifactorial problem for which solutions also have to be found outside the training unit being audited.

One example is Greece, which is currently taking action to improve control of Caesarean section rates in its training units. The Hellenic Society of Obstetrics & Gynaecology has initiated a stepped wedge randomised controlled trial towards reducing Caesarean section rates and enhanced vaginal delivery rates involving at least 5,000 and up to 10,000 births in selected centres in Greece. This undertaking may serve as a template for other countries experiencing high Caesarean section rates to undertake similar exercise in their own countries.

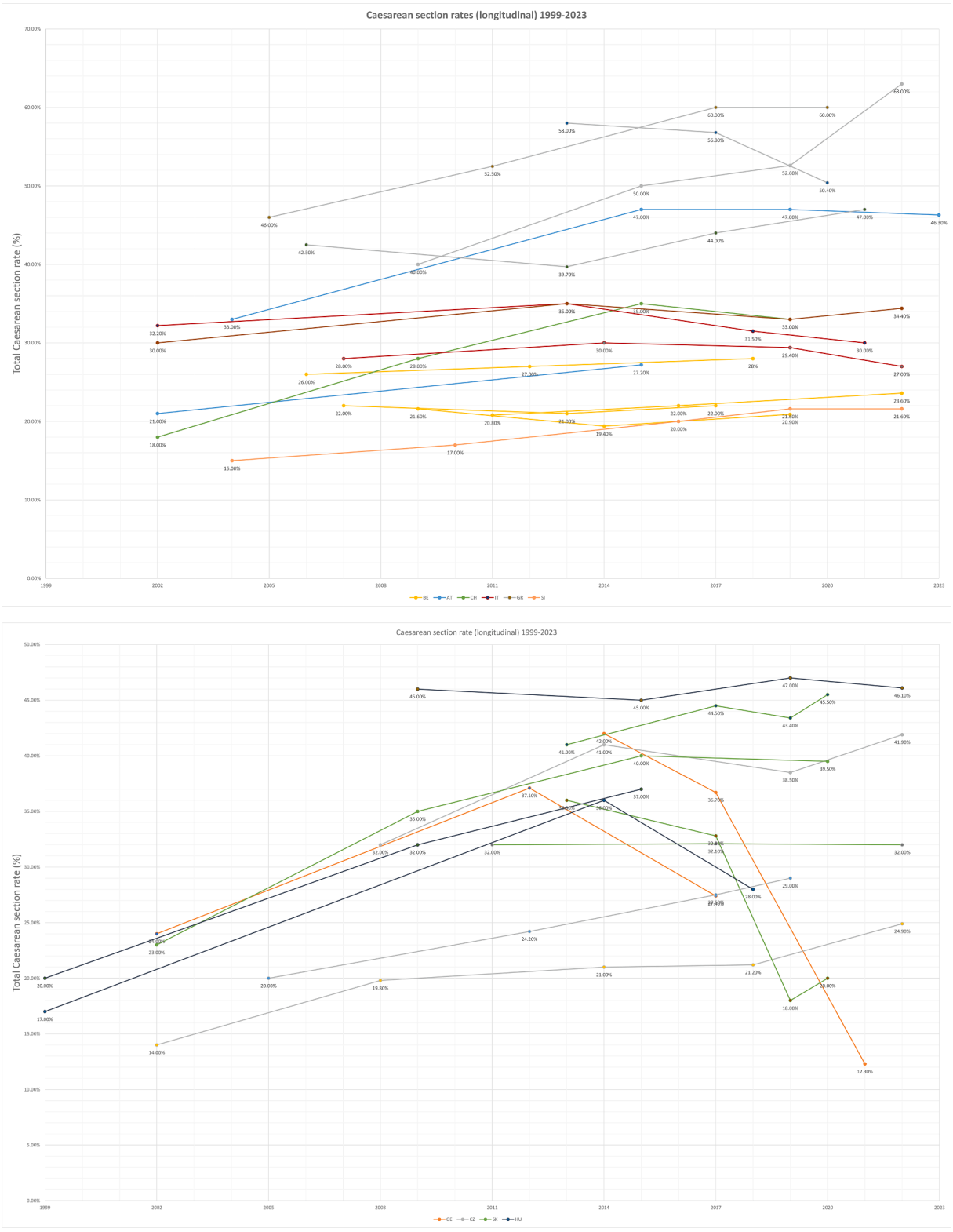
A potential approach to consider is placing emphasis on the postgraduate training of junior doctors in vaginal delivery, with an additional focus on providing them with opportunities to gain experience in operative deliveries. Simulation training is recommended as a key part in the Obstetrics & Gynaecology curriculum to acquire the necessary skills, such as delivery by vacuum extractor or forceps, before these skills are used in clinical practice [8]. Additionally, simulation should be integrated with other forms of procedural assessment, such as mini-clinical examinations and case-based discussions, to effectively translate skills to real-life situations.

The infrequent occurrence of obstetric emergencies makes it challenging to provide adequate training in a clinical setting. Therefore, simulation training of obstetric emergency situations is also essential [9,10]. Simulation assessment can identify learning gaps that are important for obstetrical trainees. In this way, trainees will be able to further consolidate their learning, improve professional skills and team performance [11,12].

The rise in caesarean sections impacts junior doctor training by increasing exposure to surgical procedures, necessitating a balanced educational approach to ensure proficiency in both surgical and non-surgical obstetric skills. However, too often trainees towards the end of their training period have insufficient experience in vaginal instrumental deliveries, which mostly is vacuum extraction. Understanding the differences between elective and emergency Caesarean sections is crucial for junior doctors to effectively manage both types of deliveries, ensuring optimal outcomes for mothers and babies. Training in a simulation setting may improve their competence level to some extent. However, training in live patient settings remains essential to reach the necessary competence. Adjustments in training programs and curricula may be required to address these evolving trends and maintain comprehensive obstetric care competencies.

## Future development

This study presents the current situation at the level of training units which are trying to improve their level of the standards in provision of obstetrical care and provides insight into the need for taking action and enhancing the training in obstetric care. EBCOG has published European Standards of Care for Women's Health, for Obstetric and Neonatal




**Figs. 3 and 4.** Some examples of trends in Caesarean section rate (%) for Belgium (BE), Austria (AU), Switzerland (CH(; Italy (IT), Greece, (GR) and Slovenia (SL) (Fig. 3) and for Germany (GE), Czech Republic (CZ), Slovakia (SK), Hungary (HU) (Fig. 4) based on two or more successive hospital audits in different hospitals during the period 1999–2023.

Services and they were launched at the European Parliament in 2014 [13]. EBCOG has also published two volumes Postgraduate Textbook of Obstetrics and Gynaecology [14]. EBCOG launched the Project for Achieving Consensus in Training (PACT), which is a pan-European training curriculum that describes the end terms of training for all gynaecologists in Europe and provides a structure to design post-graduate training programmes on a local basis with guidelines for simulation training, entrustment, quality assessment and faculty development [15]. All these initiatives aim to improve doctor's skills and healthcare quality, ensuring modern, cost-effective care for all women

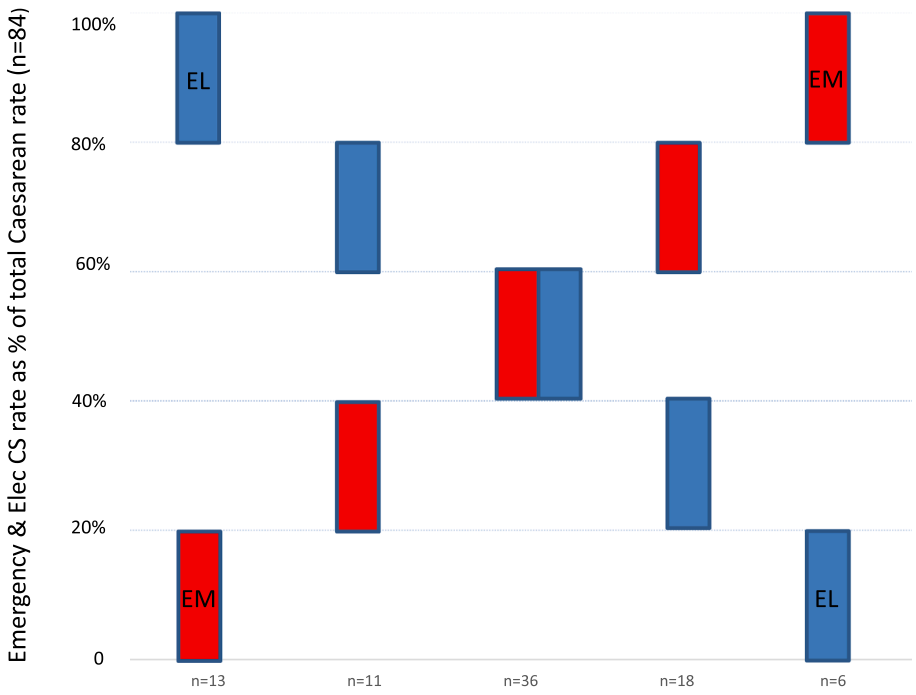



**Fig. 5.** Emergency (EM; red) and elective (EL; blue) Caesarean section rates as a percentage of total Caesarean section rates from 84 training units. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

and newborns in Europe, regardless of nationality or residence. Use and adaptation of EBCOG Standards of Care and Pan-European Training Curriculum would hopefully not only contribute substantially to standardisation and improvement of quality clinical care but would also potentially reduce numbers of unnecessary Caesarean sections.

## Conclusions

While caesarean section remains a vital surgical option for ensuring the safety of mothers and infants in certain clinical situations, its rising use as an elective procedure warrants critical caution. Adhering to the WHO's recommendations and fostering a balanced approach to childbirth can help mitigate unnecessary surgical interventions, ultimately improving maternal and neonatal health outcomes.

Sufficient training and experience in different modes of delivery among young doctors is very important, especially in training departments.

Simulation and skills drills are ideal methods for procedural training in obstetrics. Promoting informed decision-making, enhancing support for vaginal deliveries, and addressing systemic factors that contribute to the overuse of CS are another important step in aligning practice with evidence-based guidelines.

## Authorship contribution statement

JW and TM conceived the idea, ST for data handling and PV reviewed tha data and contributed to discussion. All authors read and approved the final version of the manuscript.

## CRediT authorship contribution statement

**Juriy Wladimiroff:** Conceptualization, Data curation, Project administration, Supervision, Writing – review & editing. **Sofia Tsiapakidou:** Data handling and analysis, Writing – original draft. **Tahir Mahmood:** Conceptualization, Project administration, Supervision, Writing – review & editing. **Petr Velebil:** Supervision, Writing – review & editing. All authors read and approved the final version of the manuscript.

## 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.

## Acknowledgments

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## Appendix

**Country map:** EBCOG Visiting and Accreditation of Obstetrics and Gynaecology training programmes in Europe between 1995–2023. A total of 373 visits in 27 European countries.




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