DELIVERY PREFERENCES (BIRTH) IN THE EUROPEAN UNION AND TRENDS BETWEEN 2010 AND 2021: EVIDENCE OF SHIFTS BEYOND PUBLIC HEALTH RECOMMENDATIONS

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Abstract: Methods for neonates' delivery have evolved over the course of the years, to match the existing evidence, the access to care and the personal preferences of clinicians and prospective mothers. While clinical evidence points towards recommendations to reduce the rates of deliveries using surgical procedures (i.e., Caesarean delivery or c-section) in favour of natural deliveries and its variations; the evidence suggest that trends points in the other direction. This paper explores the trends within European Union counties, the changes over time and explore potential explanations for the dichotomy between recommendations and actual practices.
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JEL Classification: I, I11, I12, I13 (I1 Health, I10 General, I12 Health Behaviour, I13 Health Insurance, Public and Private.

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Introduction

The delivery method of a new-born in an overly simplified way, can be described as taking place in either of 2 general categories: natural or normal delivery and surgical procedures commonly known as c-sections. Among them, many sub-classifications can be found including induced, epidural, assisted, and vaginal birth after caesarean. Historically, the delivery was decided based upon purely clinical reasons based on the condition of both foetus and the mother, as well as other considerations including risk factors and opportunity to access health care. Both health care professionals and health care administrators, have leaned towards natural delivery as preferred method, for clinical and economic reasons. On the former, there is a wealth of evidence pointing towards the benefits for both the new-born and the mother1, 2, 3, with the child showing improved immune response particularly when is about food and allergies. This is also paired with evidence about shorter hospital stay, faster recovery of the mother and a significantly lower rate of complications, particularly for the mother due the general risks of a surgical procedure (e.g., potential for surgical site infection, tissue healing process, pain, and discomfort after delivery). From a health economics perspective, the natural delivery incurs in the use of fewer resources (e.g.,

delivery room, drugs, and therapies post-delivery, medical follow up and sanitary personnel) and due reduce hospital length of stay, the general resources are used more efficiently, hence the preference among health administrators mostly in a public health care setting.

Types of health care systems.

In general, there are currently 4 types of health care systems in place. in the world, with some combinations of them to adapt to local market nuances: Beveridge or universal access which provides access to health care to all the country citizens and is funded through tax payments. This system is common in several commonwealth countries and western Europe and is generally known in the United States as "socialized medicine". The Bismarck or co-funded model which relies on funding coming both from government and employers and usually the health care facilities are not for-profit organizations. This system is common in central Europe and Japan. The National Health Insurance which involves by using private providers elements of both Beveridge and Bismarck models using an insurance premium or deductible. Lastly, the out-of-pocket model is that prevalent in most undeveloped economies and consist of direct payment to the provider, usually working on private consult settings with limited infrastructure.

The challenges most health care systems face due changes in the population tapestry, namely increased life expectancy, reduced health contributions at retirement age and higher morbidity and prevalence of diseases among the population they serve, has become a driver in the development of private for-profit insurers and providers. This has been becoming more prevalent due the increased participation of employers who subscribe additional health care insurance as benefits for their employees, increasing the value proposition to their employees. These new these providers/insurance services -often vertically integrated- often provide a reduce wait time when compared with public health care providers. This does not necessarily mean the quality of care is better, but often perceive as such due the more modern facilities and general infrastructure. Often, these additional insurances are sponsored or subsidized by employers to increase their value proposition to highly talented and scarce human resources.

Clinical recommendations about delivery.

As far as 1985, there has been discussions around what an adequate rate of deliveries from c-section as a percentage of the overall deliveries. In 2015, the World Health Organization6, proposed the use of the Robson Classification System to standardize the identification and assessment of c-sections in members countries through a statement on caesarean sections rates. This suggested that rates of C-Sections of up to 10%, are inked to a decrease on maternal and neonatal mortality, however an increase beyond 10% is not driving a reduce ed mortality. Their approach is holistic as considers not only mortality of the procedures but adverse events for the both the mother and newborn. Despite this, the trends in caesarean sections continue to increase both due unmet need and overuse8, the rates of c-sections in several European countries are significantly higher than the proposed WHO Rates. Moreover, the 12 years trend on the compound annual growth rate of c-section in the selected countries, is in 9 out of the 23 countries studies, higher than the 10% recommendation. Moreover, 5 countries have rates above 30% and up to 62%. Other recommendations have leaned towards multidisciplinary scientific societies

recommending a better assessment of both expecting mothers and those in labour to prevent the caesarean section as much as clinically possible9.

Scope of the research.

This research spans the period 2000 to 2021 and within the scope are the members of the European Union with available data10 for the period between 2000 and 2021. Cyprus, Greece, Malta, and Portugal were not included due lack of data.

Shifts in delivery method for the 2000-2021 period.

Over the period 2000-2021, the annual growth rate of deliveries through caesarean section shows median of 41,3% and range between -8.3% and 244.99% (Table 1, Figure 1). The growth rate has increased in 22 out of the 23 countries, with Italy as one outlier which after a peak in 2008, shows a growth rate of 8.31%. The remaining 22 countries, show growth rates between 7% and 245%. On the upper end of growth rate, Austria (81.4%), Czechia (92.4%), Slovenia (95.2%), Slovakia (102.0%), Poland (119.4%), Croatia (165.8% and Bulgaria (245.0%); show the most significant growth rates in the area.

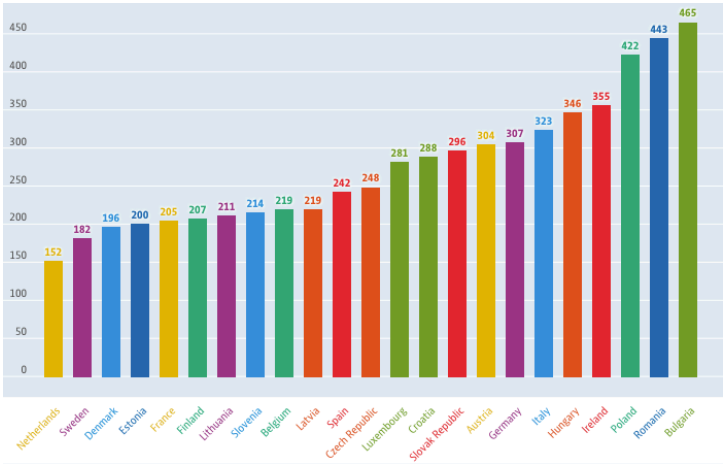
Table 1: Caesarian deliveries CAGR -2000-2021.

Country	CAGR
Austria	81.4%
Belgium	14.9%
Bulgaria	245.0%
Croatia	92.4%
Czechia	16.7%
Denmark	27.4%
Estonia	7.8%
Finland	37.8%
France	31.4%
Germany	19.6%
Hungary	165.8%
Ireland	34.7%
Italy	71.3%
Latvia	-8.3%
Lithuania	64.3%
Luxemburg	41.3%
Netherland	46.2%
Poland	27.7%
Romania	119.4%
Slovakia	46.0%
Slovenia	102.0%
Spain	95.2%

Sweden	6.9%

Source: Author, August 2023.

Figure 1: overall c-sections in 2020.



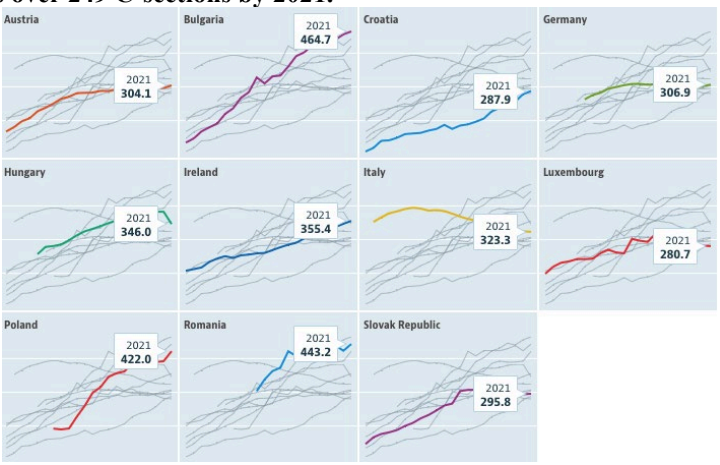
Source: OECD (2023), Caesarean sections (indicator). doi: 10.1787/adc3c39f-en (Accessed on 07 August 2023)

From a caesarean section rates perspective, all the countries are above the WHO recommended rate of up to 10% established back in 2015 with 3 countries reporting over 4 times the recommended rate in 2021 (Hungary 38.3%, Poland 39%, Romania (43.9% and Bulgaria 44%) Table 2, Figure 2. For visualization purposes, two classifications have been selected: countries under 248 c-sections by 2021 and countries over 249 C-sections by 2021, shown on figures 3 and 4.

Figure 3: countries under 248 c-sections by 2021 4.

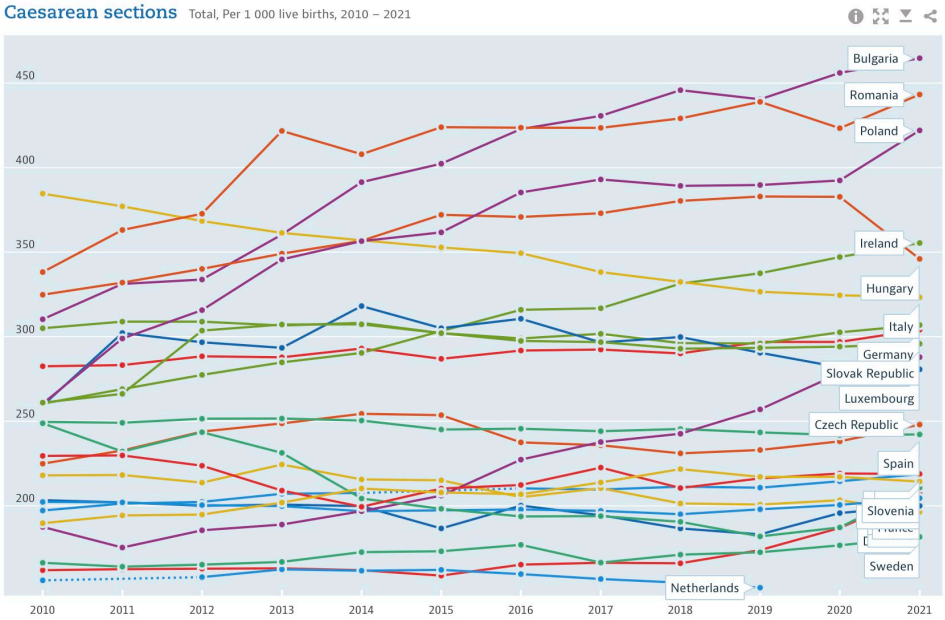
Source: OECD (2023), Caesarean sections (indicator). doi: 10.1787/adc3c39f-en (Accessed on 07 August 2023)

Figure 4: countries over 249 C-sections by 2021.



Source: OECD (2023), Caesarean sections (indicator). doi: 10.1787/adc3c39f-en (Accessed on 07 August 2023)

Figure 2: Trends on the selected countries over the period 2000-2021.



Source: OECD (2023), Caesarean sections (indicator). doi: 10.1787/adc3c39f-en (Accessed on 07 August 2023)

Table 2: Caesarean sections rates in 2019

Country	% of C-Sections over 100 live births
Austria	29.7%
Belgium	21.1%
Bulgaria	44.0%
Croatia	23.3%
Czechia	29.6%
Denmark	20.1%
Estonia	24.3%
Finland	18.3%
France	17.4%
Germany	19.8%
Hungary	25.7%
Ireland	38.3%
Italy	33.8%
Latvia	32.7%
Lithuania	18.2%
Luxemburg	29.1%
Netherland	21.6%
Poland	15.2%
Romania	39.0%
Slovakia	43.9%
Slovenia	29.3%
Spain	21.7%
Sweden	17.3%

Source: OECD (2023), Caesarean sections (indicator). doi: 10.1787/adc3c39f-en (Accessed on 07 August 2023)
Source: Author, August 2023.

From a linear regression perspective (Table 3), over half of (n=14) of the countries shows a positive regression (≥0.6), effectively suggesting that the trends are substantial and will remain in the near future. Given the observed p-values, it is possible to reject the null hypothesis (no statistical change over time) to lean towards the alternative hypothesis that times, in this case the years of measurements does have an impact in the increase of most.

Table 3: Regression analysis.

Regression Analysis	R Square	P-value
Austria	0.79	0.000004314
Belgium	0.93	0.000000003
Bulgaria	0.98	0.000000000
Croatia	0.94	0.000000000
Czechia	0.74	0.000004156
Denmark	0.21	0.030182555
Estonia	0.41	0.001366650
Finland	0.33	0.005429030
France	0.57	0.000044965
Germany	0.35	0.012743440
Hungary	0.86	0.000000034
Ireland	0.97	0.000000000
Italy	0.60	0.000041897
Latvia	0.42	0.001160471
Lithuania	0.17	0.054724263
Luxemburg	0.71	0.000000732
Netherland	0.42	0.001160471
Poland	0.92	0.000000005
Romania	0.76	0.000097297
Slovakia	0.86	0.000000001
Slovenia	0.93	0.000000000
Spain	0.03	0.431297348
Sweden	0.85	0.000002977

Source: Author, August 2023.

Discussion

The evidence suggests that the trends towards an increased number of neonates delivered by means of caesarean section is, albeit at different rates; increasing; with non-existence observation of the recommended rates proposed by WHO. This trends, may be rooted on several different factors, including economic, financial, social, and education related. The increase of disposable income may lead to higher health care related expenses, including the subscription of private health care insurance with coverage of delivery in private care settings.; which in turn provide health care in a newer, better health care facilities. This economical and financial aspect shifts the perception of need of health care, particularly the delivery of neonates; as well as it shifts from public to private providers. Changes in the social tapestry may also have a positive impact on the increase of caesarean sections delivery due the increased age of expecting mothers and the increased risk factors that comes with age, for both the neonate and the prospective mother. Moreover, migration from low- and middle-income country may also impact the preferences towards c-sections,

due the limited access in these countries to qualify health care professionals and adequate access to health care for prospective mothers. In addition to that, for-profit health care providers may lean towards recommending caesarean section delivery to increase the reimbursement rates from either public of health care insurance; as this type of delivery is considered a surgical procedure and therefore has an increase cost to the payer; either solely as the insurance or paid through deductible or premiums to the patients.
Lastly, the educational and information aspects of the different types of delivery methods are limited for the prospective mothers, relying mostly on health care professional advice focusing mostly on the delivery itself and not the short- and long-term consequences of caesarean delivery not clinically needed.

Conclusion

There is a dichotomy between the clinical evidence, clinical guidance's and regulatory bodies recommendations and the actual trends on delivery through caesarean section. Despite the evidence supporting the natural delivery and its variances as preferred option, trends in the in-scope countries are broadly leaning towards increased number of c-section deliveries. This dichotomy may be related to the ongoing transformation of the demographic elements of prospective mothers, a similar transformation in the health care systems and insurance due the ongoing demographic changes and its inherent pressures on their economic viability, or diverging views between the evidence and the personal preferences of medical practitioners. A deeper assessment at country level, could shed better light on what the actual drivers are and how to balance the clinical needs with the long-term benefits for both prospective mothers and neonates.

Disclosure

This research provides general information around trends in delivery methods based on clinical and public health information, as well as that provided by regulatory bodies and professional and medical societies as recommendations or clinical guidance. It is not meant to be used as sole guidance to decides on the best method of delivery. The author acknowledges the complexity of such decision and strongly support such decision to be made by expecting mothers with the advice of qualified health care professionals.

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