What makes the difference on the decision for the delivery mode?

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AT A GLANCE

Elective cesarean sections (CS) are primary CS, which oftentimes do not have any medical indication, but are conducted due to psychological issues or woman's personal preferences. This is the first paper to identify the elective CS ratio in Switzerland, based on a holistic assessment. To identify influencing factors on the decision for the delivery mode, literature was consulted and applied to the Swiss context. Around 8% of all conducted CS are classified as elective. **Age**, **insurance class**, **movement score**, **number of nurses per bed**, and **income per capita** are significantly higher for women with elective CS. Contrastingly, a high **rurality score** and the **number of midwives per canton** are negatively associated with elective CS. Based on these findings, countermeasures may be formulated to decrease the number of elective CS, as the risk of morbidity and mortality is higher for both the woman and the neonatal.

BACKGROUND & RESEARCH QUESTION

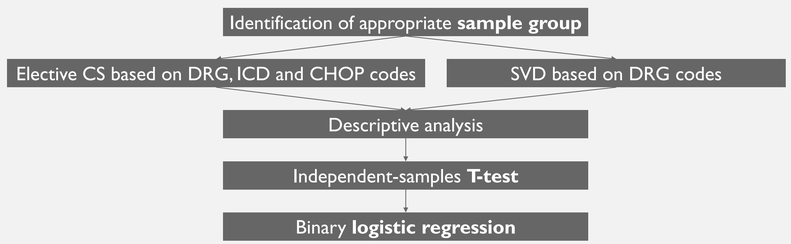
Preferrable outcomes associated with CS, such as lower maternal or neonatal mortality or morbidity are only achieved until a certain threshold. After having crossed this ratio, no better results are observable compared to vaginal delivery.[1] Therefore, the WHO recommends a **national rate between 10-15%,**[2] however around **one third of all births are delivered via CS** in Switzerland.[3]

While primary CS stands for a planned intervention, where either a medical indication or the decision of the mother is respected, secondary CS is conducted as an urgent or emergency procedure, as labor already started. Medical indication belonged to the main reasons for choosing a CS in the 1990s,[4] whereas **psychosocial factors such as fear of birth or maternal request without any co-existing indication lead today**.[5]

Different studies drew attention to the risks of medically not indicated CS.[6,7] Both the **mother and the neonatal face higher risks** such as higher blood loss, increased probability of a hysterectomy, negative implications for future pregnancies, increased neonatal respiratory morbidity, and higher risks of short- and long-term morbidity in general compared to spontaneous vaginal delivery (SVD).[8] Nevertheless, not only the potential iatrogenic harm for women and neonates is significantly higher, but it results also in **expanded economic costs to the health system**.[9]

➡ This research aims at identifying the **number of elective CS in Switzerland from 2014-2018**. Additionally, influencing factors on the decision for the delivery mode are identified based on an extensive **literature review** and **quantitatively** evaluated. The sample group of elective CS is **compared to SVDs** without complex or complicated diagnoses. It is assumed that if the woman did not decide for an elective CS, she could have delivered spontaneously.

METHODS



The dataset on patient level was provided by the Federal Statistical Office, including 98.3% of all births delivered in Switzerland (n = 430,920). All statistical analyses were conducted with the Statistical Package for Social Sciences (SPSS),Version 27.

RESULTS

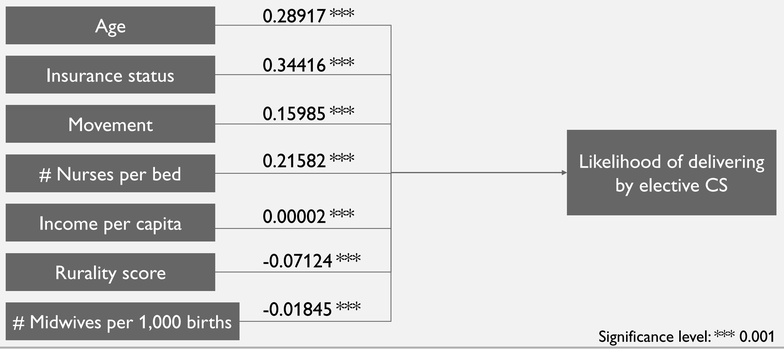
The sample size consists of **11,112 elective CS** and **176,908 SVDs**, which were born in Switzerland between 2014-2018. The Table below displays that around 8% of all conducted CS are on an elective basis in Switzerland. Contrastingly, SVDs account for more than 40% of all births on a yearly average.

	# Births	# CS	Elective CS (# el CS)	# Vag. births	# SVD (w/o complex or complicated diagnoses)	$\frac{\#CS}{\#\ Births}$	$\frac{\#\ el\ CS}{\#\ CS}$	$\frac{\#\ el\ CS}{\#\ Births}$	$\frac{\#\ SVD}{\#\ Births}$
Average 2014-2018	86,184	28,227	2,222	57,957	35,381	32.76%	7.87%	2.58%	41.10%

Next, the generated insights of the **t-test** are presented and compared between the two sample groups. All variable differences are on the highest significance level ($p < 0.001$).

Age: Women with an elective CS are significantly older.
Insurance status: Women with an elective CS show a higher tendency to have a supplemental insurance (private or semi-private).
Movement score: Women with an elective CS tend to cross regional borders more often for giving birth.
 # Nurses per bed: Women with elective CS are treated more often in cantons with a higher number of nurses per bed.
Income per capita: Women with elective CS tend to live in cantons with higher income per capita.
Rurality score: Women with elective CS rather live in urban than in rural areas.
 # Midwives per 1,000 births: Women with elective CS live in cantons with a lower number of practicing midwives per 1,000 births.

Finally, the factors were included in a **logistic regression** to calculate their impact on the decision for the mode of delivery.



Significance level: *** 0.001

DISCUSSION

One of this research's main findings is the identification of elective CS per annum in the time from 2014-2018. On a yearly basis, it amounts to almost 8% of all CS, which are more than 2,200 treatments in absolute terms. Comparable studies only controlled for one diagnosis on its approximation for identifying elective CS.[6,10] However, the presented approach allows for a **more precise approximation on the number of elective CS p.a.** due to the holistic range of evaluation criteria.

Lessons Learned: All included factors have an impact on the decision for the delivery mode. Especially age and insurance status have a strong influence. Furthermore, the insurance status positively correlates with income per capita ($r_S = 0.155$, $p < 0.01$). However, it was also shown, that a higher number of midwives per 1,000 births decreases the likelihood of delivering via CS. This supports the assumption that midwife-led care models are positively associated with a higher probability for SVD.

➡ **Call for Action:** Obstetricians shall be sensitized to special characteristics of women requesting a CS in absence of any medical indication and communicating the risks for both the mother and the neonatal more explicitly. Furthermore, the density of practicing midwives should be increased in case they are capable of reducing the number of elective CS.

Limitations: Only an approximation on the amount of elective CS between 2014-2018 is possible – including some minor bias. Additionally, the sample groups show an imbalance in their distribution: 11,112 elective CS vs. 176,908 SVDs. To control for this, a logistic regression was chosen instead of another analysis as logistic regression reveals workable results despite the imbalance in the sample.

Future Research: This research grounds on a pure quantitative approach. Thus, close contact with childbearing women should be sought to identify personal and interpersonal factors and relate these to the decision-making process on the mode of delivery. Giving birth to a child is different from typical treatments provided in a hospital, as personal beliefs and preferences must be considered. The final aim should be to build a predictive model which identifies women during pregnancy with a strong implicit tendency requesting an elective CS and allocating interventions accordingly.

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