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Geographic distribution of livebirths < 2000 g in Switzerland

Switzerland is a federalistic state composed of 26 cantons of varying surface area, geographic profile and population density. With 85000 livebirths per year and 14 neonatology units in 12 of the 26 cantons, perinatal health care is regionalised across cantonal borders. Although they have never been officially delineated, the regional networks function very effectively and with great collegiality both within themselves and between each other. We have, however, one major shortcoming: inadequate cost reimbursement.

The cost of neonatal care is exclusively paid for by our federal social insurance system (AI/IV) which covers only 50 to 60% of the hospital costs¹⁻³. The balance represents a deficit at the charge of the canton where care is given.

The following analysis is an attempt to document and quantify the intercantonal perinatal "traffic" in order to propose solutions to this problem.

Method

Since most newborn infants weighing less than 2000 g at birth (or of less than 34 weeks gestation) require admission to a neonatal

unit, we used this population to estimate the intercantonal collaboration in perinatal health care. We identified the cantons of birth and the cantons of residence of the mother for all livebirths in Switzerland over a two year period from the birth certificates (1992–1993). We then identified liveborn infants weighing less than 2000 g and performed a matrix analysis to identify whether birth took place in the canton of residence of the mother or not, and if not, in which other canton it took place.

Results

Between January 1992 and December 1993, 3251 infants weighing less

than 2000 g were born alive, see Table 1. Of these, 23%, or 763 of 3251, were not born in the canton of residence of the mother (extra-cantonal births). Figure 1 illustrates total livebirths per canton subdivided into cantonal and extra-cantonal births. The bulk of these extra-cantonal births, i.e. 708 of 763, or 93%, took place in 9 cantons. Figure 2 illustrates the numbers and the cantons of origin of the extra-cantonal births for these 9 cantons. Figure 3 depicts the cantons of origin (residence of the mother) for these patients, and the cantons where their birth took place. Another way to visualise these results is with the use of geographic maps (Figure 4).

Birthweights in grams	Number of infants	Percent
Less than 1500	1373	0.8
1500–1999	1878	1.1
2000–2499	6132	3.6
2500 and over	161538	94.3
Weight not recorded	436	0.3
Total livebirths	171357	100

Table 1. Weight distribution for all liveborn infants in Switzerland (1992–1993).

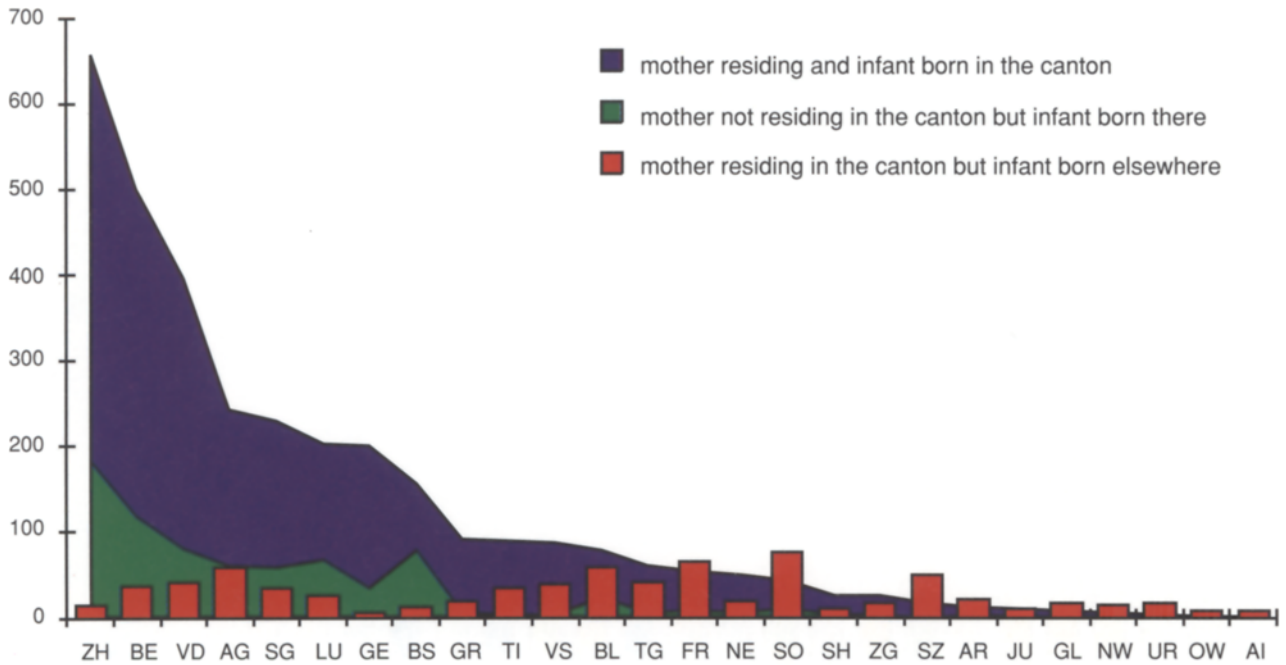


Figure 1. Number of infants <2000 g born alive in the various cantons (1992/1993).

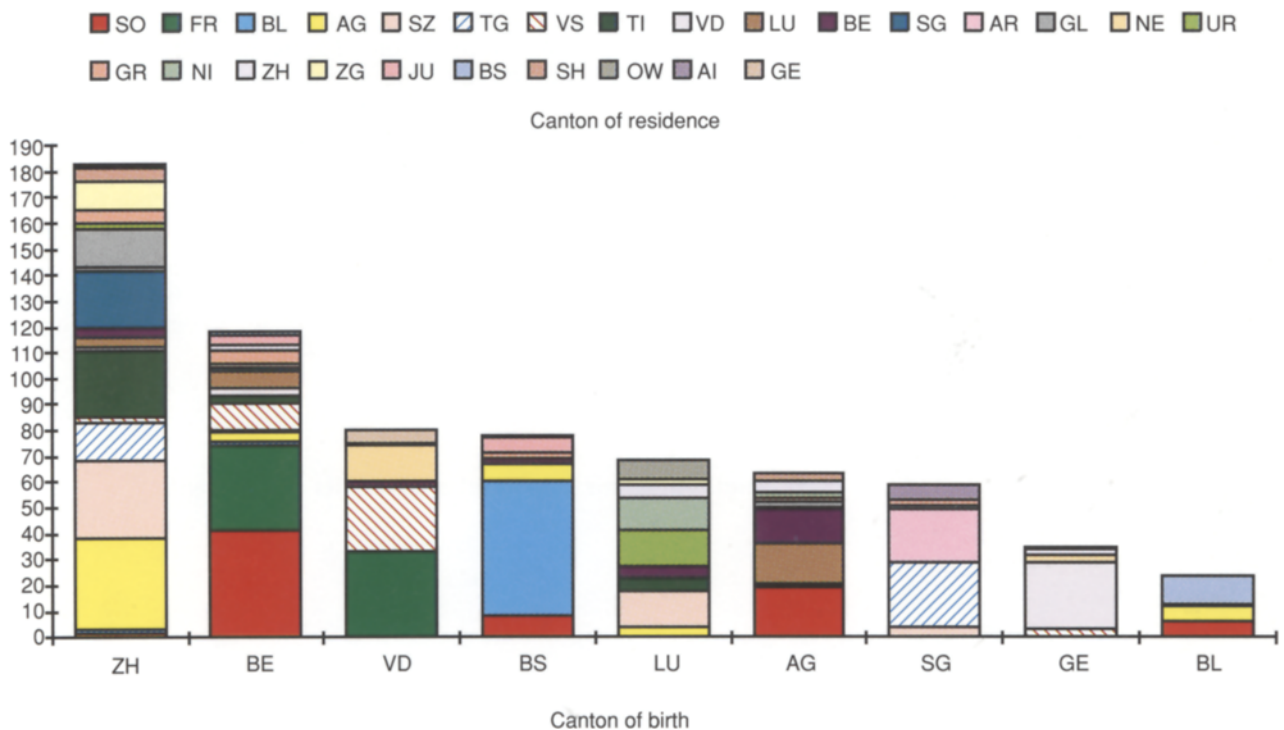


Figure 2. Cantons where the highest number of extra-cantonal births <2000 g take place (1992/1993).

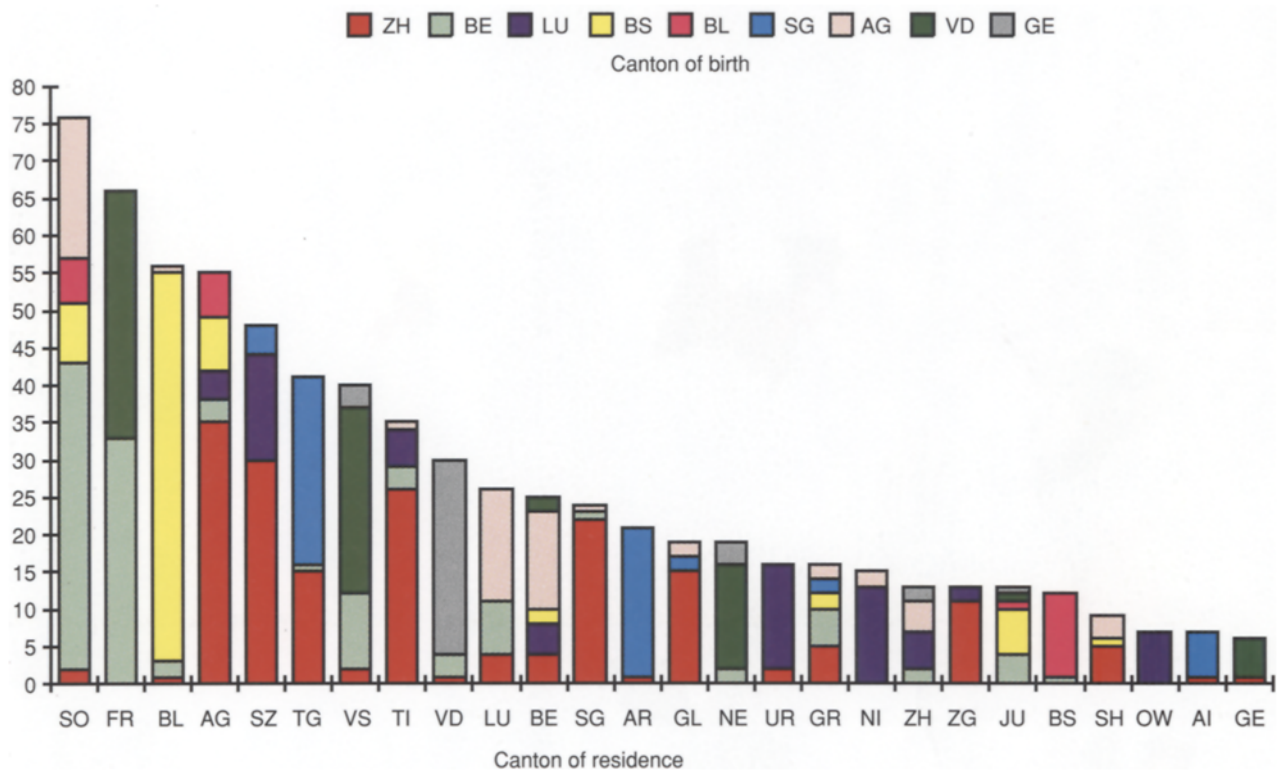


Figure 3. Cantons of residence for newborn infants <2000 g born in another canton (1992/1993).

Discussion

This geographic analysis demonstrates that a strong cooperation exists between cantons in perinatal health care, and regional networks can be visualised, see Figure 4. The regional network of the canton of Zurich for instance, with the highest number of livebirths <2000 g and also the largest contribution from extracantonal births covers the entire eastern part of Switzerland. The canton of Berne covers West-central Switzerland and the canton of Vaud includes the french-speaking part of the country. The network of the canton of Luzern is visually striking and illustrates the determinant role of geographic access in perinatal regionalisation. It shows that the Gotthard axis is a major passage-way across the Alps.

The vital statistics data base used to obtain this information is reliable but unfortunately not complete enough to further define the workings of our regionalised system for perinatal care. Knowledge of the precise place of birth would be crucial to analyse whether high risk infants are born in the right place. Postnatal transports to a neonatal unit would also need to be identified, whether they occur within a canton, or across cantonal borders. It is not clear whether networks for prenatal referral (the ones suggested by our analysis) are similar to networks for postnatal referral. Can the information obtained by this analysis be used to suggest a better way to partition the costs for neonatal care between cantons? While it is interesting to see the number of extra-cantonal births by cantons of residence, and their

place of birth (Figure 3), a system of intercantonal reimbursement would seem cumbersome given the complexity of the referral pattern, see Figure 5. In addition, the figures are likely to vary from year to year. Given the fact that we already have a good system with a federal social insurance (AI/IV) in place, an adjustment of the reimbursement to the actual cost of neonatal care seems to be a more appropriate method.

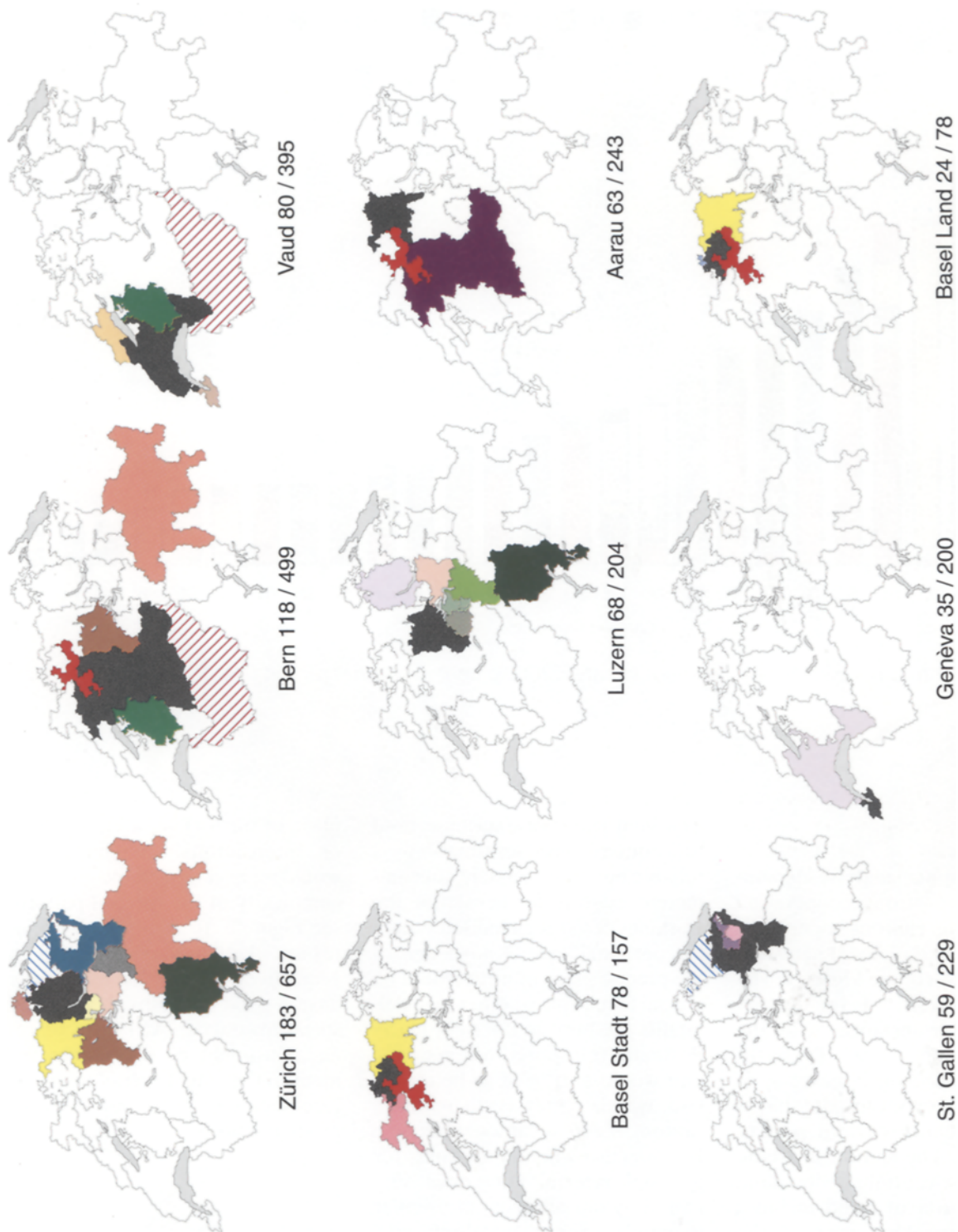


Figure 4. Geographic illustration of regional networks. The numerical ratios given next to the name of the cantons of birth (shown in black) indicate the ratio of extracantonal to cantonal births (1992/1993). The cantons of residence are color-coded when more than 4 livebirths < 2000 g occurred.

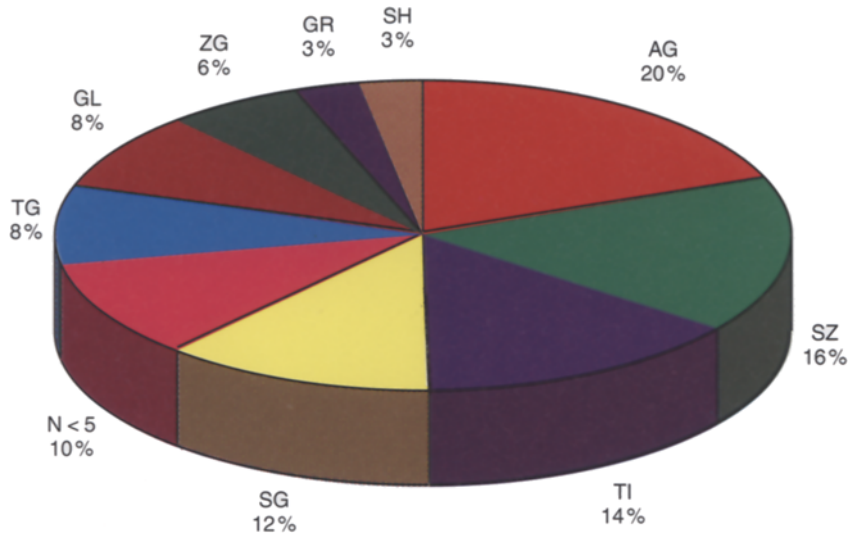


Figure 5. This figure illustrates the complexity of the mix of cantons of residence for extracantonal births < 2000 g in Zurich (1992/1993). N < 5 indicates that 10% of the extracantonal births came from cantons with < 5 such livebirths.

References

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