

# Is the introduction of anonymous delivery associated with a reduction of high neonaticide rates in Austria? A retrospective study

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**Objective** To assess rates of neonaticide after the implementation of a preventative ‘anonymous delivery’ law in mid-2001 in Austria. Women are allowed to access antenatal care and give birth in a hospital anonymously, without showing any ID and free of charge.

**Design** Retrospective study.

**Setting** A complete census of police-reported neonaticides was obtained from the police statistics of Austria, Sweden and Finland.

**Population** All neonaticides reported to the police, 1991–2009.

**Main outcome measures** Neonaticide rates before (1991–2001) and after (2002–2009) the introduction of anonymous delivery legislation per 100 000 births.

**Methods** The Mann–Whitney *U*-test for two independent samples was used to compare neonaticide rates in the period before the new law was introduced with the rates observed after the implementation of the new law for each country.

**Results** On average the rate of police-reported neonaticides was 7.2 per 100 000 births (SD 3.5, median 7.1) in Austria prior to the new

law being passed, and 3.1 per 100 000 births (SD 2.1, median 2.6) after the law was passed. A significant decrease in neonaticide was observed in Austria after the implementation of anonymous delivery (Mann–Whitney *U*-test  $P = 0.017$ ). Whereas the Finnish and Swedish rates were lower than the Austrian rates before and after the implementation of the Austrian law, they remained unchanged over the study period.

**Conclusions** Our data demonstrate a significant decrease in the number of police-reported neonaticides in Austria after the implementation of anonymous delivery. Even though underlying factors associated with neonaticide are complex, the findings could indicate an effect of anonymous delivery in the prevention of this crime.

**Keywords** Anonymous birth, anonymous delivery, child abandonment legislation and jurisprudence, denial of pregnancy, newborn, neonaticide..

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## Introduction

Neonaticide is one of the most perplexing, sad and utterly repugnant offences in modern society. It is defined as the homicide of a newborn within the first 24 hours of life by its mother.<sup>1</sup> A denied or concealed pregnancy, which occurs in approximately one in every 475 pregnancies,<sup>2</sup> followed by an unattended delivery outside a hospital threatens the mother’s health and the child’s outcome.<sup>3</sup> In some rare cases it leads to the death of the child through neglect or more active methods of killing. Reported neonaticide rates in European

countries vary, and the actual numbers are likely to be much higher because neonaticide represents a hidden crime. For example, the hidden disposal of corpses and incorrect rulings of accidental death by coroners in some neonaticide cases contribute to the under-reporting of cases of neonaticide.<sup>4–6</sup>

In Europe there are two primary preventive strategies for the phenomenon of neonaticide and child abandonment: ‘anonymous delivery’ and so-called ‘baby hatches’, which are similar to safe haven laws in the USA.

The anonymous delivery law, as enacted in some European countries, allows women to give birth in a hospital anony-

mously and free of charge if she gives her child for adoption. Baby hatches are easily accessible incubators situated outside hospitals. The incubator signals the staff on call when a baby is placed inside. Similarly, safe haven laws in the USA allow for the anonymous surrender of unwanted newborns at designated locations, such as hospitals and fire stations, and were first implemented in the USA in 1999.<sup>1</sup> In Austria, whether the baby is born anonymously in the hospital or put in a baby hatch, it is immediately put under the custody of the corresponding Austrian regional child welfare institution. The mother has several weeks during which she may re-claim custody. After that time, custody remains with the corresponding child welfare institution and the child is given for adoption.

Anonymous delivery was implemented in France during the French revolution, on 28 June 1793. This right was re-enacted under Napoleon, and a similar decree was again enacted on 2 September 1941 during World War II.<sup>7</sup> Luxembourg followed in 1993, Italy in 1997 and Austria in 2001.<sup>8</sup>

The aim of this study was to evaluate the effect of the anonymous delivery law on the frequency of neonaticide, and to compare rates of neonaticide with those in countries where there is a police register for neonaticides but there are neither anonymous delivery nor safe haven laws (Finland and Sweden). Given its high rate of neonaticides, Austria introduced anonymous delivery in 2001, followed by a public awareness campaign at the beginning of 2002 on TV and in newspapers. Implementation of the law in 2001 represents a natural experiment, making it possible to compare the effects before and after the introduction of this measure.

## Methods

In Austria neonaticide is a crime covered by a specific law (§79 StGB), and therefore police statistics treat neonaticide cases separately from homicide cases.

“...A mother, who kills her child during childbirth or as long as she was influenced by the process of giving birth, should be punished with one to five years of imprisonment...”

Neonaticide is legally classified separately from infanticide in only a few European countries, including all of the countries participating in this study (Austria, Finland and Sweden).

Based on Austrian neonaticide law and the corresponding police statistics, we were able to evaluate the effect of the implementation of the anonymous delivery law on the number of neonaticide cases reported to the police, and compare these results with the reported neonaticide cases in countries without similar legislation.

Only countries that differentiate in their criminal law between neonaticide and infanticide are able to provide

accurate data on neonaticide in their police registries. Therefore, we contacted the statistics departments of Austria, Sweden, Finland, Denmark, Norway and the Netherlands, countries that make this distinction in their corresponding legislation and are known to have registers.

Only Austria, Finland and Sweden had or could supply police statistics on neonaticides, and include in their statistics all neonaticides that are reported to the police as a suspected neonaticide, regardless of the result of later investigations. Police-reported cases of neonaticide during the period 1991–2009 in Austria, Finland and Sweden were analysed in this study.<sup>9–11</sup> Police statistics are publicly available,<sup>9–11</sup> and ethical approval was provided by the Medical University of Vienna.

Poisson regression analysis was used to estimate the respective trends in the rates of neonaticide in all participating countries across the entire study period (1991–2009), as well as before and after the implementation of the law. Birth rates were drawn from the national birth registries of each country.<sup>12–14</sup>

The year 2001 was considered as a pre-law year because the law was implemented in the second half of 2001. The Mann–Whitney *U*-test for two independent samples was used to compare neonaticide rates during the pre-law period (1991–2001) with the rates observed after the implementation of the new law (2002–2009) for each country. All reported *P* values are two-sided.

Sensitivity analysis was performed by comparing the neonaticide rates observed in 1994–2001 (8 years) with the rates observed in 2002–2009 (8 years). Furthermore, a correction was made for the neonaticide cases observed in 2007: six neonaticide cases were reported, but three of these were committed by the same perpetrator more than 30 years ago (1977–1980). Therefore, sensitivity analysis included statistical comparisons of the pre-law period 1991–2001 with the post-law period 2002–2009, with and without the adjusted rates for the year 2007.

## Results

Police-reported neonaticide cases, as well as rates for 1991–2009 in Austria, Sweden and Finland, are presented in Figures 1 and 2, respectively.

Poisson regression analysis for Sweden and Finland showed a minor downward trend over time [ $B = -0.055$  ( $P = 0.821$ ) and  $B = -0.040$  ( $P = 0.871$ ), respectively]. However, this was not statistically significant. On the contrary, Austria experienced a significant reduction ( $B = -0.578$ ;  $P = 0.009$ ) in the police-reported neonaticide rate over the entire study period from 1991 to 2009.

The mean, median and range for annual police-reported neonaticide rates for period 1 (1991–2001, before anonymous delivery was legal in Austria) and period 2 (2002–2009,

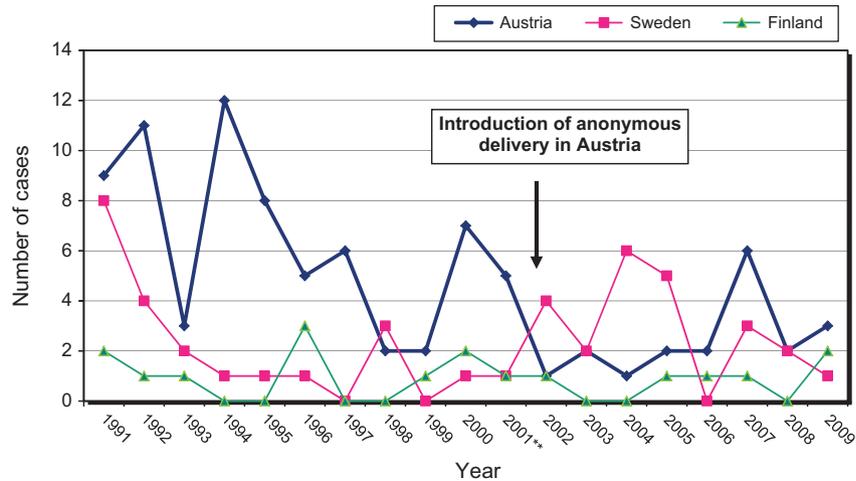


Figure 1. Neonaticide cases in Austria, Sweden and Finland, 1991–2009.

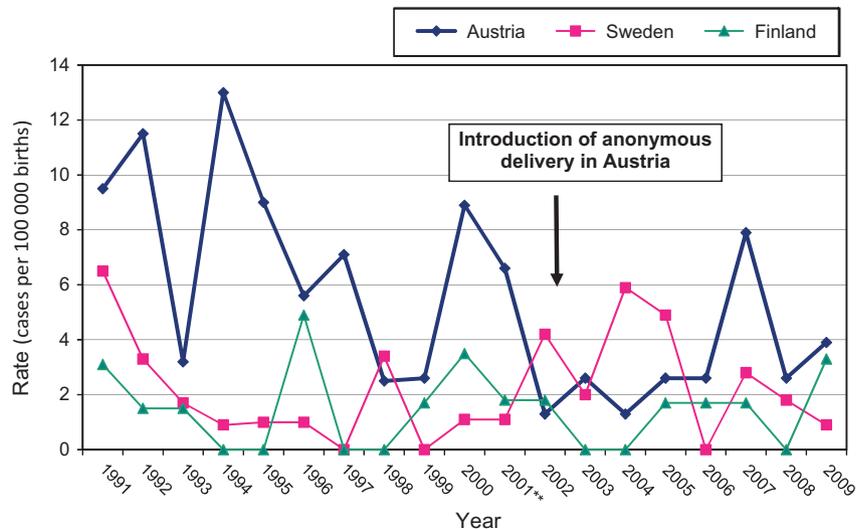


Figure 2. Neonaticide rates in Austria, Sweden and Finland, 1991–2009.

when anonymous delivery was available in Austria) were calculated for all three countries (Table 1).

Comparison of period 1 with period 2 showed a significant decrease in the reported rates in Austria (two-tailed Mann–Whitney  $U$ -test,  $U = 73$ ,  $n_1 = 11$ ,  $n_2 = 8$ ,  $P = 0.017^*$ ; Table 1,  $^*P$  is significant, by a two-tailed Mann–Whitney  $U$ -test.). No significant change was found for Finland or Sweden.

Sensitivity analysis did not change the conclusions. A significant decrease in the neonaticide rates during the post-law period (2002–2009) compared with the pre-law period (1994–2001) was observed for Austria, but not for Sweden or Finland (Table 2). In addition, adjusting the neonaticide rate for the year 2007 also gave similar results regarding the comparison of pre-law (1991–2001 and 1994–2002) versus

post-law (2002–2009) neonaticide rates (two-tailed Mann–Whitney  $U$ -test,  $U = 76$ ,  $n_1 = 11$ ,  $n_2 = 8$ ,  $P = 0.008^*$  versus  $U = 54$ ,  $n_1 = 8$ ,  $n_2 = 8$ ,  $P = 0.02^*$ , respectively; Table 2). The mean rates per period studied are presented in Table 3.

## Discussion

The aim of this study was to evaluate the effectiveness of the new anonymous birth law by analysing police-reported neonaticides in Austria before and after the implementation of the law. We also compared Austrian neonaticide rates with neonaticide rates observed during the same period in Sweden and Finland, two countries without similar provision.

**Table 1.** Rates of police-reported neonaticide cases in Austria, Sweden and Finland, for 1991–2001 and 2002–2009

	Austria		Sweden		Finland	
	1991–2001	2002–2009	1991–2001	2002–2009	1991–2001	2002–2009
Cases total	70	19	22	23	11	6
Cases mean	6.4	2.4	2	2.9	1	0.8
Rates						
Mean	7.2	3.1	1.8	2.8	1.6	1.3
SD	3.5	2.1	1.9	2.0	1.6	1.2
Median	7.1	2.6	1.1	2.4	1.5	1.7
Range	2.5–13.0	1.3–9	0.0–6.5	0.0–5.9	0.0–3.5	0.0–3.3
Two-tailed Mann–Whitney <i>U</i> -test	<i>U</i> = 73, <i>P</i> = 0.017*		<i>U</i> = 57.5, <i>P</i> = 0.26.		<i>U</i> = 46, <i>P</i> = 0.90	

Cases (total) represent the total number of neonaticide cases reported during the period under investigation.

Cases (mean) represent the average number per year of neonaticide cases reported during the investigated period.

Rates are expressed as neonaticide cases per 100 000 births.

\**P* is significant, by a two-tailed Mann–Whitney *U*-test.

**Table 2.** Comparison of neonaticide rates in Austria, Sweden and Finland, observed during the pre-law versus the post-law periods

Country	Time period	<i>U</i>	<i>n</i> <sub>1</sub> <i>n</i> <sub>2</sub>	<i>P</i>
Austria	1991–2001 versus 2002–2009	73	<i>n</i> <sub>1</sub> = 11, <i>n</i> <sub>2</sub> = 8	0.17*
Austria	1994–2001 versus 2002–2009	51	<i>n</i> <sub>1</sub> = 8, <i>n</i> <sub>2</sub> = 8	0.045*
Austria	1991–2001 versus 2002–2009**	76	<i>n</i> <sub>1</sub> = 11, <i>n</i> <sub>2</sub> = 8	0.008*
Austria	1994–2001 versus 2002–2009**	54	<i>n</i> <sub>1</sub> = 8, <i>n</i> <sub>2</sub> = 8	0.02*
Sweden	1991–2001 versus 2002–2009	57.5	<i>n</i> <sub>1</sub> = 11, <i>n</i> <sub>2</sub> = 8	0.264
Sweden	1994–2001 versus 2002–2009	48.5	<i>n</i> <sub>1</sub> = 8, <i>n</i> <sub>2</sub> = 8	0.08
Finland	1991–2001 versus 2002–2009	57.5	<i>n</i> <sub>1</sub> = 11, <i>n</i> <sub>2</sub> = 8	0.87
Finland	1994–2001 versus 2002–2009	48.5	<i>n</i> <sub>1</sub> = 8, <i>n</i> <sub>2</sub> = 8	0.92

Rates are expressed as cases per 100 000 births.

\**P* is significant, by a two-tailed Mann–Whitney *U*-test.

\*\*The neonaticide rate observed during 2007 is adjusted.

**Table 3.** Neonaticide rates in Austria, Sweden and Finland during the pre-law (1991–2001 and 1994–2001) and the post-law (2002–2009) periods

Country	Period	Mean	Standard error of the mean
Austria	1991–2001	7.22	1.07
Austria	1994–2001	6.91	1.23
Austria	2002–2009	3.1	0.75
Austria	2002–2009*	2.6	0.35
Sweden	1991–2001	1.81	0.58
Sweden	1994–2001	1.06	0.37
Sweden	2002–2009	2.8	0.72
Finland	1991–2001	1.63	0.5
Finland	1994–2001	1.49	0.66
Finland	2002–2009	1.27	0.42

Rates are expressed as cases per 100 000 births.

\*The neonaticide rate observed during 2007 is adjusted.

Our data show that police-reported neonaticide cases and rates decreased significantly in Austria after the new law was implemented. In contrast, no such differences were observed in Sweden and Finland, where a consistently low rate of police-reported neonaticides was observed throughout the study period. Importantly, there were no other socio-economic or policy changes in Austria that could be associated with the observed decrease, such as the passage of abortion laws or changes regarding childbirth benefits. This, together with our results, provides evidence that this new law might have contributed to reductions in reported neonaticides. These results are important because shortly after the implementation of the anonymous delivery law, the awareness campaign was stopped, probably because of concerns that women would use anonymity to avoid the more complicated process of conventional adoption. However, these concerns were not based on data or scientific evidence.<sup>15</sup>

The fact that anonymous birth may reduce the risk of neonaticide was previously demonstrated by a clinical psychodynamic study in France, which inspired the French parliament to modify the anonymous birth law in 1990, 1996 and 2002.<sup>16</sup> Bonnet's study revealed that the causes of neonaticide were primarily psychodynamic and not socio-economic, and that the process of a pregnancy can relocate the offender to her own traumatic childhood, and thus trigger negative associations with the fetus, resulting in neonaticide.<sup>3</sup> On the other hand, there is concern that mothers who would abandon an infant in a hospital might represent a different group than neonaticidal mothers. But until now only Bonnet's study has provided insight into the psychological dimensions of women who abandon their children, finding that these women demonstrated similar impulses to harm and kill their babies as the women who committed neonaticide.<sup>3</sup>

One US study found the rate of infants killed or left to die by a parent to be 2.1 per 100 000 births per year (1985–2000), prior to the enactment of a safe haven law in that state.<sup>17</sup> Another study estimated the number of illegally abandoned and legally surrendered newborns (via safe havens) in the state of Texas, based on newspapers stories during 1996–2006.<sup>18</sup> Texas was the first US state to introduce safe haven laws (in June 1999), and this study found that the number of abandoned newborns did not decrease after the safe haven law was enacted.<sup>18</sup> After passing the law in Texas, 20.4% of all abandoned newborns were abandoned in safe havens ( $n = 11$ ); the others were abandoned illegally ( $n = 43$ ), often in garbage cans or public toilets. The author concluded that the new law was unlikely to have caused any harm, but that it did not work as well as it was intended. She further states that awareness campaigns would be necessary to inform possible users, but that women affected by mental illness and the denial of pregnancy would most likely not benefit from such measures. Another study on safe havens in the US reports that some states experienced a reduction in illegal newborn abandonment after passing safe haven laws, whereas others did not, and that overall there is very limited data to accurately test the effectiveness of these laws.<sup>19</sup> Nevertheless, as of 2003, 45 of 50 US states had enacted safe haven laws.<sup>19</sup>

Baby hatches, a similar prevention effort to safe havens in the US, are used in Austria, Germany, Switzerland, Czech Republic, Hungary, Italy, Poland, Japan, Philippines, Pakistan and South Africa. In Austria, two or three cases of babies being abandoned in baby hatches are reported each year,<sup>20</sup> whereas cases of anonymous birth are in the range of 30–40 cases a year.<sup>21</sup> In Europe there are not adequate statistics to determine whether baby hatches result in changes in the numbers of either killed or abandoned newborns. Furthermore, the baby hatches have an inherent disadvantage: they do not provide adequate support for the woman. On the

contrary, she is left on her own during pregnancy, and most importantly during the potentially dangerous delivery. Only if she and the child both survive childbirth, and provided that she is physically able to do so, may she then place the newborn in a baby hatch. Another problematic aspect is that anyone could place a newborn in a baby hatch, potentially without the consent of the mother. Finally, the baby might be the result of rape or incest, and therefore investigation would be impossible with this approach.

At this moment we can only speculate about the possible mechanisms involved in the decline of neonaticides in Austria. Previous studies about women who have committed neonaticide or have abandoned their child have revealed the existence of an unwanted pregnancy, and a resulting denial of that pregnancy.<sup>16</sup> Many different reasons may be involved (e. g. an inability to keep the baby in the present social or partner situation, incest, rape, domestic violence, traumatised childhood, family pressure, societal disapproval, etc.).<sup>16</sup> However, most women want to give their child a chance to live, even if they cannot provide the necessary love and environment themselves.<sup>16</sup>

We believe that public awareness of the available options of anonymous antenatal care and delivery is fundamental. The anonymous delivery approach could break the dreadful chain of events that lead from despair and denial to unsafe birth, and subsequently to abandonment or neonaticide. Notably, neonaticide represents a hidden crime, meaning that the discovered cases represent only the tip of the iceberg. Therefore, it is reasonable to assume that the benefits we observed in our study might actually be of a much larger magnitude.

## Strengths and Limitations

All three countries in this study maintain a highly reliable police recording system for homicide crimes, including neonaticide.

Police statistics have advantages over court files in that they also include the discovered corpses of neonates, without necessitating evidence regarding the offender. This is very important as unidentified corpses represent a substantial number (13–37%) of all reported neonaticides or abandonment cases.<sup>22–24</sup> Notably, the most important limitation of police statistics is that there may be reported cases that are not neonaticides, or alternatively, our data may be missing some neonaticides. From 50 original cases in the Finnish police statistics, 18 (36%) went through complete court process and were rated as neonaticides. The others were not included and analysed in this study.

One further limitation of police statistics is that data are only available from reports after a one-year delay. Neonaticide cases are always registered in the corresponding year of their recovery, and not in the year during which they were

actually committed. However, this limitation is minimised by the fact that our study extends over a 20-year period.

Such over- or underestimation of the actual cases should not influence the differences in police reporting differentially between the pre- and post-law time periods.

Although undiscovered neonaticides and illegally abandoned babies represent a considerable phenomenon, our study methods do not allow us to shed light on the extent of this problem. However, although not ideal, police statistics remain the only available method to assess the effect of the anonymous delivery law across different countries.

There may be confounding factors that we are unable to measure, occurring over time or within the different countries, that are not known to the authors, and may account for our findings. However, to our knowledge the basic socio-economic situation is very similar in all three countries: they are culturally not very different, except that the two Nordic countries are completely secular and Austria still has a strong influence of the Roman Catholic Church.

It is worth speculating why the Nordic countries have much lower neonaticide rates than Austria, even after the intervention. Whether abortion laws influence neonaticide rates is not known. The abortion law in Austria has a lower gestational limit (12 weeks) and higher costs than in both Finland (up to 20 weeks under certain circumstances, such as young age or limited capacity to care for a child) and 18 weeks upon request in Sweden.<sup>25</sup> This may be of importance when denial of pregnancy is taken into consideration, as such denial may prevent women from reacting in a timely manner. However, Sweden has twice as many abortions as Finland, but still has a similar rate of neonaticide,<sup>26,27</sup> whereas Austria has approximately the same abortion rate (only estimated rates are available for Austria) as Sweden, but has a higher rate of neonaticide. When changes in socio-economic circumstances occur, rates of neonaticides may change substantially. Permissive abortion laws and sex education in the 1970s have contributed to the decrease of numbers of neonaticides in Finland,<sup>22</sup> and in Serbia neonaticide rates declined following the Abortion Act in the 1960s.<sup>28</sup> Lester found no changes in neonaticide rates after five states in the USA legalised abortion in 1970.<sup>29</sup> Further research is needed to understand the effect of abortion regulations as well as other factors on neonaticide rates, and changes in these rates, in the countries in our study.

It has been shown that there are complex underlying factors in neonaticide,<sup>30</sup> and of course no simplistic approach and an over-interpretation of causality is possible.

## Conclusion

Our data demonstrate a significant decrease in the number of police-reported neonaticide cases in Austria following the implementation of the anonymous delivery law in mid-2001,

and our findings are suggestive of a possible connection between these two events.

Experts in neonaticide favour prevention strategies such as safe havens or anonymous delivery,<sup>31</sup> as mothers and infants of denied and concealed pregnancies have poorer health outcomes,<sup>32–34</sup> but no definitive conclusions can yet be made regarding the effectiveness of these strategies. Interviewing women who make use of anonymous delivery would help to elucidate the circumstances of pregnancy and, reasons for giving up her child and mechanisms, and subsequently may also give us insight into the ways of better preventing these neonaticides.<sup>3</sup>

We would like to emphasise the fundamental role of public awareness. Only if potential users are aware of the anonymous delivery measure will they be able to use it as intended. We strongly believe that the use, design and potential effects of public awareness campaigns should be explored in future research.

## Disclosure of interests

The authors have indicated that they have no financial relationships relevant to this article to disclose, and no other conflicts of interest.

## Contribution to authorship

CK., SA., CF., GW., HP. and SP. all contributed substantially to the conception and design of the study. GC. analysed and interpreted the data. All authors contributed to the drafting of the article or revising it critically for important intellectual content. All authors have given final approval of the version to be published.

## Details of ethics approval

Ethical approval was granted in Austria by the Austrian Ethics Commission, the Department of Justice and the Medical University of Vienna.

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