

# Pregnancy and Perinatal Outcomes in Pregnancies After Assisted Reproductive

## Technology (ART) with a Focus on Single Embryo Transfer (SET)

We used the Medical Birth Registry of Norway and the Norwegian IVF- registry to compare outcomes in women delivering singletons after SET, twins after ART and spontaneously conceived singletons and twins. Infant outcomes were perinatal and neonatal death, low five-minute Apgar scores, preterm birth, and small for gestational age (SGA).

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### BACKGROUND

There has been a shift in practice from double to single embryo transfer (SET) in pregnancies conceived after assisted reproductive technology (ART). This study aimed to evaluate pregnancy and perinatal outcomes in ART pregnancies, with a main focus on SET.

### METHODS

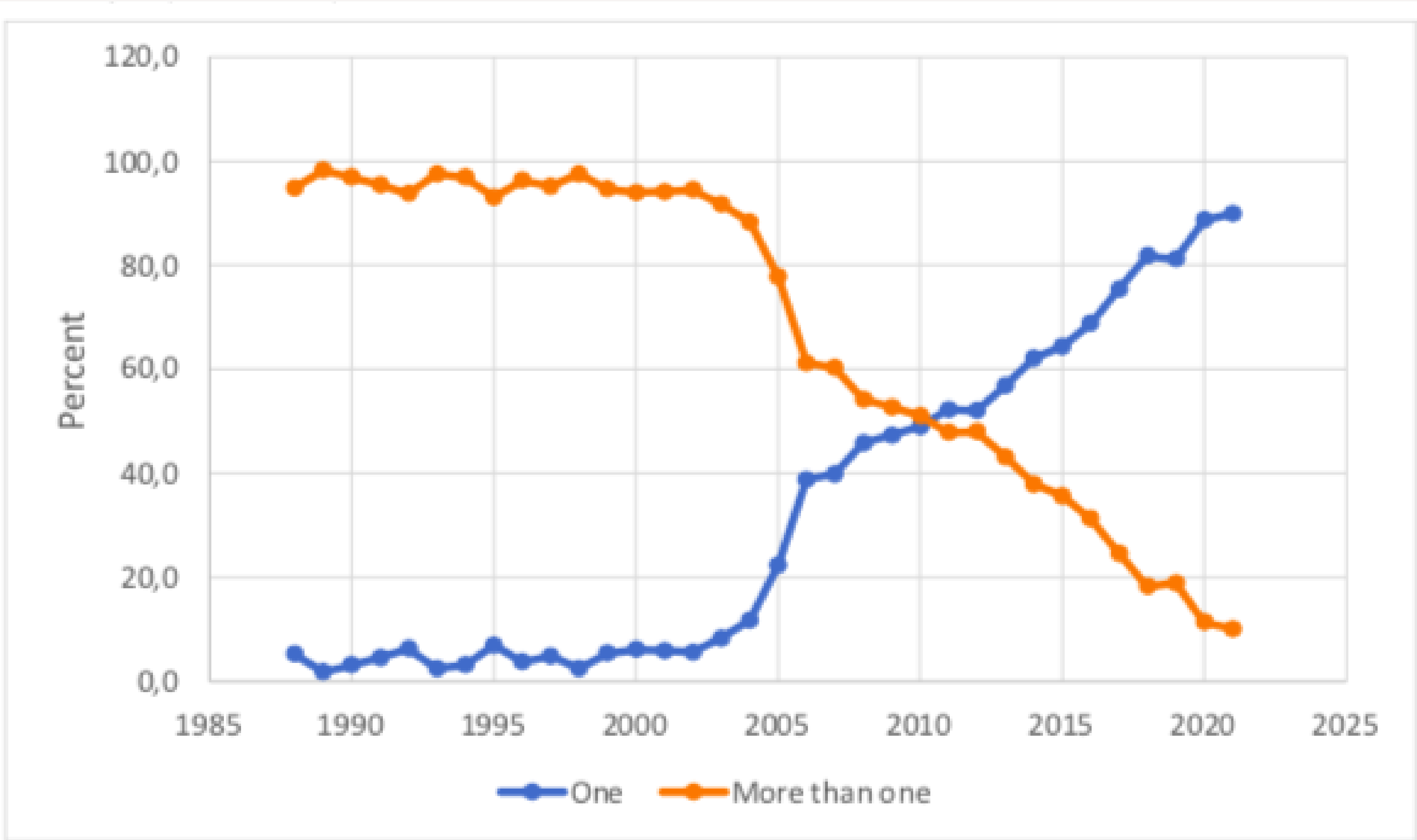
We used data from the Medical Birth Registry of Norway and the Norwegian IVF- registry and included 812,963 nulliparous women giving birth during 1988-2021. Exposure was ART treatment with and without SET where we compared outcomes in women delivering singletons after SET, twins after ART and spontaneously conceived singletons and twins. Infant outcomes were perinatal and neonatal death, low five-minute Apgar scores, preterm birth, and small for gestational age (SGA). We used log binomial regression and calculated prevalence ratios and relative risks with 95% confidence intervals, adjusting for time-period and potential confounders.

### RESULTS

Women pregnant with a SET-singleton were older, had increased risk of gestational diabetes, preeclampsia, placental abruptio and excessive bleeding than women with spontaneously conceived singletons. The prevalence of pre-pregnant chronic disease or pre-pregnant BMI  $\geq 30$  did, however, not differ. SET-singletons had higher risk of all adverse infant outcomes than spontaneously conceived singletons, except for SGA, e.g. perinatal death: adjusted relative risk 1.62 (95% CI 1.36-1.93)

### CONCLUSION

We found that the risk of nearly all unfavorable pregnancy and perinatal outcomes was higher in singletons after SET compared to singletons conceived spontaneously, despite women exhibiting similar pre-conceptional health indicators. Consequently, women pregnant after SET may need more optimized antenatal care with an aim to reduce these risks.



**Figure 1:** Time trends in number of embryos transferred during ART in Norway, as registered in the IVF-registry of Norway, 1988-2021.

Infant outcomes	ART yes (N=12,997) N (%)	ART no (N=793,557) N (%)	Crude RR* (95% CI)	Adjusted RR** (95% CI)
Perinatal death	137 (1.1)	6,554 (0.8)	<b>1.28 (1.08; 1.52)</b>	<b>1.62 (1.36; 1.93)</b>
Neonatal death	28 (0.2)	1,622 (0.2)	1.06 (0.73; 1.54)	1.46 (0.99; 2.16)
Apgar < 4	162 (1.3)	5,435 (0.7)	<b>1.82 (1.56; 2.13)</b>	<b>1.50 (1.28; 1.76)</b>
Apgar < 7	377 (2.9)	15,150 (1.9)	<b>1.52 (1.37; 1.68)</b>	<b>1.23 (1.10; 1.36)</b>
Preterm	1,202 (9.3)	51,353 (6.5)	<b>1.43 (1.35; 1.51)</b>	<b>1.39 (1.31; 1.47)</b>
Very preterm	337 (2.6)	12,310 (1.6)	<b>1.67 (1.50; 1.86)</b>	<b>1.45 (1.29; 1.62)</b>
SGA10	1,507 (11.6)	90,473 (11.4)	1.02 (0.97; 1.07)	0.98 (0.93; 1.03)
SGA2.5	358 (2.8)	22,754 (2.9)	0.96 (0.87; 1.06)	1.04 (0.94; 1.16)

**Table 1:** Infant outcomes (with the infant as the observation unit) to nulliparous women delivering singletons after ART with SET compared to women delivering singletons after spontaneous conception. Norway, 1988-2021.

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